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# Journal of Asian Finance, Economics and Business

# JAFEB

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# Chinese Corporate Leverage Determinants\*

Benno Ferrarini<sup>1</sup>, Marthe Hinojales<sup>2</sup>, Pasquale Scaramozzino<sup>3</sup>

Received: December 12, 2016. Revised: January 30, 2017. Accepted: February 5, 2017.

## Abstract

Total debt in the People's Republic of China surged to nearly 290% as a ratio to GDP by the second quarter of 2016, mostly on account of non-financial corporate debt. The outpouring of credit to stem the impact of the global financial crisis accentuated industrial overcapacity in traditional sectors, such as steel, cement, and energy, while feeding asset bubbles in the property, equity and bond markets. At the Chinese corporate level, this has translated into weakened fundamentals and a fall in industrial profits, particularly of SOEs. As debtors struggle to service interest payments, non-performing loans (NPLs) have been on the rise. This paper assesses the financial fragility of the Chinese economy by looking at risk factors in the non-financial sector. We apply quantile regressions to a dataset containing all Chinese listed companies in Standard & Poor's IQ Capital database. We find higher sensitivity over time of corporate leverage to some of its key determinants, particularly for firms at the upper margin of the distribution. In particular, profitability increasingly acts as a curb on corporate leverage. At a time of falling profitability across the Chinese non-financial corporate sector, this eases the brake on leverage and may contribute to its continuing increase.

**Keywords:** Corporate Debt, People's Republic of China, debt Sustainability, Panel Quantile Regression.

**JEL Classification Code:** H30, G21, G01, H60.

## 1. Introduction

Corporate leverage in the People's Republic of China (PRC) accelerated in the aftermath of the global financial crisis, accentuating industrial overcapacity in traditional sectors and fueling asset bubbles in the property, stock and bond markets. Earnings and financial performance of companies have deteriorated, and with them the asset

quality of the Chinese financial sector holding the bulk of the corporate debt. Warnings about the dangers of excessive corporate leverage and financial sector vulnerability have been a staple of the international press since at least 2015, and also the Chinese authorities have recognized the problem.

Much of the debate on debt and financial sustainability in the PRC has centered on aggregate data and indicators, which suggest a marked rise in corporate debt and non-performing loans held by the domestic banking system. However, a macro focus tends to overlook heterogeneity and vulnerabilities at the micro level, which are relevant to policy formulation (Bernanke & Campbell, 1988). For example, recent market analysis associates the energy sector with the lowest return on capital and the largest increase in non-performing loan ratios among Chinese industries, suggesting that it should be a prime focus of authorities' monitoring efforts (S&P Global Market Intelligence, 2016).

Additional and more systematic insights can be gained from regression analysis of corporate balance sheet data. Early attempts, pre-dating the recent credit surge, can be found in the literature assessing the determinants of capital structure in the PRC (e.g. Chen, 2004, Huang & Song, 2006). It shows that the insights from modern finance theory of capital structure are borne out in the Chinese corporate

\* The views expressed in this paper are those of the authors and do not necessarily reflect the views and policies of the Asian Development Bank (ADB) or its Board of Governors or the governments they represent.

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data, notwithstanding institutional differences compared to the US and European markets and the presence of financial constraints in the Chinese banking sector.<sup>2</sup>

This paper builds on this strain of literature to determine the drivers of non-financial corporate debt in the PRC during the credit surge since 2009. Focus is on the margins of the corporate distribution and on variations in the determinants of corporate leverage that could signal rising risk of financial distress particularly in these segments of the Chinese corporate landscape. This is accomplished through the use of panel and simultaneous quantile analysis, beyond the mean-based OLS regression analysis of previous approaches. The empirical investigation relies on Standard & Poor's IQ Capital database, which contains richly detailed historical balance sheet data and key financial indicators of Chinese companies up until 2015. The data and sources are summarized in Appendix.

We find that, over time, corporate leverage has become more sensitive to changes in some of its key determinants, particularly for firms at the upper margin of the distribution. In particular, profitability appears to have increased over time its impact as a curb on corporate leverage. Among the underlying reasons is the government-induced massive stimulus to stem the global financial crisis, which caused a significant decline in lending rates and incentivizes companies to borrow instead of relying on retained earnings as a source of funding. This eases the brake on leverage at a time when corporate profitability is falling, and likely contributes to further rises of corporate debt.

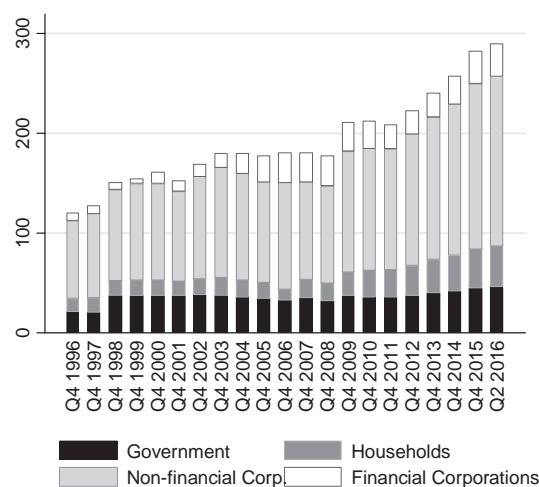
The paper is structured to provide a brief overview of rising leverage and financial risk in the PRC's corporate sector, in Section 2. This is followed, in Section 3, by a presentation of the empirical framework and the data used, and a discussion of the results achieved. The paper closes with lessons for policy and broader conclusions, in Section 4.

## 2. Corporate Leverage and Growing Financial Risk

Stable at roughly 40% of GDP in 2015, general government debt in the PRC is not particularly large compared to other emerging economies.<sup>3</sup> However, total

debt across all sectors ballooned to nearly 290% by the second quarter of 2016 (Figure 1). The massive build-up of debt—mostly domestic—accelerated from the end of 2008 onward, when the government enacted unprecedented monetary and fiscal stimulus to stem the impact of the global financial crisis.<sup>4</sup> Fiscal stimulus alone amounted to nearly CNY 6 trillion—or 18.5% of GDP—between 2008 and 2010 (Ferrarini et al., 2012).

Stimulus often was directed to the state-owned enterprises (SOEs) whose liabilities grew to 115% of GDP in 2015, or funneled through the policy and state-controlled commercial banks. The net effect of intervention was a significant though discontinuous fall in the benchmark lending rate, from nearly 7.5% in January 2008 to 5.3% by 2010 and 4.3% by the end of 2015 (Figure 2). The decline in the lending rate is likely to have altered the relative opportunity cost of the alternative funding sources for firms, and in particular between retained earnings and external debt.



Note: Based on International Institute of Finance (IIF) data. Q2 2016 is an estimate.

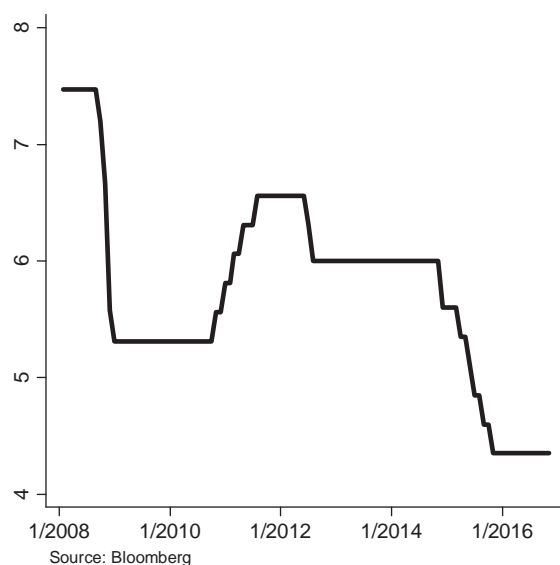
<Figure 1> PRC total debt (in percent of GDP)

<sup>2</sup> In particular, the state exerts vast control over the state-owned enterprises and the financial system, which reduces the likelihood and costs of financial distress compared to those facing the private corporate sector (Chen 2004, Borst and Lardy 2015).

<sup>3</sup> Accounting for both explicit and contingent off-budget liabilities incurred by local governments through their financing platforms, the International Monetary Fund (IMF) estimates that the PRC's

public debt ratio is substantially higher, at 56% in 2015, and will rise to nearly 74% of GDP by 2021.

<sup>4</sup> And grow it did: the PRC's real GDP expanded on average by nearly 9.2% each year between 2009 and 2013, while the United States, Japan and the euro area were struggling with 0.3% growth on average (ADO 2011, 2013).



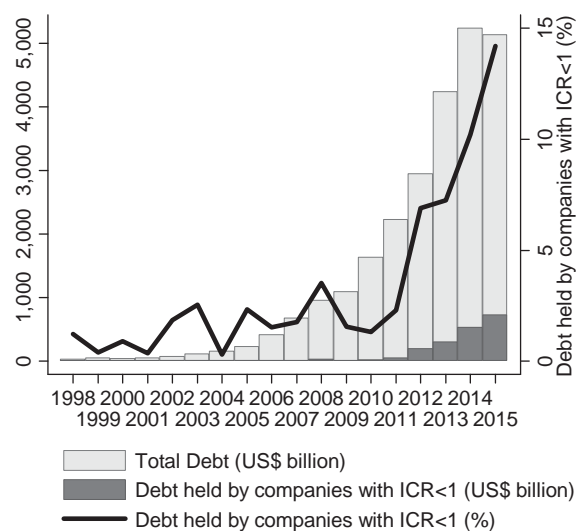
<Figure 2> PRC benchmark lending rate (%)

The PRC's credit to GDP gap—measuring banking risk and defined as the difference between the credit-to-GDP ratio and its long-term trend—reached 30.1 in the first quarter of 2016 (BIS, 2016). The Bank for International Settlements warns that this exceeds the gap of any other country it has been tracking, as well as that of the East Asian economies involved in the 1998 crisis and the United States' prior to the Lehman crisis. Moreover, the PRC's credit has expanded against the backdrop of a sharply slower economic growth in recent years, reflecting weaker external demand as well as authorities' steering efforts toward a more balanced, sustainable growth model.

The credit surge since 2009 worsened industrial overcapacity—hence profitability—in traditional sectors, such as steel, cement, and energy, while feeding asset bubbles in the property, equity and bond markets. At the Chinese corporate level, this has translated into weakened fundamentals and a sharp fall in industrial profits, particularly of SOEs. As debtors struggle to service interest payments, non-performing loans (NPLs) have been on the rise. Chinese official figures show NPLs continuously rising during the past four years, to 1.8% of total loans in the first quarter of 2016. However, the PRC does not follow standard international practice in recording NPLs, which tend to be understated as a result. Most analysts estimate that the NPL ratio exceeds 15% of total loans outstanding (CLSA, 2016; Fitch Ratings, 2016). This ratio does not include bad debt in the country's shadow banking system, which itself is estimated to have grown more than threefold between the

end of 2012 and the first quarter of 2016, to about 10% of bank assets (S&P Global Ratings, 2016a).

Data limitations notwithstanding, rising pressure in the Chinese corporate sector is best gauged at the firm level, as the share of total debt held by companies whose earnings (EBITDA) are insufficient to cover interest expenses. This ratio is seen spiking from 3.5% or less throughout the period from 1998 to 2011, to nearly 7% in 2012 and to more than 14% in 2015 (Figure 3).<sup>5</sup>

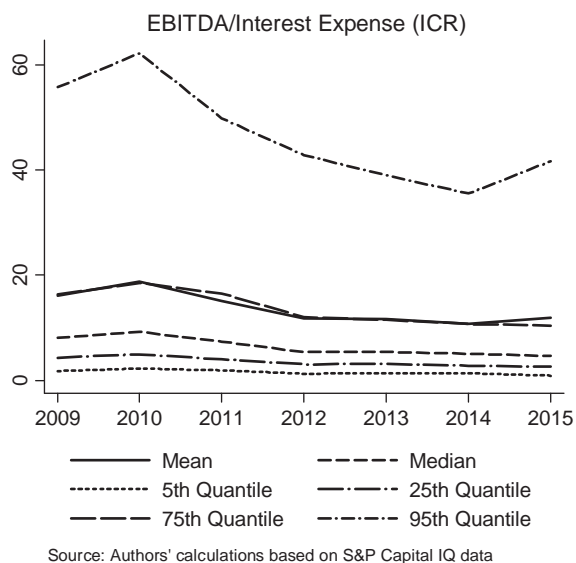


<Figure 3> Non-financial corporate debt at risk

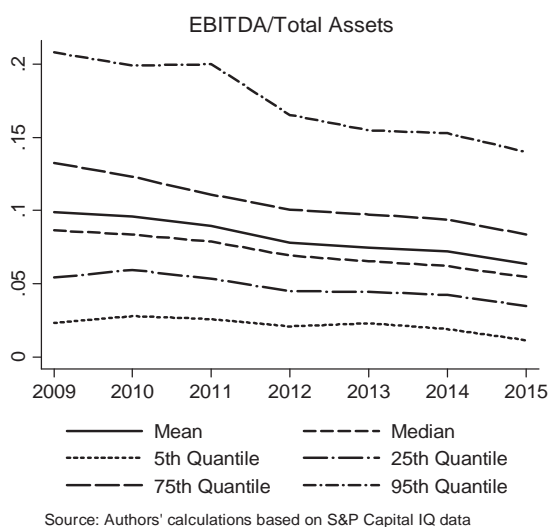
Breaking down the non-financial corporate distribution, the ICR can be seen deteriorating across corporate layers delineated by its 5<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> and 95<sup>th</sup> quantiles

<sup>5</sup> Specifically, we derive this measure from the S&P Capital IQ database, described in Appendix. The S&P data extract accounts for all Chinese listed companies for the years between 1990 and 2015. Isolating non-financial companies with accounting data available, we are able to identify a sample of expanding size over time, from 52 companies in 1998 to 3,377 in 2015. Companies' interest coverage ratio (ICR) is defined as the ratio of earnings before interest, tax, depreciation and amortization (EBITDA) to interest expense. A company is considered to be at risk when EBITDA is insufficient to cover its interest expense in any given year, or  $ICR < 1$  (IMF 2016.) This threshold is arbitrary. Less conservative approaches have been to define at risk all debt owed by firms with  $ICR < 2$  (such as in IMF 2016). The US dollar amount of debt at risk in the Chinese non-financial corporate sector is then computed as the ratio of aggregate debt owed by companies with  $ICR < 1$  to total debt.

(Figure 4). Similarly, profitability has declined repeatedly between 2009 and 2015 at all five the quantiles (Figure 5). However, deterioration of these financial ratios is considerably stronger at the upper 95<sup>th</sup> quantile of Chinese non-financial corporate distribution, compared to the mean and lower quantiles, which suggests that regression analysis is to allow for heterogeneity in the PRC's corporate landscape.

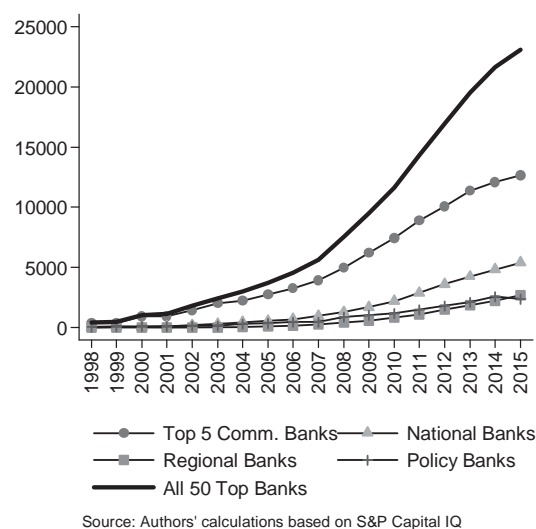


<Figure 4> Non-financial sector ICR quantiles



<Figure 5> Non-financial sector profitability

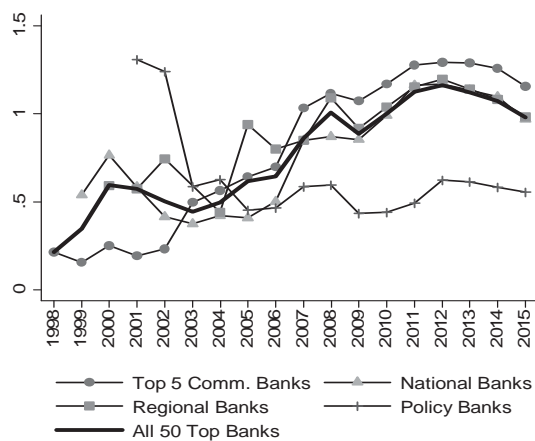
As a result of growing financial pressures in vast segments of the non-financial corporate landscape, the Chinese banking system now holds an unprecedented pile of loans that constitutes a large contingent burden and is fueling concerns about the growing risks of a disruptive adjustment to the Chinese economy, with international repercussions (ADB, 2016; Moody's, 2016). Based on current market reports, it is unclear to what extent the nation's banking system will be able to absorb weakening borrower credit quality without requiring a larger bail out operation by the state. Some evidence on banking sector performance can be evinced from the S&P data. We rank the top 50 banks according to their total asset holdings in 2015, and group them into four policy and commercial bank categories.<sup>6</sup>



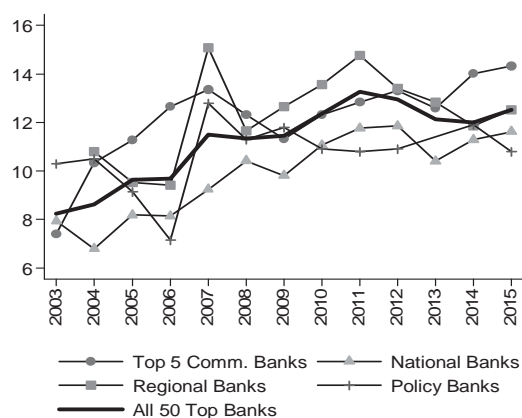
<Figure 6> Total Assets (group totals, USD billion)

<sup>6</sup> Following S&P Global Ratings (2016b), we divide banks into the following categories:

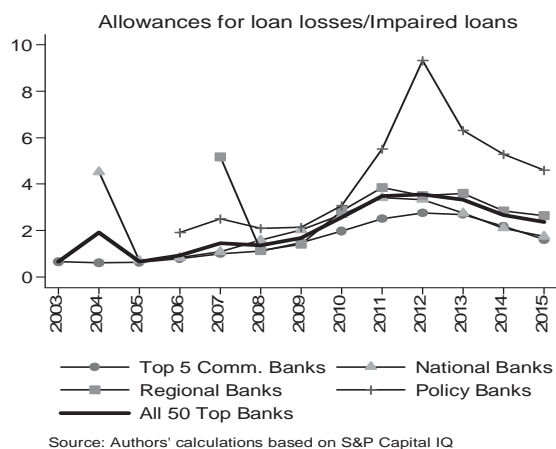
- (A) Top 5 commercial banks: the top five largest banks by far in terms of asset size and with the broadest branch network across the country;
- (B) National banks: large joint-stock commercial banks with a nationwide network;
- (C) Regional banks: smaller joint-stock commercial banks and the leading city or rural commercial banks; and
- (D) Policy banks: Agricultural Development Bank of China, China Development Bank Corporation, and The Export-Import Bank of China, which are used by the Chinese authorities to direct financing to certain economic sectors.



&lt;Figure 7&gt; Return on Assets (averages)



&lt;Figure 8&gt; Total Capital Ratios (average percent)



&lt;Figure 9&gt; Coverage ratio (group averages)

Financial indicator charts along this breakdown provide evidence of incipient vulnerability in the banking sector. Total assets surged across the sector, although at a progressively slowing rate since about 2010 (Figure 6). The top five commercial banks hold the bulk of assets, but credit growth involved all segments of the banking sector, including the regional banks. However, growth in revenues and net income did not keep up with that of assets, causing returns on assets (ROA) to drop significantly in the three years to 2015 (Figure 7). In the meantime, the banking sector failed to raise capital at the same pace as it was issuing credits, causing capital ratios to shrink between 2011 and 2014 (Figure 8). This is true in relation to average ratios for the 50 top banks taken together, not for the policy banks, which raised capital and saw their ratios increase over the same period. Lately, since 2015, the top 5 and other commercial banks have been raising capital in response to higher loan impairments. Nevertheless, the banking sector's efforts have been insufficient so far to stem against the continuing fall since 2012 of the ratio of loan losses allowance to impaired loans (Figure 9). Averaging 2.4 in 2015 across the top 50 banks, coverage appears to be adequate still, although the underestimation of impaired loans may grossly overstate this statistic.

In sum, S&P company data provides evidence of rising leverage in the Chinese non-financial corporate sector against the backdrop of falling returns and interest coverage ratios. The impact of deteriorating asset quality does not yet seem fully reflected in banks' balance sheets. However, weakening capital ratios since the 2009 credit surge and a sharp drop in returns on assets more recently appear to signal financial sector vulnerabilities, which are likely to sharpen against the trend of rising financial pressure in large segments of the PRC's corporate sector.

### 3. Determinants of Corporate Debt

Focus turns now to the determinants of corporate leverage in the PRC. Heterogeneity across the non-financial corporate sector implies that an aggregate, mean-based approach would be ill suited to identifying vulnerabilities, particularly those affecting firms at the margins of the corporate distribution. Our empirical approach thus entails quantile regression analysis, which we apply within the framework developed by the theoretical literature on corporate debt. This literature has identified a number of possible explanations for the capital structure of firms (Titman & Wessels, 1988; Harris & Raviv, 1991). According to models based on agency costs, firms choose their debt-equity ratio with a view to mitigate the possible conflicts of interest between equity holders and managers, and

between equity holders and debt holders. An important implication of these theories is that firms with limited scope for asset substitution are likely to have higher debt levels, because they face lower agency costs of debt. Corporation tax rules could also act as an incentive to issue debt to reduce tax liabilities. In general, firms might trade off the increasing agency and bankruptcy costs associated with high debt with the tax benefits of increased leverage.

An alternative explanation of capital structure is based on asymmetric information between investors and firm's insiders. Managers may choose a high debt-equity ratio in order to signal the good financial health of the firm. A high leverage would credibly convey the signal that the firm faces a low risk of bankruptcy. Finally, the pecking order theory of financing argues that firms will seek to avoid the higher cost of external debt and the dilution of equity capital associated with new equity issue. Firms will finance new investment internally in the first instance; once internal sources of finance are exhausted they will issue low-risk debt, and only as a last resort will they choose to issue new equity.

The empirical literature on corporate finance has identified a number of potential determinants of the capital structure choice. These determinants include profitability, size, growth opportunities, asset tangibility, non-debt tax shields, and volatility or business risk (see Titman & Wessels, 1988, Harris & Raviv, 1991). Profitability should have a negative effect on leverage according to the pecking order theory of capital structure. Bigger firms could face a lower risk of default than smaller firms because of the greater diversification of their investment. Furthermore, larger firms could have easier access to capital markets, and could borrow under better conditions than small firms. We would therefore expect a positive effect of firm size on debt. Growth opportunities can be seen as non-collateralizable assets: firms with sizeable growth opportunities may find it more difficult to borrow externally because of the asset substitution effect (Titman & Wessels, 1988). By contrast, a greater share of tangible assets should have an unambiguously positive effect on leverage because the assets can be used as collateral for loans. Non-debt tax shields, such as depreciation allowances, should have a negative influence on leverage because they reduce the incentive to issue external debt (DeAngelo & Masulis, 1980). Finally, volatility or business risk could be associated with the potential cost of financial distress, and should have a negative effect on leverage.

In our empirical analysis, we examine the determinants of the debt-equity ratio of firms (LEV), the interest coverage ratio (ICR) defined as the ratio between EBITDA and interest expense, the debt-earnings ratio (DTE), and Altman's Z-score (ZALT). The regression variables are

computed from the S&P Capital IQ database and include Chinese company panel data from 2009 to 2015.<sup>7</sup>

### 3.1. Panel Fixed Effects

Table 1 presents the results of estimating the model by panel fixed effects.<sup>8</sup> The first three columns report estimates for total leverage (LEV), defined as the ratio of total debt to total assets, and for both long-term leverage (LLEV) and short-term leverage (SLEV) where we consider long-term debt and short-term debt only respectively. Profitability has a negative and significant coefficient, which is consistent with the pecking order theory of capital structure. Size has a positive and significant coefficient for total leverage LEV and for long-term leverage LLEV only. Neither asset growth (GROWTA) nor earnings volatility (EVOL) is significant for any of the measures of leverage. Asset tangibility (TANG) is positive and significant for all definitions of leverage, consistent with both the agency theory and the pecking order theory. Finally, non-debt tax shields (NDTS)—calculated as the ratio of total depreciation to total assets—are statistically significant but are only negative for long-term leverage. That is, non-debt tax shields seem to shorten debt maturity.

Our findings so far are broadly supportive of the agency and the pecking order theory of capital structure, and weakly also of the signaling theory, although they would not be able to discriminate conclusively between these alternative theories.

<sup>7</sup> The database and variables are described and summarized in Appendix.

<sup>8</sup> Hausman tests reject the random effects specification for all the estimated equations.

&lt;Table 1&gt; Capital Structure of non-financial firms, panel fixed effects

Variable	Total leverage	Long-term leverage	Short-term leverage	1/ Interest Coverage Ratio	Debt/Earnings Ratio	1/ Altman-Z score
	(1)	(2)	(3)	(4)	(5)	(6)
	LEV	LLEV	SLEV	(ICR) <sup>-1</sup>	DTE	(ZALT) <sup>-1</sup>
Prof	-0.208***	-0.092*	-0.094*			
(lagged) prof				-1.548***	-30.720***	0.01
size	0.023***	0.016***	-0.004	0.060**	1.558***	
(lagged) size						0.104**
growta	0.000	0.000	0.000	0.000	0.001	
(lagged) growta						-0.001
tang	0.210***	0.083***	0.096***	-0.13	4.222	
(lagged) tang						0.212
evol	0.000	0.000	0.000			
(lagged) evol				0.003	0.071	0.001*
ndts	0.545*	-0.365*	0.686**	2.374*	-42.104	
(lagged) ndts						-4.042
C	0.011	-0.041	0.116***	-0.009	-3.173	-0.199
N	6881	6881	6881	6751	6751	6747
Number of groups	983	983	983	983	983	983
R-squared	0.186	0.21	0.029	0.053	0.085	0.007
F-statistic	29.652	14.219	9.694	17.105	14.534	8.083
Hausman	36.37***	43.94***	52.38***	64.41***	57.83***	14.48*

Note: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001. Standard errors are robust and allow for intergroup correlation.

Regression variables are computed from S&P Capital IQ data, and include Chinese company data from 2009 to 2015.

Columns (4) to (6) of Table 1 examine potential determinants of key indicators of financial fragility of firms. Column (4) reports the results of estimating the equation for the inverse of the interest coverage ratio (ICR)<sup>-1</sup>. Values of ICR less than one indicate that current earnings fall short of the interest expenses which are due, and therefore low values of ICR (or high values of its inverse (ICR)<sup>-1</sup>) are an indicator of financial distress. Profitability and earnings volatility have been lagged to avoid potential endogeneity with the dependent variable. The fixed-effects estimates show that lagged profitability has a negative effect and non-debt tax shield a positive effect as expected. Size has a positive effect, which is consistent with its positive influence on leverage.

Column (5) of Table 1 looks at the debt-earnings ratio (DTE) as the dependent variable. This ratio too is used as an indicator of the potential financial distress of companies.

Profitability and earning volatility have again been lagged to avoid endogeneity. The only significant variables are profitability and size, with a negative and a positive coefficient, respectively, as expected.

Finally, column (6) gives the results of estimating the determinants of the inverse Altman's Z-score, (ZALT)<sup>-1</sup>. The Z-score is a weighted average of five ratios: (i) working capital / total assets; (ii) retained earnings / total assets; (iii) earnings before interest and taxes / total assets; (iv) the market value of equity/ the book value of total liabilities; and (v) sales / total assets (Altman 1968). It is usually interpreted as a predictor of the probability that the company will go into bankruptcy within two years. High values of the inverse Z-score can thus be read as indicating low bankruptcy risk. All the regressors are lagged one period in the fixed effect regressions to avoid simultaneity bias. Among the statistically significant variables, size has a large



and positive coefficient, which indicates that size is associated with a lower probability of bankruptcy. Earnings volatility also has a positive and significant coefficient, but its effect is relatively modest in absolute value.

### 3.2. Quantile Regression Panel Data

The estimates in Table 1 allow for firm-specific, time-invariant fixed effects  $\alpha_i$  to capture the unobserved heterogeneity across firms in the response of the dependent variable to the conditioning variables. A potential shortcoming of this approach is that it assumes a common response of the dependent variable to the explanatory variables for all firms. This can be a strong assumption, since the response of the dependent variable could be different across the distribution of firms. For example, variables such as the size of the firm or the share of tangible assets could play a different role depending on whether the firm is already highly leveraged or not. In this case, a more suitable approach to estimating the response of the dependent variables to the conditioning variables across the whole distribution of firms is to estimate the model by quantile regression (Koenker & Bassett, 1978). Quantile regression estimation allows for different values of the regression coefficients across the different quantiles of the distribution of firms, and is therefore able to capture non-linearities in the response of the dependent variable to its determinants<sup>9</sup>.

Quantile regressions with fixed effects for panel data presents however the difficulty that quantile estimators with additive fixed effects may not have the same interpretation as cross-sectional regressions. The reason for this is that, using conventional notation, the distribution of  $(Y_{it} - \alpha_i)|X_{it}$  is not order-isomorphic to the distribution of  $Y_{it}|X_{it}$ : an observation which lies in one of the low quantiles of the distribution with respect to  $Y_{it}$  may lie in one of the top quantiles of the distribution with respect to  $(Y_{it} - \alpha_i)$ , and *vice versa*. This creates difficulties for the interpretation of panel quantile regressions with additive fixed effects, since the results cannot be understood in the same manner as cross-sectional regressions.

The estimator developed by Powell (2014) is able to address this concern, and to yield estimation results which can be interpreted in the same manner as cross-sectional regressions. The regression outcomes are modeled as:

$$(1) Y_{it} = X'_{it}\beta(U_{it}^*)$$

where  $U_{it}^* \sim U(0,1)$  and where  $X'_{it}\beta(\tau)$  is strictly increasing in  $\tau \in (0,1)$ . The outcomes in (1) can be compared with other quantile estimators by setting  $U_{it}^* = f(\alpha_i, U_{it})$ . The causal effect of a change in the conditioning variable from  $x_1$  to  $x_2$  for a given  $\tau$  is:

$$(2) x'_2\beta(\tau) - x'_1\beta(\tau)$$

where  $\tau$  denotes the quantile of the distribution. Using (2), we can define the structural quantile function (SQF) for equation (1) as:

$$(3) S_Y(\tau|x) = x'\beta(\tau)$$

The identifying assumption for additive fixed effects models is the following:

$$(4) U_{it}|(X_{it}, \alpha_i) \sim U(0,1)$$

Powell's (2014) Quantile Regression Panel Data (QRPD) estimator relaxes (4), and only requires the weaker identification assumption:

$$(5) U_{it}^*|X_i \sim U_{is}^*|X_i \quad t, s = 1, 2, \dots, T$$

The SQF for the additive fixed effect model is  $\alpha_i - x'\beta(\tau)$ , whereas the SQF for the QRPD model is  $x'\beta(\tau)$ . As a result, the interpretation of the  $\tau$ -th quantile for the QRPD is the same as for the cross-sectional distribution (or equivalently for the pooled quantile regression).

<sup>9</sup> Fattouh et al. (2005, 2008) use quantile regression to study capital structure in the Republic of Korea and in the United Kingdom respectively.

&lt;Table 2&gt; Capital structure of non-financial firms, Quantile Regression Panel Data (QRPD)

Total Leverage					
Variable	5 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	95 <sup>th</sup>
prof	-0.105	-0.241	-0.232	-0.283**	-0.335
size	0.162***	6.189	0.057	0.023*	0.040
growta	0.000	0.000	0.000	0.000	0.000
tang	0.100	1.433	0.250	0.186***	0.091
evol	0.000	-0.001	0.000	0.000	0.000
ndts	0.496	2.488	0.784	0.526	0.427
N	6881				
No. of groups	983				
Long-term Leverage					
Variable	5 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	95 <sup>th</sup>
prof	0.000	-0.006	-0.005	-0.009	-0.160
size	0.247	0.012*	0.029***	0.044***	0.037
growta	0.000	0.000	-0.000***	0.000	-0.000***
tang	0.002	0.037**	0.082***	0.111**	0.177
evol	-0.001	0.000	0.000	0.000	0.029
ndts	0.066	-0.057	-0.223	-0.251	-0.047
N	6881				
No. of groups	983				
Short-term Leverage					
Variable	5 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	95 <sup>th</sup>
prof	-0.028	-0.140	-0.108	-0.255**	-0.343
size	0.229	5.029	0.035*	-0.008	-0.008
growta	0.000	-0.001	0.000	0.000	0.000
tang	0.011	0.025	0.019	0.044	0.042
evol	0.000	-0.002	0.000	0.000	0.001
ndts	0.111	0.319	0.896	1.987***	0.789
N	6881				
No. of groups	983				
1/ Interest Coverage Ratio					
Variable	5 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	95 <sup>th</sup>
(lagged) prof	-0.038	-0.179***	-0.641***	-0.904***	-0.043
size	0.001	0.024***	0.021	0.021	0.040
growta	0.000	0.000	0.000	0.000	0.000
tang	0.008	0.016	0.038	0.021	-0.046
(lagged) evol	0.000	0.000	0.001	0.002	8.185***
ndts	0.334	0.442*	0.116	-0.096	-0.448
N	6751				
No. of groups	983				
Debt/Earnings Ratio					
Variable	5 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	95 <sup>th</sup>
(lagged) prof	-0.332	-6.904*	-11.654***	-17.648***	-24.964***
size	7.527***	0.736	1.044***	1.256	1.061
growta	-0.001	-0.001	-0.001	0.008	-0.005
tang	1.768	1.955*	2.368***	2.532**	10.328
(lagged) evol	0.002	0.007	0.016	0.019	0.368
ndts	-1.324	-9.140	-14.305	-24.029	-41.029
N	6751				
No. of groups	983				
1/ Altman-Z score					
Variable	5 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	95 <sup>th</sup>
(lagged) prof	-0.210	-0.622***	-0.780***	-0.864***	-0.810
(lagged) size	9.591	0.053***	0.076	0.091***	0.081
(lagged) growta	0.000	0.000	0.000	0.000***	0.001
(lagged) tang	0.072	0.126***	0.186***	0.216**	0.273
(lagged) evol	0.010	0.000***	0.000	0.001	0.156
(lagged) ndts	-0.010	0.222	0.151	0.753	3.379
N	6747				
No. of groups	983				

Note: \* p&lt;0.05, \*\* p&lt;0.01, \*\*\* p&lt;0.001

Table 2 reports the results of quantile regression panel data estimation for our sample of non-financial companies. The findings reveal that the fixed-effects assumption of constant regression coefficients across the distribution of firms is not generally confirmed by the data. The estimated coefficients often vary across quantiles, although it is difficult to discern a clear pattern in the data across all the financial variables. Regarding capital structure, some of the strongest results are obtained for long-term leverage. Both size and the share of tangible assets are positive and statistically significant over the central quantiles of the distribution, with the first result consistent with the signaling theory of capital structure and the second with collateralizable assets ceasing to be relevant for firms with a very low or a very high leverage.

Lagged profits exert a strong and significance influence on financial ratios. The estimated coefficients are negative and significant for the inverse of ICR and for DTE, and increase in size for the upper quantiles of the distribution: higher profits therefore reduce the financial fragility of firms. They however increase the overall risk of bankruptcy as measured by the Z-score, which may also be consistent with signaling theory. Size tends to be associated with high debt-earnings ratios for firms in the left tail of the distribution and with lower Z-scores for firms in the central quantiles of the distribution. A higher share of tangible assets tends to be associated with larger debt-earnings ratios but with lower Z-scores.

The QRPD estimations illustrate that the assumption that regression coefficients are constant across the distributions



of firms may not be valid. The effects of the regressors on the debt-equity ratios or on financial ratios can be different in the middle ranges of the distributions of firms and on the tails. The findings from QRPD tend to be more supportive of signaling theories of capital structure than the fixed-effects estimates would suggest.

### 3.3. Simultaneous Panel Quantile Regressions

The Quantile Regression Panel Data approach of Section 3.2 has the advantage of being directly comparable to

cross-sectional quantile regression estimations in the interpretation of the regression coefficients, because of the weaker identifying assumption (5). Estimation by QRPD however still requires that the coefficients remain constant over time. DeAngelo and Roll (2015) found evidence that firm leverage exhibits significant variability over time. It is important therefore to investigate whether the responses of the dependent variables to their determinants vary along the economic cycle or over time. If this proves to be the case, then the assumption of constant coefficients would not be valid.

<Table 3> Capital structure of non-financial corporations: simultaneous panel quantile regressions (by year)

Dependent variable: Total Leverage (LEV)

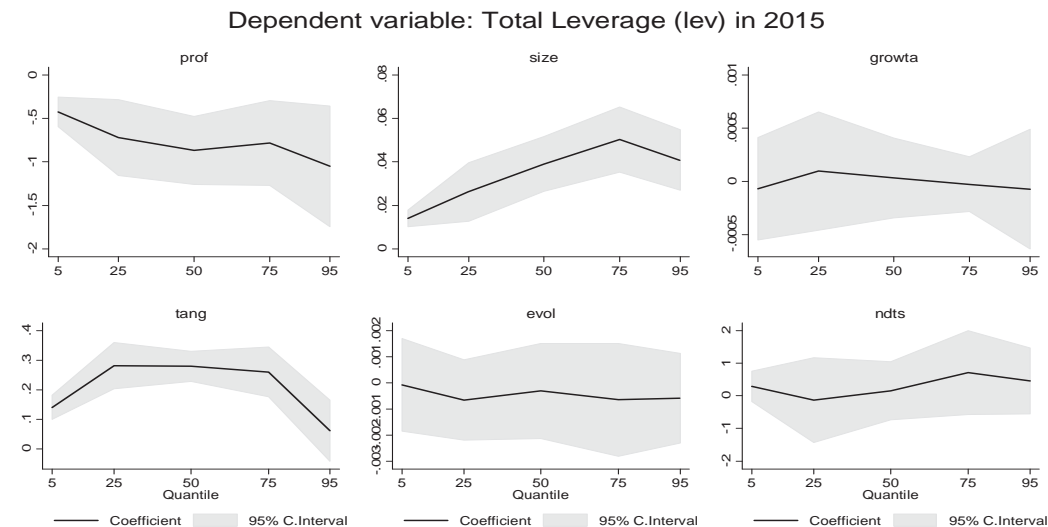
Quantile	Variable	2009	2011	2013	2015
5 <sup>th</sup>	Prof	0.014	-0.178*	-0.285	-0.428***
	Size	0.002	0.012**	0.013***	0.014***
	Growta	0.000	0.000	0.000	0.000
	Tang	0.161***	0.168***	0.185***	0.141***
	Evol	0.000	0.001	0.001	0.000
	Ndts	0.088	-0.099	0.481	0.294
	C	-0.039	-0.082**	-0.099***	-0.090**
25 <sup>th</sup>	Prof	-0.281**	-0.461***	-0.620**	-0.722***
	Size	0.000	0.021**	0.021***	0.026***
	Growta	0.000	-0.001	0.000	0.000
	Tang	0.329***	0.282***	0.269***	0.282***
	Evol	0.000	0.000	0.000	-0.001
	Ndts	0.404	0.164	0.100	-0.135
	C	0.020	-0.075*	-0.060	-0.103*
50 <sup>th</sup>	Prof	-0.391***	-0.546***	-0.506***	-0.868***
	Size	0.002	0.035***	0.036***	0.039***
	Growta	0.000	0.000	-0.001*	0.000
	Tang	0.372***	0.294***	0.295***	0.279***
	Evol	0.000	0.000	0.000	0.000
	Ndts	0.394	0.858	0.229	0.159
	C	0.088*	-0.094***	-0.093**	-0.104*
75 <sup>th</sup>	Prof	-0.429**	-0.578***	-0.829***	-0.781***
	Size	0.003	0.026***	0.035***	0.050***
	Growta	0.000	-0.001	-0.002*	0.000
	Tang	0.339***	0.272***	0.244***	0.260***
	Evol	0.001	0.000	0.000	-0.001
	Ndts	0.978	1.248**	1.102	0.710
	C	0.173***	0.055	0.033	-0.100*
95 <sup>th</sup>	Prof	-0.678***	-0.731***	-1.117**	-1.051***
	Size	0.006	0.029***	0.033***	0.041***
	Growta	0.000	0.000	0.001	0.000
	Tang	0.229*	0.097	0.150***	0.062
	Evol	0.001	-0.001	0.000	-0.001
	Ndts	0.447	1.733***	1.154***	0.462
	C	0.386***	0.272***	0.246***	0.233**

	<i>F-test on equality of coefficients</i>				
	<i>Prof</i>	7.119***	4.598**	2.874*	2.711*
	<i>Size</i>	0.247	4.537**	17.779***	13.064***
	<i>Growta</i>	0.628	0.495	1.883	0.331
	<i>Tang</i>	5.971***	6.174***	2.546*	4.168
	<i>Evol</i>	0.850	7.059***	3.223*	0.104
	<i>Ndts</i>	0.918	3.030*	1.675	0.358
	<i>N</i>	983	983	983	983

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Table 3 shows the results of simultaneous panel regressions on total leverage for selected years from 2009 to 2015. Compared to QRPD, these estimations reveal that the effects of the explanatory variables on the response variables tend to vary over time, as well as across quantiles. For each year, the null hypothesis that the coefficients are constant across the distribution is often rejected by *F* tests. Profitability attracts a negative and significant coefficient which becomes larger in absolute value over time. Size is only significant for the more recent periods, whereas the effects of tangibility tend to be positive and significant across all time periods.

Similar results hold for long-term debt, where however profitability tends to play a less significant role, and for short-term debt. Lagged profitability also tends to exert an increasingly important role for the inverse of the interest coverage ratio ICR and for the debt-earnings ratio DTE. The influence of the share of tangible assets too becomes more significant in the more recent period. A strong cyclical effect appears to be present in the coefficients on the inverse Z-scores, with the coefficients for profitability and tangible assets increasing during the middle years of the sample for the central quantiles and then declining towards the end of the sample period.



Source: Authors' calculations based on S&P Capital IQ

<Figure 10> Simultaneous panel quantile regressions (dependent variable=lev; year=2015)

Figure 10 illustrates the changing values of the regressions coefficients for total leverage across quantiles of the distribution in 2015, the last year of the sample. In particular, the influence of profitability tends to increase in

absolute value for the top quantiles of the distribution and the influence of size tends to increase, whereas tangibility displays an inverted U-shaped pattern.

The combined results from QRPD and simultaneous panel regressions indicate that the assumptions of constant coefficients across firms and over time may not be valid for Chinese non-financial firms. A number of coefficients increase in size over time pointing to increased sensitivity of debt ratios to some of their determinants in recent years. This can be a potential cause for concern, since a deterioration in the variables which act as a restraining influence on debt ratios could see even greater increases in the leverage of Chinese corporations.

In particular, the simultaneous panel quantile regressions show that the role of profitability in reducing debt levels has grown in importance in the more recent period. At the same time, non-financial corporations have experienced a decline in their profitability in the more recent years. A reason for this finding can be traced to the aggressive intervention by Chinese policy authorities in the aftermath of the global financial crisis. The significant decline in the lending rate since 2008 has reduced the opportunity cost of external debt relative to retained earnings as sources of funding, thereby increasing firms' incentive to borrow in preference to internal sources of finance. Together with the decline in profitability over the same period, the decline in the opportunity cost of debt resulted in a heightened sensitivity of the firm capital structure to earnings.

The joint effect of the increased role of profitability for leverage and of the decline in profitability itself is thus likely to lead to larger debt ratios in the coming years. This result is of relevance for the future financial sustainability of Chinese firms. It is important to note that this conclusion could not have been obtained from an aggregate analysis of financial variables nor from a conventional fixed effects analysis, since it only emerges from a simultaneous quantile analysis where the regression coefficients are allowed to change over time.

## 4. Conclusions

Ever since the Chinese government chose to implement a large stimulus to support the economy in the wake of the financial crisis of 2008-09, corporate leverage has experienced a steep and sustained increase. The ratios of total debt and of credit to GDP have increased at the same time as corporate returns and interest coverage ratios have been weakening, raising concerns about growing systemic vulnerability within the Chinese financial system.

Based on the analysis of aggregate data, there is no clear evidence yet of weakening corporate performance onto the

Chinese financial sector. To an extent, this reflects the predominance of SOEs in the Chinese corporate landscape, and authorities' control over the financial system and its major players and institutions. Such a controlled environment has the ability to contain or delay the spillover of financial distress from the corporate to the financial sector for some period of time, but not indefinitely. Ultimately, growing systemic pressure constitutes a contingent liability to the state, and its realization would come to bear heavily on the public budget and debt ratios.

This paper assessed corporate sector fragility through panel regressions that relate leverage and other financial indicators to the determinants of capital structure, such as companies' size and profitability. The rationale for quantile regression analysis—of which we implement also the panel approach developed recently—is that it picks up vulnerabilities not just at the mean or median of the distribution, but also for the more marginal firms, which are those most exposed to negative shocks. Indeed, our analysis confirms that the sensitivity of leverage to its determinants varies across quantiles, with some areas of the distribution being affected much more strongly than others. We also find that some of the estimated coefficients have increased substantially in absolute size over time.

In particular, we find that profitability has a restraining effect on corporate leverage, the intensity of which has risen sharply over recent years. Possibly, this can be explained by a significant decline in lending rates in the wake of the massive stimulus program, which increased Chinese firms' incentive to borrow instead of relying on retained earnings as a source of finance. Against the backdrop of deteriorating profitability, this resulted in firms' heightened sensitivity of the capital structure to earnings. Ultimately, this finding raises some concern about the recent downward trend in corporate firms' profitability, because it implies that firms could react by taking on even larger levels of debt in the future. An uptick in corporate profitability in 2016—reflected in the latest data release but not in the above analysis—provides some relief in this regard.

In sum, the findings in this paper seem to confirm our hypothesis that financial sector based on aggregate indicators tend to overlook the increased vulnerability of the marginal non-financial firms in the Chinese corporate sector. The fragility of the system tends to be underestimated as a result, and may provide a sense of complacency about the stability of the Chinese financial system which is unwarranted in view of continuing weakness in the corporate system.

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## Appendix : The S&P Capital IQ Database and Regression Variables

Variable	Description	Measurement
LEV	Total leverage	Ratio of total debt to total assets
LLEV	Long-term leverage	Ratio of long-term debt to total assets
SLEV	Short-term leverage	Ratio of short-term debt to total assets
ICR	Interest Coverage Ratio	Ratio of EBITDA (earnings before interest, taxation, depreciation, and amortization) to interest expense
DTE	Debt-to-Earnings	Ratio of total debt to EBITDA
ZALT	Altman's Z-score	The Z-score is a weighted average of five ratios: (i) working capital / total assets;(ii) retained earnings / total assets;(iii) earnings before interest and taxes / total assets;(iv) the market value of equity/ the book value of total liabilities; and (v) sales / total assets.
PROF	Profitability	Ratio of EBITDA to total assets
SIZE	Size	Natural logarithm of total assets
GROWTA	Growth opportunities	Ratio of revenue growth to total assets growth
TANG	Tangibility	Ratio of net property, plant, equipment and inventory to total assets
EVOL	Earning volatility	Change of operating income (absolute value of first differences)
NDTS	Non-debt tax shields	Ratio of depreciation and amortization (EBITDA-EBIT) to total assets

Note: As of November 2016, the S&P Capital IQ database<sup>10</sup> covers more than 45,000 active companies—spanning 130 countries and several currencies. It also provides financial statement data for more than 800,000 private companies. Data on fundamentals cover equities, fixed income, capital structure, credit ratings, transactions, private equity firm profiles, ownership, and business relationships. It is accessible with a subscription: <https://www.capitaliq.com/>

For this study, we downloaded data for all private and public firms geographically located in the PRC that are considered operating as of September 2016. This includes 36 financial ratios, 24 standardized balance sheet and income statement items, as well as 10 indicators specific to banks. The data run from 1990 to 2015 and are expressed in US\$ millions, based on the platform's historical exchange rates. For regression analysis, we retained data from 2009 to 2015 only and computed variables as described in the above table.

<sup>10</sup>See S&P Capital IQ Fundamentals. [http://marketintelligence.spglobal.com/documents/products/SPCIQ\\_Fundamentals\\_v2.pdf](http://marketintelligence.spglobal.com/documents/products/SPCIQ_Fundamentals_v2.pdf) and The S&P Capital IQ® Platform.[http://marketintelligence.spglobal.com/documents/products/SPCIQ\\_Platform\\_v2.pdf](http://marketintelligence.spglobal.com/documents/products/SPCIQ_Platform_v2.pdf)

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# Impacts of the Real Effective Exchange Rate and the Government Deficit on Aggregate Output in Australia

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## Abstract

Based on a simultaneous-equation model consisting of aggregate demand and short-run aggregate supply, this paper estimates a reduced-form equation specifying that the equilibrium real GDP is a function of the real effective exchange rate, the government deficit as a percent of GDP, the real interest rate, foreign income, labor productivity, the real oil price, the expected inflation rate, and the interactive and intercept binary variables accounting for a potential change in the slope of the real effective exchange rate and shift in the intercept. Applying the exponential GARCH technique, it finds that aggregate output in Australia has a positive relationship with the real effective exchange rate during 2003.Q3 – 2013.Q2, the government deficit as a percent of GDP, U.S. real GDP, labor productivity and the real oil price and a negative relationship with the real effective exchange rate during 2013.Q3 – 2016.Q1, the real lending rate and the expected inflation rate. These results suggest that real appreciation was expansionary before 2013.Q3 whereas real depreciation was expansionary after 2013.Q2 and that more government deficit as a percent of GDP would be helpful to stimulate the economy. Hence, the impact of real appreciation or real depreciation on real GDP may change overtime.

**Keywords:** Exchange Rates, Government Deficit, Interest Rates, Labor Productivity, Oil Prices.

**JEL Classification Code:** F31, E62.

## 1. Introduction

Australia has continued to show economic strengths as evidenced by an average annual growth rate of 3.1% in the first quarter of 2016 (Reserve Bank of Australia). There is an area which may deserve more attention. The Australian dollar versus the U.S. dollar fluctuated significantly in recent years, depreciating 42.45% during 2008.Q2 – 2009.Q1, appreciating 37.75% during 2009.Q1 – 2011.Q2, and depreciating 47.87% again during 2011.Q2 – 2016.Q1. The Australian government has also relied on deficit spending to stimulate the economy during times of crisis. For example, the government deficit as a percent of GDP reached 5.73% in 2010.Q3 after the global financial crisis had slowed down the economy significantly.

This paper attempts to examine whether real depreciation /appreciation or more government deficit may help or hurt aggregate output and has several different aspects. First, a

simultaneous-equation model consisting of aggregate demand and aggregate supply is applied. Second, labor productivity and the energy cost are considered in the aggregate supply function. Third, an interactive term is included to detect whether the relationship between real GDP and the real effective exchange rate may have changed in recent years.

## 2. The Model

This paper specifies that real GDP demanded in Australia is a function of the inflation rate, government spending, government tax revenue, the real interest rate, foreign income, and the real effective exchange rate and that real GDP supplied in the short run is influenced by the inflation rate, labor productivity, the real oil price and the expected inflation rate. We can express real GDP demanded and supplied as:

$$Y^d = h(\pi, G, T, R, Y^f, \varepsilon) \dots\dots\dots(1)$$

$$Y^s = g(\pi, P, E, \varepsilon, \pi^e) \dots\dots\dots(2)$$

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where

$Y^d$  = real GDP demanded,  
 $\pi$  = the inflation rate,  
 $G$  = government spending,  
 $T$  = government tax revenue,  
 $R$  = the real interest rate,  
 $Y^f$  = foreign income,  
 $E$  = the real effective exchange rate,  
 $Y^s$  = real GDP supplied in the short run,  
 $P$  = labor productivity,  
 $E$  = the real oil price per barrel, and  
 $\pi^e$  = the expected inflation rate.

In equilibrium,  $Y^d = Y^s$ . Solving for the two endogenous variables,  $Y$  and  $\pi$ , we have the equilibrium real GDP:

$$\bar{Y} = w(\varepsilon, D, R, Y^f, P, E, \pi^e) \dots\dots\dots(3)$$

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where  $D$  stands for the government deficit or  $G - T$ .

According to economic theory, equilibrium real GDP is positively associated with foreign income and labor productivity and negatively affected by the real interest rate and the expected inflation rate.

The impact of real depreciation on aggregate output has been examined extensively. Real depreciation of the Australian dollar would make Australian-made goods more attractive and competitive, increase exports, and shift aggregate demand to the right. However, real depreciation would make imports more expensive, raise domestic inflation, and shift the short-run aggregate supply curve to the left. The net impact on real GDP is unclear.

Several articles have studied the effect of real depreciation or devaluation on aggregate output based on samples including Australia and other related countries. Kamin and Klau (1998) find that for industrialized countries including Australia, devaluations are contractionary in the short run but are not contractionary in the long run. Kalyoncu, Artan, Tezekici and Ozturk (2008) reveal that real depreciation is neutral in the short run and that there is no long-run cointegration between real output and real depreciation. An, Kim and Ren (2014) and Kim, An and Kim (2015) find that real depreciation may be contractionary or expansionary. Bahmani-Oskooee and Miteza (2003) provide a literature survey.

The effect of the government deficit/debt as a percent of GDP is inconclusive. The Ricardian equivalence hypothesis suggests that debt- or deficit-financed government spending has a neutral effect on real output because people tend to save more in anticipation of more taxes in the future to pay

off the debt (Barro, 1974, 1989). Some studies indicate that more government deficit/debt would not raise the interest rate (McMillin, 1986; Gupta, 1989; Darrat, 1989, 1990; Findlay, 1990; Ostrosky, 1990). However, other studies show that more government deficit/debt raises real interest rates and tends to crowd out private spending (Feldstein, 1982; Hoelscher, 1986; Cebula, 1997; Cebula & Cuellar, 2010; Cebula, 2014a, 2014b; Cebula, Angjellari-Dajci, & Foley, 2014). Reinhart and Rogoff (2010) show that if government debt as a percent of GDP is greater than 90%, economic growth would decline and that a higher government debt ratio results in a higher inflation rate in emerging economies.

A higher oil price would cause the short-run aggregate supply curve to shift to the left and aggregate output to decline in oil importing countries. Nevertheless, a demand-driven higher oil price may produce a positive impact in the short run and a negative impact in the long run (Hamilton, 1996; Kilian, 2008a, 2008b).

### 3. Empirical Results

Data sources came from the Reserve Bank of Australia, the International Financial Statistics published by the International Monetary Fund, and the St. Louis Federal Reserve Bank. Real GDP in Australia is measured in million dollars. The real effective exchange rate is a trade-weighted index based on the consumer price index (CPI), and an increase means real appreciation. Government deficit is measured as a percent of GDP. The real interest rate is equal to the lending rate minus the expected inflation rate. U.S. real GDP is chosen to represent world income. Labor productivity is estimated as total output divided by total employment and measured in the Australian dollar.  $\pi^e$  is estimated as the average inflation rate of the past four quarters. Except for negative values, other variables are expressed on a log scale. The sample ranges from 2003.Q3 to 2016.Q1. Consistent data for the government deficit before 2003.Q3 are not available.

The ADF test shows that all the variables have unit roots in level and are stationary in first difference at the 5% level. According to the ADF test on the regression residual, the test statistic is estimated to be -4.3038 compared with the critical value of -2.6120 at the 1% level. Hence, these time series variables are cointegrated and have a long-term equilibrium relationship.

Figure 1 shows that the relationship between real GDP and the real effective exchange rate changed during the sample period. Therefore, a binary variable  $B$  with a value of one during 2013.Q3 - 2016.Q1 and zero otherwise is created. An interactive binary variable and an intercept binary variable are included in the estimated regression:

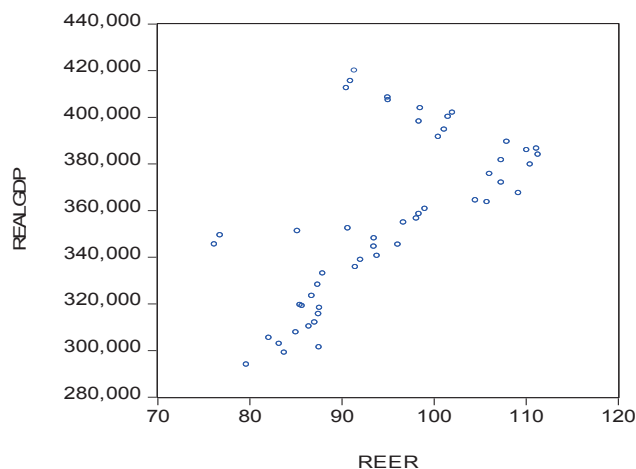
$$\bar{Y} = w(\varepsilon, \varepsilon \times B, B, D, R, Y^f, P, E, \pi^e) \dots\dots\dots(4)$$

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Suppose that  $\beta_1$  and  $\beta_2$  are the estimated coefficients for  $\varepsilon$  and  $\varepsilon \times B$ . The partial derivative of equilibrium real GDP with respect to the real effective exchange rate is equal to  $\beta_1$  during 2003.Q3 - 2013.Q2 and  $\beta_1 + \beta_2$  during 2013.Q3 - 2016.Q1. A negative relationship between equilibrium real GDP and  $\varepsilon$  during 2013.Q3 - 2016.Q1 suggests that  $\beta_2$  is negative and greater than  $\beta_1$  in absolute values.

The estimated regression and relevant statistics are reported in Table 1. The exponential GARCH model is employed to estimate the variance equation and regression parameters. As shown, approximately 98.75% of the change in real GDP in Australia can be explained by the nine exogenous variables. All the coefficients are significant at the 1% level. Real GDP in Australia is positively affected by the real effective exchange rate during 2003.Q3-2013.Q2, government deficit as a percent of GDP, U.S. real GDP, labor productivity and the real oil price and negatively associated with the real effective exchange rate during 2013.Q3-2016.Q1, the real interest rate, and the expected inflation rate.

Specifically, a 1% real appreciation of the Australian dollar would raise real GDP by 0.1854% during 2003.Q3-2013.Q2, but a 1% real depreciation would increase real GDP by 0.1690% during 2013.Q3-2016.Q1. If the government deficit as a percent of GDP rises 1 percentage point, the log of real GDP would increase 0.0025. When U.S. real GDP rises 1%, Australia's real GDP would increase 0.9236%. A 1% increase in labor productivity and the real oil price would lead to an increase in real GDP by 0.5212% and 0.0220%, respectively.



**<Figure 1>** Scatter diagram between real GDP (REALGDP) and the real effective exchange rate (REER)

Several other variables are considered. When the real effective exchange rate based on the consumer price index is replaced by the real exchange rate measured as units of the Australian dollar per U.S. dollar times the relative prices in the U.S. and Australia, a 1% real appreciation of the Australian dollar would raise real GDP by 0.1439% during 2003.Q3 - 2013.Q2, but a 1% real depreciation would raise real GDP by 0.0375% during 2013.Q3 - 2016.Q1. Other results are similar. When the real effective exchange rate based on the unit labor cost substitutes for the real effective exchange rate based on the consumer price index, a 1% real appreciation of the Australian dollar would increase real GDP by 0.1479% during 2003.Q3 - 2013.Q2, but a 1% real depreciation would raise real GDP by 0.2641% during 2013.Q3 - 2016.Q1. Other results are similar.

**<Table 1>** Estimated regression of log (real GDP) in Australia

Variable	Coefficient	z-Statistic
Intercept	-2.333552	-8.950935
Log(real effective exchange rate)	0.185391	13.22736
Log(real effective exchange rate) x Binary variable	-0.354398	-4.789305
Binary variable	1.612299	4.746633
Government deficit as a percent of GDP	0.002463	3.368020
Real interest rate	-0.021024	-9.930724
Log(U.S. real GDP)	0.923575	97.44215
Log(labor productivity)	0.521151	21.22149
Log(real oil price)	0.022026	4.391400
Expected inflation rate	-0.009657	-3.493254
R-squared	0.987518	
Adjusted R-squared	0.984777	
Akaike information criterion	-6.007213	
Schwarz criterion	-5.552665	
Sample period	2003.Q3-2016.Q1	
Methodology	EGARCH	
Mean absolute percent error	0.839908%	



## 4. Main Results

This study has examined the impacts of the real effective exchange rate, the government deficit and other selected macroeconomic variables on aggregate output in Australia. Real appreciation has a positive impact on real GDP during 2003.Q3 – 2013.Q2, but real depreciation has a positive impact on real GDP during 2013.Q3 – 2016.Q1. A higher government deficit as a percent of GDP, a lower real interest rate, a higher U.S. real GDP, a higher labor

productivity, a higher real oil price or a lower expected inflation rate would raise real GDP.

There are several policy implications. The trend of recent real depreciation of the Australian dollar is expected to increase real GDP. The positive significant coefficient of the government deficit as a percent of GDP suggests that its positive effect is not cancelled out by a negative crowding-out effect. World income as represented by real U.S. GDP is a powerful variable as an increase in exports creates jobs and raises income.

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# Multivariate Causal Relationship between Stock Prices and Exchange Rates in the Middle East

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## Abstract

This study investigates the causal relationship between stock prices and exchange rates for six Middle Eastern countries, namely, Egypt, Iran, Jordan, Kuwait, Oman, and Saudi Arabia before and during (after) the 2007 global financial crisis for the period between January 2004 and September 2015. The sample is divided into two sub-periods, that is, the period from January 1, 2004 to September 30, 2007 and the period from October 1, 2007 to September 30, 2015, to represent the pre-crisis period and the post-crisis period, respectively. Using Vector Autoregressive (VAR) model in a multivariate framework (including two control variables, inflation rates and oil prices) the results suggest that in the case of Jordan, Kuwait and Saudi Arabia, there exists bidirectional causalities after the crisis period but not the before. The opposite status is available for the case of Iran. In the case of Oman, there is bidirectional causality between the variables of interest in both periods. The results also reveal that the relationship between stock prices and exchange rates has become stronger after the 2007 global financial crisis. Overall, the results of this study indicate that fluctuations in foreign exchange markets can significantly affect stock markets in the Middle East.

**Keywords:** Stock Price, Exchange Rate, VAR Model, Middle East.

**JEL Classification code:** C01, F31, G01, G12.

## 1. Introduction

In an open economy, the impact of unexpected changes in exchange rates on the present value of a firm's assets, liabilities and cash flows exposes the economic value of the firm to exchange risk. This implies that exchange rates play a significant role in the movements of stock prices.

The results of the investigation on the relationship between stock prices and exchange rates are important because of two reasons: First, the relationship between exchange rates and stock prices is able to influence the development of capital markets, particularly in those emerging and newly industrializing countries which have recently attracted the attention of the international investors. In fact, the awareness of the relationship between these two financial markets would help the domestic and international

investors to hedge and diversify their portfolios (Abdalla & Murinde, 1997). Second, it is believed that the 1997 Asian financial crisis, which started as an exchange rate crisis in Thailand and then led to the depreciation of other currencies in the region, resulted in the collapse of the stock markets (Hatemi & Roca, 2005). In such a scenario, understanding and foreseeing the relationship between stock prices and exchange rates might enable policymakers to formulate appropriate policies before the spread of the crisis. On one hand, "exchange rates are often the easy target for policy intervention and therefore it is crucial to know how exchange rates will affect other asset markets and on the other hand, when asset markets are under stress, volatility will be higher and returns will be lower" (Hatemi & Roca, 2005, p. 540).

Furthermore, it is believed that the 2007-2008 global financial crisis influenced the Middle Eastern stock exchange markets through exchange rate fluctuations and oil price hike, as oil industry holds major share of the whole shares in the region. Thus this study investigates the causal relationship between stock prices and exchange rates, for six Middle Eastern countries, namely, Egypt, Iran, Jordan, Kuwait, Oman, and Saudi Arabia before and during the 2007 global financial crisis for the period between January 2004 and September 2015.

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The rest of the paper is organized as follows. The next section explains the theories behind the study and reviews the literature of the study and some of the past studies. Section 3 describes the sources of data and types of econometrics methods are employed in the study. In section 4 the empirical results are presented and finally some of the concluding remarks and policy implications are provided in section 5.

"In spite of fast economic growth of the Middle East, less attention has been paid by researchers and investigators to the region compared with other emerging markets in the Europe, Asia, etc" (Parsva, 2012, p.31). For example, Saudi Arabia's stock exchange had a market capitalization of 247 billion U.S. dollars in 2008 and ranked 20<sup>th</sup> in the world. The United Arab Emirates (UAE), Qatar, and Bahrain are among the top fifty major financial centers globally in terms of competitiveness. Dubai has been one of the important and stable places for financial investors to establish new companies over the past decade. Jordanian Shaheen Business & Investment Group is another example which benefits from Jordan's free trade agreement with the U.S. (Cheng, Jahan-Parvar, & Rothman, 2010).

Geography, political conflicts, and direct effect of oil price changes on the economy of the Middle East are the most special characteristics of the region.

1. Geography: The simplest geographical definition of the Middle East is the region where Asia, Africa, and Europe meet (Roskin & Coyle, 2008). Most of the countries which are located in the Middle East have quite similar societies, cultures, economies, religions, politics, etc.

2. Political crisis: It is worth noting that high financial market returns have been realized while the Middle East has experienced major political and security instabilities such as the civil war in Iraq, high tension between Israel and Palestine, etc. (Cheng, Jahan-Parvar & Rothman, 2010).

3. Oil factor: The Middle East is the largest oil-producing region in the world and holds about two-thirds of the earth's proven oil reserves. Thus, the area has been the center of attention over the past decades. The Persian Gulf states are among these countries; therefore the occurrence of any oil price shock has a crucial and vital effect on the economies of these countries.

## 2. Theoretical Framework and Literature Review

There are two theoretical backgrounds on whether or not exchange rate impacts on stock prices and vice versa. They are traditional and portfolio-balance approaches that are explained below.

### 2.1. Traditional Approach

The microeconomic level suggests that exchange rates lead the stock prices (Dornbusch & Fischer, 1980; Aggarwal, 1981; Wu, 2000; Yau & Nieh, 2006), so the first perspective is the traditional approach which states any change in exchange rates would lead to changes in the stock prices.

Typically, the reason behind the occurrence of the traditional approach is the "flow-oriented" or "goods-market" model which has been developed by Dornbusch and Fischer (1980). The model emphasized the behavior of exchange rate and current account. The authors started by setting out a basic model for equilibrium of money market. When the value of the local currency appreciates, exporting firms lose profit and the value of equities of these firms will reduce. On the contrary, the status of importing firms is absolutely different since the value of them would benefit from an appreciation of the local currency. Stock prices would be affected by exchange rate (currency) movement since in general stock prices are the present value of future cash flows of the firms. The result of their study demonstrated that any change in exchange rates would have an influence on the international competitor firms and their trade balance.

Aggarwal (1981) investigated the relationship between trade-weighted value of the U.S. dollar and stock returns for the period starting from 1974 to 1978. He pointed out that there is a positive correlation between these variables. However, Soenen and Henningar (1988) found an inverse relationship between stock prices and exchange rates.

### 2.2. Portfolio-Balance Approach

The second theoretical framework refers to stock market performance (Mishra, 2004). The portfolio-balance approach, which also evaluates the linkage between stock prices and exchange rates, is one way and states that exchange rates are determined by the market mechanism. In other words, the "portfolio theory focuses on the important role of the capital account transaction which uses to determine exchange rate dynamics" (Parsva & Lean, 2011, p.157-158).

Branson (1981) and Frankel (1983) developed the "stock-oriented" model. The model presents the capital account as a main factor in determining exchange rate dynamics. As the stock prices diminish, domestic wealth is reduced and subsequently the demand for domestic money and interest rate decreases. In addition, foreign investors demand for local currency declines and finally the currency depreciates. Gavin (1989) also expressed that any change in stock prices could cause the realignments of exchange rates.

The value of a firm's equity increases while the prices of new company equipment remain unchanged in the short run. As a result, investment is relatively cheaper and companies tend to invest more. Thus,

$$I = f(R, SP) \quad (1)$$

where  $I$  is investment,  $SP$  is stock prices, and  $R$  is the borrowing/ lending interest rate, which has a negative impact on investment because it makes the investment funding more costly.

Dimitrova (2005) has explored theoretically that an increase in stock prices will positively affect the value of financial assets held by households, leading to an increase in household wealth and therefore consumption. As people associate higher wealth with lower probability of financial distress, they are likely to hold more illiquid assets. This is consistent with higher expenditure both domestically and internationally, which means imports rise and the current account balance worsens. Therefore, the government or monetary authorities would initiate to prevent further dependency on imports by depreciating the domestic currency.

This study aims at reducing the omitted variable bias in the literature through encompassing two relevant variables, oil price and inflation rate, into the model. Adding oil price to the model is due to the key and vital role of the crude oil in the economy and national income of most Middle Eastern nations. Inflation rate also is included into the model because the economy of the area has been suffered over the past decade by the high rate of inflation. Moreover, according to Wu's (2000) and Kim's (2003) findings, any changes in the inflation rate can lead to traditional approach occurrence, which has been explained earlier.

As mentioned earlier, knowing any interaction between stock market and foreign exchange market is very important. It has captured the attention of economists so far and it is still ongoing. However, despite a growing theoretical and empirical literature, it still lacks details on this important issue.

Some of the past studies on this issue are listed as below:

Frank and Young (1972) investigated the stock prices reactions of some multinational firms to the real realignments of exchange rate. They employed six major currency realignments and used two American equity indices such as the Dow Jones and S&P Industrials. They found no relationship between stock prices and exchange rates, and interestingly stated that a manager would be unwise if he makes decisions based on the exchange rate realignments.

Solnik (1987) was the first investigator who used financial prices such as stock prices, instead of the traditional

macroeconomics data, for evaluating how stock returns can be used to test exchange rate models. He employed the monthly and quarterly data for the period from July 1973 to December 1983 and chose the stock markets of eight countries, Canada, France, Germany, Japan, the Netherlands, Switzerland, UK, and US. He finally found that there was a weak positive relationship between stock-returns differentials and changes in the real exchange rate.

### 2.3. Oil Price Shocks, Exchange Rates and Stock Prices in the Oil-Exporting Countries

The situation in oil-exporting countries is quite different from oil-importing countries when oil price changes. Oil price changes can impact on the economy of oil-exporting countries in two ways. First, a higher oil price leads to an immediate transfer of wealth from oil importers to oil exporters. If oil exporting countries use this wealth to create more investment opportunities in the overall economy, the demand for labour and capital will increase and consequently, a higher level of activity and employment in these countries would be generated. Second, as the oil-importing countries suffer from an increase in oil price, their demand for imported goods and services from oil-exporting countries diminishes and this probably has a negative impact on the economy of oil-exporting countries (Bjornland, 2009).

Bjornland (2009) analyzed the effect of oil price shocks on stock returns in Norway, an oil-exporting country. She found that a higher oil price has a very positive effect on the Norwegian economy. She further concluded that an oil price hike can increase the value of equities and appreciate the value of the domestic currency. This would increase the wealth of the economy and help to decrease the rate of unemployment.

The Middle East plays a very important role in producing and exporting crude oil in the world. Moreover, most countries in the region have oil-based economies and their oil sectors provide most of their GDP and total exports. Therefore, several empirical studies have been done on Arab oil-exporting countries in the Middle East as well as Iran. Numerous studies investigated the effects of oil price on the macroeconomic variables in these countries.

Jahan-Parvar and Mohammadi (2008) evaluated the relationship between oil prices and real exchange rates in a sample of fourteen countries to test the validity of the "Dutch disease" hypothesis. The hypothesis states that "a higher oil price in an oil-exporting country may cause an appreciation of the real exchange rate, reduces the competitiveness in the non-exporting sector and limits its ability to build a diversified exports base" (Jahan-Parvar & Mohammadi,



2008, P.2). In agreement with this hypothesis, their empirical study confirmed the existence of stable long-run linkages between oil prices and real exchange rates in all sample countries.

Rault and Arouri (2009) investigated the relations between oil prices and stock prices in the GCC countries<sup>1</sup>. Their results indicated that there is cointegration of oil prices and stock prices in the GCC countries and the oil price increase has a positive effect on raising the value of equities.

## 2.4. Review of Previous Empirical Studies

Ma and Kao (1990) investigated the impact of appreciation of currency on the domestic stock market. They employed the monthly stock indices and exchange rates from January 1973 to December 1983 of six major industrialized countries, i.e. the UK, Canada, France, West Germany, Italy, and Japan. They pointed out that the relationship between exchange rates and stock prices depends on the export/import-dominant country. In other words, the appreciation of currency has a positive (negative) effect on the stock market for an import-dominant (export-dominant) country.

Bahmani-Oskooee and Sohrabian (1992) are among the first to use econometrics techniques such as Granger causality and cointegration to analyze the linkage between stock prices and exchange rates. Their sample included the monthly observations over the period of July 1973 to December 1980, and they also used effective exchange rates of the U.S. dollar and S&P 500 index to represent the stock price. According to their Granger causality result, there is a dual causal relationship between stock prices and exchange rates at least in the short-run. Based on cointegration result, they found no linkage between the two variables.

Bartov and Bodnar (1994) focused on empirical exploration of the relationship between abnormal stock performance and contemporaneous and lagged changes in the value of the U.S. dollar for a set of firms. They found that contemporaneous changes in the U.S. dollar have little impact on abnormal stock returns. However, a lagged change in the U.S. dollar is negatively associated with abnormal stock returns.

Nieh and Lee (2001) employed both the Engle-Granger test and the Johansen maximum likelihood cointegration test to investigate the dynamic relationships between stock prices and exchange rates for the G7 countries namely, Canada, France, Germany, Italy, Japan, the UK, and the US. They used the stock indices and foreign exchange rates for the sample period starting from October 1, 1993 to February 15, 1996. Their results supported Bahmani-Oskooee and

Sohrabian's (1992) findings that stock prices and exchange rates do not have any long-run equilibrium relationships.

Hatemi and Irandoust (2002) examined the linkage between exchange rates and stock prices in Sweden. Monthly nominal effective exchange rates and stock prices over the period of 1993-1998 were used. The results stated that an increase in Swedish stock prices reduces the exchange rates of the country.

Farooq and Wong (2004) tried to complement the existing literature by investigating the relationship between stock prices and exchange rates in Pakistan. They used the monthly time series data of four stock indices of Pakistan and Rs/USD exchange rates from January 1994 to December 2003. Based on the results of one stock index (KSE General), there is a unidirectional causality from stock prices to exchange rates. However, according to the results of another stock index (KSE Services), it was found that exchange rates have an effect on stock prices.

Ooi et al. (2009) analyzed the causal relationship between exchange rates and stock prices of Thailand and Malaysia before and post Asian financial crisis by using daily data from 1993 to 2003. Based on the estimated results, they found a unidirectional causality relationship from stock prices to exchange rates in the case of Thailand both before and post crisis. Furthermore, their findings show that there is a unidirectional causal relationship from the Malaysian stock market to Malaysian exchange rate in post-crisis. However the variables are not linked in the pre-crisis period in Malaysia.

Rahman and Uddin (2009) investigated the interactions between stock prices and exchange rates in three emerging countries of South Asia, Bangladesh, India and Pakistan. They used monthly average nominal exchange rates of the U.S. dollar in terms of three currencies namely, Bangladeshi Taka, Indian Rupee, and Pakistani Rupee. Moreover, the monthly closing stock indices for all three countries in the period of January 2003 to June 2008 were employed. Their results indicated that there is no cointegrating relationship between stock prices and exchange rates. Furthermore, there is no causal relationship between the above variables.

## 2.5. Review of the Related Literature in the Middle East

In the articles related to the present study, Abdelaziz, Chortareas and Cipollini (2008) concentrated on the relationship between stock prices and exchange rates in four Middle Eastern countries, Egypt, Kuwait, Oman, and Saudi Arabia. Monthly data and different sample periods for each country were employed by the authors. Finding no evidence of cointegration between stock prices and

exchange rates in a bivariate model, they included oil prices into the model. The results of their cointegration test illustrated that there is a long-run relationship among all the variables in three out of four sample countries.

Parsva and Lean (2011) employed Johansen cointegration and Granger causality tests to analyze the relationship between stock prices and exchange rates in six Middle-East economies from January 2004 to September 2010. They found that the causality results in the pre-crisis and during crisis periods are inconsistent among the Middle-East economies, except for Egypt and Oman.

### 3. Data and Methodology

To investigate the causal relationship between stock prices and exchange rates, this study focuses on six Middle Eastern countries, namely, Egypt, Iran, Jordan, Kuwait, Oman, and Saudi Arabia. To achieve this purpose, monthly data has been employed from 2004:1 to 2007:9 and from 2007:10 to 2015:9 to represent the pre-crisis period and post-crisis period, respectively. The most important fluctuation after financial crisis has been selected as the breakpoints to form the sub-periods for each currency.<sup>2</sup> All variables are transformed into natural logarithm except inflation rate. The data for stock prices, exchange rates and crude oil price (U.S. dollar/BBL) are obtained from DataStream, except the stock prices in Iran which is taken from Tehran Stock Exchange's website (<http://new.tse.ir/>). Inflation rate data is extracted from the IMF's database. The closing spot exchange rates for the Middle East countries are used in terms of Euro, since most of the sample countries' currency are pegging against the U.S. dollar.

The estimated models can be expressed in the following two equations:

$$LnSP_t = \alpha_0 + \alpha_1 LnEX_t + \alpha_2 INF_t + \alpha_3 LnOP_t + \varepsilon_t \quad (2)$$

$$LnEX_t = \beta_0 + \beta_1 LnSP_t + \beta_2 INF_t + \beta_3 LnOP_t + \varepsilon_t \quad (3)$$

where

$\alpha_0$  and  $\beta_0$  are the constant parameters,

$LnSP_t$  is the natural log of stock price,

$LnEX_t$  is the natural log of exchange rate (national currency in terms of Euro),

$INF_t$  is the rate of inflation,

$LnOP_t$  is the natural log of oil price (U.S. dollar/BBL)

and  $\varepsilon_t$  is the error term.

The lag length is determined by the minimum value of Akaike Information Criteria (AIC). The Johansen-Juselius co-integration process based on the Vector Autoregressive (VAR) model is as follows:

$$\Delta Y_t = \lambda + \sum_{i=1}^k A_k Y_{t-i} + \varepsilon_t \quad (4)$$

Where  $Y_t$  is a co-integrating vector of  $I(1)$  variables,  $\lambda$  is a vector of constants, and  $\varepsilon_t$  is a vector of white noise residuals (Johansen, 2000). In our model,  $Y_t \equiv (SP, EX, INF, OP)$ , if  $Y_t$  is cointegrated, it can be generated by a Vector Error Correction Model (VECM) and in subsequent the Equation 3 can be written in the first difference form:

$$\Delta Y_t = \lambda + \sum_{i=1}^{k-1} A_i \Delta Y_{t-i} + A_k Y_{t-1} + \varepsilon_t, \quad (5)$$

where  $\lambda$  is a  $4 \times 1$  vector of drift, As are  $4 \times 4$  matrices of parameters, and  $\varepsilon_t$  is a  $4 \times 1$  white noise vector. Johansen-Juselius derived trace test ( $\lambda_{trace}$ ) and maximum eigenvalues test ( $\lambda_{max}$ ) for testing the numbers of cointegrating rank in the system as follows:

$$\lambda_{trace} = -N \sum_{j=r+1}^k \ln(1 - \lambda_j) \quad \lambda_{max} = -N \ln(1 - \lambda_{r+1}) \quad (6)$$

where  $\lambda_j$  is the estimated eigenvalue,  $r$  is the number of co-integration vectors,  $k$  represents the number of variables and  $N$  is the sample size. If the variables are cointegrated, Granger causality test based on the VECM is used to include an error correction term as follows:

$$\Delta \ln SP_t = \lambda_1 + \sum_{i=1}^m \alpha_{1i} \Delta \ln SP_{t-i} + \sum_{i=1}^m \beta_{1i} \Delta \ln EX_{t-i} + \sum_{i=1}^m \chi_{1i} \Delta \ln INF_{t-i} + \sum_{i=1}^m \rho_{1i} \Delta \ln OP_{t-i} + \theta_1 ECT_{t-1} + \varepsilon_{SP} \quad (7)$$

$$\Delta \ln EX_t = \lambda_2 + \sum_{i=1}^m \alpha_{2i} \Delta \ln SP_{t-i} + \sum_{i=1}^m \beta_{2i} \Delta \ln EX_{t-i} + \sum_{i=1}^m \chi_{2i} \Delta \ln INF_{t-i} + \sum_{i=1}^m \rho_{2i} \Delta \ln OP_{t-i} + \theta_2 ECT_{t-1} + \varepsilon_{EX} \quad (8)$$

where  $\Delta$  is the first difference operator,  $\lambda_1$  and  $\lambda_2$  are the constant,  $\alpha_1, \alpha_2, \beta_1, \beta_2, \chi_1, \chi_2$  as well as  $\rho_1, \rho_2$  are the long run parameters,  $ECT$  is the lagged error



correction term derived from the long-run co-integration model,  $\varepsilon_{SP}$  and  $\varepsilon_{EX}$  are two white noise residuals.

## 4. Empirical Results

### 4.1. Results of Unit Root Test

Table 1 and 2 summarize the results of unit root tests for the series of stock prices in terms of the ADF and PP tests respectively. Table 3 and 4 summarize the results of unit root tests for the series of exchange rates in terms of the ADF and PP tests respectively. Table 5 and 6 summarize the results of unit root tests for the series of inflation rates in

terms of the ADF and PP tests respectively. Moreover, Table 7 indicates the results of the same unit root tests for oil price. The first test equation in each Table (1-7) involves only the intercept, while the second test equation includes the intercept and trend.

As can be seen clearly in Tables 1 to 7 the results of both the ADF test and PP test or at least the PP test indicate that null hypothesis of a unit root is rejected in all variables and all countries when the data series are first differenced.

Thus the first difference of the data series of the variables is stationary and all variables are  $I(1)$ . As noted earlier, when the variables are  $I(1)$ , they will correspond to cointegrating relations (Pesaran & Smith, 2006). Therefore, the study can proceed to the next step of the process which is the JJ cointegration test.

<Table 1>: Results of the ADF Unit Root Test (Stock Price)

Country	Level		First difference	
	$H_0$ : non-stationary		$H_0$ : non-stationary	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Pre-crisis period				
Egypt	-1.1802(3)	-2.3379(3)	-14.3492(2)***	-14.3451(2)***
Iran	-1.0140(10)	-1.8681(10)	-7.1287(9)***	-7.1256(9)***
Jordan	-1.7273(8)	-0.4944(8)	-10.1990(7)***	-10.4270(7)***
Kuwait	-1.1003(5)	-1.2370(5)	-12.1569(4)***	-12.1672(4)***
Oman	-0.9436(6)	-1.9853(6)	-10.4491(5)***	-10.4449(5)***
Saudi Arabia	-1.8415(7)	-1.1889(7)	-7.1272(12)***	-7.3997(12)***
Crisis period				
Egypt	-1.1308(1)	-1.0378(1)	-25.3940(0)***	-25.3853(0)***
Iran	-0.2421(4)	-0.2804(4)	-5.4445(3)***	-9.5073(3)***
Jordan	-0.8333(0)	-3.1099(0)	-28.9792(0)***	-29.0267(0)***
Kuwait	-1.0281(10)	-1.3205(10)	-6.3926(9)***	-6.3986(9)***
Oman	-0.9023(4)	-1.3096(4)	-14.8986(3)***	-14.8915(3)***
Saudi Arabia	-1.2919(2)	-1.4682(2)	-17.5046(1)***	-17.4944(1)***

Notes: Numbers in brackets represent Newey-west Bandwidth (as determined by Bartlett-Kernel). The asterisks \*, \*\*, \*\*\* indicate rejection of the null hypothesis of non-stationary at the 10%, 5%, and 1% levels respectively.

<Table 2> Results of the PP Unit Root Test (Stock Price)

Country	Level		First difference	
	$H_0$ : non-stationary		$H_0$ : non-stationary	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Pre-crisis period				
Egypt	-1.1448(8)	-2.1918(8)	-28.0151(7)***	-28.0031(7)***
Iran	-0.8134(16)	-1.7951(16)	-22.7874(13)***	-22.7819(13)***
Jordan	-2.0447(14)	-0.6138(13)	-29.9368(13)***	-30.0510(13)***
Kuwait	-1.3265(12)	-1.3051(12)	-25.3743(10)***	-25.3740(10)***
Oman	-1.1467(14)	-1.9527(15)	-27.9651(14)***	-27.9545(14)***
Saudi Arabia	-1.8689(4)	-1.1448(6)	-29.7102(6)***	-29.8703(8)***

Crisis period				
Egypt	-1.1595(5)	-1.0934(5)	-25.4573(3)***	-25.3992(2)***
Iran	-0.1381(17)	-0.2069(17)	-22.5950(15)***	-22.3943(14)***
Jordan	-0.8518(3)	-3.1165(4)	-28.9624(4)***	-29.0068(5)***
Kuwait	-0.8021(13)	-1.0514(13)	-22.1617(10)***	-22.1512(10)***
Oman	-0.8774(13)	-1.3870(13)	-22.1793(16)***	-22.1654(16)***
Saudi Arabia	-1.2228(7)	-1.3482(6)	-25.6180(9)***	-25.6029(9)***

Notes: Numbers in brackets represent Newey-west Bandwidth (as determined by Bartlett-Kernel). The asterisks \*, \*\*, \*\*\* indicate rejection of the null hypothesis of non-stationary at the 10%, 5%, and 1% levels respectively.

<Table 3> Results of the ADF Unit Root Test (Exchange Rate)

Country	Level		First difference	
	H <sub>0</sub> : non-stationary		H <sub>0</sub> : non-stationary	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Pre-crisis period				
Egypt	-1.2189(0)	-1.1986(0)	-29.4397(0)***	-29.4736(0)***
Iran	-0.3085(1)	-1.9851(1)	-32.6399(0)***	-32.6501(0)***
Jordan	-0.9450(0)	-1.8515(0)	-32.3894(0)***	-32.4194(0)***
Kuwait	-1.6924(0)	-2.1771(0)	-31.9019(0)***	-31.9097(0)***
Oman	-0.9368(0)	-1.8471(0)	-32.4402(0)***	-32.4703(0)***
Saudi Arabia	-0.9611(0)	-1.8664(0)	-32.4110(0)***	-32.4397(0)***
Crisis period				
Egypt	-1.9605(9)	-2.2566(9)	-8.9298(8)***	-8.9239(8)***
Iran	-1.7155(8)	-1.5704(8)	-9.7581(7)***	-9.8286(7)***
Jordan	-1.5637(0)	-1.9828(0)	-20.5917(1)***	-20.5796(1)***
Kuwait	-1.8890(0)	-1.9655(0)	-28.3978(0)***	-28.3797(0)***
Oman	-1.5269(0)	-1.9345(0)	-26.9111(0)***	-26.8945(0)***
Saudi Arabia	-1.5546(0)	-1.9774(0)	-27.3653(0)***	-27.3486(0)***

Notes: Numbers in brackets are lag lengths used in the ADF test (as determined by minimum AIC). The asterisks \*, \*\*, \*\*\* indicate rejection of the null hypothesis of non-stationary at the 10%, 5%, and 1% levels respectively.

<Table 4> Results of the PP Unit Root Test (Exchange Rate)

Country	Level		First difference	
	H <sub>0</sub> : non-stationary		H <sub>0</sub> : non-stationary	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Pre-crisis period				
Egypt	-1.2526(4)	-1.2083(3)	-29.4373(2)***	-29.4728(1)***
Iran	-0.1796(14)	-1.9254(11)	-32.8034(13)***	-32.8313(13)***
Jordan	-0.7672(6)	-1.6945(6)	-32.4960(7)***	-32.5412(8)***
Kuwait	-1.5985(9)	-2.0894(9)	-31.9750(11)***	-31.9934(11)***
Oman	-0.7613(6)	-1.6922(6)	-32.5420(7)***	-32.5857(8)***
Saudi Arabia	-0.7572(7)	-1.7121(6)	-32.5164 (7)***	-32.5589(8)***

Crisis period				
Egypt	-1.9287(7)	-2.1369(6)	-27.5403(9)***	-27.5239(9)***
Iran	-2.0623(24)	-1.9203(24)	-29.7305(26)***	-29.8120(27)***
Jordan	-1.5895(5)	-2.0300(6)	-27.2381(4)***	-27.2210(4)***
Kuwait	-1.8344(3)	-1.9096(3)	-28.4138(5)***	-28.3953(5)***
Oman	-1.6010(7)	-2.0288(7)	-26.9030(5)***	-26.8862(5)***
Saudi Arabia	-1.5894(6)	-2.0247(6)	-27.3599(4)***	-27.3430(4)***

Notes: Numbers in brackets represent Newey-west Bandwidth (as determined by Bartlett-Kernel). The asterisks \*, \*\*, \*\*\* indicate rejection of the null hypothesis of non-stationary at the 10%, 5%, and 1% levels respectively.

<Table 5> Results of the ADF Unit Root Test (Inflation Rate)

Country	Level		First difference	
	H <sub>0</sub> : non-stationary		H <sub>0</sub> : non-stationary	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Pre-crisis period				
Egypt	-1.8707(1)	-2.0385(1)	-3.2641(2)**	-3.3686(0)*
Iran	-1.2043(0)	-1.2447 (0)	-5.7982(0)***	-5.7966(0)***
Jordan	-2.4102(10)	-1.8688(10)	-5.2827(4)***	-5.2524(4)***
Kuwait	-1.3265(0)	-2.7273(14)	-5.2244(2)***	-5.1042(2)***
Oman	3.1684(8)	3.1316(9)	-7.4882(0)***	-7.6773(0)***
S. Arabia	1.6475(5)	-1.9933(5)	-6.0896(0)***	-4.8560(4)***
Crisis period				
Egypt	-2.2502(1)	-2.9228(1)	-3.3744(0)**	-3.6135(0)**
Iran	-0.7166(1)	-2.1647(1)	-3.5934(0)**	-3.6052(0)**
Jordan	-2.3114(2)	-2.9704(9)	-3.1801(11)**	-4.1835(11)**
Kuwait	-0.7742(1)	-2.8921(1)	-3.5643(0)**	-3.6066(0)**
Oman	-1.8041(2)	-2.4671(12)	-2.7451(7)*	-2.6792(7)
S. Arabia	-0.6605(0)	-2.3871(0)	-3.5612(0)**	-3.5235(0)*

Notes: Numbers in brackets are lag lengths used in the ADF test (as determined by minimum AIC). The asterisks \*, \*\*, \*\*\* indicate rejection of the null hypothesis of non-stationary at the 10%, 5%, and 1% levels respectively.

<Table 6> Results of the PP Unit Root Test (Inflation Rate)

Country	Level		First difference	
	H <sub>0</sub> : non-stationary		H <sub>0</sub> : non-stationary	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Pre-crisis period				
Egypt	-1.5540(4)	-1.6026(4)	-3.2379(2)**	-3.3509(2)*
Iran	-1.3901(2)	-1.3692(1)	-5.7982(0)***	-5.8031(1)***
Jordan	-2.2729(2)	-2.6036(2)	-5.8577(7)***	-5.8598(7)***
Kuwait	-1.2711(10)	-1.9322(6)	-5.5283(16)***	-5.4032(16)***
Oman	3.3232(43)	-1.9947(4)	-7.9859(18)***	-15.309(42)***
Saudi Arabia	1.0624(3)	-1.6453(4)	-6.0896(0)***	-6.8111(4)***

Crisis period				
Egypt	-1.9079(4)	-2.1006(4)	-3.5895(4)**	-3.8454(4)**
Iran	-0.6499(4)	-2.1247(3)	-3.6289(3)**	-3.6584(3)**
Jordan	-1.4685(4)	-1.8463(4)	-3.4627(2)**	-3.4122(2)*
Kuwait	-0.7224(4)	-2.1188(4)	-3.6654(3)***	-3.7475(3)**
Oman	-0.8998(4)	-2.0108(4)	-3.4504(2)**	-3.3277(2)*
Saudi Arabia	-1.1836(4)	-2.3755(4)	-3.5227(2)**	-3.5049(2)*

Notes: Numbers in brackets represent Newey-west Bandwidth (as determined by Bartlett-Kernel). The asterisks \*, \*\*, \*\*\* indicate rejection of the null hypothesis of non-stationary at the 10%, 5%, and 1% levels respectively.

<Table 7> Results of the Unit Root Test for Oil Price (All Countries)

Variables	Level		First difference	
	H <sub>0</sub> : non-stationary		H <sub>0</sub> : non-stationary	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Pre-crisis period				
ADF	-1.3805(0)	-2.1967(0)	-6.4970(0)***	-6.4409(0)***
PP	-1.3641(4)	-2.2176(1)	-6.4986(4)***	-6.4363(4)***
Crisis period				
ADF	-1.9754(1)	-1.9402(1)	-3.9036(0)***	-3.8566(0)**
PP	-1.8224(3)	-1.8398(3)	-3.8230(1)***	-3.7729(1)***

Notes: Numbers in brackets are lag lengths used in the ADF test (as determined by minimum AIC). When using the PP test, numbers in brackets represent Newey-west Bandwidth (as determined by Bartlett-Kernel). The asterisks \*, \*\*, \*\*\* indicate rejection of the null hypothesis of non-stationary at the 10%, 5%, and 1% levels respectively.

## 4.2. Results of Cointegration Test

As noted earlier, determining the optimal lag length should be carried out before running the cointegration test because the cointegration results are sensitive to lag length. Therefore, the study runs the VAR model first in order to determine the optimal lag length based on the minimum AIC. The results of the cointegration test are provided in Tables 8 and 9.

The results of both trace and maximum eigenvalue statistics suggest that at least one long-run equilibrium relationship can be detected between the variables, stock prices, exchange rates, oil prices, and inflation rates.<sup>3</sup> In

other words, there is a long-term co-movement between the variables, and the results of the JJ cointegration test reject the null hypothesis of no cointegration in all the sample countries. These results are consistent with the findings of Jorion (1990), Abdalla and Murinde (1997), and Rahman and Uddin (2009) who have employed the same cointegration test in their studies.<sup>4</sup>

In all cases, there is one cointegrating vector in the equations. Table 10 and Table 11 illustrate the normalized cointegration results which represent the long-run relationship between all the variables, namely stock prices, exchange rates, oil price and inflation rate.

&lt;Table 8&gt; Results of the Johansen-Juselius Multivariate Co-Integration Test (Pre-Crisis Period)

Country	H <sub>0</sub>	H <sub>1</sub>	Trace Statistic	Maximum Eigenvalue
Egypt	r=0	r=1	51.0563(3)*	29.6320(3)*
	r≤1	r=2	23.1242(3)	12.3620(3)
	r≤2	r=3	10.5542(3)	10.3325(3)
	r≤3	r=4	0.0331(3)	0.0331(3)
Iran	r=0	r=1	48.1232(1)	29.5663(1)*
	r≤1	r=2	19.3011(1)	15.1324(1)
	r≤2	r=3	5.1610(1)	5.1421(1)
	r≤3	r=4	0.0687(1)	0.0687(1)
Jordan	r=0	r=1	51.5625(2)*	27.8257(2)*
	r≤1	r=2	22.8552(2)	17.5212(2)
	r≤2	r=3	6.3662(2)	6.3556(2)
	r≤3	r=4	0.0116(2)	0.0116(2)
Kuwait	r=0	r=1	63.1856(2)*	38.1208(2)*
	r≤1	r=2	26.5986(2)	16.2132(2)
	r≤2	r=3	10.9238(2)	10.6324(2)
	r≤3	r=4	0.2323(2)	0.2323(2)
Oman	r=0	r=1	43.5462(1)*	27.5523(1)*
	r≤1	r=2	16.1421(1)	13.5552(1)
	r≤2	r=3	5.1120(1)	6.1521(1)
	r≤3	r=4	0.0006(1)	0.0006(1)
Saudi Arabia	r=0	r=1	45.5862(1)*	21.8213(1)
	r≤1	r=2	24.4525(1)	13.5332(1)
	r≤2	r=3	11.0021(1)	10.6598(1)
	r≤3	r=4	0.0452(1)	0.0452(1)

Note: \* indicates rejection of null hypothesis of no co-integration at 5%, using MacKinnon-Haug-Michelis (1999) p-values. The values in the brackets are the optimal lag order selections.

&lt;Table 9&gt; Results of the Johansen-Juselius Multivariate Co-Integration Test (Crisis Period)

Country	H <sub>0</sub>	H <sub>1</sub>	Trace Statistic	Maximum Eigenvalue
Egypt	r=0	r=1	115.2218(5)*	63.2451(5)*
	r≤1	r=2	52.5624(5)*	34.0048(5)*
	r≤2	r=3	19.2898(5)*	17.2451(5)*
	r≤3	r=4	1.8864(5)	1.8864(5)
Iran	r=0	r=1	53.0123(1)*	32.2162(1)*
	r≤1	r=2	21.4485(1)	16.5224(1)
	r≤2	r=3	5.2884(1)	5.0214(1)
	r≤3	r=4	0.2345(1)	0.2345(1)
Jordan	r=0	r=1	48.1265(3)*	27.2554(3)*
	r≤1	r=2	21.2136(3)	16.7785(3)
	r≤2	r=3	4.2755(3)	3.4251(3)
	r≤3	r=4	0.4275(3)	0.4275(3)
Kuwait	r=0	r=1	53.2535(3)*	23.2362(3)
	r≤1	r=2	29.7469(3)	19.0308(3)
	r≤2	r=3	12.1517(3)	11.2035(3)
	r≤3	r=4	0.8559(3)	0.8559(3)
Oman	r=0	r=1	65.2342(1)*	39.2341(1)*
	r≤1	r=2	27.8521(1)	16.1203(1)
	r≤2	r=3	12.2539(1)	9.0135(1)
	r≤3	r=4	2.8868(1)	2.8868(1)
Saudi Arabia	r=0	r=1	50.7214(1)*	30.5124(1)*
	r≤1	r=2	20.5421(1)	11.0124(1)
	r≤2	r=3	10.5965(1)	6.1088(1)
	r≤3	r=4	3.7877(1)	3.7877(1)

Note: \* indicates rejection of null hypothesis of no co-integration at 5%, using MacKinnon-Haug-Michelis (1999) p-values. The values in the brackets are the optimal lag order selections.

&lt;Table 10&gt; Normalized Cointegrating Coefficients with respect to Log Exchange Rate

Country	Coef. of LSP	Coef. of LOP	Coef. of INF
Pre-crisis period			
Egypt	-0.2216*(0.0387)	0.4951*(0.0910)	0.0125*(0.0015)
Iran	-0.1709*(0.0743)	0.0989*(0.0374)	0.0205*(0.0023)
Jordan	-0.1843*(0.0280)	0.3568*(0.0634)	0.0107*(0.0052)
Kuwait	-1.7618*(0.3161)	0.6578*(0.2615)	0.2416*(0.0348)
Oman	-0.1477*(0.0402)	0.1473*(0.1020)	0.0094(0.0121)
Saudi Arabia	-0.6384*(0.1653)	1.7688*(0.3533)	-0.2539*(0.068)
Crisis period			
Egypt	-0.7118*(0.3361)	0.2943*(0.0232)	0.0051*(0.0026)
Iran	-0.1029(0.1558)	0.5934*(0.0854)	-0.0111*(0.0034)
Jordan	-0.1366*(0.0462)	0.2669*(0.0950)	0.0078*(0.0015)
Kuwait	-0.7817*(0.1336)	0.1794*(0.0715)	0.0487*(0.0081)
Oman	-2.5467*(0.4488)	0.8123*(0.2913)	0.0627*(0.0118)
Saudi Arabia	-2.6361*(0.5881)	0.6558*(0.4236)	0.1211*(0.0274)

Note: the values in the brackets are standard errors.\* denotes statistically significant at 5% level.

&lt;Table 11&gt; Normalized Cointegrating Coefficients with respect to Log Stock Price

Country	Coef. of LEX	Coef. of LOP	Coef. of INF
Pre-crisis period			
Egypt	-0.4038(0.3265)	0.6249*(0.0505)	0.01895(0.0151)
Iran	-4.5121*(0.9944)	2.2339*(0.1485)	0.0566(0.0131)
Jordan	-5.8512*(1.1206)	0.5791*(0.2390)	0.1203(0.0214)
Kuwait	-5.4251*(0.9089)	1.9358*(0.0508)	0.0580(0.0278)
Oman	-6.7702*(2.3812)	0.9971*(0.5138)	0.0638(0.1258)
Saudi Arabia	-1.5663*(0.6577)	2.7706*(0.2712)	-0.3977(0.0626)
Crisis period			
Egypt	-0.2216*(0.1001)	0.2032*(0.5214)	0.04215*(0.0022)
Iran	-9.7106*(5.6128)	5.7628*(0.9885)	-0.1083*(0.0279)
Jordan	-7.3191*(1.8264)	1.9533*(0.0248)	0.0572*(0.0143)
Kuwait	-1.2793*(0.2479)	0.2295*(0.0580)	0.0623*(0.0027)
Oman	-0.3926*(0.2061)	0.3189*(0.0527)	0.0246*(0.0024)
Saudi Arabia	-0.3793(0.4824)	0.2488*(0.1139)	0.0459*(0.0102)

Note: the values in the brackets are standard errors. \* denotes statistically significant at 5% level.

The cointegrating equation which is given in Table 10 shows that there is a significant effect of stock price, oil price and inflation rate on exchange rate, with the exception of a few cases. The exchange rates in all the sample countries are negatively related to the stock prices (stock prices have effect on exchange rates) in both sub-periods, while it is positively related to the oil prices. This result is in accordance with a priori theoretical expectations. The impact of inflation rate on the exchange rate of the Middle Eastern countries is mostly positive.

A negative long-run linkage between stock price and exchange rate means that an increase in stock price will lead to decrease in exchange rate or appreciation of the Middle Eastern currencies. This is consistent with the theory behind the linkage between stock price and exchange rate which noted in the section of theoretical framework.

The cointegrating equation which is given in Table 11 shows that there is a significant effect of exchange rate, oil price and inflation rate on stock price, with the exception of a few cases. Stock price in most countries is negatively related to the exchange rate (exchange rate has effect on stock price) in both sub-periods, while it is positively related to the oil prices. However, the table indicates mixed (both positive and negative) long-run relationship results between inflation rate and stock price.

#### 4.3. Results of Granger Causality Test

Tables 12 and 13 present the results of Granger causality tests. The findings for the pre-crisis period suggest that Iran

and Oman are the countries that have bidirectional causality between stock prices and exchange rates in the short-run. Oman has the same causality in the long-run too. The direction of causality in Egypt runs from stock prices to exchange rates in both the short-run and long-run. On the other hand, there exists no interaction among the markets in Jordan, Kuwait and Saudi Arabia in the short-run, while a two-way linkage exists in Jordan and Saudi Arabia in the long-run. However, in the crisis period all the sample countries have bidirectional causality among stock prices and exchange rates in the short-run with the exception of Iran which there is no causal relationship among its stock price and exchange rate.

Based on the results of the ECM model, stock market and exchange rate market significantly have effect on each other and there is bidirectional causality between them in all the sample countries, with the exception of Iran which follows the portfolio-balance approach. Hence, considering the theoretical framework behind the study all the sample countries (except Iran) obey both traditional and portfolio approaches. These results lent support to Bahmani-Oskooee and Sohrabian (1992), Ajayi and Mougoue (1996), Granger et al. (2000), Muhammad and Rasheed (2002), Phylaktis and Ravazzollo (2005), Aydemir and Demirhan (2009) and Kumar (2009), who provided evidence for the presence of both approaches.

According to Granger (1998), when markets are influenced by both portfolio-balance and traditional approaches simultaneously, a feedback loop is expected to

be found via the strength of two approaches. To determine the stronger approach, the signs of the relationships between the variables should be obtained, while the Granger causality test does not provide it.

The results suggest that the relationship between stock prices and exchange rates have been totally influenced by the global financial crisis in the case of Jordan, Kuwait and Saudi Arabia, since in spite of absence of any causal relationship between the variables before the crisis, there is bidirectional causality after the crisis. The results reveal no change in the direction of causality between share prices and exchange rates in the case of Oman after the crisis and its markets are still integrated in a two-way causality.

<Table 12> Granger Causality Test (Pre-crisis Period)\*

Country	Causality	K	F-statistic <sup>a</sup>	t-statistic <sup>b</sup>
Egypt	EX → SP	3	1.9752	-3.196**
	SP → EX	0	8.0927**	-3.0262***
Iran	EX → SP	0	9.7524***	0.2934
	SP → EX	3	3.0452**	-3.4952***
Jordan	EX → SP	4	1.2201	-2.2621**
	SP → EX	0	0.1285	-2.4852**
Kuwait	EX → SP	0	0.1239	-4.0521***
	SP → EX	0	0.1923	-1.4215
Oman	EX → SP	2	3.2935**	-2.2154***
	SP → EX	0	4.5984**	-2.4952**
Saudi Arabia	EX → SP	0	2.5523	-2.0821**
	SP → EX	0	2.0215	-2.2012**

<Table 13> Granger Causality Test (Crisis Period)\*

Country	Causality	K	F-statistic <sup>a</sup>	t-statistic <sup>b</sup>
Egypt	EX → SP	0	4.0488*	-3.5123**
	SP → EX	1	3.9645**	-2.2387**
Iran	EX → SP	0	0.2425	0.3561
	SP → EX	0	2.6754	-3.8964***
Jordan	EX → SP	0	19.9912***	-3.4687***
	SP → EX	4	3.8001**	-3.0342***
Kuwait	EX → SP	0	7.1202**	-3.0192***
	SP → EX	4	6.1021***	-3.3142***
Oman	EX → SP	4	3.2145**	-2.8995*
	SP → EX	1	5.2152**	-2.023*
Saudi Arabia	EX → SP	8	7.8965***	-4.6592***
	SP → EX	4	291.6238***	-36.5296***

\* k is the optimal lag lengths. → Implies Granger cause, e.g. EX → SP implies exchange rate Granger causes stock index. a) F statistic for testing  $H_0: \alpha_{21} = \alpha_{22} = \dots = \alpha_{2m} = 0$  or  $H_0: \beta_{11} = \beta_{12} = \dots = \beta_{1m} = 0$  b) t statistic for testing  $H_0: \delta_1 = 0$  or  $H_0: \delta_2 = 0$  in ECM model. \*\*\*, \*\*, and \* denotes statistical significance at the 1%, 5%, and 10%, respectively.

## 5. Conclusion

This study investigates the causal relationship between stock prices and exchange rates, for six Middle Eastern countries, namely, Egypt, Iran, Jordan, Kuwait, Oman, and Saudi Arabia before and during the 2007 global financial crisis for the period between January 2004 and September 2015. Using Vector Autoregressive (VAR) model, the results suggest that in the case of Jordan, Kuwait and Saudi Arabia, there exist bidirectional causalities after the crisis period but not before 2007. The opposite is true for the case of Iran. Thus, during the crisis period, market participants in Iran cannot use the foreign exchange market as a hedge for investments in the stock market and vice-versa (Hatemi & Roca, 2005). In the case of Oman, there is bidirectional causality between the variables of interest in both periods.

Our findings also indicate the new insight for the Middle East-global markets integration in recent years. Overall, the results of this study indicate that fluctuations in foreign exchange markets can significantly affect stock prices in the Middle Eastern financial markets. This suggests stock market crashes may be prevented by stabilizing the exchange rates through central bank interventions.

## Endnotes

- [Persian] Gulf Cooperation Council countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates)
- The breakpoints which have been obtained by the first trend after the global financial crisis are the same for all countries except Egypt and Iran since they follow a floating exchange rate regime. Details on sub period estimation are available from the authors upon request.
- However, trace and maximum eigenvalue statistic yielded conflicting results in the case of Iran and Saudi Arabia in the pre-crisis period and Kuwait in crisis period.
- According to Cheung, Yin-Wong and K. S. Lai (1993), Johansen tests are biased toward finding cointegration more often than what asymptotic theory suggests. Therefore, we have used EViews By default; EViews will compute the critical values for the test using MacKinnon-Haug-Michelis (1999) p-values. The (nonstandard distribution) critical values are taken from MacKinnon-Haug-Michelis (1999) so they differ slightly from those reported in Johansen and Juselius (1990). (For more information refer to EViews 7 User's Guide, Quantitative Micro Software, LLC, Irvine, CA.)



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# A Fuzzy Based Early Warning System to Predict Banking Distress on Selected Asia-Pacific Countries\*

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## Abstract

This study develops an early warning system (EWS) to prevent the banking crisis. The proposed system incorporates both the perspective of crises and fundamental characteristics of the banking system in each economy. A fuzzy logic method with data from 1990-2009 is employed to construct the EWS of banking crisis based on 21 pre-determined variables from the aspect of total economy, financial and banking sectors. Our results show: Firstly, South Korea recorded higher probability to have a banking crisis in 1997 as there was large foreign debt in dollars. Secondly, China, Australia and New Zealand banking systems appear to be vulnerable to the crisis in 2007. The surge of China export, FDIs and booming stock market were signs of a heated economy. Australia with high commodity prices was also vulnerable to crisis. Thirdly, Australia, China, Japan and New Zealand banking systems appear to be exposed to the higher chance of a crisis in 2010. Japan with deflation coupled with expensive yen did not augur well for its export. Overall, the findings show that in Asian Financial Crisis 1997/98 and Global Financial Crisis 2008/09, many economies are exposed to a higher probability of having the crisis and this shows an urgent need of having surveillance in these economies.

**Keywords:** Early Warning System, Financial Crisis, Banking Crisis, Fuzzy.

**JEL Classification Code:** C53, G01, G21, G32, H12.

## 1. Introduction

In the 1990s, a financial crisis was considered as an event that may occur in an individual economy but the crisis like Asian Financial Crisis (AFC) 1997-98 showed that it could affect the whole economies which have a relationship with the affected economies. The AFC which started from Thailand spread to other neighboring countries like Indonesia, Malaysia, South Korea and Hong Kong within a short span of time. One of the reasons behind in most studies is the unproductive investments guaranteed by the government. Indeed, this huge amount of investment

in mega projects and the mismatch of long-term project with short-term financial instruments are the underlying causes which trigger the start of a crisis. At the same time, the activities of protecting depositors and financial institutions have caused governments to accumulate a huge amount of contingent liabilities. In addition, inter-economies trading activities also allow the crisis to permeate to other economies.

The other source of the crisis was the weak financial markets at the international level. At first, it was not imaginable that whole region was bound to such crisis, but when the panic started in Thailand, investors pushed it to the rest of the region. In fact, the investors' re-evaluations of risks related to Malaysia, Indonesia and South Korea led to a huge outflow of funds from these countries. Investors' pessimistic expectation and their cautious outlook for the region, and agents' knee-jerk reaction and judgment towards the market movements created a contagion in the Asia Pacific region.

However, according to Filardo et al. (2010), the region has improved to regain stability as the result of all effort to reform the institutions. Efforts by policy makers have stopped the sharp capital outflows, fallen GDP, and disruption in stock exchanges. In contrast, for the

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2007-8 Global Financial Crises (GFC) in Asia, the financial and economic infrastructures were completely sound before the crisis occurred. The published data showed that before the crisis, the region had a healthy banking system, bond markets, and sound fiscal policies.

For the banking system, capital adequacy was more than 10 percent and non-performing loans was reported to be low and even reducing for the region. For the mentioned period, loan to deposit ratio is less than 10 percent in the Asia-Pacific region which means they were independent of wholesale funding. Similarly, development in payment system benefited the microstructure of financial market. Increasing market liquidity, stable inflation (less than 6% for the whole region's economies), healthy fiscal policies and relatively stable economic growth were some of the significant development of the regional economies. In addition, budget surpluses were reported in Thailand, Singapore, New Zealand, Korea, Hong Kong, China and Australia in 2007.

In spite of financial soundness in the region, Asia-Pacific economies were not immune from the crisis and the whole region experienced huge instabilities in their economies as well as the banking system. As a result, a comparison between the 2007-8 crisis and East Asian crisis, shows that both of them rose from booms in asset prices which were due to capital inflows. Also, in both crises, the disaster in the real sectors of the economy started once the asset bubble burst, and the effect was transmitted to the banking system due to increase in non-performing loans, and later to the equity market as pessimistic outlook and poor business sentiment led to capital outflows.

As discussed, the crises imposed crucial costs to the economy. Capital outflows and fall in major macroeconomic variables like GDP, consumption, exports and imports impose direct and indirect costs of the economy. As the result, in the aftermath of crises, the credit crunch in the financial system and credit rationing, further exacerbated the crisis. These huge costs highlight the important role of EWS in the prediction of banking crises. Effective EWS can recognize hidden bank runs and the related risks and suggest policies to prevent potential crises or limit the after effects. On one hand, the role of the banking sector in economic development cannot be neglected, however, excessive lending create speculative activities which build asset bubbles, and subsequently trigger crises which can result in serious disruptions of economic activities (Hoggarth, Reis, & Saporta, 2001). So developing and utilizing effective early warning systems would provide the policy makers with tools to deal with the current crisis as well as prevent future crises.

Specifically, the main objective of this paper is to develop an early warning preventing tool for banking crisis

identification. The proposed EWS incorporates a comprehensive perspective of the crises as well as the fundamental characteristics of the banking system for each economy in the studied cases. Also, this research will lead to quantifying the probability of the crisis that relies on a huge variety of the variables. So, in the process of gathering a huge collection of variables in the three most important levels in the economy (total economy, financial sector, and banking sector), this research suggests a richer approach to:

- Design an early warning system to model the systemic banking crises using a fuzzy method.
- Determine the possibility of the occurrence of crisis by transferring a qualitative concept to a quantitative calculation.

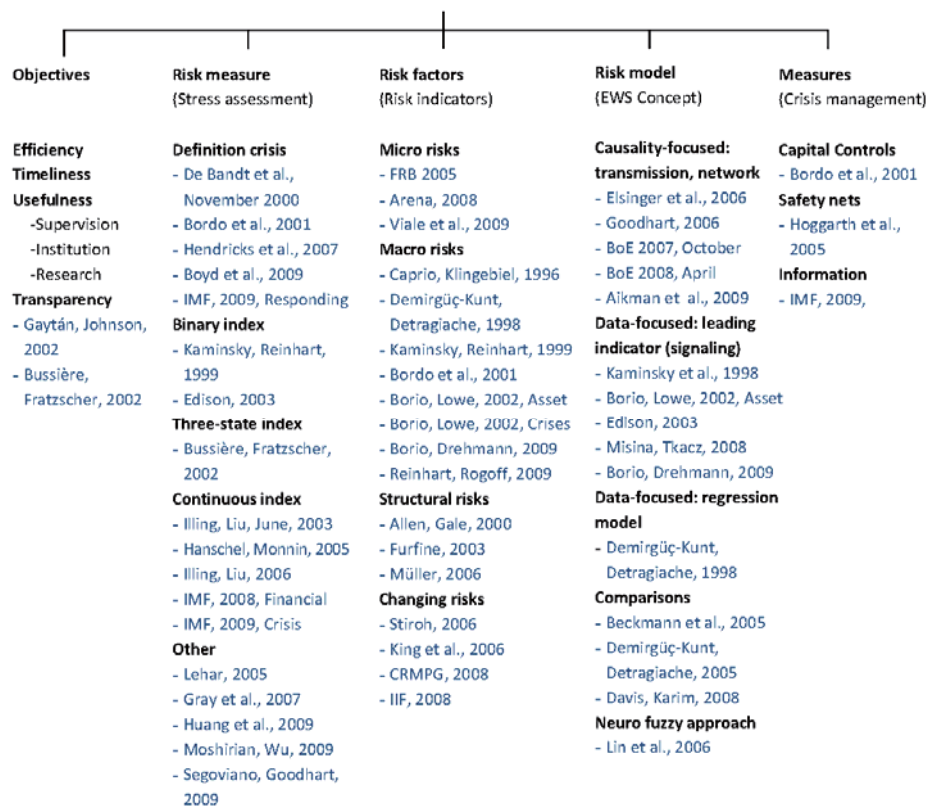
In this study, we consider the Asia Pacific region as our basic case study. The data set includes the emerging and developed economies in the region such as Australia, China, Japan, South Korea, Malaysia, New Zealand and Singapore. In order to analyze the crisis, an index of a crisis is defined according to 21 variables in three levels, total economy, financial sector and the banking sector. The period of time series is the years 1990-2009. Specializing numerical values to economical-critical situations, this study introduces a robust approach to prove the possibility of the crisis in different levels of the economy without engaging in the complicated direct and indirect relationships among them. Utilizing a fuzzy approach this study developed an early warning system that can recognize the crisis and determine its power, according to the historical changes of the variables.

## 2. Literature Review

Totally, the literature on EWSs in banking categorize the major elements of any EWS as below:

- Definition and quantification of the distress
- Models and methodologies
- Distress variables

Combining these three major elements develops different designs of EWSs. The most efficient of these possible systems is chosen according to main objectives and the needs of any user (Davis & Karim, 2008; Gaytán & Johnson, 2002). Figure 1 shows the main elements of EWSs mentioned by different researchers in recent decades.



Source: Gramlich, Miller, Oet, & Ong (2010)

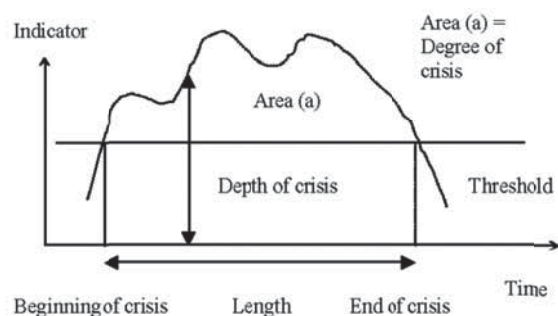
<Figure 1> Main Elements of EWSs

Actually, there is no pre-determined or conceptual definition of the financial crisis before the 1990s. According to Aziz, Caramazza, and Salgado (2000) and Ishihara (2005), financial crisis consists of three main categories: banking, currency and foreign debt crisis. In these studies, financial market inefficiency introduced as the main reason for the crisis that transmits disruptions to the real part of the economy through the banking system. The definition of distress in the banking system is the subject of a lot of prediction models and basically, it can be said the first step in designing such model is to quantify the distress. The output of this process is a particular definition of the crisis that will lead to a particular forecast at a particular time.

According to recorded data on the banking crisis, this kind of crisis origins in two concepts; liquidity and insolvency. Normally, the ratio of demand deposit and capital to a number of assets usually figure out these kinds of crises. In fact, liquidity crisis turns up when a bank cannot meet its creditor obligations and solvency crisis situations when the liabilities grows more than assets. In several types of

research, the instability, financial indices related to assets, liabilities, NLPs and capital are examined to identify this form of crisis. Also, employing some policies by government, such as nationalization or recapitalizing of banks and contractionary policies may be a signal of the crisis in a way (Ishihara, 2005). Additionally, distortion in local currency which associated banking crisis to the currency crisis that is called 'twin crises'.

Indeed, sudden variations in some macroeconomic variables such as liquidity, credit, interest rates, assets, and liabilities can be treated as the signals of a crisis in the banking system. According to Ishihara (2005), simply, the approach to identify a crisis can be introducing an indicator and compare it with an appropriate threshold. Overpassing the indicator of the amount of threshold is a signal of crisis and the gap between these two amounts is the degree of crisis. (Figure 2)



Source: Ishihara (2005)

<Figure 2> Simple Approach to Identify the Crisis

In fact, the role of modeling in an EWS is to connect the distress indicators and the predictions. In modeling a

distress, we are seeking for a rule to link the signals of the market to an effective anticipation and the result of this process is a framework that determines our EWS. Considering 150 papers in the field of early warning methodology, Yucel (2011) shows that the period 2001 up to 2005 is the pick of researchers about early warning models in the world. Also, he introduced the year of 1996 as the starting point of this jump result of globalization. Amongst the models are implied in this period, logit analysis, signal extraction and factor analysis were the most utilized methodologies and fiscal balance, the balance of payments, monetary aggregates, credits, exchange and interest rates and domestic economic indicators are the most employed variables in these studies (Table 1 and Table 2).

<Table 1> The Most Popular Models Used in EWSs

ARMA	2		Artificial Neural Networks	2	2
Forecasts&combinations	4		Exchange market pressure index	4	
Regression (p/np)	8		Indicators&indices	6	10
VAR&simultaneous equations	2		Markov-switching	6	6
VARMA-GARCH	1	17	Bayesian belief revision	1	1
Burrit	1		Simulation	1	
Linear probability model	1		Value-at-Risk	2	3
Logit	21				
Lomit	1	31			
Probit	7				
Analytical hierarchy process	1		CAAMPL	1	
Binary recursive tree	1		CAMEL	2	
Clustering	2		Catastrophe	1	
Diffusion index	2		Damocles (Lehman Brothers)	1	
Discriminant analysis	12		Descriptive	3	
Factor analysis	2		Expert opinion&cualitative	2	
Lachenbruch classification	1		Gini's transvariation	1	
Survival analysis	1		Hill-1975 tail index	1	
Trait recognition analysis	1	23	MIMIC	1	
Signal extraction	14		Ratio analysis	1	
Signal extraction (real time)	1	15	Survey	1	
			Topological analysis	1	16
			Total		124

Source: Yucel (2011)

<Table 2> The Most Popular Variables Used in EWSs



M1,M2,M3 (excess balances)	8		Fiscal balance	24	24
M1,M2,M3 (multipliers)	11		Capital account	5	
M1,M2,M3 (other ratios)	14		Current account	16	
M1,M2,M3, money	15		Exports&Imports	46	
M1,M2,M3/Reserves	26	74	Debt&debt service	9	
Bank deposits	11		External debt	19	
Bid-Ask spread	4		FDI&Portfolio	8	
CB credits	8		FX reserves	26	129
Credit&credit growth	9		Exchange rates	11	
Domestic credit	33		Interest rate repricing period	4	
Household debt	1		Interest rates&differentials	15	
Loan volume volatility	5	76	Real Exchange Rates	27	
Loans&loan growth	5		Real Interest Rates	24	
Average maturity&duration	9		Terms of trade	17	98
Capital adequacy	5		Expectations	5	
Non-Performing Loans	13	27	Inflation	27	32
Capacity utilization	1		Political&Institutional&Social&Geographical	42	42
GDP&growth&composition	44		Return on Assets&Return on Equity	9	
Indicators	6		Value at Risk	3	
IP&economic activity	12		Working capital	2	14
Stock market&prices	31	95	Financial ratios&other	382	382
Unemployment	1		Total		1005
World growth&performance	4				
World&DC interest rates	8	12			

Source: Yucel (2011)

As it can be seen in the above tables, the early warning models used in banking can be grouped into a few major categories: signal extraction models, binary variables models, supervisory models, statistical models and artificial neural networks. Early warning explanatory variables are based on a theory of what causes risk. Since the 1980s, literature on EWSs consists of a transformation in explanatory variables of systemic distress.

In addition, the literature shows there is a complete evolution of the theories about the origins of systemic distress. In the present study, it is shown that factors like macroeconomic deterioration, diverging developments, financial system shocks, banks' idiosyncratic risks, and contagion among institutions in the real economic and financial sectors can lead to financial system's exposure (Illing & Ying, 2003).

In other studies, implying the concept of deviating macroeconomic and financial variables, a design of gap indicator series is presented. The gaps are calculated as deviations of variables from their means, so they are the signs of pressures in the system. In terms of computation, gaps avoid the problems associated with calculating risk factors on an absolute basis. The earlier works view the credit/GDP gap as a fundamental mismatch between economic variables. In the later works, several factors are

added, such as commodity prices and international factors but not incorporated due to data limitations. Hanschel and Monnin (2005) are one of these cases that utilize this method.

The crisis of 2007-08 shows there is a need to develop the EWSs. From the consequences of recent turmoil, it is obvious that the common indices of distress such as capital asset ratios and NPLs do not present a complete perspective of the environment in which the bank is acting. Furthermore, an updated EWS needs to integrate several dimensions of the distress.

### 3. Materials and Methods

After the banking crises in the 1990s, several attempts have been devoted to the structure of a EWS for estimating the probability of the next crisis with the intention of avoiding its recurrence. Different crisis in the world tells us it is needed to prevent or at least a managing function such damage to the world economy, discovering an efficient early warning solution and method that has been turned out an important issue. Nowadays, expert systems have risen suddenly such as Fuzzy Logic and Neural Network of which have been manipulated for providing assistance managers

in generating real-world decision making. The expert system provides the facility of embedding the past experiences into the object system; fuzzy logic makes it possible to describe the problem how it is as close as possible to the process of human reasoning accompanying accommodating the uncertainty and inaccuracy entangled with the data.

Although there are difficulties coming up with the data acquisition of the knowledge base for both fuzzy logic and expert systems and the difficulties with the conventional illustration over the appropriate structure of the "real" relation among the Neural Network model variables which inhibited the implementation of the conventional models (Lin, Khan, Chang, & Wang, 2008). In 1965, this strategy was first proposed by the Zadeh complicated systems control that is too hard to be analyzed by traditional mathematics. But the fuzzy logic theory did not find wide popularity in various applications such as economics, management, medicine, or process control until the 1970's (Zadeh, Klir, & Yuan, 1996).

Mamdani and Assilian (1975) introduce the first application of fuzzy set theory for controlling a small laboratory steam engine. After the success of this theory, many scientists were inspired to attempt to implement the fuzzy logic, not only in engineering applications but also in other disciplines of science, particularly in Economics. As an example, Alam, et al.(2000) illustrates the fuzzy clustering provides proper classification tools for estimating possibly failing banks. The coefficients of membership that are developed by the fuzzy clustering algorithm are probabilities of membership group in the Zadeh sense (Kandel, 1982).

Perceptive organs help human brain interprets imprecise and incomplete sensory information. Similarly, fuzzy set theory tries to provide a systematic calculus to deal with such information linguistically, and performs numerical computation by using linguistic labels stipulated by membership functions. To model human expertise in any area, the fuzzy inference system (F.I.S.) should be designed properly (Zadeh et al., 1996). A classic set is a crisp set with a crisp boundary. For example, a classical set A of real numbers smaller than 8 can be expressed as below:

$$A = \{x|x < 8\} \quad (1)$$

It is very clear and unambiguous boundary 8 such that if x is smaller than this number, then x belongs to this set A; or otherwise x does not belong to A. Classical sets are useful for various applications nevertheless they are too abstract and imprecise to reflect the human nature of thoughts. In spite of classical sets, a fuzzy set, as what its name shows, is a set without a crisp boundary. In fuzzy sets, members have transitions between "does not belong to a set" and "belongs to a set" smoothly. Membership functions define

this gradual transition. They make it flexible to modeling common physical values by linguistic expressions such as "speed is low" or "current is high". The term fuzz does not imply that members of a set are random values. But it refers to uncertain nature of physical and concrete parameters in abstract belonging concepts (Zadeh et al., 1996).

### 3.1. Fuzzification

Fuzzifier measures input variables, scales and maps them according to membership function. By fuzzification input signals and variables are scaled to crisp input quantities with numerical values (fuzzy quantities) according to membership functions. Usually, shapes and numbers of membership functions are chosen by the user.

All membership functions have values between 0 and 1 implying on of belongings of a quantity to a fuzzy set. Value 0 indicates that the quantity does not belong to the set absolutely and value 1 implies that the quantity belongs to the fuzzy set certainly. As what's discussed, M.F. parameterizes fuzzy set completely. Since most fuzzy sets have a universe of discourse X consisting of the real line R, it would be impractical to list all the pairs defining a membership function. So a M.F. is expressed with the help of a mathematical formula. A MF can be parameterized regarding to the complexity required.

### 3.2. Rules

Proposing the concept of linguistic or "fuzzy" variables by using fuzzy variables(Zadeh, 1973) claim that nouns can be used for sensor inputs such as "pressure," "displacement," "flow," "temperature," and "velocity". The fuzzy variables are adjectives that describe the variable (e.g. "largely negative" error, "small negative" error, "zero" error, "small positive" error, and "largely positive" error). For describing an error, one at least may simply have "positive", "zero", and "negative" variables for each of the parameters. For more comprehensive model additional ranges such as "very large" and "very small" could also be included which can be omitted in a basic system.

After the definition of linguistic variables and values, the rules of the fuzzy inference system can be formulated. These rules map the fuzzy inputs to fuzzy outputs. This mapping takes place through the compositional rule of inference, which is based on Zadeh's extension of modus ponens, which is nothing more than the familiar if-then conditional form. A fuzzy if-then rule (also known as fuzzy rule) assumes the form If x is A then why is B, where A and B are linguistic values defined by fuzzy sets on the universe of discourse X and Y, respectively. "x is A" is called the antecedent or premise, while "y is B" is called



the consequent or conclusion. This rule is also abbreviated as  $A \rightarrow B$ . The antecedent normally consists of some combination of the inputs and the consequent consists of output variables (Zadeh et al., 1996). The antecedent takes the form:

$$\tilde{u}_1 \text{ is } \tilde{A}_1^j \text{ and } \tilde{u}_2 \text{ is } \tilde{A}_1^k \text{ and, } \dots, \tilde{u}_n \text{ is } \tilde{A}_n^k \quad (2)$$

where

$$\tilde{A}_i = \{\tilde{A}_i^j : j = 1, 2, \dots, N_i\} \quad (3)$$

$\tilde{A}_i^j$  is the  $j$ th linguistic value of the linguistic variable  $\tilde{u}_i$  defined over the universe of discourse  $U_i$ . The linguistic variable  $\tilde{u}_i$  and its linguistic value  $\tilde{A}_i^j$  are combined with the other variables and values on the antecedent by the fuzzy AND or OR operators. The choice depends upon the desired inference system. The AND operator corresponds to the intersection of the fuzzy sets and the OR operator corresponds to the union of the fuzzy sets. The antecedent need not require all linguistic variables and indeed could contain as few as one. The consequent takes the form

$$\tilde{y}_i \text{ is } \tilde{B}_i^p \quad (4)$$

where

$$\tilde{B}_i = \{\tilde{B}_i^p : p = 1, 2, \dots, N_i\} \quad (5)$$

$\tilde{B}_i^p$  is the  $p$ th linguistic value of the linguistic variable  $\tilde{y}_i$  defined over the universe of discourse  $Y_i$ . Assuming all premise terms are used in every rule and a rule is generated for each possible premise combination, number of total rules will be:

$$\prod_{i=1}^n N_i = N_1 \cdot N_2 \cdot \dots \cdot N_n \quad (6)$$

where  $n$  represents the number of linguistic variables in the antecedent and  $N_i$  is number of linguistic values per variable (Zadeh et al., 1996).

### 3.3 Defuzzification

Different defuzzification techniques exist, but the most commonly used are the centroid and the weighted average, respectively. The centroid method tries to determine the point at which a vertical line slices the combined set into two equal parts. This point is known as the center of gravity (C.O.G.) and its mathematical expression is shown below:

$$COG = \frac{\sum \mu_a(x) * x}{\sum \mu_a(x)} \quad (7)$$

where  $\mu_a(x)$  is the MF of fuzzy set  $A$  for the crisp value  $x$ . The weighted average (W.A.) method calculates a defuzzified value using the following mathematical expression:

$$WA = \frac{\mu(x_1) \times x_1 + \mu(x_2) \times x_2 + \dots + \mu(x_i) \times x_i}{\mu(x_1) + \mu(x_2) + \dots + \mu(x_i)} \quad (8)$$

where  $\mu(x_i)$  is the fuzzified input corresponding to the appropriate crisp value  $x_i$  for each input fuzzy set. The election of cluster-heads requires a new fuzzy expert system.

In general, the steps for developing a new fuzzy expert system are: define appropriate linguistic variables, determine the fuzzy sets, define the rules, encode the fuzzy sets and rules in order to perform fuzzy inference, and, finally, evaluate the system. The linguistic values are the input variables to the system, the total number of rules depends on the number of input variables according to the rule  $n^k$  where  $k$  is the number of input variables in the system and  $n$  is the number of membership functions of each fuzzy set.

## 4. Results and Discussion

The cases are examined in this study is selected from the Asia and Pacific countries that experienced at least two huge financial crises in their economic history. There is no doubt the banking system sustained the shocks and after effects arose from the financial system as well. The periods of 1997-8 and 2007-8 were the years of crisis in the region as well as the other parts of the world. Considering the trend of basic indicators in different markets of the mentioned economies, dramatic turbulences can be seen around the period of both crises. This may be a witness of the contagion phenomenon in the region significantly when it is analyzed with respect to the global economy.

The data set used for this project consists of Australia, China, Japan, South Korea, Malaysia, New Zealand, and Singapore in the period of 1990-2009. The data are extracted from IMF, World Bank and Econstat databases and it is a compound of signal variables in the three levels of the total economy, financial sector and the banking sector. The list of signal variables and their definitions are shown in Appendix 1.

The selection of the explanatory variables is based on the different kinds of literature listed in previous research and the popularity of the variable usage. Also, it is based on the

data availability in the selected countries. It should be mentioned in the cases with missing data, a method of interpolation and extrapolation is applied to simulate the data. In most of the studies, the focus is just on one or two aspects of the crisis and there are few types of research which try to consider the crisis as a contagious phenomenon.

In this study, the banking sector is not assumed as an isolated market and despite the data limitations, the effort is to consider all the factors may lead to the critical situations. Therefore, entering lots of explanatory variables in the model limits the usage of prevalent statistical methods where these methods are not that much successful in analyzing the historical behavior of the variables. In fact, the statistical models are constructed on classical assumptions which limit their ability in explaining the dynamic variations.

Our initial approach employed to analyze the behavior of the signal variables is Fuzzy and the crisis index defined according to the (Hanschel & Monnin, 2005) EWS study. In order to construct an index for determining the crisis, there is a need to combine all the variables together and transform them to a unique variable that is the representative of the crisis. To come up with the problem of different weights the approach of variance equal weights is applied to devote equal weights to each variable. This way the difference between every variable and its average is divided by the standard deviation to approach the standardized X:

$$SX = ABS\left(\frac{X-\bar{X}}{\delta}\right) \quad (9)$$

The absolute value is constructed to avoiding of canceling off the negative and positive effects in the index. Lastly, the distress index will be calculated as below:

$$Y_t = \sum_{i=1}^t SX_i \quad (10)$$

Next step is the heart of analysis of this project. At this step, a differentiation is applied to each successor  $Y_t$ . In mathematical explanation, it is defined as below:

$$\Delta Y_t = Y_t - Y_{t-1} \quad (11)$$

Based on principle differential definition,  $\Delta Y_t$  is defined the slope or change in each year and also can be used to predict the rate of variations in the coming year. In fact, the slope shows the intensity of the crisis; the more amount of slope –either negative or positive– the more tensivity of the crisis. In a simple illustration, the estimation of next year distress index can be defined as:

$$\hat{Y}_{t+1} = Y_t + \Delta Y_t \quad (12)$$

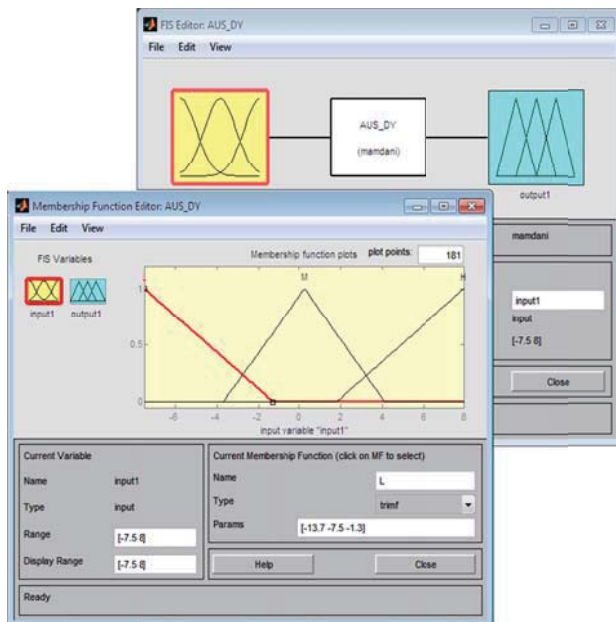
Where  $\hat{Y}_{t+1}$  represents the estimated distress index in the coming year. Besides providing the slope, the average and the respective standard deviation of each year's distress index are provided to be implemented in the Fuzzy logic estimator function.

The first fuzzy logic estimator function is the defined basis on this slope. It means, the slope is the input of the Fuzzy Logic Estimator function, and this input is verified regarding the average and calculated a standard deviation. In the project definition, if the input of the function, slope, is in the range,  $\bar{X} - \delta < \Delta Y_t < \bar{X} + \delta$  the coming next period risk is low and if the slop is out of the range,  $\Delta Y_t < \bar{X} - \delta$  and  $\Delta Y_t > \bar{X} + \delta$  the next coming period risk is high. The rule of this fuzzy function is defined as below:

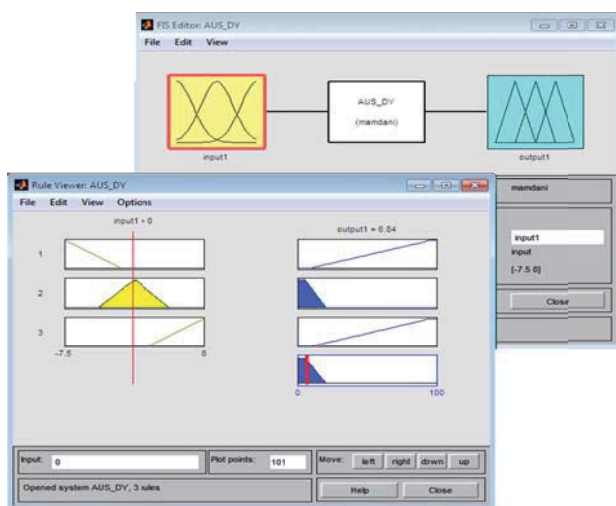
$$\begin{cases} \text{If INPUT is MEDIUM then OUTPUT is LOW} \\ \text{If INPUT is LOW then OUTPUT is HIGH} \\ \text{If INPUT is HIGH the OUTPUT is HIGH} \end{cases} \quad (13)$$

The next step is defining our member functions and the respective ranges. In Australia case, for example, in the year of 2009, the average is 0.234 and the standard deviation is 3.877; according to equations, the confidence range is between  $0.234 - 3.877$  and  $0.234 + 3.877$  equals between  $-3.643$  and  $4.111$  defining the input medium member function, considering the middle point equals to average number, 0.234.

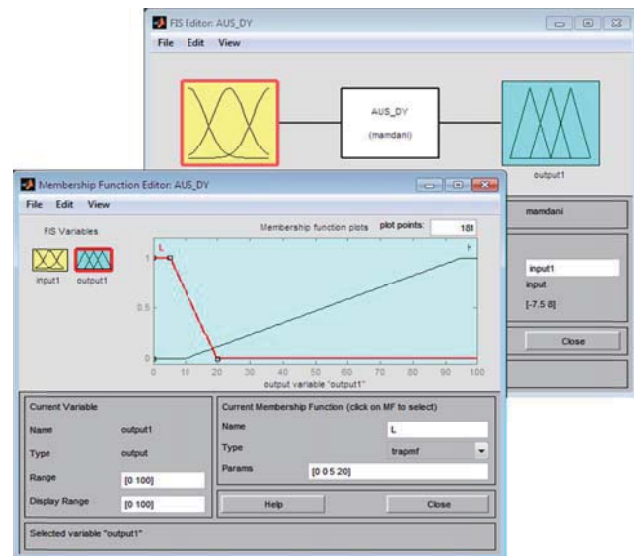
In the project, the lowest critical range is defined as  $\bar{X} - (2 * \delta)$  and the highest critical range is defined as  $\bar{X} + (2 * \delta)$ , so the lowest and highest critical ranges equal to  $0.234 - (2 * 3.877) = -7.52$  and  $0.234 + (2 * 3.877) = 7.99$  respectively. It is clear all lower or higher values than the ranges are rounded to the nearest in range value. The output is constituted of two member functions, High and Low, considering the lowest value is 0, equals to 0% and the highest range is 100, which equals to 100%. The Low member function range is between 0 to 20, and the High member function range is between 10 to 100. In fact, the final result of the designed system indicates the probability of the coming period crisis. Regarding the aforementioned, the resulted Input and Output member functions, and rules are shown in Figures 3 to 5.



&lt;Figure 3&gt; Fuzzy Logic Input Member Functions



&lt;Figure 4&gt; Fuzzy Logic Rule Definition



&lt;Figure 5&gt; Fuzzy Logic Output Member Functions

The fuzzy logic function is extended for all selected countries by the same construction procedure. The resulted crisis probability for those countries in 1997, 2007, and 2010 are provided in Tables 3 to 5 respectively. Based on principle differential definition,  $\Delta Y_t$  is defined as the slope or change of index in each year and also can be used to predict the rate of variations in the coming year. In fact, the slope shows the intensity of the crisis; the more amount of slope –either negative or positive- the more the intensity of the crisis." This amount shows the power of the shock.

&lt;Table 3&gt; Crisis Forecasting for 1997

Country	$\Delta Y_t$	Average	ST Deviation	Probability
Australia	0.756	-2.39	3.107	63%
China	-3.436	-1.657	4.404	8%
Japan	-3.323	-2.540	1.937	8%
S. Korea	-2.492	-0.467	2.408	53%
Malaysia	4.826	3.079	6.912	8%
New Zealand	-2.412	1.142	5.283	7%
Singapore	-0.387	-1.192	3.576	7%

As the table above show  $\Delta Y_t$  can be a proper signal of crisis resulted in the cases that this amount shows a peak the probability of the crisis which estimated by the system also rises and vice versa. In 1997, South Korea recorded higher probability to have a banking crisis from the EWS. South Korea had a large foreign debt denominated in US dollars in 1997. In the hindsight, Korean Won tumbled in low value after the Asian financial crisis struck in July 1997. China and Japanese banking system are also vulnerable.

**<Table 4>** Crisis Forecasting for 2007

Country	$\Delta Y_t$	Average	ST Deviation	Probability
Australia	4.315	-0.786	3.094	68%
China	4.635	-0.432	3.511	67%
Japan	0.388	-0.671	2.286	8%
S. Korea	0.287	0.324	4.064	7%
Malaysia	1.894	0.632	4.966	7%
New Zealand	5.212	0.711	4.233	63%
Singapore	1.665	-0.233	4.298	8%

In 2007, China, Australia and New Zealand banking systems appear to be vulnerable to crisis. The surge of China export, the influx of FDIs and booming in the stock market are some of the signs of heated economy.

**<Table 5>** Crisis Forecasting for 2010

Country	$\Delta Y_t$	Average	ST Deviation	Probability
Australia	8.914	0.234	3.877	70%
China	4.991	-0.054	3.798	65%
Japan	6.042	-0.165	2.644	70%
S. Korea	0.277	0.467	3.737	7%
Malaysia	-1.013	0.138	4.744	7%
New Zealand	-5.494	0.391	4.148	67%
Singapore	2.35	0.664	4.671	8%

Similarly in 2010, Australia, China, Japan and New Zealand banking systems appear to be exposed to the high chance of the crisis. Japan with internal problem of deflation and stagnant economic growth, coupled with the high value of Yen in international market exposes its economy to slow growth and higher non-performing loans in the banking sector.

As it can be seen in the tables mentioned in all the years covered in the results, the big economies have more exposure to the crisis. It may be because they are more dependent on the global economy. The other reason is because they are big economies with higher GDP and M3, the shocks are more prevalent in these countries. It can be said that there is no guarantee that developing economies can get rid of the crisis and the costs may be higher.

## 5. Conclusion

In this study, we tried to develop an early warning system that can recognize the crisis and determine the power of it

according to the historical changes of the variables. The advantage of this study compared to the previous studies is the variety of the variables implied. However, this can be considered as a disadvantage if the employed modeling approach could not explain the behavior of the variables logically as statistical models lose their efficiency when a number of variables goes up. The problem of stationary is the other limitation for using these models.

This way, in order to solve the problem we employed a fuzzy approach to get rid of the time-consuming statistical analyses. Indeed, the fuzzy approach provides us the possibility of describing the shocks without engaging with the limitations of data and statistical models. On the other hand, most of the studies used mathematical approaches such as fuzzy logic have employed just a few variables in their analyses because of the limitation of logic model and processing. In this study, defining a comprehensive index of crisis we consider a wide variety of important variables in different economic dimensions and use it as a tool for modeling the crisis that relies on fuzzy logic theory.

Our results show, firstly, in 1997, South Korea recorded higher probability to have a banking crisis from the EWS. South Korea had a large foreign debt denominated in US dollars in 1997. Secondly, in 2007, China, Australia, and New Zealand banking systems appear to be vulnerable to crisis. The surge of China export, the influx of FDIs and booming in the stock market is some of the signs of a heated economy. Australia with uncertainty prices in the commodity is also vulnerable to crisis. Thirdly, in 2010, Australia, China, Japan and New Zealand banking systems appear to be exposed to the high chance of a crisis. Japan with internal problems of deflation and stagnant economic growth, coupled with the high value of the yen in international market exposes its economy to slow growth and higher non-performing loans in the banking sector.

This way it can be claimed that our results show the defined signal of the crisis can properly illustrate the critical situations. In the cases when there is a shock in the crisis index, the probability of the crisis, which is estimated by the system also shows rising and vice versa. The other interesting issue is that the trend of the index completely can explain the behavioral changes of the studies economies.

Also, in the critical years, more powerful economies are exposed to a higher probability of a crisis and this issue obviously shows the urgent need of crisis monitoring in big economies.

This way it can be said there is no guarantee that powerful economies are immune from the crisis and the cost may be higher.

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# Eurasian Economic Union: Asymmetries of Growth Factors\*

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## Abstract

The aim of the study is to assess the asymmetry of influence of factors of economic growth of national economies, which are included in the integration. Unlike previous research, the scientific significance of the obtained results consists in the use of a new method of study – external demand as a factor of economic growth, disaggregated into two components. The first is net exports mutual trade in goods within integration associations. The second is net exports of foreign trade in goods outside the integration. By use of these methods we have evaluated the contribution of these factors on economic growth of the Customs Union and the Common Economic Space (CU/CES), as well as Kazakhstan, Russia and Belarus. In the conducted analysis of scientific research was based on the fact that the economies of the member (CU/CES) are very different in scale, economic potential and volume of foreign trade. Based on this research we conclude: integration is developing successfully and efficiently only with the rise of the national economies of the member countries; to enhance economic growth and competitiveness of the countries of the Eurasian integration it is necessary to increase the volume of mutual trade of member countries of this integration.

**Keywords:** Globalization, Integration, Economic Growth, External Demand, Domestic Demand, Net Exports Trade.

**JEL Classification Code:** F14, F15, F62.

## 1. Introduction

In the modern world the relationship of globalization and regional integration becomes a rather topical problem. Globalization is diverse process of development of the world economy, which leads to new integration blocs and unions. Regional integration is a complex process, largely dependent on the specific characteristics of each individual case where there are no rules that would be both universal and practical policy in relation to integration agreements. Dialectics of interaction of processes of globalization and integration confirmed that:

- Firstly, the establishment of integration associations is a natural reaction to the negative effects of globalization, particularly the instability of the world economic system.
- Secondly, the tendency to the creation of an integrated global system global partnership (between the integration associations).

It is an undisputed fact that economic integration is a means of resolving contradictions of globalization. The value of integration is determined by the creation of its opportunity to enhance the competitive position of the participating countries in the uncompromising struggle for world markets, sources of raw materials and energy resources, new technologies, investments, etc. Along with this, the rich experience of Western European States clearly shows that integration enhances competitiveness of national economies. The establishment of integration associations contributes to their opposition to the largest transnational and national economic structures can pose a real threat to the sovereignty of developing countries and emerging markets (Khusainov, 2012).

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At the turn of 80-90-ies of XX century the process of globalization has caused two interrelated phenomena: the decline of the role of the nation-state and the emergence of regional groupings (blocks). At the same time in modern conditions, regional integration has become the dominant trend of development of the world. In fact the whole world today is a set of regional blocs. In Western Europe, North America, South America, Southeast Asia, the former Soviet Union and Africa are the major regional enterprises, related to General economic and geopolitical interests. Goals and reasons for creating them was different, but in the context of globalization of the world economy they are all aimed at defending national interests of a group combine their states. And this is their strength, comparable with the possibilities of a single country.

In the modern global economy prosperity, the role and place of the state, to a certain extent depends on the ability to function effectively in integration associations, defending national interests, which is a very non-trivial problem.

In this context it is very important to evaluate factors of economic growth, integration associations, and national economies of the member countries. There is a certain amount of research aimed at identifying the effects of participation of any country in the integration associations. However, very few academic works that explore the contribution of various factors, in particular, of foreign and mutual trade and domestic demand to economic growth. This is the novelty of the conducted research.

Economic phenomena and processes that occur in integration cannot be in equilibrium. Moreover, the national economies under the influence of transformational change (and not only them, as will be shown later) accumulated asymmetries, which to disturb the balance and to create a certain imbalance in their integration development. There are also asymmetries that came from the previous economic system.

Asymmetry is a characteristic feature of globalization and, as a consequence, the world economic development. However, the asymmetry inherent in the development of not only the global economy, but almost all of the integration formations, of which there are more than two hundred. These are the asymmetry in the Eurasian integration Association. And therefore, *this research paper aims to identify and analyze the asymmetry.*

The study is divided into the following sections. The Section 2 proposes to consider the literature aspects of the economic process and growth. Section 3 sets the methods of net exports of goods within the integration and net exports external trade in goods outside the integration. Section 4 is a concluding part.

## 2. Literature Review

Economic growth is the most pressing problem of economic theory and practice. In the world economic science to problems of economic growth is dedicated to the many scientific papers. This is evidenced by numerous studies, including the famed Cambridge debate on capital theory, in fact, despite a wide range of issues. The significance of this debate is crucial in methodological terms, and applied economic-mathematical aspect. Since 1950-ies, this debate has involved in its orbit a lot of economists, including the "famous" scientists of the first magnitude, and went far beyond the discussion of the problem of capital (Dzarasov, 2004).

The discussion was conducted by two groups of scientists' economists – English Cambridge and American Cambridge. Thus, the English Cambridge were presented scientific papers of Sraffa (1960); Pasinetti (1966); Harcourt (1969); Robinson (1980); Cohen (1989), which examined the measurement of capital models aggregated production function. But, American Cambridge was presented scientific works among them Nobel laureates like Modigliani and Miller (1958); Samuelson (1962); Solow (1963), which studied theories and models about the general equilibrium.

Further, important task is to explain the reasons for the growth of real output in the long term, to perform various scenarios of this growth, to determine the factors influencing economic growth. This task helps to identify the causes of cross-country differences in living standards and identify ways to eliminate them. From a chronological point of view count modern theories of growth have begun from the work of Ramsey (1928). The problem of optimization of the households, which studied by Ramsey gave impetus not only to growth theory but also the theory of business cycles, consumption, prices, and assets. However, the most complete view of the neoclassical model of economic growth was obtained in the works of Solow (1970) and Swan (1956), then Solow-Swan growth model. A significant part of modern theories of economic growth aimed at generation of external demands specified in the growth model of Solow-Swan focused on aspects of the determinants of economic growth. Thus, using the proposed growth model can be considered optimum economic growth, which is characterized by the highest possible level of consumption.

Since the advent of Solow-Swan growth model, these aspects represent some of the most promising areas of economic science. In particular, Russian researchers have focused on the determination of the values of the factor of technological progress for economic growth. In this regard, mention must be made of a number of concepts for long-term economic development and forecasting, a long time to

develop in Russia. They are based on different theoretical aspects: methodology multivariate analysis of the dynamics of scientific and technical progress as a long-term development of the level of public technology (Lvov, 1990); in the successive stages of theory of scientific progress (Anchishkin, 1989); the theory of long-term economic development based on the concept of technological structures (Glazyev et al. 1992); development of evolutionary economic theory (Maevsky, 2003; Inshakov, 2004).

Then, some economists noted that increased income inequality reduces economic growth, but growth increased of inequality in the long run (Herzer & Vollmer, 2013). Other economists postulate that in some periods, inequality will grow more rapidly than the wealth accumulated labor (Piketty, 2014). It goes without saying that in our research is use of a new method of study – external demand as a factor of economic growth, disaggregated into two components: net exports mutual trade in goods within integration associations and net exports of foreign trade in goods outside the integration.

### 3. Methods

The proposed study aimed to assess the asymmetry of influence of factors of economic growth of national economies, which are included in the integration. The novelty of the methodology that external demand disaggregated into two components:

- net exports (difference between exports and imports) of goods within the integration of education, i.e. net exports in mutual trade;
- net exports external trade in goods outside the integration.

Domestic demand was also disaggregated into two components – the final consumption and fixed capital investments. Accordingly, in this research evaluated the contribution of these factors on economic growth of the Customs Union (CU) and the Common Economic Space (CES), as well as Kazakhstan, Russia and Belarus, which have formed this association.

The methodology of our study used three instrumental variables. The essence of this method consists in the following. The contribution of net exports mutual and foreign trade (net of mutual trade) in real gross domestic product (GDP) is calculated as the average of changes in real volumes for a certain period of time divided by the value of real GDP in the initial year of this period. Similarly calculate the contribution of final consumption to the growth rate of real GDP. The contribution of investment in fixed assets in the growth rate of real GDP is calculated as the difference

between average annual growth in real GDP and a total contribution of net exports mutual and foreign trade, and final consumption.

For the correctness of the assessment and comparative analysis that was conducted for the period 2004-2014, the values of all indicators were converted to constant USD in 2005 year. Net export of goods of mutual and external trade of Kazakhstan, Russia and Belarus transferred in a comparable form with the purchasing power indices of exports. These indexes are taken from statistics UNCTAD data base (UNCTAD, 2014). Foreign trade indicators in current prices were taken from Trade map database (TM, 2014), GDP and final consumption were taken from the World Bank database (WBDB, 2014).

#### 3.1. General Comments on the Relationship of Economic Growth and Trade

Analysis of the calculations suggests a remark on the impact of foreign trade on economic growth. Foreign trade generally stimulates economic growth and ultimately contributes to public welfare and, consequently, to poverty reduction. In some economic studies it is proved theoretically that the impact of trade on welfare is always positive in the absence of market failures and distortions caused by economic policy (Stiglitz & Charlton, 2005). If the failures and distortions do occur, the impact of trade on economic growth can be both positive and negative. Despite the fact that in the economic research have accumulated empirical experience in building models, there are certain conceptual and technical difficulties that impede the establishment of links between trade and economic growth (Winters, 2004).

This is obvious there are some reservations in the general rules.

Firstly, participation in foreign trade is associated with certain costs. In particular, it makes the country vulnerable to world markets from the impact of protectionist measures taken by trading partners. Moreover, this vulnerability is particularly acute where exports or imports mostly raw materials, as commodity prices more volatile than manufactures. So, for example is the economy of Kazakhstan, Russia and some Latin American States, including those in MERCOSUR.

Secondly, in the case of market failures or distortions caused by economic policies, trade can have a negative impact on economic growth. Ultimately, this affects the public welfare. For example, if trade between two economies generated by artificial specialization and is conducted without due regard to the comparative advantages of these countries, this may lead to slower

economic growth in both countries. Unwanted is also to increase the volume of exports by lowering export prices. This can lead to "depleting growth" in which the production expansion is accompanied by a decrease in social welfare. So, for example is the export from the republics of the USSR (export of copper from Kazakhstan, the trade of which was carried out from the so-called center, i.e. the Union Ministry of non-ferrous metallurgy). In particular, copper, which in 1990 accounted for a quarter of the export potential of the Republic (3.2 billion USD) exported for internal very low prices and sold abroad at world prices, which were significantly higher than domestic. As a result, the export of copper had positive effects on economic growth of Kazakhstan and the increase in social welfare in the Republic. Another example is the export of Uzbek cotton. And these "experiments" in foreign trade are numerous.

Thirdly, in order to participate in foreign trade and to reap the benefits, the government should have a clear and sound economic policies, relevant institutions and infrastructure for its development and support. However, the creation of institutions and infrastructure of foreign trade requires quite a long time. Thus economic policy must organically include

trade policy, policy in the field of competition, investment policy, favorable foreign exchange and tax regime, transport and communication infrastructure, logistics services, and a number of other important components.

### 3.2. Evaluation of the Contribution of Factors to Real GDP Growth in the CU/CES and Incoming of Countries-Members.

Overall, it is difficult to compare the associations of integration due to very different scales of their economies, the significant differences and asymmetries in levels of development of countries in them. However, the comparative analysis of the key macroeconomic parameters of integration structures allows identifying the main trends of their development in the global economy. Thus, we propose to analyze the contribution of net exports mutual and foreign trade, final consumption and investments in fixed assets in the annual average real growth with total GDP of the CU/CES (Table 1).

**<Table1>** The contribution of net exports mutual and foreign trade, final consumption and investments in fixed assets in the annual average real growth with total GDP of the CU/CES in 2004-2014 years, in %

Indicators	Customs Union (CU) and Common Economic Space (CES)									
	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
GDP	7.1	7.5	8.5	6.7	-1.0	-1.2	4.7	4.0	2.6	1.4
Net exports in mutual trade	-0.06	-0.03	-0.01	-0.02	-0.01	<b>0.14</b>	<b>0.09</b>	-0.24	-0.29	-0.12
Net exports of foreign trade	<b>15.1</b>	<b>17.6</b>	<b>14.7</b>	<b>13.4</b>	<b>13.2</b>	<b>13.9</b>	<b>14.5</b>	<b>14.5</b>	<b>13.6</b>	<b>13.3</b>
Final consumption	<b>6.9</b>	<b>7.9</b>	<b>7.7</b>	<b>1.8</b>	<b>0.3</b>	<b>4.3</b>	<b>5.4</b>	<b>4.9</b>	-37.8	-39.1
Investments in fixed capital	-14.9	-18.0	-13.9	-8.4	-14.4	-19.5	-15.3	-15.2	<b>27.1</b>	<b>27.3</b>

Note: Bold italics indicate values of positive factor of economic growth mentioned integration associations

According to the analysis of indicators was obtained the following results:

Firstly, the main contribution to the growth of real aggregate GDP of the CU/CES makes a net export of foreign trade (excluding mutual trade) beyond integration association (Khusainov, 2015).

Secondly, the factor of net exports of foreign trade in the limits of integration Association plays a key role in the two leading economies of the CU/CES (Kazakhstan and Russia).

Because the main volume of commodity exports of Russia and Kazakhstan are sent to foreign countries.

Thirdly, Belarus' exports to global markets also play an important role, especially in European markets, primarily the markets of countries-members of EU. If in the early 2000s supply of products of Belarus to the market of Russia accounted for more than half of total exports. But in 2005-2014, the Russian market share was, on average, was 36.9%. In 2014 the Russian market in the total volume of

Belarusian exports amounted to 41.8%. Besides, more than half of Belarusian imports from the Russian products.

The contribution of net exports in mutual trade of the CU/CES in the last decade, with the exception in 2009-2011 years, is consistently in the negative range. This is due to the fact that the balance of mutual trade in the CU/CES in constant 2005 prices has a negative value.

Total final consumption within integration associations has a positive impact on the economic growth of the CU/CES. The exceptions are two time periods: 2012-2013 years and 2013-2014 years. In these two time periods the negative impact of final consumption was maximum (-37,8% and -39,1 %). It affected the slower growth of real aggregate GDP of the CU/CES. The main limiting factor here was the relatively low rate of growth of real GDP in Russia and Belarus for the last three years of the study period. At the same time, Kazakhstan has a least a significant slowing of

GDP. This is due to the ongoing crisis and, as a consequence, a slowdown in real GDP growth primarily in Russia.

The contribution of investment in fixed capital in the growth dynamics of aggregate real GDP of the CU/CES, with the exception of 2012-2013 and 2013-2014, is in the negative range. However, on the basis of obtained results it is impossible to make unambiguous conclusion about the positive effects associated with the creation of integration enterprises. So, we have conducted an additional study evaluating the contribution of three factors in Kazakhstan, Russia and Belarus, which formed the CU/CES.

Thus, a more meaningful analysis of the contribution of net exports mutual and foreign trade, final consumption and investments in fixed capital in the growth of real GDP presented in Table 2.

<Table2> The contribution of net exports mutual and foreign trade, final consumption and investments in fixed capital in the growth of real GDP in 2004-2014 years, in %

Indicators	Kazakhstan									
	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
GDP	9.6	10.1	9.6	5.3	2.0	2.9	7.3	6.1	5.7	5.3
Net exports in mutual trade	-5.3	-7.1	-7.1	-6.2	-5.8	-4.2	-3.7	-5.4	-6.0	-3.0
Net exports of foreign trade	20.8	26.1	23.9	25.5	25.6	25.6	30.9	31.8	27.2	11.6
Final consumption	7.1	7.4	5.6	2.2	3.6	7.2	7.8	8.0	3.9	0.0
Investments in fixed capital	-13.1	-16.3	-12.8	-16.1	-21.3	-25.6	-27.7	-28.2	-19.3	-3.3

Source: Statistical Yearbook of the Republic of Kazakhstan by the Committee on statistics

Note: Bold italics indicate values of positive factor of economic growth mentioned integration associations

According to the analysis of indicators was obtained the following results:

Firstly, the main factors of growth of real GDP are net exports of foreign trade and final consumption. Moreover, this situation is typical for the whole analyzed period.

Secondly, the development of mutual trade is not in favor of Kazakhstan. But this is especially clearly seen since 2004-2005. A negative value of net exports of Kazakh products to the market of the single customs territory is increasing annually, reaching a maximum value of 2013-2014 (minus 5,628.4 billion USD). It is clear that this is due to the increasing cost and physical volumes of Russian and Belarusian exports to Kazakhstan market. The analysis showed that the negative balance of mutual trade of

Kazakhstan with Russia and Belarus is increasing every year, especially after the establishment of the CU/CES. So, the balance of mutual trade of Kazakhstan with the countries-members of the customs Union/EEA in 2010 compared to 2009 decreased by 52.7%. However, in 2011 in comparison with 2010 this figure increased 3.3 times. This is due to the dramatic surge of imports of Russian and Belarusian goods to the market of Kazakhstan, i.e. after formation of the CU. The maximum value of the negative balance of mutual trade of Kazakhstan with Russia and Belarus was recorded in 2013. Compared to 2011 this figure increased by 33.7%. Given the current geopolitical situation (economic sanctions of the West against Russia and retaliatory actions by Russia against the import of food and

other goods) we can assume the following. The coming years may worsen the situation with dynamics of mutual trade of Kazakhstan with the countries-members of the CU/CES.

Thirdly, the contribution of investment in fixed assets in dynamics of growth of real GDP is consistently negative. Moreover, since 2007 the financial crisis began in Kazakhstan, which had a negative effect on the dynamics of growth of real GDP. Even in safe years before the crisis it was clear that the economic growth should be provided with the transient factors and it will be necessary to take steps in the direction of Kazakhstan transition to the steady growth based on modernization and innovations (Kireyeva & Nurlanova, 2013). So, the combined contribution of domestic demand to economic growth of Kazakhstan is a deterrent.

Further, we propose to analyze of net exports in mutual trade of Russia and Belarus. In Russia, as in Kazakhstan,

the main contribution to real GDP growth net exports making a mutual trade. However, unlike Kazakhstan and Belarus, with net exports in mutual trade also has a positive effect on the dynamics of growth of real GDP of Russia. Moreover, in the crisis of 2008-2009, as well as immediately after the creation of the CU/CES, the contribution of this factor to economic growth was the highest in the past decade. The contribution of final consumption to the growth rate of real GDP is positive throughout the studied decade. The exception is the period of 2013-2014, when the contribution of final consumption to economic growth in Russia was almost zero. Investment in fixed capital had a negative effect on Russia's economic growth as well as in Kazakhstan. This indicates a low efficiency of investments allocated for the development of national economies of both countries (Table 3).

<Table 3> The contribution of net exports mutual and foreign trade, final consumption and investments in fixed capital in the growth of real GDP of Russia and Belarus in 2004-2014 years, in %

Indicators	Russia									
	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
GDP	6.8	7.2	8.3	6.7	-1.5	-1.9	4.4	3.8	2.3	1.0
Net exports in mutual trade	<b>0.9</b>	<b>1.1</b>	<b>1.3</b>	<b>1.4</b>	<b>1.5</b>	<b>1.5</b>	<b>1.2</b>	<b>1.0</b>	<b>0.9</b>	<b>0.9</b>
Net exports of foreign trade	<b>14.9</b>	<b>17.2</b>	<b>14.1</b>	<b>12.4</b>	<b>12.2</b>	<b>13.3</b>	<b>13.2</b>	<b>12.8</b>	<b>12.5</b>	<b>12.8</b>
Final consumption	<b>6.8</b>	<b>8.0</b>	<b>7.8</b>	<b>1.6</b>	-0.1	<b>4.0</b>	<b>5.2</b>	<b>4.6</b>	<b>1.6</b>	0.0
Investments in fixed capital	-15.8	-19.1	-14.8	-8.7	-15.1	-20.7	-15.3	-14.5	-12.8	-12.7
Indicators	Belarus									
	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
GDP	10.4	9.7	9.3	9.4	1.3	1.1	6.6	2.9	1.8	1.9
Net exports in mutual trade	-16.1	-15.9	-18.7	-23.5	-24.5	-21.6	-16.2	-13.2	-9.8	-7.8
Net exports of foreign trade	<b>10.0</b>	<b>10.9</b>	<b>9.5</b>	<b>10.8</b>	<b>8.9</b>	<b>1.3</b>	<b>2.4</b>	<b>9.9</b>	<b>5.4</b>	<b>0.5</b>
Final consumption	<b>8.5</b>	<b>8.4</b>	<b>9.9</b>	<b>5.3</b>	<b>3.3</b>	<b>4.0</b>	<b>4.4</b>	<b>7.5</b>	<b>5.6</b>	<b>1.7</b>
Investments in fixed capital	<b>8.0</b>	<b>6.3</b>	<b>8.6</b>	<b>16.7</b>	<b>13.6</b>	<b>17.4</b>	<b>15.9</b>	-1.3	<b>0.6</b>	<b>7.4</b>

Source: compiled by the UNCTAD statistical database

Note: Bold italics indicate values of positive factor of economic growth mentioned integration associations

According to the above analysis it is evident that the situation is different for net exports was formed in Belarus. Growth factors of the national economy of this country are: net exports of foreign trade, final consumption and fixed capital investments. Overall, domestic demand, whose contribution to the last the period decreased significantly

and has a positive impact on the growth of the Belarusian economy. This is a big difference in the economy of this country. It is noteworthy that net exports of foreign trade; an important factor in the growth of the national economy, throughout the analyzed decade has had a positive impact on the dynamics of real GDP of this country. In Belarus, as



well as in Kazakhstan, the contribution of net exports in mutual trade to economic growth is negative. This is due to the chronic deficit in bilateral trade with Russia.

#### 4. Conclusions

Based on the conducted research, we made the following conclusions:

Firstly, to increase economic growth and, as a consequence, the competitiveness of the Eurasian economic Union must increase the volume of mutual trade of member countries of participants of the integration Association. However, we should develop certain limiting parameters of growth of volumes of mutual trade. This is due to the fact that the economies of the member (CU/CES) are very different in scale, economic potential, the volume of foreign trade.

Secondly, without major changes in the structure of Kazakhstan's exports should not expect a substantial increase in the growth rate of net exports in mutual trade. This necessitates the development of adequate trade and industrial policies aimed at overcoming the commodity

structure of Kazakhstan export. It is also necessary to reduce dependence on the import of products that can be produced on the territory of Kazakhstan.

Thirdly, and this is a key point, it should be to develop a coherent trade policy of the Eurasian economic Union, adequate to the modern geopolitical challenges and threats of globalization, without which the development of national economies of the integration of the enterprises will be are not effective.

Fourthly, an important condition of efficiency of integration processes is the proximity of levels of economic development of the participating countries of the regional Association. As world experience shows, in order for the country with lower economic development indicators could equal participation in the integration processes, requires quite a long time. But most importantly, it is necessary that the participating country itself must seek own development.

Fifthly, regional integration, as a complex of measures on creation of free trade zone, then the Customs Union and the Common Economic Space, etc. – the process is gradual from the lower to the higher forms, where each stage must be consistent the interests of all participants of the integration process.

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# Quality of Corporate Governance: A Review from the Literature

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## Abstract

The purpose of this paper is to review the quality of corporate governance from the prior empirical literature. This study finds that most of the researchers developed the self structured corporate governance index and few researchers used the corporate governance index provided by rating agencies. This study also finds that there is no uniform basis to measure the corporate governance quality and observed the variation in terms of overall and individual attributes of corporate governance; sub-indices of corporate governance; scoring system; weighted and un-weighted method; statistical method; time period; financial and non financial companies; code of corporate governance; listing requirement; disclosure practices; legal environment; firms characteristics; and country perspective. This study also observed that overall corporate governance quality is very low in most of the studies and even quality of corporate governance varies in the firms within the same country. This study recommends that the boundary of corporate governance quality should be defined based on the agreed set of rules and regulation, code of governance and practices. This study also suggests that the regulator and policy makers should more emphasize on code of corporate governance and regulatory framework and monitoring to improve the quality of corporate governance.

**Keywords:** Corporate Governance, Quality of Corporate Governance, Code of Corporate Governance, Shareholder Right.

**JEL Classification Code:** G24, G34, M42, M48.

## 1. Introduction

Corporate governance is an emerging issue in an academic research because of chain of financial scandals worldwide (Turrent & Ariza, 2016) and various corporate scandals such as Enron and Andersen in US and Marconi in UK (Khanchel, 2007). The demand of effective corporate governance increases because corporate governance ensures better monitoring and meet the company's objective or shareholders demand of value maximization and interest of other stakeholders. Quality of corporate governance scrutinizes the transparency and accountability of the firm's governance related issues and helps to assess whether the firm is better or poorly governed. In addition, academics, practitioners and regulators and monitoring authorities

emphasized on corporate governance quality, measured by corporate governance rating or benchmarking, and which is used as an instrument to identify or predict the determinants of success or failure (Lazarides et al., 2008; Lazarides & Drimpetas, 2011). Shareholders, investors, and advisors are interested to know the practices and compliance of corporate governance other than financial position and performance and market players increase the demand of corporate governance rating as it works as a reliable source of information for decision making (Ariff et al., 2007).

The purpose of this paper is to review the quality of corporate governance from the prior empirical literature. The empirical literature on corporate governance quality are mainly based on US (Khanchel, 2007; Silveira et al., 2009; Turrent & Ariza, 2016), UK (Barucci & Falini, 2005; Beiner et al., 2006; Lazarides & Drimpetas, 2011), Canada (Gordon et al., 2012), Africa (Waweru, 2014a,b), Korea (Black et al., 2006); Bangladesh (Biswas, 2012) and cross country studies (Klapper & Love, 2004; Durnev & Kim, 2005; Tchuigoua, 2015).

## 2. Quality of Corporate Governance-Measurement and Analysis

Corporate governance quality is defined as code of governance, rules, regulation, and best practices related to

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governance and developed to assess whether best governed or worst governed firms. Corporate governance is a system used to direct and monitor the firms (Cadbury committee, 1992). The measurement and analysis of corporate governance quality of the previous empirical literature are explained below:

### **2.1. Klapper and Love (2004) Study**

Klapper and Love (2004) study examined corporate governance quality using total 374 firms of 14 emerging markets such as Brazil, Chile, Hong Kong, India, Indonesia, Korea, Malaysia, Pakistan, Philippines, Singapore, South Africa, Taiwan, Thailand and Turkey in 2010. The sample includes 58% firms from East Asia, 19% firms from South Asia and 11% firms from Latin America. They considered total 57 qualitative questions that have binary yes or no answer to measure the corporate governance quality through corporate governance ranking. The questions covered six broad categories such as management discipline, transparency, independence, accountability, responsibility, fairness from Credit Lyonnais Securities Asia (CLSA).

The descriptive statistics presents that the average mean of corporate governance index is 54.11 and ranges from 11.77 to 92.77 with a standard deviation of 14. It is also evident that the mean of corporate governance index 31.85 in Pakistan and 66.53 in South Korea which implies that governance index varies country to country. It is also found that corporate governance index ranges from 17.25 to 66.68 in Pakistan which indicates a larger variation within countries. From the above analysis, they stated that quality of corporate governance varies widely in the sample and the variation is not systematically associated.

### **2.2. Barucci and Falini (2005) Study**

Barucci and Falini (2005) study examined corporate governance quality using 277 companies in 2002 and 275 companies in 2003 from listed financial market of Italian Stock Exchange. They considered composition of board of directors and selection of directors, activity of board of directors and board of auditors as the three attributes of quality corporate governance. The composition of board of directors includes board size, proportion of independent directors, appointment of directors, disclosure of directors profile before appointment, chairman of the board is independent; activity of board of directors includes CEO duality, independence of internal control committee, appointment committee, independence of compensation committee, and defining exclusive power of the board; board

of auditors include threshold to present a list to appoint auditors, size of board of auditors is minimum three, and company is controlled by shareholders coalition.

They find that quality of corporate governance is high in general but quality is low on some points such as power of the board of directors, role of independent directors and director appointment. They also find that chairman is independent in few companies; appointment of directors is not transparent; few companies adopted five members in board of auditors; appointment committee is rare and existence of internal and compensation committee but only few companies have independent committees.

### **2.3. Durnev and Kim (2005) Study**

Durnev and Kim (2005) study investigated the quality of corporate governance practices using total 344 companies of 27 countries. The quality of corporate governance includes composite index, investor protection and social awareness from Credit Lyonnais Securities Asia (CLSA). Composite index is again measured by simple average of six categories of corporate governance (such as discipline (managerial incentives and discipline towards value maximizing actions); transparency (timely and accurate disclosure); independence (board independence); accountability (board accountability); responsibility (enforcement and management accountability) and protection (minority shareholder protection)) of CLSA groups which considers 57 questions that have binary answers yes or no and minimize analysts subjectivity. They also added that protect is the direct measure of investor protection against theft and more relevant to ownership rather than composite index and thus single out protect from six CLSA governance categories.

### **2.4. Beiner et al. (2006) Study**

Beiner et al. (2006) study investigated corporate governance quality using total 109 firms of Swiss Exchange in 2002. Corporate governance index (CGI) is based on survey responses of total 38 questions/attributes, which includes the recommendation of Swiss code of best practice and divided into five sub categories such as corporate governance commitment (5 elements); shareholders' rights (7 elements); transparency (5 elements); board of directors and executive management (15 elements); reporting and auditing (6 elements). Corporate governance index is measured by assigning a value of minimum 1 and maximum 5 based on the acceptance level of each question and add one point for each subsequent acceptance level on the five-scale answering range and finally compute simple sum of all

38 questions. Corporate governance index is normalized to have a value of between 0 and 100. The higher acceptance level or higher governance index implies that firm is practicing better corporate governance.

The descriptive statistics presents that the average mean of corporate governance index is 58.46 and median is 59.21 which indicates symmetric distribution and ranges from 25 to 90.13 with a standard deviation of 14.34.

## 2.5. Black et al. (2006) Study

Black et al. (2006) study examined corporate governance quality considering total 453 firms (including 418 small and 35 large firms) of Korean Stock Exchange (KSE) in 2001. The quality of corporate governance is measured by corporate governance index which consider the survey responses of corporate governance practices of Korean Stock Exchange (KSE). Corporate governance index includes total 39 governance elements and divided into five equally weighted subcategories (each category 0-20) such as shareholder rights (5 elements); board structure (4 elements); board procedure (26 elements); disclosure (3 elements); ownership parity (1 element).

The descriptive statistics presents that the average mean of corporate governance index is 29.21 and ranges from 12.73 to 59.33 with a standard deviation of 6.96 for small firms and 51.82 and ranges from 30.22 to 70.55 with a standard deviation of 10.70 for large firms. It is also evident that the average mean of- shareholder rights is 2.99 and 5.6 for small and large firms respectively; board structure is 0.85 for small firms and 14.71 for large firms; board procedure is 8.16 and 11.87 for small and large firms respectively; disclosure subcategory is 0.69 for small firms and 3.24 for large firms and ownership parity is 16.53 and 16.40 for small and large firms respectively.

## 2.6. Khanchel (2007) Study

Khanchel (2007) study examined corporate governance quality considering total 624 nonfinancial firms of US from 1994 to 2003. Quality of corporate governance index is measured by four broad categories such as board of directors, board committees, audit committee, and overall or total index. Board size, separate chair dummy, outside directors, board meetings are considered to measure board of directors; existence of compensation committee and nominating committee, CEO not on compensation committee and nominating committee and, meetings of compensation committee and nomination committee are considered to measure the compensation and nominating committee i.e. board committee; existence of an audit

committee, audit committee size, audit committee meetings, auditor is a BIG 4, members financial expertise are considered to measure audit committee and board of directors, board committee and audit committee jointly measure corporate governance.

He finds that the average mean of board index is 49.92 and ranges from 13.25 to 91.75 with a standard deviation 12.51; the average mean of compensation and nominating committees are 50.19 and minimum 20.83 and maximum 75 with a standard deviation 12.03 and the average of audit index is 51.2 and the minimum and maximum are 6 and 76.4 respectively with a standard deviation 12.98 and the overall mean of total governance index is 50.78 and ranges from 22.78 to 73.61 with a standard deviation of 8.61. He added that firms which exercise the best monitoring systems have the governance index 73.61 and firms which practice the worst governance have the governance index 22.78.

He also mentioned that the problem of corporate governance could not solved by only increasing the corporate governance quality or using the best practices of other firms. Finally, he concluded that a unique governance model should consider the internal strength and relationship based corporate governance process to enhance the corporate governance practices.

## 2.7. Silveira et al. (2009) Study

Silveira et al. (2009) study examined corporate governance quality considering total 823 firm year observations of 200 financial and non financial firms from listed Sao Paulo Stock Exchange of Brazil during 1998 to 2004. Corporate governance index is measured by total 24 objective questions which are collected from publicly available secondary data. If the answer of each question is positive score 1 point otherwise 0 and the total score ranges from 0 to 24 which indicates from lowest to best governance quality. Total 24 objective questions of corporate governance quality are divided into four sub-categories such as: disclosure (6 questions); board structure and operation (6 questions), ethics and conflicts of interest (6 questions) and shareholder rights (6 questions). They used equally weighted method to compute the corporate governance index. They argued that this equally weighted method is less questionable than any other difficult weighting method though it involves subjective evaluation.

The descriptive summary statistics presents corporate governance index (CGI) on a scale of 0 to 10 during 1998 to 2004. It is evident that the average mean of corporate governance index is 4.16 and 5.00 in 1998 and 2004 respectively which indicates the overall quality of corporate governance is poor though it is improving slowly over the year. It is also evident that the average mean of disclosure

is 6.26 and 6.64 in 1998 and 2004 respectively; board of directors is 3.48 and 4.77 in 1998 and 2004 respectively; ethics and conflicts of interest is 4.16 and 4.59 in 1998 and 2004 respectively; shareholder rights is 2.75 and 4.02 in 1998 and 2004 respectively. The above result indicates that firms are performing better in terms of disclosure and firms are performing poor regarding shareholder rights. They also added that corporate governance quality varies in the firms within the same country.

## 2.8. Lazarides and Drimpetas (2011) Study

Lazarides and Drimpetas (2011) study examined the corporate governance quality considering the total sample of 303 observations of 60 firms of two stock indexes (FTSE-20 and FTSE-40) of the Greek capital market from 2001 to 2006. Total 12 elements are considered to assess the corporate governance quality which includes CEO duality, audit committee, compensation committee, nominee committee for board members, number of independent members, number of independent members on audit committee, committee for the evaluation and recruitment of executives, internal statute, code of ethics of for corporate governance, disclosure of board members biographical notes, disclosure of board members and executives compensation. They collected data from the annual report and developed the index of corporate governance quality considering binary variable and score 1 if the answer of the variable is true otherwise score 0 and corporate governance score ranges from 0 to 12. They stated that if the corporate governance index is low, it does not mean that the firm has low level of corporate governance and if the corporate governance index is high, it does not mean that firm is practicing best corporate governance mechanisms.

They stated that corporate governance index is influenced by time, sector and index ranking. They classified the corporate governance index into two groups and first group consider the value between 1 to 4 and second group consider the value of 6 to 8. They find that only 16.5% of the firm is ranked in the second group but 80% of the firm is ranked in first group and they find that corporate governance quality is not high in Greece. They also divided the firms into FTSE-20 index and FTSE-40 index and find that larger firms (FTSE-20) practice higher corporate governance than small firms. They also find that corporate governance index of financial firms are higher than non financial firms.

Finally, they concluded that policy makers should develop the legal regulatory framework to improve the level of corporate governance quality.

## 2.9. Biswas (2012) Study

Biswas (2012) study investigated the corporate governance quality using total 2305 firm years' observations of public listed companies of Dhaka Stock Exchange (DSE) from Bangladesh during the period of 1996 to 2009. He stated that corporate governance quality is composed of total 148 elements into five broad sub categories such as ownership structure and investor rights (15 attributes), financial transparency, and information disclosure in the annual report (24 attributes), board, management structure and process (80 attributes), auditing (13 attributes), and corporate responsibility and compliance (16 attributes) considering corporate governance guidelines 2006, regulatory and legal requirement, disclosure practices of listed companies and prior empirical literature. Corporate governance quality is measured by corporate governance score and score 1 for each attributes if the firm comply the requirement of the attributes otherwise score 0 following the prior studies (Cooke, 1989, 1993; Williams, 2001; Bujaki & McConomy, 2002; Barako et al., 2006). He stated that any undisclosed attributes scored 0 which avoid the judgment error during coding process and this is considered following the study of Morris et al. (2011). He also stated that any undisclosed item means (1) the firm does not have the attributes; or (2) the firm has the attributes but it is immaterial to disclose it or (3) the firms has attributes, it is material but the firm chose not to disclose it. He used the un-weighted disclosure model and all attributes are scored equally to avoid subjectivity and this equally weighted system is consistent with Cooke (1989, 1993). After scoring of all attributes, corporate governance score is computed by adding the scores and the score ranges from 0 to 148.

The average mean of corporate governance score 35.81 and ranges from 12 to 104 with a standard deviation of 17.512. The lowest mean score is 23.68 in 2006 and the highest mean score is 62.79 in 2009 and the score is increased over the year as expected and he stated that listed companies adopted various changes in their governance after implementation of corporate governance guidelines 2006 but the governance score in different areas like board, management structure and process are low in compare to other countries. He also stated that firms have developed their governance slowly over the year.

## 2.10. Gordon et al. (2012) Study

Gordon et al. (2012) study examined corporate governance quality using total 702 small publicly traded companies listed on Toronto Stock Exchange (TSE) Venture Exchange in 2004. They developed the corporate governance score considering 22 key factors of 14 TSE



corporate governance guidelines and the score is computed by adding all 14 relevant TSX guidelines. They divided the corporate governance score in two categories such as board composition and policies. Board composition includes board independence, independent directors in audit committee, compensation committee, and nominating committee, CEO duality, Chairman of the board, existence of a process for performance evaluation of the board, its members and supporting committees, directors' independence to meet with management, chairman of the board is an independent director, availability of nominating committee, compensation committee and corporate governance committee and each item is scored 1 and adding of all items compute the score of composition where as policies include strategic position, code of conduct or ethics, orientation and education program for the board, external advisors affiliation, evaluation of board effectiveness, policy of disclosure and policy is computed after deducting the composition score from corporate governance score.

The descriptive statistics presents that the average mean of corporate governance score is 3.223 and ranges from 0 to 19 with a standard deviation of 3.94. The average of board composition is 1.96 and minimum is 0 and maximum is 11 with a standard deviation of 2.08 and average mean of policies is 1.27 and ranges from 0 to 9 with a standard deviation of 2.49.

They concluded that owners and managers should focus on good governance because good governance is the main driving force of small firm.

### 2.11. Waweru (2014a) Study

Waweru (2014a) study examined corporate governance quality considering total 247 firm year observations of 50 largest firms listed on Johannesburg Stock Exchange (JSE) of South Africa during 2006 to 2010. Quality of corporate governance is measured by board size, proportion of non executive director and shareholder concentration. Board size is measured by the total number of directors, proportion of non executive director is computed by percentage of non executive directors on the board and shareholder concentration is measured by the percentage of shares held by 10 largest shareholders to total shares.

The descriptive statistics presents that corporate governance quality is high in South Africa which implies that firms highly comply the corporate governance requirements. The average mean of ownership concentration is 63.2% which indicates high involvement of institutional investors. The average mean of board size is 13.8 and ranges from 4 to 27 which indicate that all the sample firms followed the listing code of JSE. The proportion of non executive director

is 73.8% which implies that boards are controlled by non executive director.

He stated that the findings of the study will improve quality of corporate governance and reduce the corporate failure and protect the interest of minority shareholders and thus concluded that high quality of corporate governance is the precondition of a good business.

### 2.12. Waweru (2014b) Study

Waweru (2014b) study examined the corporate governance quality using 247 firm year observations of 50 largest companies listed on Johannesburg Securities Exchange (JSE) of South Africa and 234 firm year observations of 49 companies listed on Nairobi Stock Exchange (NSE) from 2006 to 2010. Quality of corporate governance index is measured by corporate governance index and it is divided into six sub-categories such as board (19 attributes), charter or laws (5 attributes), audit (6 attributes), director composition (6 attributes), progressive practices (11 attributes) and ownership (4 attributes). He considered total 51 binary attributes to measure the corporate governance score. Each item is scored 1 if the attributes is present otherwise score is 0.

The descriptive statistics presents that the average mean of quality of corporate governance score is 37.48 or 73.3% and ranges from 25 to 45 with a standard deviation of 3.4051 in South Africa which indicates that firms are highly following the corporate governance requirements in South Africa. The descriptive statistics also presents that the average mean of quality of corporate governance score is 26.35 or 52% and ranges from 16 to 34 with a standard deviation of 1.96 in Kenya which indicates that corporate governance quality in Kenya is lower than South Africa.

He concluded that high operating performance influence the quality of corporate governance and high quality of corporate governance reduce information asymmetry and conflict of interest and thereby ensures larger shareholder wealth.

### 2.13. Tchuigoua (2015) Study

Tchuigoua (2015) study used the score of Planet rating, the specialized rating agency, to assess the quality of corporate governance. He considered total 178 micro financial institutions of 53 countries rated by Planet Rating during 2001 to 2011. Corporate governance quality is measured by the corporate governance index which considers governance, information, risk management, activity, funding and liquidity, efficiency, (in short form, GIRAFE) of micro financial institutions.

## 2.14. Turrent and Ariza (2016) Study

Turrent and Ariza (2016) study examined quality of corporate governance through corporate governance rating considering total 826 observations of 128 highest ranked companies on the stock exchange of Argentina, Brazil, Chile and Mexico during 2004 to 2010. Corporate governance rating includes total 43 items, with a maximum value of 100, and divided into four sub categories such as composition and performance of the board, shareholder rights, ethics and conflicts of interest and other information related to corporate governance and each sub category is weighted as 53, 18, 16 and 13% respectively.

The descriptive statistics presents that the average mean of corporate governance rating is 0.36, 0.48, 0.53 and 0.66 in Argentina, Brazil, Chile and Mexico respectively and the average mean of overall corporate governance rating is 0.53

and ranges from 0.12 to 0.81 with a standard deviation of 0.17 in 2004. It is also evident that the average mean of corporate governance rating is 0.64, 0.72, 0.64 and 0.78 in Argentina, Brazil, Chile and Mexico respectively and the average mean of overall corporate governance rating is 0.70 and ranges from 0.37 to 0.88 with a standard deviation of 0.12 in 2010. They find that corporate governance rating is increased over the year after comparing between 2004 and 2010 because good governance and regulation have increased and changed over time. They also added that codes of good governance and different level and mechanism of corporate transparency of each country influence corporate governance rating and thus rating varies country to country.

The overall summary of the quality of corporate governance is presented in Table 1.

<Table 1> Summary Studies of Quality of Corporate Governance

Study	Sample	Time Period	Measurement of Quality of Corporate Governance
Klapper & Love (2004)	Total 374 companies of 14 emerging market such as Brazil, Chile, Hong Kong, India, Indonesia, Korea, Malaysia, Pakistan, Philippines, Singapore, South Africa, Taiwan, Thailand, and Turkey.	2010	Corporate governance ranking consist of total 57 qualitative and binary yes/no questions under seven categories (management discipline, transparency, independence, accountability, responsibility, fairness, and social awareness).
Barucci & Falini (2005)	277 companies in 2002 and 275 Companies in 2003 listed on Italian stock exchange	2002 to 2003	Corporate of governance is measured by three governance attributes such as composition of board of directors and selection of directors, activity of board of directors and board of auditors.
Durnev & Kim (2005)	344 companies in 27 countries	2000	Governance index is measured by three different scores that are composite index; investor protection and social awareness. Composite index is measured by taking a simple average of the six categories which are : discipline (managerial incentives and discipline towards value-maximizing actions); transparency (timely and accurate disclosure); independence (board independence); accountability (board accountability); responsibility (enforcement and management accountability); protection (minority shareholder protection).
Beiner et al. (2006)	109 Swiss firms of Swiss Exchange (SWE)	2002	Corporate governance index (CGI) is based on survey responses of total 38 questions/attributes into five categories (Corporate governance commitment (5 elements); Shareholders' rights (7 elements); Transparency (5 elements); Board of directors and executive management (15 elements); Reporting and auditing (6 elements))
Black et al. (2006b)	Total 453 listed firms (including 418 small and 35 large firms) of Korean Stock Exchange (KSE)	2001	Corporate governance index is measured by total 39 elements into five sub indices (shareholder rights (5 elements); board structure (4 elements); board procedure (26 elements); disclosure (3 elements); ownership parity (1 element)) and this index is based on survey of governance practices of Korean Stock Exchange (KSE).
Khanchel (2007)	624 US listed and non financial firms	1994 to 2003	Four indices ((board of directors, 4 elements), (board committees, 6 elements), (audit committee, 5 elements) and (overall or total index)) summarize the governance quality
Silveira et al. (2009)	Total 823 firm years observations of 200 financial and non financial firms listed on Sau Paulo Stock Exchange of Brazil	1998 to 2004	Corporate governance quality is measured by corporate governance index which includes four sub indices (disclosure; board composition and functioning; ethics and conflicts of interest; and shareholder rights)

Study	Sample	Time Period	Measurement of Quality of Corporate Governance
Lazarides & Drimpetas (2011)	Total 303 observations of sixty (60) firms ranked among the two major stock indexes (FTSE-20 and FTSE-40) of Greek capital market	2001 to 2006	Governance quality is measured by corporate governance index which includes 12 elements such as CEO duality, audit committee, independent directors on audit committee, compensation committee, nominee committee for board members, committee for evaluation and recruitment of executives, internal statute, code of ethics, disclosure of board members biographical notes, compensation, executive compensation and number of independent members
Biswas (2012)	Total 2305 firm year observations of non financial companies of Bangladesh	1996 to 2009	Corporate governance quality is measured by total 148 elements considering five sub indices which are ownership structure and investor rights (15 elements); financial transparency and information disclosure in the annual report (24 elements); corporate responsibility and compliance (16 elements); board and management structure and process (80 elements) and auditing (13 elements)
Gordon et al. (2012)	702 companies listed on TSX (Toronto Stock Exchange) Venture Exchange	2004	Corporate governance score is based on 22 key guidelines of the 14 TSX corporate governance guidelines
Waweru (2014a)	Total 247 firm year observations of 50 largest firms listed on Johannesburg Stock Exchange (JSE) of South Africa	2006 to 2010	Corporate governance quality is measured by shareholder concentration (ownership structure), board size and proportion of non executive director (board composition)
Waweru (2014b)	247 firm years of 50 largest companies listed on Johannesburg Securities Exchange (JSE) of South Africa and 234 firm years of 49 companies listed on Nairobi Stock Exchange (NSE) of Kenya	2006 to 2010	Corporate governance quality is measured by total 51 elements considering six sub indices which are board (19 elements); charter/laws (5 elements); audit (6 elements); director composition (6 elements); progressive practices (11 elements); and ownership (4 elements)
Tchuigoua (2015)	178 micro financial institutions rated by Planet rating	2001 to 2011	Governance quality is measured by governance rating scores which covers (governance, information, risk management, activity, funding and liquidity, efficiency in short form, called GIRAFE) and this score is provided by Planet rating, famous rating agencies specially in micro finance
Turrent & Ariza (2016)	Total 826 observations of 128 highest ranked companies on the stock exchange indices of Argentina, Brazil, Chile and Mexico	2004 to 2010	Corporate governance rating (CGR) includes total 43 items in four sub indices which are composition and performance of the board (24 elements), shareholders rights (8 elements), ethics and conflicts of interest (7 elements) and other information related with CG (6 elements)

### 3. Conclusion

Quality of corporate governance helps to assess whether firms are practicing better quality or worst quality in governance issues. Daily & Dalton (2004) and Khanchel (2007) study also stated that corporate governance quality distinguish the firms between best and worst. Khanchel (2007) study stated that corporate governance quality is important because investors (like institutional investors) uses the quality to perform a crucial role in the capital market and management give special emphasize on corporate governance quality when quality of corporate governance is at bottom line. This study finds that corporate governance quality is measured by different names such as corporate governance ranking, corporate governance score,

corporate governance index, corporate governance quality in percentage form, corporate governance rating etc. though the basic objectives are same. Most of the researchers developed their self structured corporate governance index on the basis of code of best practice or governance guidelines, listing requirement, disclosure practices, corporate law or law applicable for companies, and previous literature to measure the corporate governance quality where as few researcher used the corporate governance index provided by rating agencies. This study observed that variation of- overall and individual attributes of corporate governance; categories or sub-indices of corporate governance; scoring in each item; weighted and un-weighted method; statistical method; time period; financial and non financial companies; guidelines or requirement in



the code of best practice or corporate governance; listing requirement; disclosure practices; legal environment, firms characteristics and country perspective and therefore, there is no unique measurement or process to assess the quality of corporate governance. This study also finds that quality of corporate governance varies in the firms within the same country. This study also observed that overall corporate governance quality is very low in most of the studies though

the measurement of corporate governance quality is different. This study recommends that the boundary of corporate governance quality should be defined based on the agreed set of rules and regulation, code of governance and practices. This study also suggests that the regulator and policy makers should more emphasize on code of corporate governance and regulatory framework and monitoring to improve the quality of corporate governance.

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# Employee Expectation to Demonstrate Innovative Work Behaviour in Asia

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## Abstract

The competitive nature of enterprises requires organizations to foster an environment that encourages employee innovation that leads to profitability and customer satisfaction. Organizational innovation is influenced by several factors with employee behaviour being one of the important factors. Employees contribute in the innovation process and thus, it is important for organizations to understand employee expectations to demonstrate innovative work behaviour in order to create and maintain an innovative work culture. In the present study, a conceptual model based on culture, reward and program, training, compensations, leadership and systems was tested to assess that impact on employee expectations leading to innovative work behaviour. The study was conducted in the context of city-state of Singapore due to its significant emphasis on promoting and nurturing employee innovation. The model was tested using empirical data collected through a survey of employees in Singapore. The results indicate that while culture, rewards and training programs have a direct relationship on employee expectations to demonstrate innovative work behaviour, when considered together, leadership and systems are significantly and positively associated with employee expectations. These factors are usually under the control of organizations and can be enhanced through systematic interventions, thereby providing practice managers an avenue to improve employee innovation behaviour. The other implications of the findings and future scope are discussed.

**Keywords:** Innovative Work Behaviour, Innovation, Employee Expectation, Leadership, Singapore.

**JEL Classification Code:** C20, C83, M10, M12.

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## 1. Introduction

Organizations are facing challenges and disruptions triggered by globalization and technological advancements accentuating the need for systematic innovation in organizations (Drucker, 2014), compelling the need to innovate product, processes and services. There is increasing evidence that firms with focus on innovation enjoy better business performance and are expected to survive longer than normal ones due to their adaptive behaviour (Sinar, Wellins, & Pacione, 2011). Innovation continues to be one of the critical challenges faced by firms

in Asia (Hu, 2015) and organizations are relying on their employees as key resources for innovations at work. Employee values, attitudes, perception and behaviour influences their performance which in turn contributes to organizational growth (Martins & Terblanche, 2003). Employee's innovative work behaviour is crucial in any organization for continuous improvement. Innovative firms consider their employee's as sources of innovation and are constantly looking for ways to encourage employee driven innovations (de Jong, 2006), (Imran, Saeed, Anis-UI-Haq, & Fatima, 2010).

Employee performance depends on the employee expectation, work experience and job satisfaction and the gap created due to mismatch with the workspace reality leads to job dissatisfaction, which can impact an organization's innovative culture (Dörner, 2012). The employee behaviour can be studied using Innovative Work Behaviour (IWB) framework which is the sum of work activities carried out by an employee for innovation development (Messmann & Mulder, 2012).

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Past research indicates benefits of innovative work behaviour for organizations and anticipates organizational profit from encouraging it. This means that it is important to identify precedents for innovative work behaviour such as employee expectation, which is closely linked with Innovative work behaviour (Dörner, 2012). There is a link between innovations, enhanced quality of services and better financial performance and these links are strengthened through employee empowerment (Camuffo & De Stefano, 2016), hence it is critical to study employee perception on innovative work behaviour. Organizations need to further understand employee expectation and their priority in order to get productivity, efficiency and new ideas in workspace.

The city-state of Singapore is reliant on innovation for its continuous economic growth and constantly implements initiatives that supports innovations (Ng, 2012). Past research indicates a significant positive relationship between organizational factors and innovation, however there is scope to study the role of leadership and human resource practices on employee's motivation to innovate (Wan, Ong, & Lee, 2005). The primary aim of this research is to assess the role of employee expectation in demonstrating innovative work behaviour in Singapore context.

## 2. Literature Review

A comprehensive review of existing literature was undertaken to study innovative work behaviour and the precedents influencing employee expectations. This section outlines the key factors considered in the present study on employee expectations namely culture, reward and program, training, compensations, leadership and systems.

### 2.1. Innovative Work Behaviour (IWB)

IWB is viewed as a set of behaviours that includes idea generation and opportunity exploration (Scott & Bruce, 1994); (de Jong & den Hartog, 2010); (Janssen, 2000) and other definitions include proactive idea implementation and problem solving (Parker, Williams, & Turner, 2006). These behaviours can range from incremental improvements to developing radically new ideas, thus having varying effect on organizational outcomes. Innovative work behaviour is seen as an extra role behaviour, not usually defined as part of a typical job description of an employee (Dörner, 2012), thus making it a discretionary behaviour. Past studies indicate that IWB is affected by leadership, problem-solving style of an individual and work group relationship (Scott & Bruce, 1994).

IWB is influenced by the lack of resources and other factors at individual employee level such as meaning of work, boredom and personal growth (Stock, 2015). At a team level IWB is influenced by team processes variables such as support for innovation, vision and task orientation and external communication (Hülshager, Anderson, & Salgado, 2009). Since these factors are controlled and designed by organizations, a better understanding of these will enable improvement of employee IWB.

The IWB has been described as a set of four related tasks that include 'intentional idea generation, promotion and realization of new ideas to provide benefit for organizations' by West and Farr (1990). These four factors of IWB are further elaborated as -

#### i. Opportunity exploration

Innovation is triggered by identification of a performance gaps that lead to identifying the opportunities. These opportunities can be either internal such as improvement in current products or services or external through different sources.

#### ii. Idea generation

Any opportunity can be exploited in the presence of a creative idea and employee are a major source of these ideas. According to Kanter (1998), employee's ability to construct new ideas is as important as identifying new opportunities. Idea generation and opportunity exploration include recognizing opportunities to innovate and produce ideas.

#### iii. Championing

Championing refers to promoting the generated ideas for the benefits of organization by overcoming any resistance to change. Championing includes behaviour related to finding support and building coalitions, such as influencing employees, pushing and negotiating.

#### iv. Application

Application means doing what is needed to convert ideas into reality. It includes behaviour such as product or work processes and testing and modifying them. From the aspect of IWB, such a behaviour needs to be proactive and persistent (de Jong, 2006).

### 2.2. Culture

Organizational culture asserts significant influence in shaping behaviour patterns of employees (Kotter & Heskett,

1992). Hofstede (1980) summarizes organizational culture as a collective process of the mind that differentiates the members of one group from others. Organization culture is the drive that recognizes the organization member's effort and contribution and provides a holistic understanding of purpose and means of the goals, interrelationships and ways for each employee to attain organizational goals. Organization culture influences creativity and innovation through the values, norms and beliefs in both positive and negative manner (Martins & Terblanche, 2003). Culture plays an important role in organization growth and innovation (Imran et al., 2010) and the long-term success of organizations is influenced by innovation, especially related to people and behavioural factors and organizational culture has proven to foster both innovation and performance (Naranjo-Valencia, Jiménez-Jiménez, & Sanz-Valle, 2016). Further, innovation processes are reliant on the cultural dimensions of the country of operation with the individualism dimension positively related to innovation (Kaasa, 2016). The playing field of innovation is culture, innovation would be stifled before starting if ideas and risk taking is not supported by culture (Wycoff, 2003). Organizational culture changes dynamically to meet varying demand for employee expectation and satisfactions. While organizations prefer to hire high performing individuals to meet their objectives, these individuals expect supporting organizational culture to attain their individual objectives. Researchers have considered the importance of individual factors to make a link with organization culture and employee performance, employee satisfaction and productivity (Uddin, Luva, & Hossian, 2013).

**Culture:** Internal environment that results from the behaviour and policies of members of organization, especially in top management.

*H1: Culture positively affects employee expectation for innovative work behaviour*

### 2.3. Reward and Recognitions

Employees are the mainstay of organizational innovation and their active participation ensures that sustainable innovation. Employees demonstrate innovation behaviour when they perceive positive organizational support (Eisenberger, Fasolo, & Davis-LaMastro, 1990). Rewards and recognition play a critical role in energizing employees to demonstrate innovative work behaviour. The psychological contract of an employee to include innovative work behaviour is influenced by meritocracy, pay equity and procedural justice (Ramamoorthy, Flood, Slattery, & Sardesai, 2005). Organizations offer extrinsic rewards to

employees to demonstrate creative performance, these rewards positively affect the intrinsic motivation of employees (Malik, Butt, & Choi, 2015). Most innovative firms are seen to adopt comprehensive human resource practices including reward systems that recognizes and boosts employee creativity (Gupta & Singhal, 1993). These HR policies can promote self-leader behaviour among employees, which is seen to encourage innovative behaviour (Stashevsky, Burke, Carmeli, Meitar, & Weisberg, 2006).

**Reward & Recognition:** is an acknowledgement by the organization of contributions or the value of expertise and experience of an employee or a team. It is the return on an employee's effort, dedication at work and results.

*H2: Organization Reward & Recognition positively affects employee expectation.*

### 2.4. Training

Training is seen to contribute in promoting innovation strategy in an organization given that acquisition of new skills and thinking precedes innovation. A longitudinal study indicates a positive association between training and innovations in technical environments (Shipton, West, Dawson, Birdi, & Patterson, 2006). The decision to innovate and intensity of innovations are linked to skills training and resources of the workers (González, Miles, & Pazó, 2015). The employee motivation to innovate and persist in innovative performance outcome is also influenced by other human resource practices adopted by firms, including strategic goal setting, motivation and adoption of technology (Schmidt, 2015). Innovation competency develops over time through active learning and engaging on real tasks. This requires the training processes to include elements of coaching to ensure development of the competency (Wycoff, 2003). The post-training behaviours of employees having undergone training are affected by the supporting environment provided by organizations (Tracey, Tannenbaum, & Kavanagh, 1995). Thus ability-enhancing and opportunity-enhancing support extended by organizations to employees is seen to as some of the expectations of employees (Ma Prieto & Pilar Perez-Santana, 2014).

**Trainings:** Training is provided to improve performance on the current job by learning process that enables achievement of organizational objectives and goals to carry out specific tasks.

*H3: Training positively affects employee expectation*

## 2.5. Compensation

Compensation is one important factor for employees to demonstrate innovative work behaviour including the perception of fairness in effort-reward (Janssen, 2000). A compensation model needs to strike a balance between the risks and rewards associated with the work to encourage innovation to avoid non-risk taking behaviours of employees in favor of career stability or future compensation. Organizational factors such as equity perception and individual factors such as pay are seen to influence IWB (Ramamoorthy, et al., 2005). On other hand, there is a likelihood of negative impact of pay on employee motivation and performance in the form of reduced creativity and productivity and this can be mitigated by focusing the rewards on long-term performance (Ederer & Manso, 2013). In addition, the rewards that are seen to be contingent upon learning are also seen to have positive effect on employee innovation (Shipton et al., 2006)

**Compensation:** Compensation represents the total monetary and non-monetary benefits provided to an employee by an employer to perform required work.

*H4: Compensations positively affects employee expectations*

## 2.6. Leadership

Leadership has been shown to be an important factor contributing to innovation and employee innovative behaviours at work are influenced by the leadership behaviours that stimulate idea generation and application (de Jong & den Hartog, 2007). A number of previous studies have shown that leadership has positively influenced organizational innovation (de Jong, 2006). Transformational leadership is seen to have significant positive relationship with IWB (Reuvers, van Engen, Vinkenbunrg, & Wilson-Evered, 2008) and these leaders stimulate employee ability to perceive problems differently and develop their full potentials. These leaders also encourage experiments to explore new ways of doing things, to test new products, services and procedures (Gumusluoğlu & Ilsev, 2009). On the other hand, firms adopting transactional leadership style are likely to demonstrate higher performance in product innovation than process innovation. (Huijun & Jianjun, 2015).

Ambidextrous leadership are effective in predicting team innovation behaviour and these are highest when the two ambidextrous leadership behaviours - opening and closing - are highest (Chan & Liu, 2016). In addition, leadership style adopted by firms has an impact on their innovation performance. In the 21st century organizations that are

characterized with high levels of autonomy and motivation, individual creativity is positively related to shared and distributed leadership style (Peter, Braun, & Frey, 2015). The attitudes of the top management are also seen to influence the innovation capability of employees (Zmud, 1984). Management plays an important role in decision making and inspiring others to perform well.

**Leadership:** The ability of an organizations management to make decisions and inspire others to perform well. It is the process of influencing and facilitating individual and collective efforts to accomplish the shared objective.

*H5: Leaderships positively affects employee expectations*

## 2.7. Systems

Systems are another important factor contributing in organization innovations and at a firm level, innovation management process is essential to turn ideas into useful and marketable products (Adams, Bessant, & Phelps, 2006) including input, knowledge and project management. These are the processes, procedures and daily activities that employees engage in to get the job done. It is believed that the organization that following best technology oriented practices such as PMI, ITIL and Six Sigma are innovative on sustainable level and taking low risk (ref). Contrary to earlier research indicating negative effect of management control on innovation, the study (Allen, Adomdza, & Meyer, 2015) report a differing effect of management control of human resources in supporting innovation on employee motivation. The effect is dependent on the attributes of knowledge being used. Increasingly, various techniques or methods are used by organizations to drive innovation such as online creativity contests, crowdfunding platforms to generate and fund innovative ideas, 'catalyst fund' and 'Shark Tank' style competition where multiple employee teams compete to pitch their best ideas to senior officials. The job resources made available to employees also has a mediating effect on the work engagement and innovative behaviour (Salanova & Schaufeli, 2008).

**Systems:** This includes process, procedure and daily activities that employees engage in to get the job done.

*H6: Systems positively affects employee expectations*

## 2.8. Employee Expectations

Employee expectations play an important role in human behaviour as people are more likely to engage in a specific behaviour when they share a belief of positive outcomes.



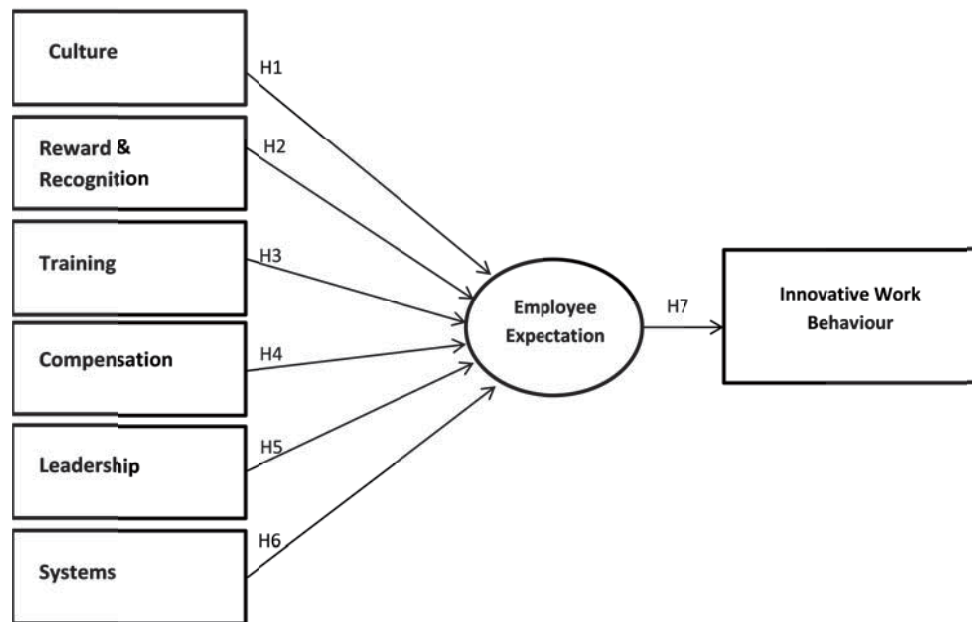
Previous research on outcome expectation has found that they positively influence work related activity, such as knowledge sharing (Hsu, Ju, Yen, & Chang, 2007) and innovative work behaviour (Yuan & Woodman, 2010). Employee expectations and perception is also affected by the nature of positive and negative stressors at work (Ren & Zhang, 2015).

*H7: Employee expectations positively affect innovative work behaviour.*

### 3. Research Methodology

The research was conducted using both qualitative interviews and quantitative survey to understand employee expectation for demonstrating innovative work behaviour. Extensive secondary review of extant literature of published

research was conducted using databases such as Scopus, to identify the variables influencing employee expectations. Qualitative interviews were conducted among 12 individuals (HR, Line manager and lead role) to assist in designing the research framework. Based on the interview result, study of existing research articles and discussion with various lead profile individuals, six variables were identified as input variables for employee expectations that have a direct impact on dependent variable employee outcome expectations. The dependent and independent variables were identified and their relationship is represented in Figure 1. The measures used in the survey were based on previously developed scales and were modified for the purpose of the present study. The Innovative Work Behaviour was assessed using the scale developed by de Jong (2010) and employee expectation was adapted from (Venkatesh, Morris, Davis, & Davis, 2003). The research framework is indicated in Figure 1.



<Figure 1> Research Framework

#### 3.1. Data collection

The survey questionnaire was prepared on the basis of the literature review and the gaps identified. The survey instrument was pretested to assess in the Information for this research will be obtained through both primary and secondary sources. The pilot study was conducted with 20 respondents to check for the coverage and understanding of

the questionnaire. The research framework was discussed with 12 senior professionals associated with innovation departments, team and HR professionals. The inputs from these interviews enabled further refinement of the questionnaire. The final questionnaire included 43 questions. A five point Likert scale was used to record responses. For the purpose of this study a purposive sampling approach was adopted and respondents were chosen from different



industries within Singapore. Care was taken to ensure that respondents have experience in participating in organizational innovation teams / projects in different roles such as team member, team leaders and HR professional. The online survey was distributed to the respondents using Qualtrics platform for anonymous feedback through emails.

The online survey was sent to a total of 150 respondents and of which 82 valid responses were received, representing 54% response rate. Table 1 summarizes the characteristics of the respondents.

**<Table 1>** Demographic Characteristics of Respondents

Item	Measure	Frequency	Percentage
Gender	Male	69	84%
	Female	13	16%
Age	21 to 30 years	14	17%
	31 to 40 years	55	67%
	41 to 50 years	13	16%
Qualification	Post Graduate	47	39%
	Graduate	32	26%
	Diploma	03	3%
Industry	Finance & Banking	29	35%
	Information Technology	21	26%
	Manufacturing	6	7%
	Others	26	32%
Professional Level	Top Management	03	3%
	Middle Management	49	60%
	Junior Management	22	27%
	General Staff	08	10%
Tenure with organization (in yrs)	0 to 4 years	2	2%
	5 to 10 years	30	37%
	11 to 15 years	30	37%
	16 to 20 years	13	16%
	Over 20 years	7	9%
Nature of work	Supervisory	38	46%
	Individual Contributor	44	54%

### 3.2. Data Analysis

The data collected from the survey was analyzed using SPSS software for univariate and multivariate analysis (Bryman & Cramer, 1994), (Burns & Burns, 2008).

### 3.3. Reliability Analysis

The reliability of data was assessed and validated by using Cronbach's alpha coefficient, which is a measure of internal consistency of measures and a value of 0.6 and above is considered satisfactory (Cronbach, 1951), (Cortina, 1993), (Bland & Altman, 1997). The Cronbach's alpha coefficients for identified variables are given below in Table 2 and the value is above 0.7, indicating good reliability of measures.

**<Table 2>** Reliability measure – Cronbach's Alpha

Variables	Cronbach's Alpha
Culture	0.833
Reward & Recognition	0.888
Training	0.857
Compensation	0.777
Leadership	0.897
Systems	0.806
Employee Expectation	0.867
Innovative Work Behaviour	0.912

### 3.4. Correlation Analysis

After verifying reliability of measures, a linear correlation analysis was carried out to view the relationship amongst all variables considered using Pearson's correlation. This is a measure of strength of linear relationship between paired data. The results of the correlation analysis including Mean and Standard Deviation are given in Table III below. Leadership ( $r=0.587$ ,  $P<0.001$ ) and Systems ( $r=0.62$ ,  $P<0.001$ ) have significant positive relationship with Employee expectations with higher strength of association ( $r>0.5$ ). Culture ( $r = 0.312$ ,  $P<0.001$ ), Training ( $r=0.406$ ,  $P<0.001$ ), Compensation ( $r=0.443$ ,  $P<0.0001$ ), have significant positive linear relationship with Employee Expectations with moderate strength of association ( $0.3 < r < 0.5$ ). Reward and recognition has a moderate positive relationship with employee expectations, however the relationship is not significant at ( $P<0.001$ ). The relationship between Employee Expectations and Innovative Work Behaviour is positive ( $r=0.288$ ) at  $P<0.01$ , but the magnitude of association is low ( $r<0.3$ ).

### 3.5. Regression Analysis

Simple regression analysis was calculated to predict relationship between dependent variable employee outcome expectation and independent variable to determine the

relation. Leadership (adjusted  $R^2=.344$ , unstandardized B value of .641) and Systems (adjusted  $R^2=.385$ , unstandardized B value of .560), Culture (adjusted  $R^2=.155$ , unstandardized B value of .370), Rewards and recognition (adjusted  $R^2=.097$ , unstandardized B value of .264),

Training (adjusted  $R^2=.165$ , unstandardized B value of .362), Compensation (adjusted  $R^2=.196$ , unstandardized B value of .369) contributes positively to employee outcome expectations at ( $P<.005$ ). The detailed results are given in Table 3.

<Table 3> Summary of Simple Regression

Table. 3.1 - Culture					
Model Summary					
Zz Model	R	R Square	Adjusted R Square	Standard Error of the Estimates	
1	.409 <sup>a</sup>	.167	.155	.63491	
a. Predictors: (Constant), Culture					
Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.533	.397		6.383	.000
Culture	.370	.099	.409	3.725	.000
a. Dependent Variable: Outcome Expectation					
Table 3.2 Reward & Recognition					
Model Summary					
Model	R	R Square	Adjusted R Square	Standard Error of the Estimates	
1	.312 <sup>a</sup>	.097	.084	.66107	
a. Predictors: (Constant), Reward & Recognition					
Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients		Model
	B	Std. Error	Beta		
1 (Constant)	2.976	.378		7.870	.000
Reward & Recognition	.264	.097	.312	2.728	.008
a. Dependent Variable: Outcome Expectation					
Table – 3.3 Training					
Model Summary					
Model	R	R Square	Adjusted R Square	Standard Error of the Estimates	
1	.406 <sup>a</sup>	.165	.153	.63593	
a. Predictors: (Constant), Training					
Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
1 (Constant)	2.660	.367		7.253	.000
Training	.362	.098	.406	3.689	.000
a. Dependent Variable: Outcome Expectation					
Table – 3.4 Compensation					
Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.443a	.196	.184	.62393	
a. Predictors: (Constant), Compensation					

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.653	.333		7.961	.000
Compensation	.369	.090	.443	4.101	.000
a. Dependent Variable: Outcome expectation					
Table – 3.5 Leadership					
Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.587a	.344	.335	.56356	
a. Predictors: (Constant), Leadership					
Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.268	.457		2.777	.007
Leadership	.641	.107	.587	6.015	.000
a. Dependent Variable: Outcome expectation					
Table – 3.6 Systems					
Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.620 <sup>a</sup>	.385	.376	.54571	
a. Predictors: (Constant), Systems					
Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.817	.336		5.406	.000
Systems	.560	.085	.620	6.571	.000
a. Dependent Variable: Outcome expectation					
Table – 3.7 Employee Expectation and Innovative Work Behaviour:					
Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.288 <sup>a</sup>	.083	.070	.67428	
a. Predictors: (Constant), Outcome Expectation					
Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.797	.472		5.929	.000
Outcome Expectation	.291	.117	.288	2.497	.015
a. Dependent Variable: Innovative Work Behaviour					

### 3.6. Multiple Regression Analysis

Multiple regression analysis was calculated between dependent variable outcome expectation and independent variable culture, reward & recognition, training, compensation, leadership and systems to determine the best relation amongst them. A significant regression equation was found ( $F(6,42)=10.893$ ,  $p<.000$ ) with adjusted  $R^2$  of .471. Based on above analysis, when all the six independent variables are considered together, four

variables culture, reward & program, training and compensation become insignificant as their P-value is greater than the stipulated .05. Due to insignificance, these variables will not be evaluated further. Leadership and systems are found significant as their p-value is less than .05. Their respective unstandardized B of .288 and .286 suggest that they contribute significantly and positively to outcome expectation. The result of multiple regression analysis is given in <Table 4>.

<Table 4> Multiple Regression Summary

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.718 <sup>a</sup>	.516	.471	.50263	
a. Predictors: (Constant), Systems, Reward & Recognition, Compensation, Training, Leadership, Culture					
ANOVA <sup>a</sup>					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	17.072	6	2.845	10.893	.000 b
Residual	10.970	42	.261		
Total	28.043	48			
a. Dependent Variable: Employee Expectation					
b. Predictors: (Constant), Systems, Training, Compensation, Leadership, Reward, Culture					
Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	.539	.451		1.195	.237
Culture	.231	.137	.256	1.688	.096
Reward & Recognition	-.220	.132	-.259	-1.662	.101
Training	.159	.111	.179	1.440	.155
Compensation	.129	.085	.155	1.517	.134
Leadership	.288	.142	.264	2.033	.046
Systems	.286	.114	.317	2.515	.014
a. Dependent Variable: Outcome expectation					

### 3.7. Hypotheses Testing

From the analysis of collected data, if considered independently, all independent variable culture, reward & program, training, compensation, leadership and system have significant and positive influence on employee expectation, which in turn have significant and positive influence on innovative work behaviour. However, when all variables are considered together in multiple regression

analysis, reward & program, training, culture and compensation lose their significance. Leadership and system continue to show significant and positive influence on employee expectation. The summary of the hypothesis testing using simple and multiple regression is given below in Table 5.

&lt;Table 5&gt; Summary of Hypothesis Testing

Hypothesis	Effect	Simple Regression	Multiple Regression
H1	Culture positively affects employee expectation.	Supported	Not Supported
H2	Reward & Recognition positively affects employee expectation.	Supported	Not Supported
H3	Training positively affects employee expectations.	Supported	Not Supported
H4	Compensation positively affects employee expectations.	Supported	Not Supported
H5	Leaderships positively affect employee expectations.	Supported	Supported
H6	Systems positively affect employee expectations.	Supported	Supported
H7	Employee expectations positively affect innovative work behaviour.	Supported	Supported

## 4. Results

The study identified seven hypotheses and three were supported with significant positive relationship. Following is the detailed explanation on the hypothesis defined. The simple regression of independent variables - culture, reward & program, training, compensation, leadership and system - have significant and positive influence on employee expectation, which in turn have significant and positive influence on innovative work behaviour. However, when all variables are considered together in multiple regression analysis, reward & program, training, culture and compensation lose their significance. Leadership and system continue to show significant and positive influence on employee expectation. Thus, this research has addressed existing research gap and contributed to understanding of employee expectations and innovative work behaviour.

## 5. Discussion

The objective of this research was to study the factors that influence employee expectations to demonstrate innovative work behaviour. The research offers new insights in the context of Singapore. The research indicates the Leadership and Systems have significant positive relationship with employee expectation and that the innovative work behaviour is positively influenced by

employee expectations. Organizations can implement programs for imparting leadership skills to its key employees and invest in enhancing the systems that track innovation processes such as Project Management, Six Sigma, Technology support, Innovation Labs in order to support innovative work behaviour of employees. The descriptive nature of the study may limit the generalizability of the study. The scope of the research was limited to Singapore. Future studies can consider other countries in the region. Other antecedents that influence employee expectations such as, individual motivation (Amabile, 1988) and role of peers (Scott & Bruce, 1994) can be included in future studies.

## 6. Conclusion

Organizations are dependent on employees as critical sources of innovation. Several factors influence employee expectations to demonstrate innovative work behaviour. These factors can be directly and indirectly influenced by organization and executive leadership. Based on the study, we can conclude that in order to maintain and generate innovative environment and behaviours amongst their employees, organizations should enhance all six factors - culture, reward & recognition, training, compensation, leadership and systems. Of these, leadership and system are crucial dimensions that significantly and positively influence employee expectation.

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# Corporate Marketing Strategy Using Social Media: A Case Study of the Ritz-Carlton Seoul\*

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## Abstract

With the increasing trend of popularity of websites and social networking sites, it is quite evident that companies need to take cautionary measures in protecting the reputations with respect to company and brands. In this process, every company should indulge in enhancing their company and brand image through websites and social networking sites that fortify the bonding nature among them. The always-on nature of websites and social networking sites has contributed to their phenomenal marketing power and altered the balance of power between consumers and firms. Websites and social networks are used by hundreds of millions of people to communicate about a huge range of topics, including personal interests, activities, social events and even public issues. The paper explores a case study of the Ritz-Carlton hotel for their marketing strategy and organizational use of their website and social media in communicating with their customers. Even for the normal luxury traveler who would not have previously used the Internet to research a hotel or make a reservation, ritzcarlton.com is making it possible for them to do so in a sense of the luxury and typical Ritz-Carlton style. It seems to be a staple of the company for years to come.

**Keywords:** Social Networking Sites; Websites; Online Marketing; Marketing Promotion; Ritz-Carlton Hotel.

**JEL Classification Code:** L83, M15, M31.

## 1. Introduction

With the increasing trend of popularity of Internet websites and online social communities, it is quite evident that companies need to take cautionary measures in protecting the reputations with respect to company and brands. In this process, every company should indulge in enhancing their company and brand image through Internet websites and social networking sites that fortify the bonding nature among them. The always-on nature of Internet websites and social

networks has contributed to their phenomenal marketing power and altered the balance of power between consumers and firms. Internet websites and social networks are used by hundreds of millions of people to communicate about a huge range of topics, including personal interests, activities, social events and even public issues (Becker, Lee, & Nobre, 2010). Searching for any topic on Twitter leads to new contacts, networks and information. One resulting change is that consumers can communicate instantly and directly with companies, bypassing the traditional media filter (Becker, Lee, & Nobre, 2010; Lee, 2011).

While the Internet and social networks have become an important means of interpersonal communication, they have also, because of the ability to rapidly connect consumers, developed into a major threat. One threat to the equilibrium of image not being adequately addressed by firms relates to the new Internet social media, which include such platforms as Facebook, Twitter, blogs as well as online reviews and rating websites. It is clear that in less than a decade advanced technologies have redefined social interaction. Previously complaints spread by a consumer's word of mouth activities were conveniently isolated to a few close contacts making these lone singular voices ineffective. With the aid of Internet websites and social networks, however,

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these voices now have the ability to quickly garner the attention of millions. Internet websites and social media have not only ended the age of one-way communication but also put extreme pressure on businesses to engage constituents in unprecedented ways. One thing is clear that the Internet and social media has changed the balance of power in the consumer's favor and this change has come about quickly. In this regard, as the popularity of Internet websites and social media increases the need for companies to take ever increasing cautionary measures in protecting reputations and brands becomes essential. Through this new group of consumers, an incidence of bad service can be echoed around Internet websites and social networks reaching thousands of other consumers within minutes.

In summary, the success of using Internet websites and social media by companies would depend not only on organizational expectations but also on their behavioral intention of using them. Understanding the use of Internet websites and social media by a luxury hospitality service company will facilitate in understanding the theoretical underpinnings of an organization's Internet website and social media strategy. In contrast with the present research in the field of Internet websites and social media, this paper attempts to investigate a best practice of the Ritz-Carlon hotel in using the Internet website and social media for their marketing activity.

## **2. Marketing Strategy and Use of Internet Websites and Social Media**

The addition of Internet websites and social media into the traditional perspective has significantly altered marketing's focus and strategy. Deighton and Kornfeld (2009) noted that the flow of information about a brand has become multidirectional, interconnected and difficult to predict. They state that marketers have lost control over their brands and now participate in a conversation about the brand. While Internet websites and social media facilitate companies to conversant with their customers, in a nontraditional sense, further more they enable customers to natter directly to one another. The control, timing and frequency of Internet websites and social media-based conversations occurring between consumers and outside managers' through that managers can influence the buying decision of consumers.

Hennig-Thurau et al. (2010) provided a model of consumer interaction that depicted the relationship between company brand, the consumer's attitude towards the brand-

company and the influence of consumer through Internet websites and social media. The model depicts many factors of the new media that serve to place much of the aspects of consumer-company relationships beyond the company's control. Internet websites and social networks obtain their power much in the same manner that interconnected networks do through the value of each additional member to that network. Kozinets, de Valck, Wojnicki and Wilner (2010) called attention to that conversations among buyers were more important than marketing communication in adoption. One might argue that in spite of this observation, companies have done little to alter their communication patterns with consumers. Companies traditionally have had a one way communication monologue channel to their consumers, however, these one way communication directed towards consumers are becoming increasingly ineffective. Therefore, companies must move to establish interactive dialogue communication with many Internet and social platforms consumers use to exchange ideas, cooperate and even to seek advice from consumers in what is considered as social casting (Jones, Temperley, & Lima, 2009).

The use of Internet websites and social media with some types of business end portends several different objectives for corporate user verses individual user usage. Individuals use Internet websites and social media for networking opportunities, business research, business knowledge, contacts and product knowledge. Businesses are theorized to use Internet websites and social media for increasing exposure or awareness, client contacts, as a funnel to sales and revenues, access to a potential employee pool and public relations (Wander, 2007; Kaplin & Haenlien, 2010, 2012). In particular, using Internet websites and social media, as a part of an organization's Internet and social media strategy is likewise foreseen to enhance these underpinning goals.

One would assume that large companies, by virtue of their resources, would be ahead of curve compared to smaller ones. Becker, Kanabar and Nobre (2011) reported that while many companies had Internet websites and social media websites the number of firms actually monitoring activities on those Internet websites and social media remained mite. Becker and Lee (2012) reported that for firms in the United States and Europe the average time to reply for the large firms was 7.14 hours while the small firms replied in 5.35 hours. It is interesting that when small firms responded they did so more quickly than large firms did. Without providing for consumer interaction one could question if most company Internet website and social media are not merely extensions of the firm's static web pages. It seems that while many large firms have recognized the need to establish Internet websites and social media most, however, do not know what to do with them. Mangold and

Faulds (2009) noted that the Internet website and social media communication paradigm now requires many important changes in company attitudes and assumptions about how to manage marketing strategy as consumers are responding to the Internet website and social media in ways that directly influence all aspects of consumer behavior, from information acquisition to post-purchase expressions of satisfaction and dissatisfaction.

Over the past decade, the Internet and social media has become a prevalent source of information changing the way businesses and consumers connect and communicate. Businesses are beginning to realize that they need to become engaged in Internet websites and social media where their consumers are interacting and change their strategies of marketing (Smith, 2009). As businesses recognize the advantages of using Internet websites and social media as a marketing tool, key benefits arise such as brand awareness, engagement, consumption and loyalty. Businesses can build community around their brand through the Internet website and social media and by engaging discussion on the Internet website and social media. According to Murugesan and Ebrary (2010), with the Internet and social media services the web 2.0 has opened the digital realm to user-generated content, allowing everyday people to connect, express their identity, share opinions and influence consumer behavior. This new form of social interaction is reshaping the way businesses and consumers communicate and access information.

Internet websites and social media are becoming an alternative, preferred resource to seek information and make purchasing decisions and are considered a more trustworthy source than traditional corporate-sponsored advertising (Mangold & Faulds, 2009). Learning to listen to the conversations that are taking place, responding to feedback and requests directly and providing a venue for storytelling and social interaction are just some ways businesses have learnt to engage customers.

Kozinets, de Valck, Wojnicki and Wilner (2010) recognized the attempts of one consumer to influence another's attitude towards a product or service without direct prompting, influence or measurement by marketers. Fogel and Nehmad (2009) found that the continual monitoring of today's highly interactive Internet and social media environment now must be added to the list of threats to a firm's image. Managing the Internet and social media environment is essential to staying relevant and building a loyal fan base. Those firms that have designed systems to react to the Internet and social media threats have found that often their brand image and consumer relationships have strengthened (Becker, Kanabar, & Nobre, 2011; Becker & Lee, 2012).

### 3. The Ritz-Carlton and Ritz-Carlton.com

#### 3.1. Introduction of the Ritz-Carlton Hotel

The Ritz-Carlton Hotel Company is a hospitality management company that committed to being a worldwide leader of providing luxury experiences for their guests. The first Ritz-Carlton was founded in 1927 in Boston, Massachusetts. Since then, the company has built a reputation as a worldwide leader in the hospitality industry. This is evident in the fact that it is the only company to win the Malcom Baldrige National Quality Award of Excellence two different times (1992 and 1999). The current Ritz-Carlton Hotel Company and its existing corporate structure have been in operation since 1983. Since 1983 the company has expanded from the 1 hotel in Boston to 85 hotels in 32 countries around the world. Their commitment to excellence is further emphasized by the fact that 22 of their 38 domestic hotels have been able to achieve AAA's highest honor of the AAA Five Diamond rating (Ritz-Carlton, 2014).

The company continues to grow and has another 11 hotels scheduled to open in various locations around the world in the coming years. Currently, the Ritz-Carlton is owned by Marriott International. Marriott purchased the Ritz-Carlton property in Boston in 1998 for \$100 million dollars. Later that same year Marriott purchased the Ritz-Carlton Hotel Company and the rights to the name for \$290 million (Ritz-Carlton, 2014). The Ritz-Carlton has been operating as a subsidiary of Marriott International since 1998. The Ritz-Carlton has been able to capitalize on the global reach and expertise of Marriott International. There are many aspects of this marriage that benefit the Ritz-Carlton. One of the most beneficial is the ability to tap into the Marriott's online presence. Although [marriott.com](http://marriott.com) and [ritzcarlton.com](http://ritzcarlton.com) operate as separate entities [ritzcarlton.com](http://ritzcarlton.com) has been able to utilize the infrastructure of [marriott.com](http://marriott.com) to streamline its online presence and increase its exposure. This paper will discuss the many aspects of [ritzcarlton.com](http://ritzcarlton.com) and how this Internet website is positioning the company for the future.

#### 3.2. Business Description of the Ritz-Carlton Hotel

The Ritz-Carlton's mission statement is to "provide genuine care and exceptional products and services resulting in profit leadership" (Ritz-Carlton, 2014). This statement combined with their vision statement of "the Ritz-Carlton inspires life's most meaningful journeys" is the basis of the company (Ritz-Carlton, 2014). The Ritz-Carlton no longer owns the physical hotels that it operates. The company has evolved into a hospitality management company that focuses providing exceptional experiences to



its guests while realizing profits for the owners of the hotels. The hospitality industry is an extremely competitive business which has many comparable choices in just about every location around the world. Operating as a true luxury hotel company, the Ritz-Carlton has been able to set itself apart from many other hotels.

Building on the company's foundation of exclusivity, they have been able to retain and expand a loyal customer base that is willing to pay a premium for their services and facilities around the world. A large part of the Ritz-Carlton's business objective is managing the assets of the hotel's owners while operating the hotel at the highest level. The management team of a particular hotel is in the business of providing a world class luxury experience to every guest that enters the hotel. They are able to accomplish this by adhering to a culture of excellence in which every employee is committed to ensuring that the needs of their guests and each other are met. The company's motto of "we are ladies and gentlemen, serving ladies and gentlemen" shows how this commitment is brought to life (Ritz-Carlton, 2014). Through the current company's thirty years of operations, they have been able to build a reputation of quality that its guests have come to trust and rely on.

### **3.3. Value Proposition of Ritz-Carlton.com**

The Ritz-Carlton caters to the rich and affluent members of society. The typical guest of the Ritz-Carlton is financially stable, knows what they want and is not concerned with how much it costs. Many of the hotel's guests have more money than available time to spend it. They choose the Ritz-Carlton because they trust that the hotel will be able provide a memorable experience where their needs and desires are not only met, they are anticipated before they even recognize that they have them. Their guests place a value on the quality of service and knowing that they are going to receive the same level of service in every interaction at every location around the world. The quality of service that their guest expects goes beyond the average expectations of an ordinary hotel guest. The Ritz-Carlton guest is looking for more than just a clean room, with clean sheets and a working TV. The Ritz-Carlton guest expects to receive a more personalized experience from the moment they walk through the front doors. One of the key aspects of this experience is the fact that every guest's preferences are tracked and acted upon at every Ritz-Carlton around the world. These preferences can be anything from the fact that the guest likes to sleep on the right side of the bed, to allergies to a certain food, to the guest's birthday or even the fact their favorite baseball team is the Boston Red Sox. This is the level of service and refinement that the typical Ritz-Carlton guest has come to know and expect.

The value proposition of the Ritz-Carlton is that their hotels become an oasis from the normal hustle and bustle of the everyday world. When you stay at a Ritz-Carlton you are the focus of every employee and they do everything to ensure that your stay is a truly memorable one. Since the Ritz-Carlton Hotel Company is a leading provider of hotel experiences and needs to anticipate the needs and desires of their guests, they have invested a great amount of resources on how their guests access their hotels prior to arrival. The Internet has become the main vessel for just about everyone to conduct business and research. The Ritz-Carlton has done an outstanding job in the development of their Internet website: [ritzcarlton.com](http://ritzcarlton.com).

At [ritzcarlton.com](http://ritzcarlton.com) guests can do all of the following:

- research features of hotels around the world
- make reservations at any one of their hotels around the world
- buy items from their virtual gift shop including: robes, bath products and gift cards
- research and make spa appointments
- plan your corporate or social event
- enroll into their customer loyalty program, Ritz-Carlton Rewards
- purchase a new condo or vacation property at the Ritz-Carlton Residences or Club

[Ritzcarlton.com](http://Ritzcarlton.com) has become the one stop shop for all things Ritz-Carlton. The main function of the Internet website is a reservation system. It allows guests to search rates and availability of hotels around the world in real time. The system is directly linked to each hotel's inventory and pricing availability. When a guest searches for a room rate on [ritzcarlton.com](http://ritzcarlton.com), they will receive the same rate that the hotel will provide over the phone and the same rate that many Internet intermediary websites like [priceline.com](http://priceline.com) or [travelocity.com](http://travelocity.com) will have. This has provided a great value for the guests and hotels. The guest is able to explore all aspects of the hotel before deciding to stay. These include: the room and suite features, food and beverage outlets, recreational activities, the surrounding area and nightly room rates. This allows them to plan their stay accordingly and to make the most educated decision on where to stay and what to do during their visit. The individual hotels have the added value of being able to communicate directly with its guests and provide them with the most accurate information about the hotel.

The hotel is able to promote and sell the many amenities and experiences that they provide directly to their guests without any middleman; reducing costs and miscommunication. The hotel saves money by not having to

pay a travel intermediary a commission or having to staff a reservations department to answer phone calls. It reduces miscommunication by ensuring that the information is accurate and not coming from a third party that may or may not be familiar with the hotel. When combined with their customer loyalty program, Ritz-Carlton Rewards, ritzcarlton.com is able to provide guests with the highest level of service that they have come to expect from the Ritz-Carlton. Once a guest has a registered Ritz-Carlton Rewards account, they will only need to enter in their rewards information when making their future travel reservations on ritzcarlton.com. Their account will pre-populate their name, address, phone number, email address, credit card information and all of their preferences into their reservation.

Additionally, this allows the guest to receive points or miles for their stay that will accumulate towards free hotel stays or flights in the future. This feature provides great added value for the guests and individual hotels. The guests are able to save time by not entering their personal information into their reservation, because all of their information is tied to their rewards account. The hotels have the added value of being part of a global guest loyalty program which many guests place a high value on.

### 3.4. SWOT Analysis for Ritz-Carlton.com

#### 3.4.1. Strengths

*Convenience and ease of use* – The ritzcarlton.com website provides convenience to anyone looking to reserve a night at one of their hotels. Navigating the website is simple and self-explanatory. Clearly labeled sections and features make it easily accessible for anyone, even those who have limited computer skills. Potential guests will be prompted through a simple reservation process where they are able to enter in all of the necessary information.

*Ability to access hotels around the world* – The website provides information about all of their hotels and products from around the world. Uniform information pages are listed for each hotel around the world. Each hotel has detailed information about their policies, procedures, outlets, area attractions and rooms.

*Diversified offerings* – Ritzcarlton.com is much more than just a hotel booking website. They offer the ability to book a meeting or social event, purchase a new residence, purchase a yearly vacation rental, enroll in their loyalty program, purchase gift cards, and purchase many items from their gift shop including candles, shampoo, lotion, robes, towels sheets, pillowcases and even beds.

*Market leader* – Known around the world as the leader in the hospitality industry. They have built a reputation as the

best of the best. This is a strength that cannot be undervalued. They have worked hard to achieve their status as a market leader and will continue to reap the rewards of the past performance of providing service that is second to none.

*Backed by Marriott.com* – Since being purchased by Marriott in 1998, Ritz-Carlton has enjoyed the backing of one of the largest hotel chains in the world. Marriott has infused their technology into ritzcarlton.com. In addition to the technological expertise guests are directed directly from marriott.com to the ritzcarlton.com website which greatly increases their exposure to new potential customers.

*B2B and B2C offerings* – Although ritzcarlton.com is typically known as a B2C website, providing resources to their guests, it also has a section set up to accommodate business requests for meetings and buying rooms in bulk.

#### 3.4.2. Weaknesses

*Limited interaction/less personal* – Since it is a website the hotel does not have as much interaction with the guest as they would if they spoke with them during the reservation process. Websites by nature are less personal and provide the guest with the ability to anonymously complete their reservation at their leisure.

*Less ability to overcome price sensitivity* – Potential guests will search rates and availability at various hotels through the website and be able to reject the rate without the hotel being able to counter their objections. During a normal reservations call the agent is able to list benefits that may justify the added cost or try to find a discounted rate that they qualify for.

*Contradicts luxury experience* – The typical luxury experience involves someone taking care of the various aspects of their experience. This website goes against that and actually has the guest making their own reservations. When you think of a luxury experience a guest should not be physically making their own reservation, carrying their own bags or cleaning their own room.

*Exposure to new customers* – Since the website relies on guests searching it out to access it, it can limit in the amount of new customers that it attracts. Normal guests would not be directed to ritzcarlton.com unless they did an open search for them.

#### 3.4.3. Opportunities

*Leverage rewards program to increase utilization* – They have a great opportunity gain exposure and additional usage by utilizing their rewards program to drive additional traffic to the website. Promotions and sales information can be directly linked the website and sent through the rewards collateral.



*Utilize mobile applications* – The website is able to take advantage of a growing mobile computing market. They have an underutilized mobile application that needs to be perfected before they will be able to realize the true benefits of the market. Once it is perfected, they will be able to anticipate guests changing preference of booking reservations and drive more traffic to the mobile application.

*Society's increased use of the Internet and mobile applications* – Society as a whole is becoming more high tech and linked into computer and mobile devices. With the added usage of the Internet and people becoming more familiar and comfortable with making their own reservations online, they should certainly see an increase in usage and traffic on the website.

*Improved economy and increase in the amount of luxury travelers* – Many of the world's economies are doing better than they have in recent years. Since the global recession of 2008/09, the world's economies have been steadily improving. This is an opportunity for the website and company, since the people that they serve need to have the resources to spend on the expensive rooms and products that they offer.

*Increased exposure through search engines* – They will be able to increase their exposure by working with various search engines (google, yahoo etc.) to ensure that when people search certain keywords they are directed to their website.

#### 3.4.4. Threats

*Competition from other hotels* – The biggest threat to any business is its competition. There are many choices for luxury accommodations out there and they always have the threat of their guests going to one of the competitors. This is especially true on the Internet, since they can research and price shop the competition from the comfort of their own home.

*Competition from online travel intermediaries* – People are able to use online travel intermediaries that offer competitive rates and are able to combine hotel, airfare and car rental services in one location. This is a threat since they not only they provide additional services; the hotel pays a commission to the intermediary when a guest books a room through them.

*Achieving direct exposure to client base* – Since many luxury travelers do not book their own reservations, the website will face the challenge of getting their true clients to use the website. As the Internet and mobile computing become more popular for every segment of our society they will be challenged to find a way to make sure their true customers are utilizing their website.

*Limited market for premium services* – Even though economies are doing well, not everyone is interested in spending their hard earned money on luxury experiences and items. There is a limited market for who is willing to spend the high prices for the products and services.

*Luxury perception objections* – During the recession of 2008/09 there were many companies that received a lot of negative publicity for having their employees stay at luxury hotels for business and incentive trips and taking from the bottom line of the company. This is OK for private companies, but when the companies are publicly traded, they run the risk of facing the negative implications of how this can be perceived, especially if the company is struggling.

*Internet price shoppers* – The Internet is a limitless marketplace that allows customers search rates and features of all of the competition from the comfort of the home. This threat will remain for as long as the Internet is utilized when making reservations. If they are not the best priced and have the best features, they will run the risk of losing their potential customers.

### 3.5. Management Issues from Ritz-Carlton.com

The Ritz-Carlton has become one of the world wide leaders in luxury accommodations and experiences. One of the challenges that they are now faced with is converting that same luxury experience into an e-commerce strategy for not just one hotel, but every hotel that is listed on their website. The company has created and maintains a premier website that has detailed information of every hotel within its portfolio. Since the corporate office does not maintain the information of the individual hotels, each hotel is challenged with ensuring that the information that they have listed is accurate and within the corporate standards. This can be easier said than done. With a high rate of turnover in the hospitality industry, many of the people at the hotel level may not be proficient in the systems that feed into the website and may not be knowledgeable about the information that they are inputting into the system. To combat the Corp office will need to conduct tutorials and training sessions to ensure that every hotel is fully trained in the proper policies and procedures.

Another challenge facing the Ritz-Carlton is maximizing the exposure of their website and reaching their target audience. In a perfect world the hotel would have all of their guests make their reservations through them, either on the phone or through their website. Each individual hotel pays out large amounts of money to online travel intermediaries, travel agencies and even search engines to ensure that they attract as many guests as possible. They pay a premium commission to online travel intermediaries (sometimes as

high as 15%) and travel agencies a commission of 10%. This is based off of the nightly room rate for commissionable rates. These numbers may not seem high, but when the nightly room rate varies from \$500 to \$5,000, the fees can add up quickly. This fee varies anywhere from \$50 to \$500 per night.

Lastly, they pay money to google and other search engines to ensure that when a person searches certain key words like "Boston hotel", that person searching will be directed to ritzcarlton.com as opposed to fourseasons.com. This is a major challenge of every hotel and one that continues to be a focus of the Ritz-Carlton. The company has addressed this issue the best possible. The introduction and linking of their customer loyalty program to their website was a great step toward addressing this issue. As more guests become familiar with ritzcarlton.com through the rewards program the more guests will be making their reservations directly through ritzcarlton.com.

### 3.6. Recommendations for Ritz-Carlton.com

In conclusion, the Ritz-Carlton Hotel Company's website ritzcarlton.com has given the company an online presence that will maximize its e-commerce opportunities for years to come. They have built the website in the theme of their longstanding tradition of service excellence, while infusing it with strategic offerings that will ensure that it will be relevant for years to come. The fact the website is linked with their customer loyalty program and their parent company's website (Marriott.com) will ensure that they are servicing their existing customers and attracting new ones for the future. Since the Internet is continuing to grow and expand into new markets and demographics every day, they will certainly be set up for success for the future. Even for the normal luxury traveler who would not have previously used the Internet to research a hotel or make a reservation,

ritzcarlton.com is making it possible for them to do so in the a true sense of luxury and in typical Ritz-Carlton style. The website has many options and features that will attract new guests from many diverse backgrounds in the future. The Ritz-Carlton website will certainly be a staple of the company for years to come. Potential guests do not need to visit a travel agent or request information to be mailed to them about the hotel, with the new age of technology, they now only need to access ritzcarlton.com to research and reserve all of their luxury accommodations.

## 4. Conclusions

This study reveals that social expectations and organizational expectations exert an imperative influence on their behavioral intention to use Internet websites and social media. Although the number of companies of using Internet websites and social media is increasing, they often refuse to use Internet websites and social media for their marketing and communication with their customers and sharing business information because they seem to have the tendency that Internet websites and social media have lack of confidence and trust of their marketing activity. However, social expectations are the external surrounding and conditions in which something anxiety or pressure on organizations. Social expectations toward organizations' use of Internet websites and social media affect its service evaluation by customers and their future behavior of using the service. Because of the direct and significant impact of the two, social and organizational expectations, organizations of using Internet websites and social media for their marketing activity should develop a lucrative and congenial environment for better delivering the service and for better communicating with their customers.

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## Appendix

### The Journal of Asian Finance, Economics and Business (JAFEB)

Print ISSN: 2288-4637 / Online ISSN: 2288-4645

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#### Aims and Scope

The Journal of Asian Finance, Economics and Business (JAFEB) publishes original research analysis and inquiry into issues of Asian Finance, Economics and Business Management. The JAFEB is an international peer-reviewed journal, which is devoted to contemporary issues of finance, economics and business in Asia, including Central Asia, East Asia, South Asia, Southeast Asia, and Middle East. The journal is published four issues per year quarterly in full English.

#### Mission

The mission of JAFEB is to bring together the latest theoretical and empirical finance, economics and business management research in Asian markets. The journal audience includes: business school academics and researchers, economists, social scientists, international business persons, and policy makers, as well as managers from both for profit and not for profit corporations.

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