THE HONG KONG POLYTECHNIC UNIVERSITY
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School of Hotel & Tourism Management
酒店及旅遊業管理學院

TOURISM IN HONG KONG RECOVERS FROM THE GLOBAL FINANCIAL/ECONOMIC CRISIS

Hong Kong Tourism Forecasting Report

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Executive Summary

This report provides updated forecasts of tourist arrivals to Hong Kong from ten key source markets over the period 2010-2015. The forecasts include annual and quarterly forecasts of tourist arrivals, and the market shares of the source markets concerned. Econometric approaches are used to generate the demand elasticities as well as their confidence intervals, which are then used to generate the interval demand predictions.

The total tourist arrivals to Hong Kong are projected to reach 53.8 million in 2015 with its interval forecasts between 38.4 and 74.4 million, representing an annual growth rate of 10.51%, 4.51% and 16.61%, respectively, compared with 2009.

The ten major source markets are expected to recover from the global financial/economic crisis with varying speeds. Mainland China and South Korea are predicted to rebound strongly from 2010 onward while Taiwan would not regain its pre-crisis level over the forecasting period. The long-haul markets (Australia, UK and USA) are forecast to recover at a faster speed than the short- and medium-haul markets (Japan, Philippines, Singapore, Taiwan, and Macau).

Mainland China is predicted to be the leading country fuelling Hong Kong's tourism industry over the forecasting period with total arrivals from the Chinese mainland reaching 40.0 million in 2015. The market share of tourist arrivals from mainland China will reach 75% in the same year. Taiwan, the second largest source market for Hong Kong, is projected to be overshadowed by the global economic crisis and the direct flights between mainland China and Taiwan, as the forecast arrivals from Taiwan would not exceed the pre-crisis level over the period 2010-2015. UK is projected to be a better performer than Australia and USA as it will increase steadily after 2010.

The forecasts provided in this report are interval forecasts based on the rigorous econometric approach. Policy-maker and practitioners can skip the technical parts, and go directly to the forecasting result section if necessary.

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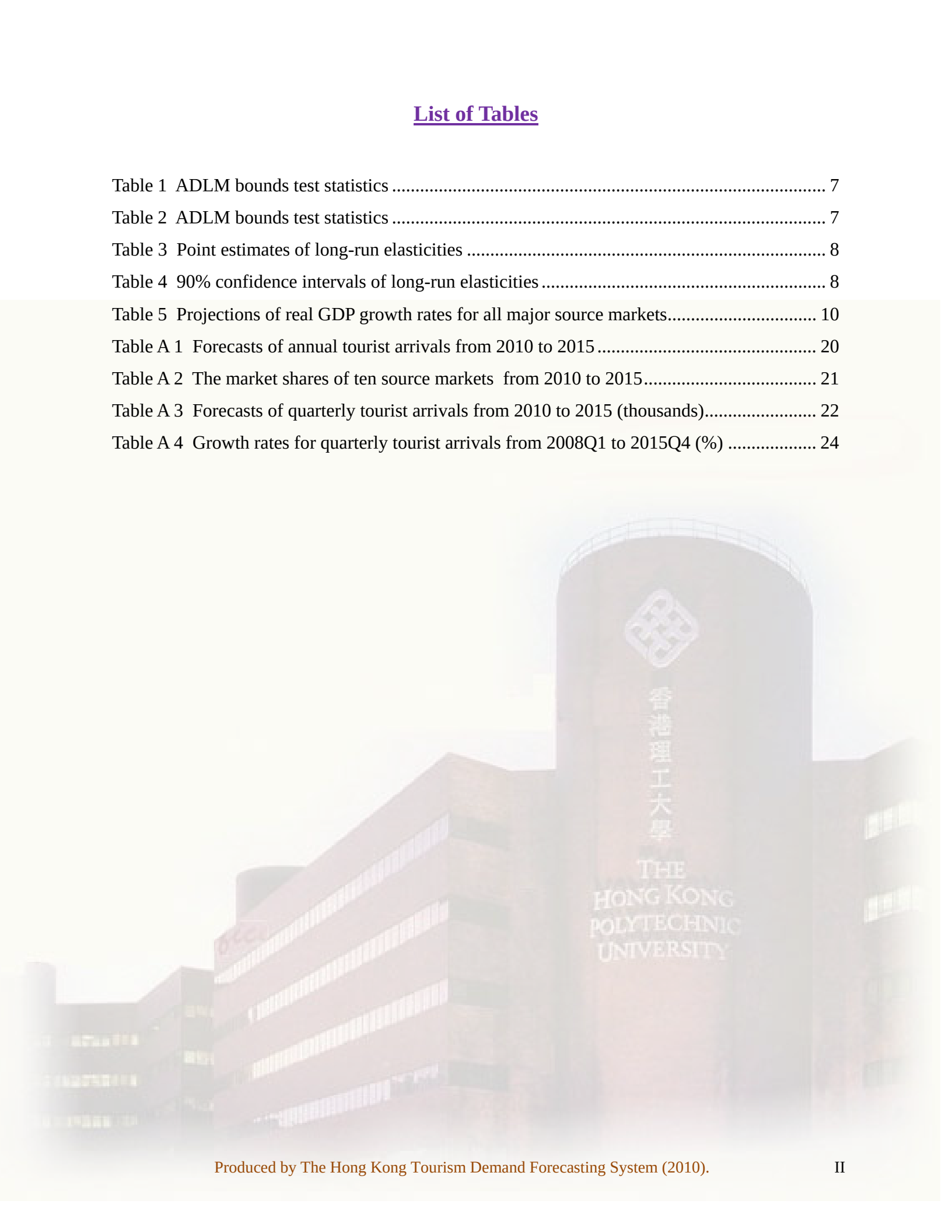

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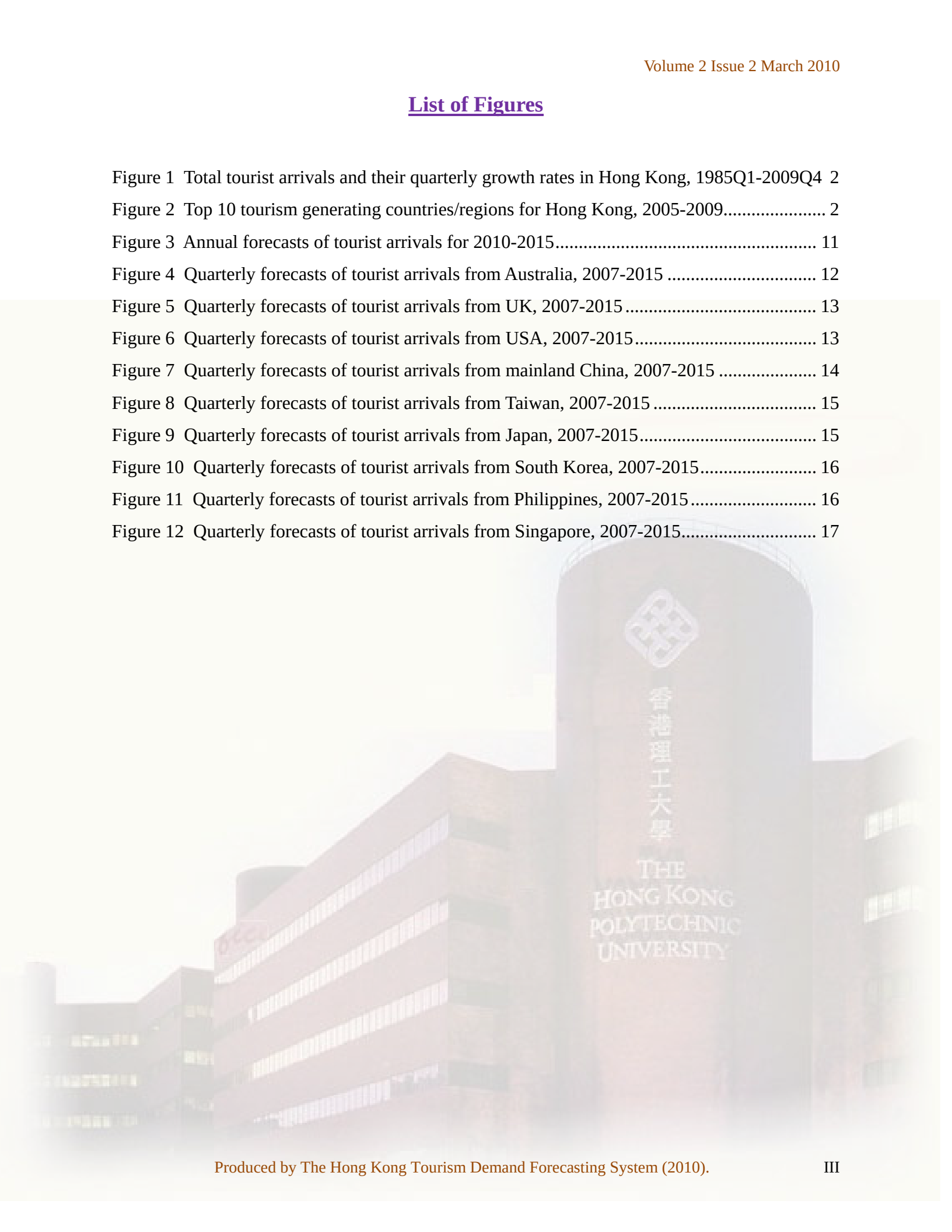

1 Introduction

According to the International Monetary Fund (IMF), “the global recovery is off to a stronger start than anticipated earlier…” (IMF, 2010c). It also predicted a clear return of economic growth in 2010 (+4% worldwide, with stronger performance for emerging and developing economies at +6.0%, alongside a more sluggish one for advanced economies at +2.1%). The economic growth is even more vigorous in mainland China with the prospect of a 10% annual increase in 2010.

Along with the encouraging economic environment, the tourism industry worldwide started to report positive results in terms of international tourist arrivals. The total tourist arrivals in the world were estimated to decrease by 4% in 2009 to 880 million with signs of recovery in the last quarter of 2009 (UNWTO, 2010). Tourism in Asia is expected to have the strongest growth compared with that of Europe and Americas.

Given its geographic proximity to mainland China, and value for money tourism product provision, Hong Kong has been less affected by the economic downturn. According to the Hong Kong Tourism Board (HKTB, 2010), the total tourist arrivals to Hong Kong reached 29.6 million in 2009 indicating a year-on-year increase of 0.28 percent. The 9.0% upswing in the last quarter of 2009 compared with the 1.8%, -8.9%, and -1.6% growth rates in the first three quarters, contributed to a better than expected full year growth (see Figure 1).

Statistics released by HKTB show that the top tourism generating countries/regions for Hong Kong during the period 2005-2009, are mainland China, Taiwan, USA, Japan, Macau, South Korea, the UK, Australia, the Philippines and Singapore (see Figure 2). Except for the UK, USA, and Australia, the other main source markets for Hong Kong tourism are in Asia with Mainland China being the leading one. Tourist arrivals from mainland China accounted for 61% of total tourist arrivals in Hong Kong in 2009 compared with a 54% share in 2005. The other nine source markets accounted for 25% of the total arrivals over the period 2005-2009. The large market size and closer economic and political ties with Hong Kong, the Chinese mainland has been the main driving force for Hong Kong’s tourism development over the past decade.

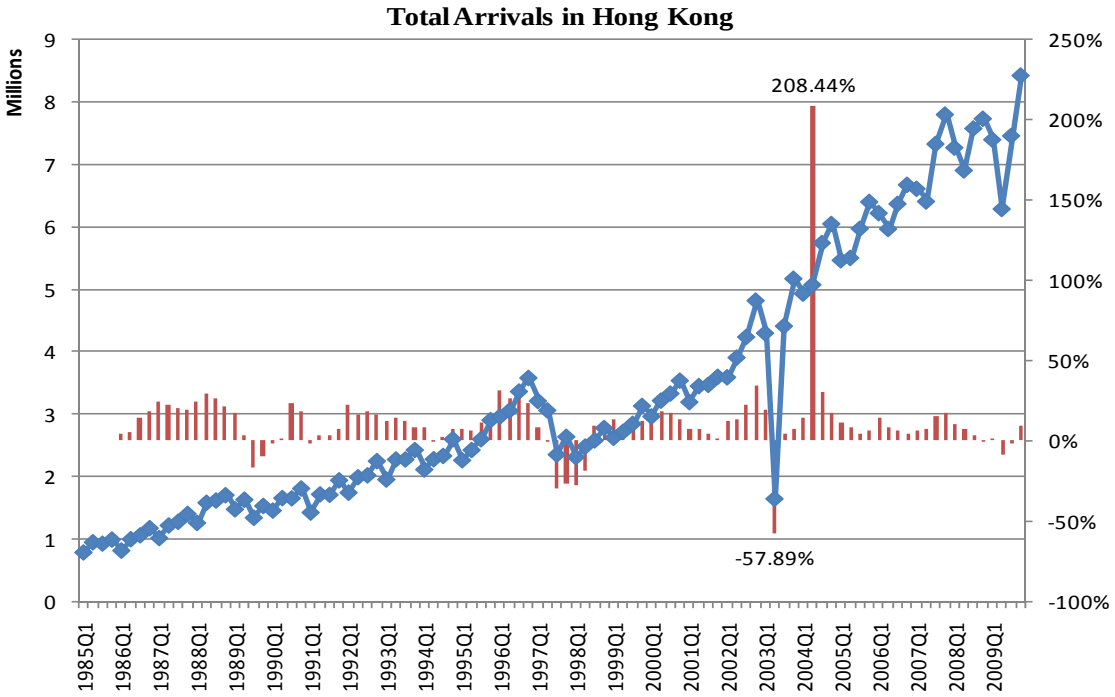

Figure 1 Total tourist arrivals and their quarterly growth rates in Hong Kong, 1985Q1-2009Q4

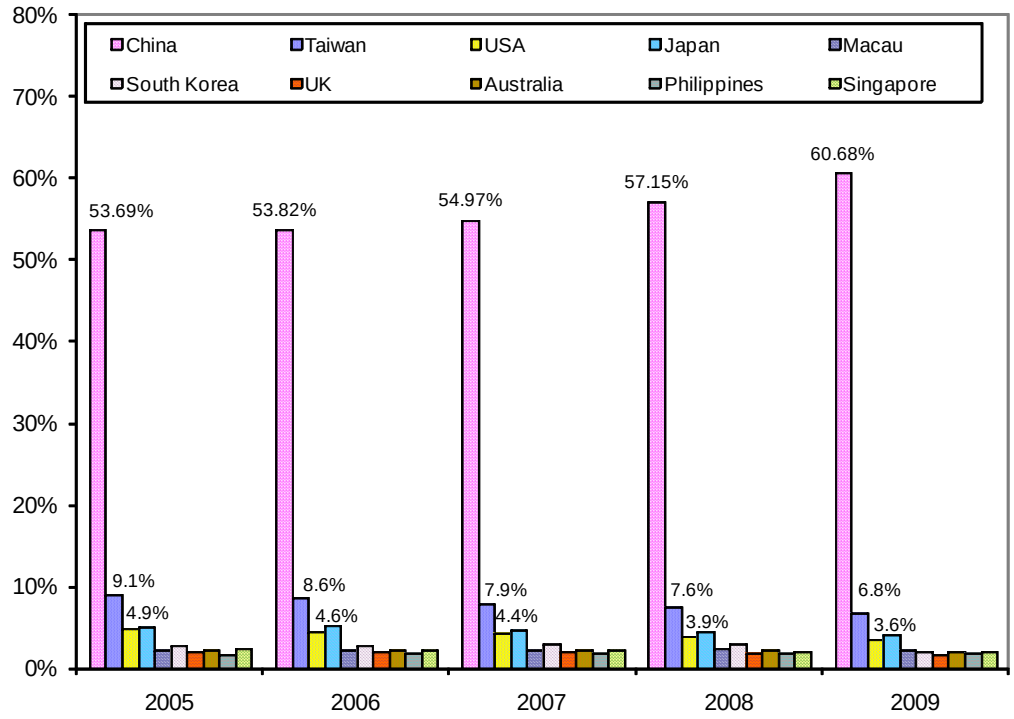

Figure 2 Top 10 tourism generating countries/regions for Hong Kong, 2005-2009

This issue of the *Hong Kong Tourism Forecasting Report* publishes the updated annual and

quarterly forecasts of tourist arrivals from 10 major source markets up to 2015. Econometric approaches are employed to generate the demand elasticities as well as their confidence intervals, which are then used to generate interval predictions of arrivals. The recovery from the global economic downturn is also incorporated by using the latest IMF projections of the economic conditions of all source markets. The next section briefly introduces the method used in generating the forecasts published in this report. The point estimates together with its 90% confidence intervals for the long-run demand elasticities are given in Section 3. Annual and quarterly forecasting results are presented in Section 4 and Section 5 concludes the report.

2 Methodology

2.1 Data Description

The most important determinants of tourism demand are tourists' income, the own price of the tourism product, the price of substitute tourism products, tourism marketing expenditure, travel costs from the origin countries/regions to the destination and one-off socioeconomic events. Equation (1) is adopted to model the demand for Hong Kong tourism by residents from a particular origin country/region *i* in this report (see Song *et al*., 2009).

$$Q_{it} = AY_{it}^{\alpha_1} P_{it}^{\alpha_2} P_{ist}^{\alpha_3} e_{it}, \qquad (1)$$

where Q_{it} measures tourist arrivals from origin country/region *i* to Hong Kong at time *t*; Y_{it} is an index of the real GDP from i^{th} origin country/region at time *t*; P_{it} is the own price variable measured by the exchange-rate-adjusted consumer price index (*CPI*) defined as $P_{it} = (CPI_t^{HK} / EX_t^{HK}) / (CPI_t^i / EX_t^i)$ at time *t*, where CPI_t^{HK} and CPI_t^i are the *CPI*s for Hong Kong and i^{th} origin country/region at time *t*, respectively, and EX_t^{HK} and EX_t^i are the exchange rate indexes for Hong Kong and i^{th} origin country/region at time *t*, respectively; P_{ist} is the substitute price variable calculated as a weighted index of *CPI* of each of the six substitute markets according to its share of international tourist arrivals at time *t*, that is, $P_{ist} = \sum_{j=1}^{6} (CPI_{jt} / EX_{jt}) w_{jt}^i$ (j = 1, 2, …, 6, representing mainland China, South Korea, Malaysia, Singapore, Thailand and Taiwan, respectively; w_{jt}^i is calculated as $TQ_{jt}^i / (\sum_{j=1}^{6} TQ_{jt}^i)$, indicating the share of international tourist arrivals for country/region *j* at time *t*, and TQ_{jt}^i is the tourist arrivals of substitute destination *j* from origin country/region *i* at time *t*); and *Dummies* refer to the seasonal dummy variables and

those that capture the influences of one-off socioeconomic events (i.e., SARS in 2003, the handover of Hong Kong to China in 1997 and relevant country/region-specific dummies, such as the 9/11 terrorist attack in the USA).

Quarterly data from 1985:Q1 to 2009:Q4 are used to estimate the demand models, which are then used to generate the annual and quarterly forecasts from 2010:Q1 to 2015:Q4. The data of the dependent variable, measured by tourist arrivals, were collected from the Visitor Arrival Statistics (HKTB, 2010). The income variable, *Y*, measured by the real GDP index (2005=100), was collected from *International Financial Statistics Yearbook* published by IMF and the official websites of the statistical bureaus or departments of all countries/regions concerned. CPIs, (2005=100) and exchange rates were also obtained from IMF.

2.2 Model Specification

Equation (1), can be written in logarithm form:

$$\ln Q_{it} = \alpha_0 + \alpha_1 \ln Y_{it} + \alpha_2 \ln P_{it} + \alpha_3 \ln P_{ist} + dummies + \varepsilon_{it}, \qquad (2)$$

where α_0 = ln$A$, ε_{it} = lne_{it}, and α_1, α_2 and α_3 are income, own price and substitute price elasticities, respectively. It is expected that α_1 and $\alpha_3 > 0$ (that is, the income level of the origin region and the substitute price have positive impacts on tourism demand), whereas $\alpha_2 < 0$ (that is, the own price of the tourism influences tourism demand negatively).

Equation (2) is a static model that does not capture the dynamics of tourism demand. To solve this problem, Equation (2) can be transformed into the following ADLM (Hendry, 1995, p.231).

$$\ln Q_{it} = \alpha_0 + \sum_{j=1}^{p} \alpha_j \ln Q_{i,t-j} + \sum_{j=0}^{p} \beta_j \ln Y_{i,t-j} + \sum_{j=0}^{p} \delta_j \ln P_{i,t-j} + \sum_{j=0}^{p} \varphi_j \ln P_{is,t-j} + dummies + \varepsilon_{it}. \quad (3)$$

Equation (3) indicates that the demand for tourism in the current period is affected by the values of lagged demand variable as well as the current and lagged values of the influencing factors. This specification takes the time path of tourists' decision-making process into consideration. As a general rule, p = 4 for quarterly data and p = 1 for annual data. However, the lag lengths of the model are normally decided by the Akaike Information Criterion (AIC) as suggested by Song, Witt, and Li (2009). ε_{it} in Equation (3) is the random error term, which is assumed to be normally distributed with zero mean and constant variance, that is, $\varepsilon_{it} \sim N(0, \sigma^2)$.

2.3 Demand Elasticities

Tourism demand elasticities can serve as a useful tool to measure the responsiveness of

tourism demand to changes in the influencing factors. They also provide useful information for tourism policy- and decision-makers who can manipulate such determinants as the own price of tourism product and tourism marketing expenditure to stimulate the demand for tourism.

It should be noted that the coefficients α_j, β_j and δ_j in Equation (3) are not demand elasticities, but after some algebraic manipulations, this equation can be rewritten as

$$\ln Q_{it} = \frac{\alpha_0}{1-\sum_{j=1}^{p}\alpha_j} + \frac{\sum_{j=0}^{p}\beta_j}{1-\sum_{j=1}^{p}\alpha_j}\times \ln Y_{it} + \frac{\sum_{j=0}^{p}\delta_j}{1-\sum_{j=1}^{p}\alpha_j}\times \ln P_{it} + \frac{\sum_{j=0}^{p}\varphi_j}{1-\sum_{j=1}^{p}\alpha_j}\times \ln P_{st} + dummies + \varepsilon_{it}, \qquad (4)$$

where $\frac{\sum_{j=0}^{p}\beta_j}{1-\sum_{j=1}^{p}\alpha_j}$, $\frac{\sum_{j=0}^{p}\delta_j}{1-\sum_{j=1}^{p}\alpha_j}$ and $\frac{\sum_{j=0}^{p}\varphi_j}{1-\sum_{j=1}^{p}\alpha_j}$ are the income, own price and substitute price elasticities, respectively.

In practice, not all of the variables included on the right-hand side of Equation (4) would be statistically significant once the model is estimated. Therefore, a modelling procedure known as the general-to-specific approach is utilized to decide which variables should be kept in the final model based on their statistical significance and economic acceptability (Song *et al*., 2009, pp. 47-60). The final model is also required to pass a series of diagnostic tests, including the tests for autocorrelation, heteroscedasticity, normality, model misspecification, structural instability and exogeneity.

In the past, tourism researchers and practitioners have mainly focused on the point estimates of demand elasticities. The point estimation alone is not informative because of the completely unknown sampling variability (Song, Kim and Yang, 2010). In this report, the Delta method developed by (Li and Maddala, 1999) is used to construct the confidence intervals for elasticities. To evaluate the confidence intervals for the long-run elasticities of tourist arrivals in Hong Kong, the ADLM bounds test proposed by Pesaran *et al*. (2001), are employed to test for the existence of the long-run relationships between the tourist arrival variable and its determinants. The test begins by estimating a conditional ADLM-ECM model based on Equation (3) as follows:

$$\begin{aligned}\Delta \ln Q_{i,t} = {} & \alpha_0 + \sum_{j=1}^{p}\psi_{Qj}\Delta \ln Q_{i,t-j} + \sum_{j=0}^{p}\psi_{Yj}\Delta \ln Y_{i,t-j} \\ & + \sum_{j=0}^{p}\psi_{Pj}\Delta \ln P_{i,t-j} + \sum_{j=0}^{p}\psi_{P_{is},j}\Delta \ln P_{is,t-j} + \pi_1 \ln Q_{i,t-1} \\ & + \pi_2 \ln Y_{i,t-1} + \pi_3 \ln P_{is,t-1} + dummies + u_{it}\end{aligned} \qquad (5)$$

where Δ is the first difference operator (i.e., $\Delta X_t = X_t - X_{t-1}$). The above equation describes the short-run dynamic interactions between the tourist arrival variable and its determinants. The π coefficients specify the long-run relationship between the demand and its determinants. If the values of π are zero, then no long-run relationship exists. *F*-test and *t*-test are used to test for the null hypothesis of no long-run relationship against the alternative hypothesis that at least one π is non-zero.

Once the long-run relationships are established, the Delta method can be used to construct the confidence intervals of the elasticities. The Delta method is a general approach for calculating confidence intervals of functions of maximum likelihood estimates, which allows the derivation of an asymptotic mean and variance for nonlinear functions of random variables using Taylor's series expansion. We define the tourism demand elasticities as $\theta \equiv (\beta_Y, \beta_P, \beta_{PS}) = (\frac{\sum_{j=0}^{N_1}\beta_{Yj}}{1-\lambda}, \frac{\sum_{j=0}^{N_2}\beta_{Pj}}{1-\lambda}, \frac{\sum_{j=0}^{N_3}\beta_{Psj}}{1-\lambda})$ and the estimator as $\hat{\theta} \equiv (\hat{\beta}_Y, \hat{\beta}_P, \hat{\beta}_{Ps}) = (\frac{\sum_{j=0}^{N_1}\hat{\beta}_{Yj}}{1-\hat{\lambda}}, \frac{\sum_{j=0}^{N_2}\hat{\beta}_{Pj}}{1-\hat{\lambda}}, \frac{\sum_{j=0}^{N_3}\hat{\beta}_{Psj}}{1-\hat{\lambda}})$. β_Y, β_P, and β_{PS} represents the income, own price and substitute price elasticities, respectively. The Delta method assumes that $\hat{\theta} \sim N(\theta, \sigma_\theta^2)$, where $E(\hat{\theta}) = \theta$. We consider $y = g(\hat{\theta})$, a differentiable function of $\hat{\theta}$. The unknown variance is estimated based on the Taylor's series approximation, and we get $\hat{\sigma}_\theta^2 = g(\hat{\theta})' \sum_{\hat{\theta}} g(\hat{\theta}) = \frac{\partial g(\hat{\theta})}{\partial \hat{\theta}'} \hat{\sigma}_\theta^2(\hat{\theta}) \frac{\partial g(\hat{\theta})}{\partial \hat{\theta}}$, where $g' = \partial g / \partial \hat{\theta}\big|_{\hat{\theta}=\theta}$ and $\sum_{\hat{\theta}}$ is the variance-covariance matrix of $(\hat{\beta}_Y, \hat{\beta}_P, \hat{\beta}_{Ps})$. Then the 90%-confidence interval is given by

$$[\hat{\theta} - z_{0.05} \cdot \hat{\sigma}_\theta, \hat{\theta} + z_{0.05} \cdot \hat{\sigma}_\theta] \qquad (6)$$

where $z_{0.05}$ is the 95th percentile of a standard normal distribution. The bounds computed by the Delta method can include values that exceed the range of the statistic being estimated, which means the bound values could be negative or greater than one.

3 The Estimated Long-Run Elasticities and Their Intervals

All the models are estimated by OLS and the general-to-specific modelling approach discussed before is used to find the final models for all source markets. The results in Table 1 suggest that all models fit the data well, as they all achieved high values of R^2 or adjusted R^2.

Table 1 ADLM bounds test statistics

Country /Region	R^2	*Adjusted* R^2	*F*-Statistic
Australia	0.94	0.93	107.06
Japan	0.94	0.93	84.38
Macau, SAR	0.99	0.99	862.00
Mainland China	0.99	0.99	1324.27
Philippines	0.99	0.98	321.99
Singapore	0.98	0.97	172.68
South Korea	0.95	0.94	97.60
Taiwan	0.99	0.99	317.93
UK	0.97	0.97	168.77
USA	0.96	0.95	117.53

Seasonal dummies are included in all models to capture the influence of seasonality on the demand for tourism. The SARS epidemic in 2003 significantly reduced tourist arrivals from all source markets as the SARS dummy is found to be statistically significant in all models. The Asian Financial Crisis in 1997 brought negative impacts on tourist arrivals from eight source markets (exclude Macau and Taiwan). The current global financial/economic crisis is found to have negative impacts on tourist arrivals from Japan, mainland China, South Korea and Singapore. The country specific dummies such as, the 911 terrorist attacks in 2001 and the return of Hong Kong to China in 1997 are found significant in the USA and UK models, respectively.

3.1 The Existence of Long-Run Relationships

As mentioned above, both the bounds and *t* tests were carried out to examine the long-run relationships between the demand for Hong Kong tourism and its major determinants, including the income, own price and substitute price variables. Table 2 presents the test results. The initial lag length (*p*) is set as *p*=4 and the final lag length is determined by the AIC values for each of the source markets. The *F* and *t* statistics are calculated based on Equation (5) with appropriate lag structure. The test results show that the long-run relationships do exist between tourist arrivals for all major source markets except for the case of South Korea.

Table 2 ADLM bounds test statistics

Country /Region	F-statistic	t-statistic	Lag (p)
Australia	43.72*	-13.00*	1
Mainland China	5.10***	-4.39*	1
Japan	75.54*	-15.78*	1
South Korea	2.17	-2.07	1
Philippines	12.10*	-6.75*	2
Singapore	52.56*	-13.67*	2
Taiwan	24.97*	-9.77*	2
UK	17.17*	-6.86*	2
USA	53.86*	-14.12*	2

Note: (1) *, ** and *** represent 1%, 5% and 10% significant levels, respectively. (2) The critical values of the

bounds test (F-statistics) and the t-statistics are adopted from Peasarn *et al.* (2001).

The point estimates of the demand elasticities are presented in Table 3 while their 90% confidence intervals are reported in Table 4. The long-haul markets include Australia, the UK and USA while the other seven markets are grouped as the short- and medium-haul markets.

Table 3 Point estimates of long-run elasticities

Country/Region	Income	Own Price	Cross Price
Australia	1.24	-0.47	0.06
Japan	1.40	-0.56	-0.16
Macau, SAR	-0.20	-3.47	-0.24
Mainland China	1.62	0.86	-0.95
Philippines	1.07	-1.06	-0.74
Singapore	0.91	-0.12	0.01
South Korea	2.16	-0.47	1.16
Taiwan	0.61	0.28	-0.53
UK	1.64	-0.02	0.68
USA	1.20	-0.29	-0.31
Long-haul Markets	**1.36**	**-0.26**	**0.15**
Short-haul Markets	**1.08**	**-0.65**	**-0.21**
Mean	**1.16**	**-0.53**	**-0.10**

Table 4 90% confidence intervals of long-run elasticities

Country/Region	Income		Own Price		Cross Price	
Australia	1.02	1.47	-0.61	-0.32	-0.23	0.36
Japan	-0.71	3.51	-1.23	0.11	-1.53	1.21
Macau, SAR	-0.58	0.17	-5.50	-1.44	-0.62	0.13
Mainland China	1.23	2.00	-0.10	1.82	-2.93	1.04
Philippines	-0.42	2.57	-1.55	-0.58	-1.65	0.18
Singapore	0.72	1.09	-0.61	0.38	-0.54	0.55
South Korea	1.53	2.78	-0.78	-0.16	-0.10	2.42
Taiwan	0.23	0.99	-0.28	0.83	-1.12	0.05
UK	1.04	2.24	-0.16	0.11	0.36	1.01
USA	0.86	1.54	-0.52	-0.07	-0.71	0.09
Long-haul Markets	**0.97**	**1.75**	**-0.43**	**-0.09**	**-0.19**	**0.48**
Short-haul Markets	**0.29**	**1.87**	**-1.44**	**0.14**	**-1.21**	**0.80**
Mean	**0.49**	**1.84**	**-1.13**	**0.07**	**-0.91**	**0.70**

3.2 Income Elasticity

Tables 3-4 indicate that the average value of the point estimates of the income elasticity for the ten major source markets is 1.16 with a value of 1.36 for the long-haul markets and 1.08 for the short-haul markets. This suggests that travelling to Hong Kong is generally regarded as luxury product by tourists from the major source markets.

The point estimates of the income elasticity of the seven source markets are greater than 1, and the corresponding interval income elasticities for four of the seven markets (i.e., Australia, China, South Korea and UK) cover the value of 1, supporting the evidence that the point income

elasticity is normally statistically different from 1 (Song, Kim, & Yang, 2010). To test for the null hypothesis $H_0 : \beta_y < 1$ versus $H_1 : \beta_y \geq 1$, the t-statistic is used and it is written as $t_0 = \frac{\hat{\beta}_y - 1}{se(\hat{\beta}_y)}$, where $se(\hat{\beta}_y)$ is the standard error of $\hat{\beta}_y$. The calculated t_0 is compared with the critical value of one-tailed *t* distribution with (n-k) degrees of freedom, where n and k are the sample size and the number of independent variables, respectively. If the calculated t_0 is greater than the critical value then the alternative hypothesis is accepted to suggest that the income elasticity is elastic. The *t* test results show that the income elasticities from four of the above-mentioned countries are elastic as they are significantly greater than 1 at 5% significance level.

Most point estimates of the income elasticities are positive, with only Macau as an exception (-0.2). But this value is statistically insignificant. The point estimate of the income elasticity for Taiwan is relatively smaller suggesting that the demand for Hong Kong tourism by residents from Taiwan is income inelastic. One possible explanation may be that the majority of visitors from Taiwan are transit passengers who regard Hong Kong as the gateway to and from the Mainland or other destinations.

3.3 Own Price Elasticity

All estimated own-price elasticities are negative indicating that an increase in the price of tourism products/ services in Hong Kong will lead to a decline in the demand for Hong Kong tourism by tourists from the source markets with Taiwan and mainland China being two exceptions. However, these two price elasticities are not statistically different from zero, as the associated confidence intervals cover the value of zero.

The average value of own price elasticities for the ten major source markets is -0.53, suggesting that price reduction would not necessarily result in significant increases in tourist revenue for Hong Kong, which is consistent with the findings in Volume 1, Issue 3 of HKTDF Report. The short- and medium- haul markets exhibit higher sensitivity to price changes (-0.65) than that of the long-haul markets (-0.26).

It is found that the point estimate of the price elasticity is significantly greater than 1 in the Macau model revealing that visitors from Macau is relatively sensitive to the price changes of tourism products in Hong Kong. The managerial implication of this would be that a decrease in the tourism price holding other variables constant tends to bring about an increase in total tourism revenue. So an appropriate pricing policy is crucial to attract Macau visitors. The other

nine source markets are found to be price-inelastic.

The t test also show that 50% of the own-price elasticity (point) estimates, including Australia, Macau, Philippines, South Korea and Taiwan, are not statistically significant which is consistent with previous findings in Song, Kim and Yang (2010).

3.4 Cross Price Elasticity

The estimated cross-price elasticities are positive in the Australia, Singapore, South Korea, and UK models, which mean that an increase in the costs of tourism in the competing destinations will lead to an increase in the demand for Hong Kong tourism. It is found that tourists from South Korea, are very much aware of the costs of tourism in the alternative destinations, and changes in the costs of tourism in the competing destinations will have a substantial impact on the demand for Hong Kong tourism by residents from these countries/regions. Therefore, maintaining the cost advantage of the Hong Kong tourism over the competitors is crucial for Hong Kong to attract tourists from South Korea.

4 Forecasts of Tourist Arrivals up to 2015

Before generating the forecasts of tourist arrivals, we need to forecast the values of the independent variables, including the income, own price and substitute price variables. The latest forecasts of the real GDP changes published by IMF (2010b, 2010c), as shown in Table 5, are used as the projections of the income variables from 2010 to 2015. We used exponential smoothing method to generate the forecasts of the own price and substitute price variables. These forecasts of the explanatory variables are used in conjunction with the estimated relationships to generate the forecasts of the tourist arrivals from all source markets, and the results are interpreted in the following two sub-sections.

Table 5 Projections of real GDP growth rates for all major source markets

Country / Region	2009	2010	2011	2012	2013	2014	2015
Mainland China (growth, %)	8.5	9.0	9.7	9.8	9.8	9.5	9.3
Japan (growth, %)	-5.4	1.7	2.4	2.3	2.0	1.8	1.7
Macau (growth, %)	5.3	7.4	6.6	6.2	5.9	5.5	5.2
Philippines (growth, %)	1.0	3.2	3.8	4.5	4.5	4.5	4.5
Singapore (growth, %)	-3.3	4.1	4.3	4.2	4.6	4.6	4.7
South Korea (growth, %)	-1.0	3.6	5.2	5.0	4.7	4.5	4.6
Taiwan (growth, %)	-4.1	3.7	4.2	4.8	5.0	5.0	5.0
Australia (growth, %)	0.7	2.0	3.3	3.4	3.2	3.0	2.9
USA (growth, %)	-2.7	1.5	2.8	2.6	2.5	2.1	1.8
UK (growth, %)	-4.4	0.9	2.5	2.9	2.9	2.9	2.8

Source: IMF, 2010b.

4.1 Annual Forecasts

To generate the total annual tourist arrivals, the market shares of the ten source countries/regions from 2010 to 2015 are estimated by adopting the exponential smoothing method (see Table A1). The point estimates of total tourist arrivals to Hong Kong are projected to reach 53.8 million in 2015 with a 90% confidence interval between 38.4 and 74.4 million, representing a year-on-year growth rate of 10.51%, 4.51% and 16.61%, respectively (see Figure 3). The 4.92% upswing registered in 2010 compared with the slight increase of 0.28% in 2009 indicates a full recovery from the recession. For detailed forecasts, please refer to Table A1.

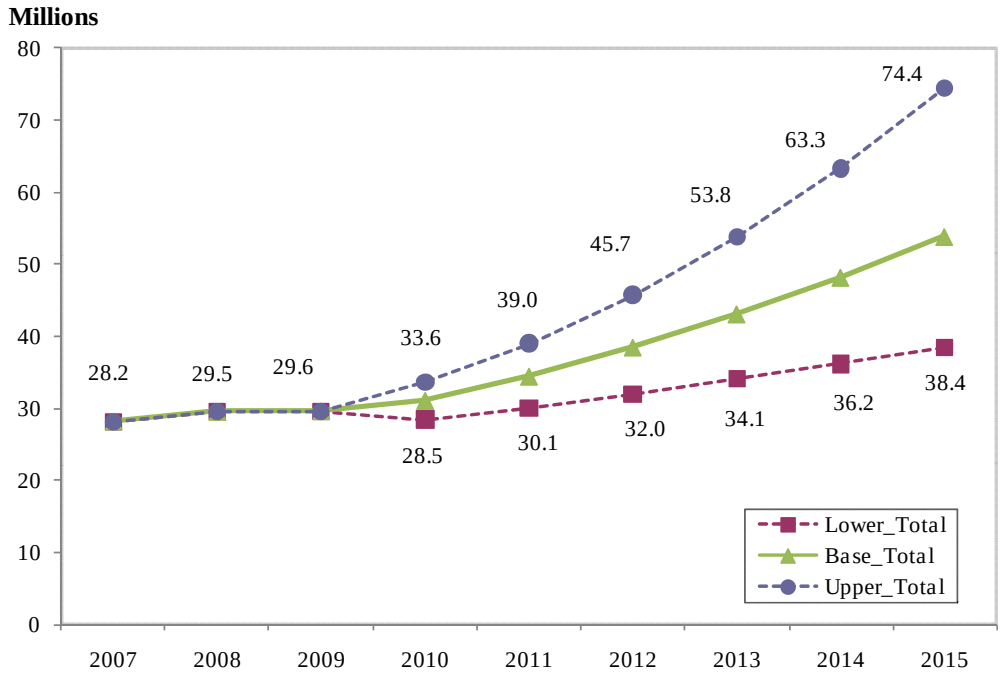

Figure 3 Annual forecasts of tourist arrivals for 2010-2015

4.2 Quarterly Forecasts

The forecasting results show that all major source markets are expected to recover from the global financial/economic crisis with different paces. The long-haul markets are likely to recover faster than the short- and medium-haul markets.

4.2.1 Long-haul Markets

The three long-haul markets are expected to show positive growth from the first quarter of 2010 (see Table A3). It is projected that the tourist arrivals from Australia, UK and USA will reach 0.74, 0.72 and 1.26 million, respectively in 2015.

As discussed in the previous section, the demand for Hong Kong tourism by tourists from the long-haul markets is more income elastic that the short-haul markets, which means that visitors from the long-haul markets are more likely to cut down their holiday expenditures in Hong Kong with adverse economic conditions. Figures 4-6 and Table A-3 show that the Hong Kong tourism suffered greater loss from the long-haul markets, i.e., tourist arrivals from Australia declined significantly for the period 2008Q3-2009Q3 and from the USA and UK for the period 2008Q2-2009Q2 due to the global economic turbulence. UK is projected to be more robust in recovery than Australia and USA.

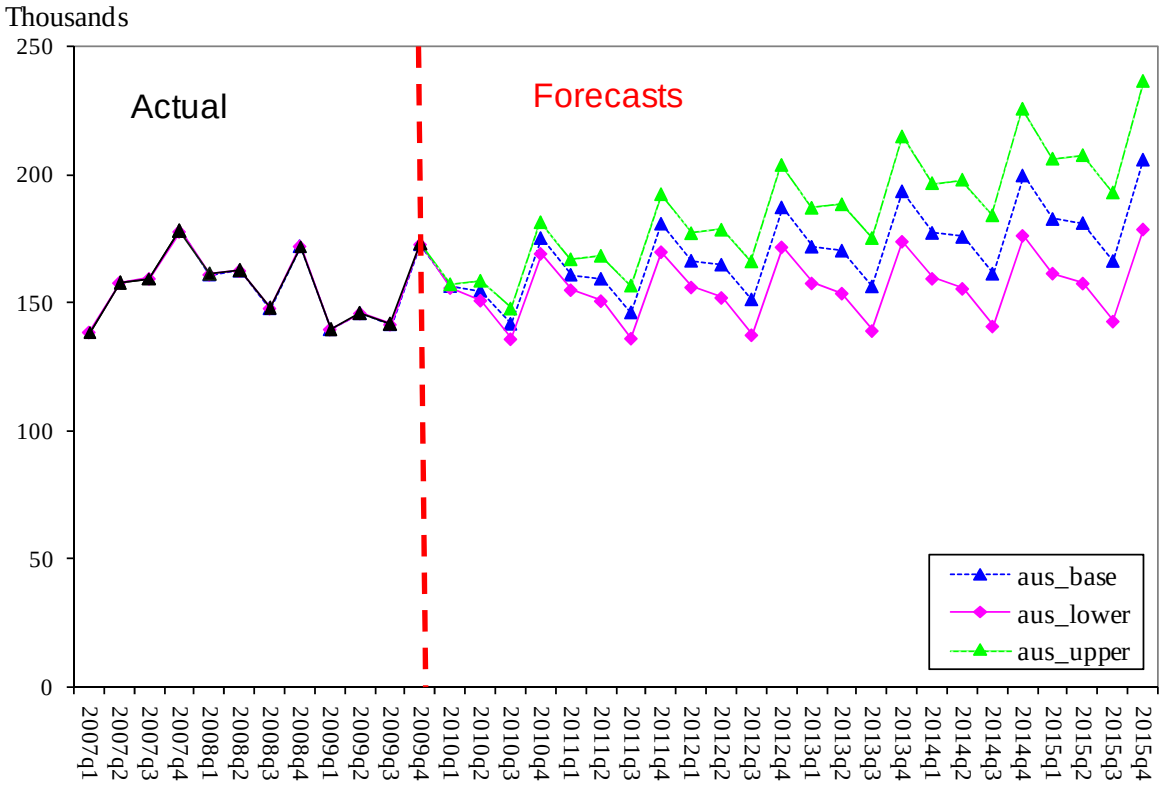

Figure 4 Quarterly forecasts of tourist arrivals from Australia, 2007-2015

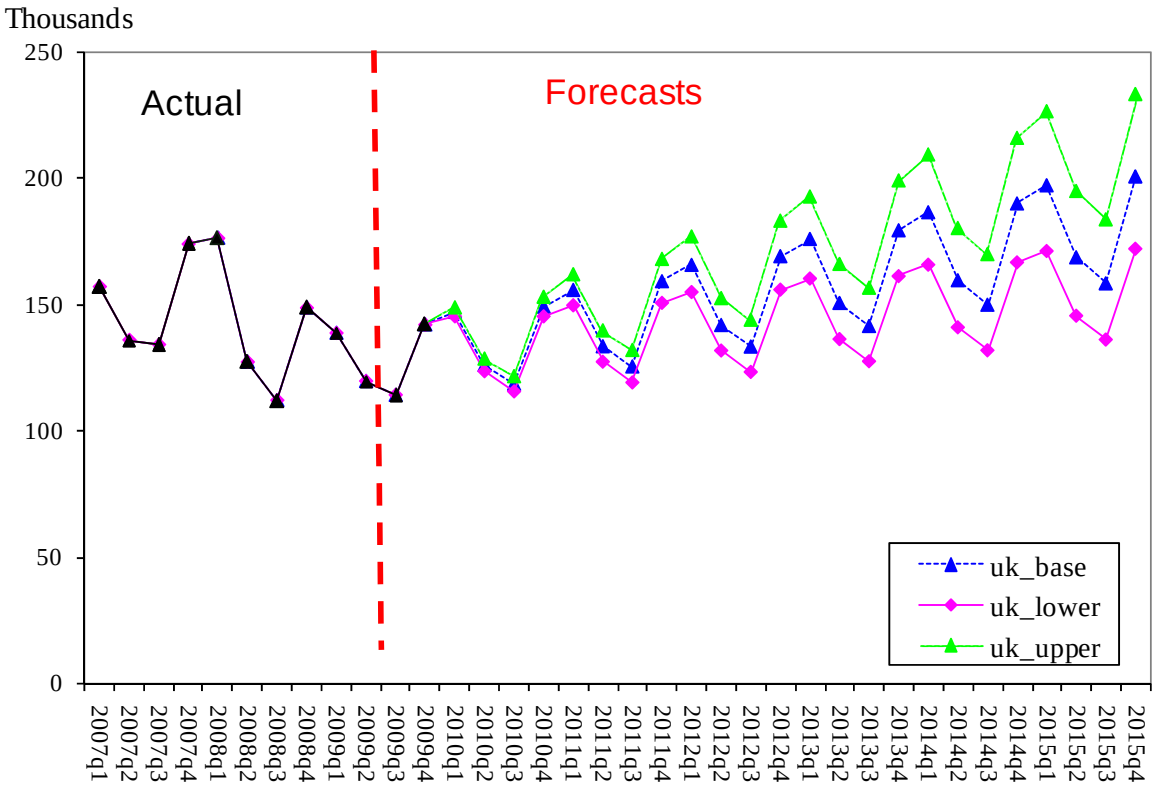

Figure 5 Quarterly forecasts of tourist arrivals from UK, 2007-2015

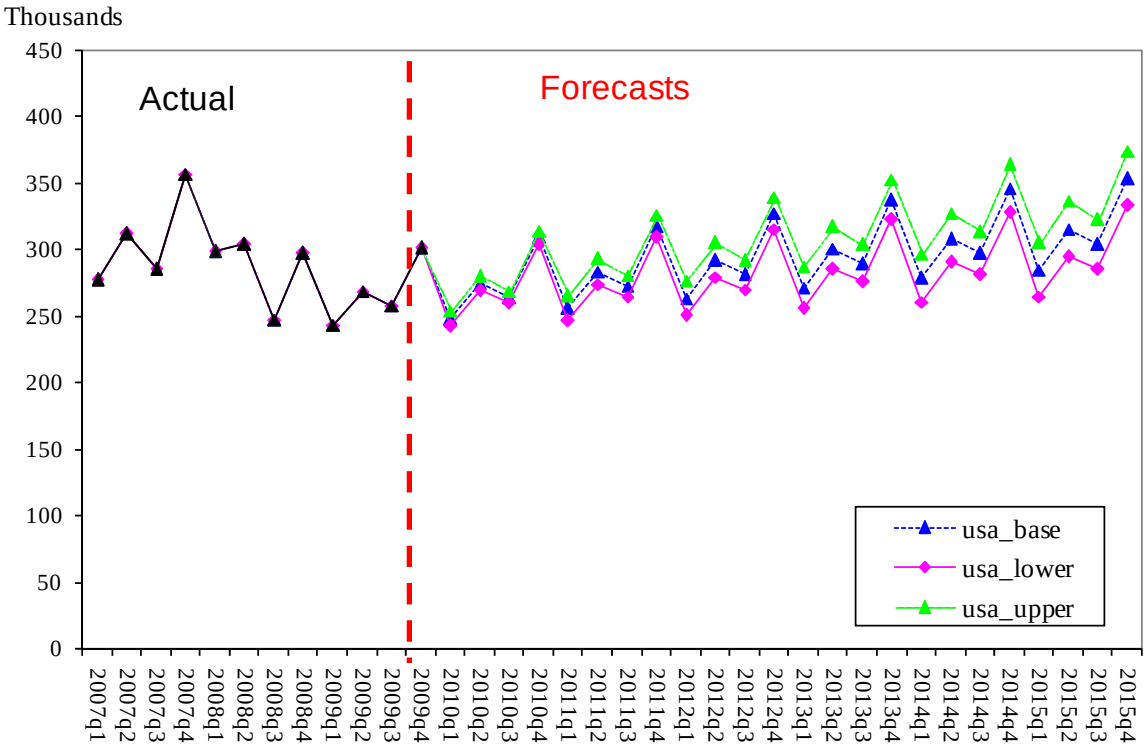

Figure 6 Quarterly forecasts of tourist arrivals from USA, 2007-2015

4.2.2 Short-haul Markets

Compared to the long-haul markets, the short- and medium-haul markets were less affected by the economic crisis and the A (H1N1) influenza outbreak, except for South Korea (see Figures 7-12). It is found that South Korea is much more sensitive to the fluctuations of the economic conditions, as a deteriorating performance was found since the second half of 2008 to the end of 2009 resulting in an annual growth of -30% in 2009. This is likely to do with the combination of the economic recession and currency depreciation.

The size of the Chinese market and the expected growth of the Chinese economy will continue to be the main driving force for Hong Kong's tourism industry over the forecasting period. In 2015, tourist arrivals from mainland China are predicted to account for 75% of the total tourist arrivals in Hong Kong.

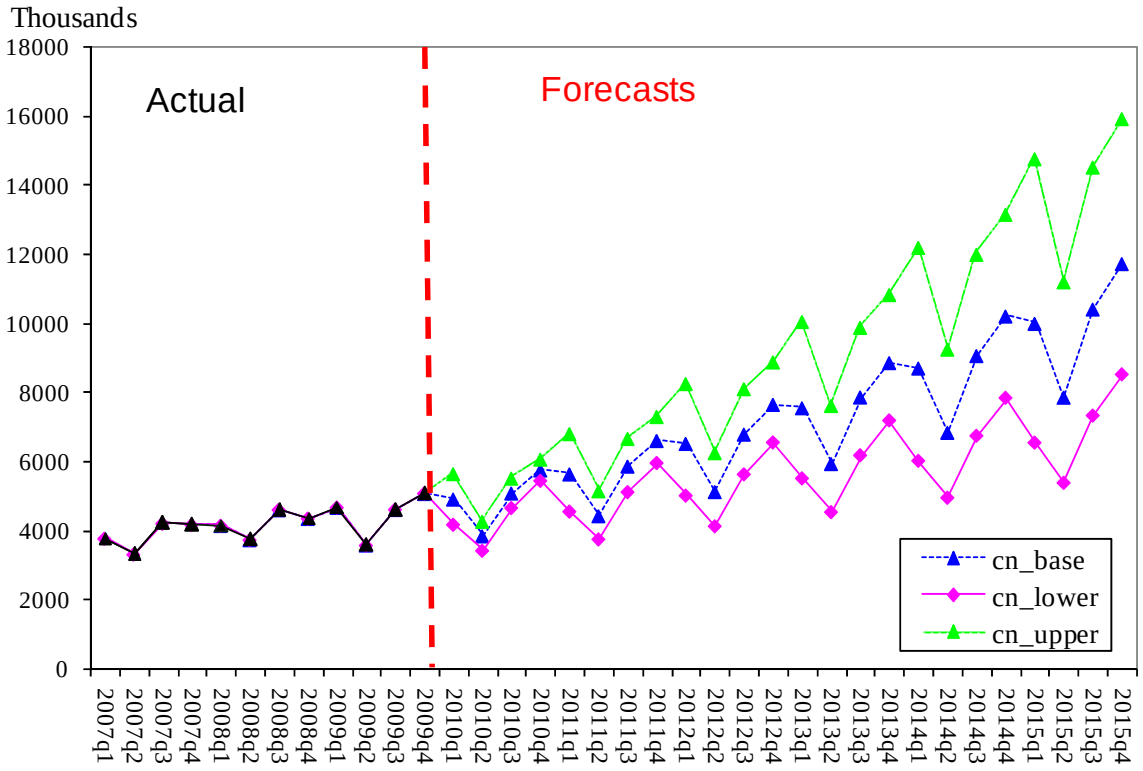

Figure 7 Quarterly forecasts of tourist arrivals from mainland China, 2007-2015

The poor macro-economic situation and the opening of direct flights between mainland China and Taiwan toward the end of 2008 resulted in the number of arrivals from Taiwan slumped by 10.3% in 2009. As a second largest source markets, Taiwan is not expected to have a strong recovery, as it is estimated that tourist arrivals from Taiwan will not return to its pre-crisis level over the forecasting period with a market share shrinking from 6.8% in 2009 to 4.2% in

2015. The forecasting results also show an optimistic prospect for three markets - Japan, Philippines and Singapore, as they will all grow with stable trends (Figures 9, 11 and 12).

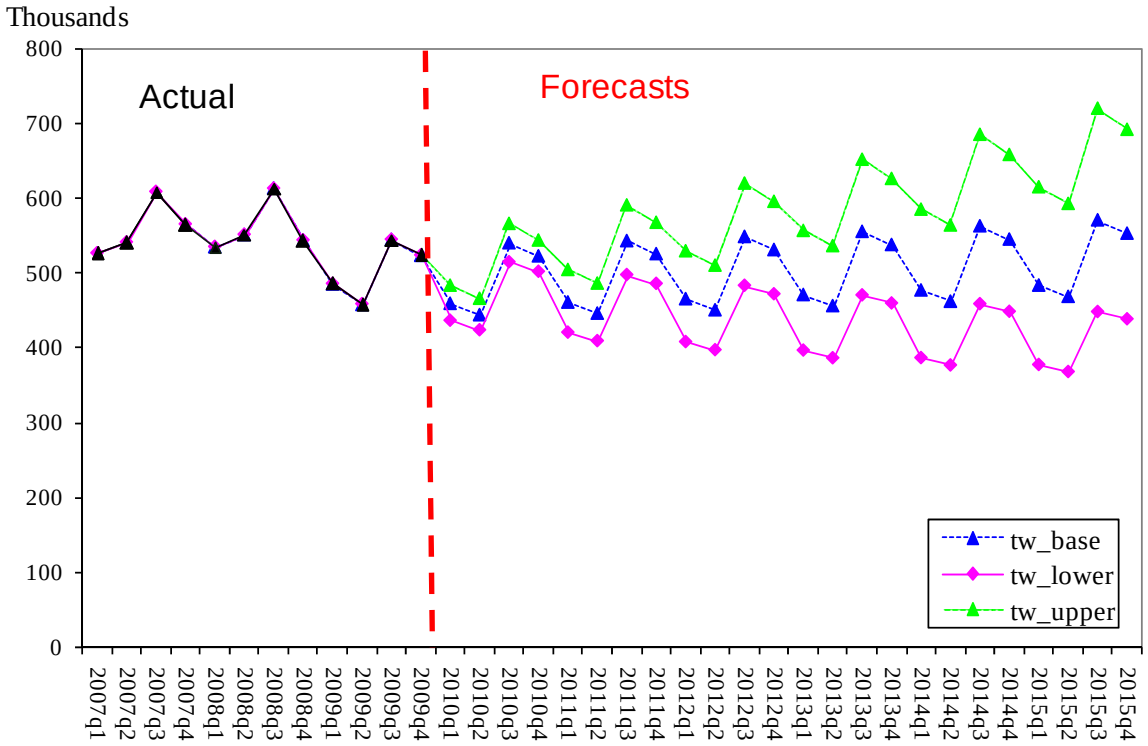

Figure 8 Quarterly forecasts of tourist arrivals from Taiwan, 2007-2015

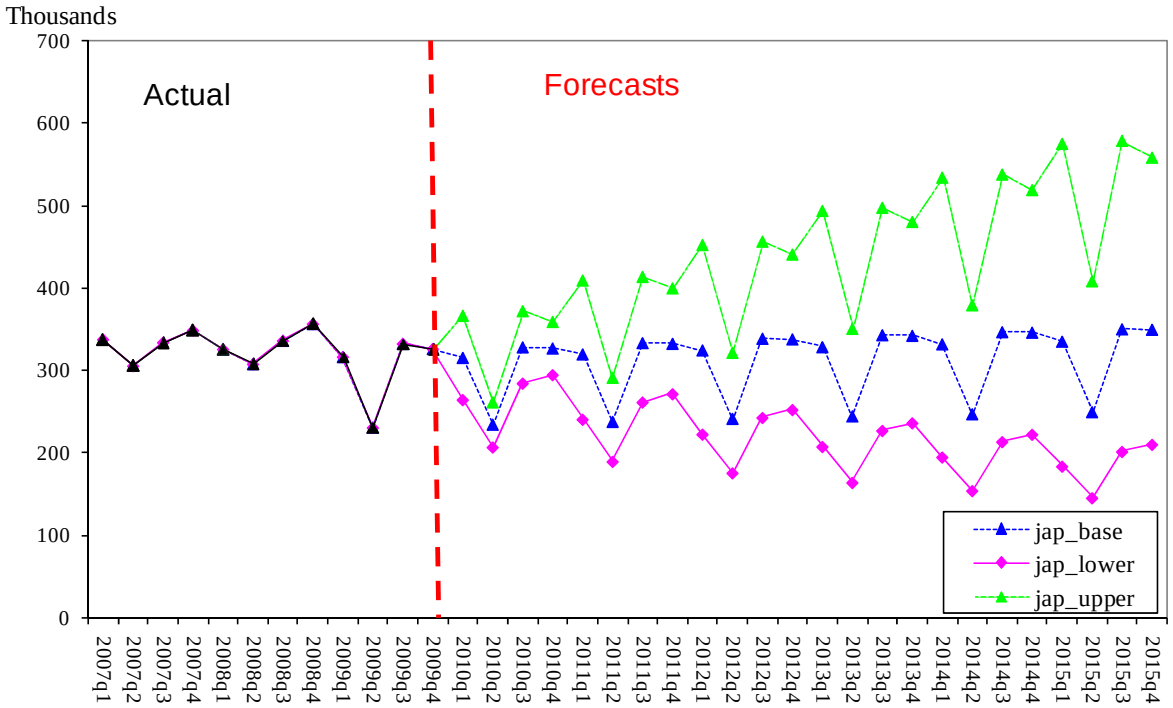

Figure 9 Quarterly forecasts of tourist arrivals from Japan, 2007-2015

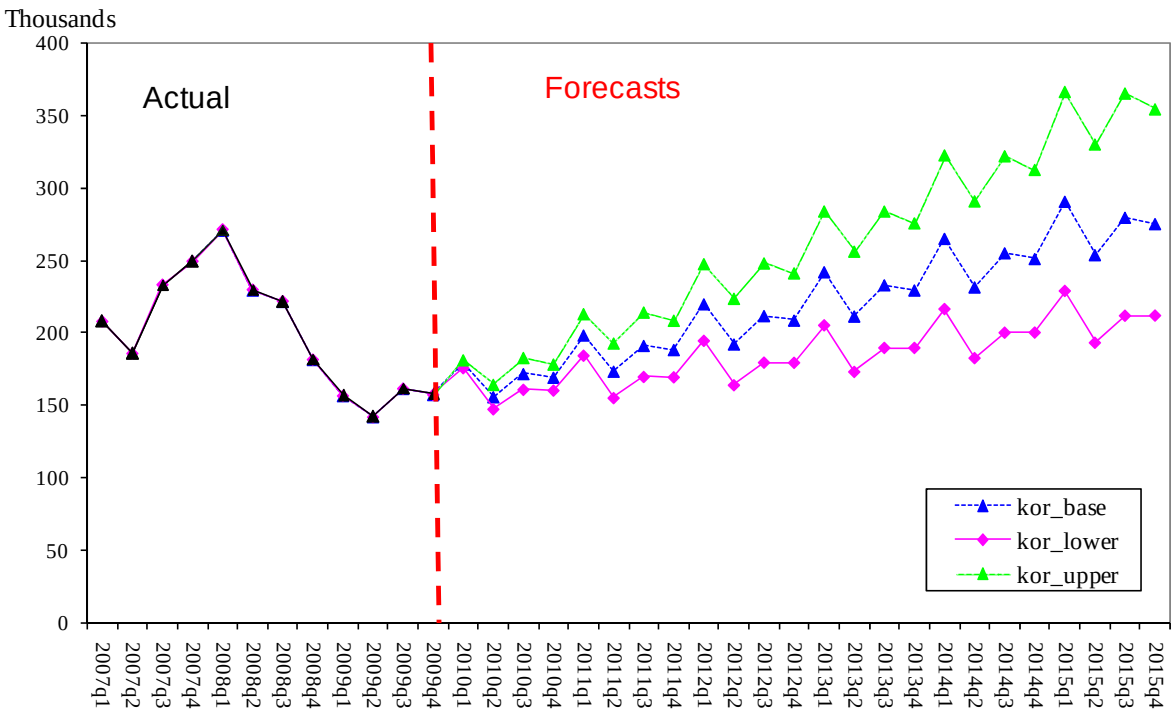

Figure 10 Quarterly forecasts of tourist arrivals from South Korea, 2007-2015

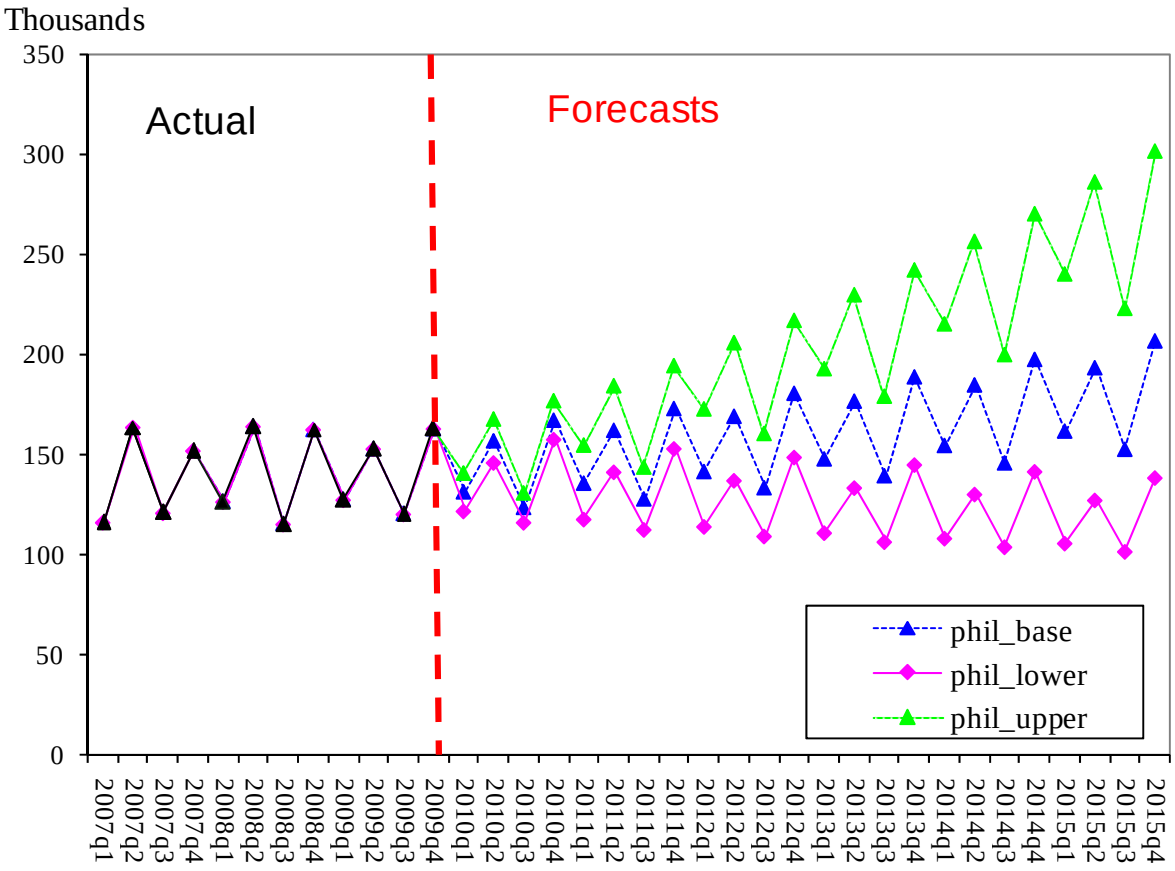

Figure 11 Quarterly forecasts of tourist arrivals from Philippines, 2007-2015

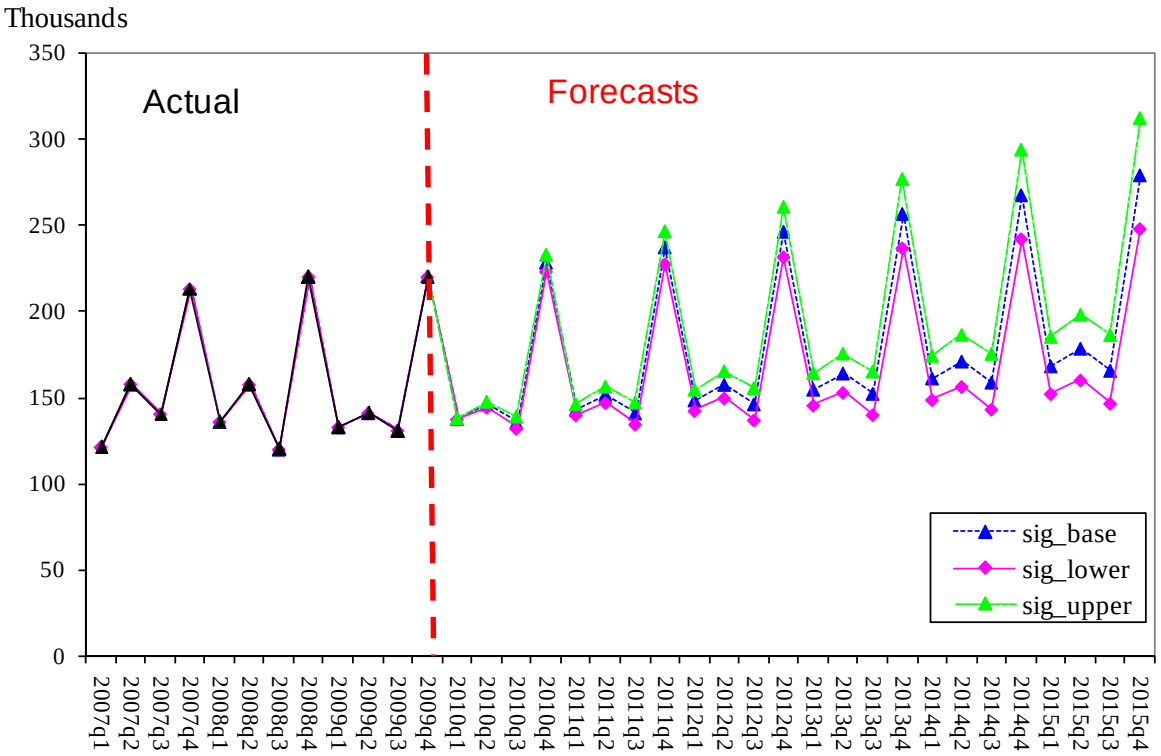

Figure 12 Quarterly forecasts of tourist arrivals from Singapore, 2007-2015

5 Conclusion

This report updates the forecasts of tourist arrivals in Hong Kong from ten major source markets (Australia, mainland China, Japan, South Korea, the Philippines, Singapore, Macau, Taiwan, the UK, and USA) up to 2015 by evaluating the impacts of the current global financial/economic crisis. The latest projections of the economic conditions of the source markets are obtained from the World Economic Outlook Database released by IMF in order to gauge the ongoing recovery from the economic recession.

The demand elasticities along with their confidence intervals are generated by econometric approaches, which are then used to produce the interval predictions of quarterly and annual tourist arrivals from the major source markets. The interval estimates of the demand elasticities are established to examine the possible impacts of changes in income levels from the major source markets, tourism prices in Hong Kong and tourism prices in alternative destinations on the demand for tourism in Hong Kong.

The analysis of demand elasticities indicates a strong relationship between the demand for Hong Kong tourism and the income levels in origin markets and the price of Hong Kong tourism. The short- and medium -haul markets exhibit higher sensitivity to price changes while the long-

haul markets are more sensitive to income changes. In addition, the demand for Hong Kong tourism by tourists from the growing economies (mainland China and South Korea) is found to be highly income-elastic. It is thus important that the policymakers in Hong Kong should closely monitor the economic conditions in the major tourism source markets, particularly in the long-haul markets. In the meantime, the suppliers of tourism products/services in Hong Kong could make appropriate adjustments to the prices of their products/services in order to maximize their total revenues from different source markets given their price elasticities. However, it may not be a good idea to offer a large price discounts which could result in revenue decline because the majority of the source markets are price inelastic.

Pulling out from the deepest global economic tsunami in recent history, the world economy has started to show strong growth (IMF, 2009b). In 2010, the total number of tourist arrivals to Hong Kong is expected to rise by 4.92% and reach 31.0 million. By 2015, the total tourist arrivals are projected to be 53.8 million, indicating an average of annual growth rate of 10.5%, compared with 2009.

The tourism industry in Hong Kong has suffered significant losses from the long-haul markets due to the global economic downturn. However, most of the major source markets are expected to recover strongly from the global financial/economic crisis though with varying speeds. Mainland China and South Korea are predicted to have strongest recovery from 2010 while Taiwan is likely to fail in regaining its pre-crisis level over the forecasting period. The long-haul markets are forecast to recover at a relatively quicker pace than that of the short- and medium-haul markets (exclude mainland China and South Korea).

Compared to its performance in the past decade, the mainland China market recorded a slower growth in the period 2008-2009 but will regain its vigorous growth from 2010. The forecasts also show that mainland China will continue to be the largest source of tourist arrivals for Hong Kong and the market share of the tourist arrivals from mainland China will reach 75% in 2015. Therefore, tourism businesses in Hong Kong should continue to focus on this market, which is predicted to be the world's fastest growing economy over the next decade.

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Appendix

Table A 1 Forecasts of annual tourist arrivals from 2010 to 2015

Year	L_Total (,000)	Base_Total (,000)	U_Total (,000)	L_Total (y-to-y, %)	Base_Total (y-to-y, %)	U_Total (y-to-y, %)	Market Share (%)
2007	28169	28169	28169	-	-	-	85.9
2008	29507	29507	29507	4.75	4.75	4.75	86.7
2009	29591	29591	29591	0.28	0.28	0.28	87.3
2010	**28475**	**31046**	**33616**	**-3.77**	**4.92**	**13.60**	**89.0**
2011	**30068**	**34409**	**39041**	**5.60**	**10.83**	**16.14**	**89.6**
2012	**31988**	**38442**	**45736**	**6.38**	**11.72**	**17.15**	**90.2**
2013	**34074**	**43067**	**53811**	**6.52**	**12.03**	**17.66**	**90.8**
2014	**36199**	**48160**	**63255**	**6.24**	**11.83**	**17.55**	**91.4**
2015	**38405**	**53819**	**74360**	**6.10**	**11.75**	**17.56**	**92.0**
AAGR	-	-	-	**4.51**	**10.51**	**16.61**	-

Note: (1) Base, L and U are referred to baseline forecasts and their lower and upper forecasts, respectively. (2) Figures in bold are forecasts. (3) AAGR is the average annual growth rate from 2009 to 2015. (4) The forecasts of market shares are calculated by using exponential smoothing method.

Table A 2 The market shares of ten source markets from 2010 to 2015

Region/Country		2007	2008	2009	2010	2011	2012	2013	2014	2015
Australia	L	2.25	2.18	2.03	**2.12**	**2.01**	**1.91**	**1.82**	**1.73**	**1.66**
	Base	2.25	2.18	2.03	**2.00**	**1.86**	**1.73**	**1.59**	**1.47**	**1.36**
	U	2.25	2.18	2.03	**1.90**	**1.73**	**1.57**	**1.41**	**1.26**	**1.12**
Japan	L	4.70	4.49	4.07	**3.64**	**3.17**	**2.76**	**2.43**	**2.15**	**1.91**
	Base	4.70	4.49	4.07	**3.83**	**3.51**	**3.20**	**2.89**	**2.62**	**2.37**
	U	4.70	4.49	4.07	**3.99**	**3.83**	**3.61**	**3.35**	**3.09**	**2.83**
Macau, SAR	L	2.22	2.36	2.27	**2.33**	**2.22**	**2.13**	**2.04**	**1.97**	**1.90**
	Base	2.22	2.36	2.27	**2.19**	**2.03**	**1.87**	**1.72**	**1.58**	**1.46**
	U	2.22	2.36	2.27	**2.06**	**1.86**	**1.65**	**1.46**	**1.29**	**1.14**
Mainland China	L	54.97	57.15	60.68	**61.52**	**63.82**	**66.04**	**68.10**	**69.98**	**71.72**
	Base	54.97	57.15	60.68	**62.49**	**64.90**	**67.30**	**69.62**	**71.79**	**73.84**
	U	54.97	57.15	60.68	**63.31**	**65.78**	**68.28**	**70.77**	**73.14**	**75.37**
Philippines	L	1.96	1.93	1.91	**1.88**	**1.73**	**1.58**	**1.44**	**1.33**	**1.22**
	Base	1.96	1.93	1.91	**1.84**	**1.72**	**1.61**	**1.50**	**1.41**	**1.32**
	U	1.96	1.93	1.91	**1.81**	**1.71**	**1.64**	**1.55**	**1.48**	**1.40**
Singapore	L	2.24	2.14	2.11	**2.21**	**2.13**	**2.04**	**1.96**	**1.89**	**1.82**
	Base	2.24	2.14	2.11	**2.06**	**1.93**	**1.79**	**1.67**	**1.56**	**1.46**
	U	2.24	2.14	2.11	**1.93**	**1.76**	**1.59**	**1.44**	**1.30**	**1.18**
South Korea	L	3.11	3.06	2.09	**2.24**	**2.24**	**2.22**	**2.20**	**2.19**	**2.19**
	Base	3.11	3.06	2.09	**2.15**	**2.16**	**2.15**	**2.11**	**2.07**	**2.03**
	U	3.11	3.06	2.09	**2.08**	**2.10**	**2.08**	**2.03**	**1.96**	**1.89**
Taiwan	L	7.95	7.59	6.79	**6.50**	**5.95**	**5.44**	**4.97**	**4.56**	**4.21**
	Base	7.95	7.59	6.79	**6.26**	**5.68**	**5.14**	**4.65**	**4.21**	**3.83**
	U	7.95	7.59	6.79	**6.05**	**5.44**	**4.88**	**4.36**	**3.91**	**3.50**
UK	L	2.13	1.91	1.74	**1.84**	**1.80**	**1.75**	**1.70**	**1.66**	**1.62**
	Base	2.13	1.91	1.74	**1.72**	**1.65**	**1.57**	**1.49**	**1.41**	**1.34**
	U	2.13	1.91	1.74	**1.62**	**1.52**	**1.42**	**1.31**	**1.21**	**1.12**
USA	L	4.37	3.89	3.62	**3.73**	**3.60**	**3.45**	**3.31**	**3.18**	**3.04**
	Base	4.37	3.89	3.62	**3.49**	**3.25**	**3.00**	**2.76**	**2.53**	**2.32**
	U	4.37	3.89	3.62	**3.28**	**2.95**	**2.63**	**2.32**	**2.04**	**1.79**

Note: (1) Base, L and U are referred to baseline forecasts and their lower and upper forecasts, respectively. (2) Figures in bold are forecasts.

Table A 3 Forecasts of quarterly tourist arrivals from 2010 to 2015 (thousands)

Quarters	Australia			Japan			Macau, SAR			Mainland China			Philippines		
	L	Base	U	L	Base	U	L	Base	U	L	Base	U	L	Base	U
2010q1	156	157	157	264	315	366	163	164	165	4182	4918	5653	122	131	141
2010q2	151	155	159	207	234	261	136	139	143	3433	3854	4274	146	157	168
2010q3	136	142	148	284	328	372	160	165	170	4663	5094	5525	116	123	131
2010q4	169	175	181	294	326	359	212	218	223	5445	5759	6074	158	167	177
2011q1	155	161	167	240	319	409	163	168	173	4561	5644	6812	118	136	155
2011q2	151	159	168	189	237	291	136	143	150	3762	4436	5157	141	162	184
2011q3	136	146	157	261	333	413	161	169	178	5120	5874	6675	113	128	144
2011q4	170	181	192	271	332	399	215	224	233	5957	6616	7308	153	173	194
2012q1	156	166	177	222	324	452	166	173	180	5020	6530	8265	114	141	173
2012q2	152	165	178	176	241	321	139	147	156	4139	5135	6263	137	169	206
2012q3	137	151	166	243	338	456	164	174	185	5631	6800	8114	109	133	160
2012q4	172	187	204	252	338	440	219	231	243	6549	7661	8891	149	181	217
2013q1	158	172	187	207	328	493	169	178	187	5515	7562	10062	111	148	193
2013q2	154	170	188	164	244	350	141	152	162	4545	5946	7630	134	177	230
2013q3	139	156	175	227	343	497	168	180	192	6180	7875	9889	107	139	179
2013q4	174	194	215	236	342	480	224	238	252	7182	8871	10842	145	189	242
2014q1	159	177	197	195	332	534	173	183	195	6020	8715	12208	108	154	215
2014q2	156	176	198	154	247	379	145	156	168	4959	6852	9260	130	185	256
2014q3	141	161	184	213	346	537	172	185	199	6739	9075	12006	104	146	200
2014q4	176	200	226	222	346	519	229	245	261	7831	10222	13165	142	198	270
2015q1	162	183	206	184	335	575	177	189	201	6542	10009	14775	106	162	240
2015q2	158	181	207	145	249	408	148	161	174	5388	7870	11209	127	193	286
2015q3	143	166	193	201	350	578	176	190	206	7322	10422	14534	102	153	223
2015q4	179	206	236	210	349	558	235	252	270	8507	11741	15940	139	207	301

Table A 3 Continued

Quarters	Singapore			South Korea			Taiwan			UK			USA		
	L	Base	U	L	Base	U	L	Base	U	L	Base	U	L	Base	U
2010q1	137	137	138	176	179	181	436	459	483	145	147	149	242	248	254
2010q2	144	146	147	148	156	165	423	444	465	123	126	128	269	275	280
2010q3	132	135	139	161	172	183	514	540	566	115	118	121	260	264	269
2010q4	223	228	233	161	170	179	501	522	543	145	149	153	304	309	314
2011q1	140	143	146	184	199	213	420	461	504	150	156	162	246	256	265
2011q2	147	151	156	155	174	193	408	446	486	127	133	139	274	283	293
2011q3	134	141	147	170	191	214	497	543	590	119	125	132	265	273	281
2011q4	227	237	246	170	189	209	485	525	567	151	159	168	309	317	326
2012q1	142	148	154	195	220	248	407	465	529	155	166	177	251	263	276
2012q2	149	157	165	164	192	224	396	451	510	132	142	152	279	292	305
2012q3	137	146	155	180	212	248	482	548	620	123	133	144	270	281	292
2012q4	231	246	260	180	209	241	471	531	595	156	169	183	315	327	339
2013q1	145	154	164	205	242	284	396	471	556	160	176	192	256	271	287
2013q2	153	164	175	173	212	256	385	456	536	136	150	166	285	301	317
2013q3	140	152	165	190	233	284	469	555	651	127	141	156	276	289	304
2013q4	237	256	276	190	230	276	459	537	626	161	179	199	322	337	352
2014q1	148	161	174	216	265	322	385	477	585	166	187	209	260	278	297
2014q2	156	171	186	183	232	291	376	462	563	141	159	180	290	308	327
2014q3	143	158	175	200	255	322	458	562	685	132	150	170	281	297	314
2014q4	242	267	293	200	251	312	447	545	658	167	190	216	328	346	364
2015q1	152	168	185	229	291	366	376	483	615	171	197	226	265	284	305
2015q2	160	178	198	193	254	330	367	468	592	146	169	195	295	315	336
2015q3	146	165	186	212	280	365	447	570	720	136	158	183	285	303	322
2015q4	248	278	312	212	276	354	437	552	692	172	201	233	334	353	374

Note: Base, L and U are referred to baseline forecasts and their lower and upper forecasts, respectively.

Table A 4 Growth rates for quarterly tourist arrivals from 2008Q1 to 2015Q4 (%)

Quarters	Australia			Japan			Macau, SAR			Mainland China			Philippines		
	L	Base	U	L	Base	U	L	Base	U	L	Base	U	L	Base	U
2008q1	16.2	16.2	16.2	-3.5	-3.5	-3.5	8.8	8.8	8.8	9.9	9.9	9.9	8.8	8.8	8.8
2008q2	3.0	3.0	3.0	0.7	0.7	0.7	-1.2	-1.2	-1.2	12.6	12.6	12.6	0.3	0.3	0.3
2008q3	-7.3	-7.3	-7.3	0.7	0.7	0.7	21.3	21.3	21.3	9.4	9.4	9.4	-4.6	-4.6	-4.6
2008q4	-3.2	-3.2	-3.2	2.3	2.3	2.3	14.0	14.0	14.0	4.4	4.4	4.4	6.9	6.9	6.9
2009q1	-13.3	-13.3	-13.3	-2.9	-2.9	-2.9	2.7	2.7	2.7	12.6	12.6	12.6	0.8	0.8	0.8
2009q2	-10.2	-10.2	-10.2	-25.0	-25.0	-25.0	-4.4	-4.4	-4.4	-4.1	-4.1	-4.1	-6.8	-6.8	-6.8
2009q3	-4.2	-4.2	-4.2	-1.1	-1.1	-1.1	-21.9	-21.9	-21.9	0.1	0.1	0.1	4.3	4.3	4.3
2009q4	0.4	0.4	0.4	-8.5	-8.5	-8.5	11.7	11.7	11.7	16.6	16.6	16.6	0.3	0.3	0.3
2010q1	11.6	12.0	12.5	-16.4	-0.3	15.8	3.2	3.9	4.5	-10.6	5.2	20.9	-4.4	2.9	10.2
2010q2	3.4	6.0	8.6	-10.3	1.5	13.3	-1.0	1.8	4.6	-4.3	7.5	19.2	-4.5	2.5	9.6
2010q3	-4.0	0.2	4.3	-14.4	-1.3	11.9	-1.9	1.2	4.4	1.0	10.4	19.7	-3.4	2.5	8.4
2010q4	-2.1	1.4	4.9	-9.7	0.2	10.0	-0.5	2.1	4.6	7.2	13.4	19.6	-3.3	2.6	8.4
2011q1	-0.5	2.8	6.2	-9.0	1.3	11.7	0.2	2.4	4.6	9.1	14.8	20.5	-3.3	3.3	9.9
2011q2	-0.1	3.0	6.1	-8.4	1.5	11.4	0.6	2.6	4.5	9.6	15.1	20.7	-3.2	3.4	9.9
2011q3	0.2	3.1	6.1	-8.0	1.6	11.2	0.9	2.7	4.5	9.8	15.3	20.8	-3.0	3.4	9.9
2011q4	0.4	3.2	6.0	-7.8	1.8	11.4	1.2	2.8	4.4	9.4	14.9	20.3	-2.9	3.5	9.9
2012q1	0.7	3.4	6.1	-7.5	1.5	10.5	1.4	2.8	4.3	10.1	15.7	21.3	-3.1	4.3	11.7
2012q2	0.8	3.4	6.0	-7.3	1.6	10.4	1.5	2.9	4.2	10.0	15.7	21.5	-3.0	4.3	11.7
2012q3	1.0	3.5	6.0	-7.2	1.6	10.3	1.7	2.9	4.2	10.0	15.8	21.6	-2.9	4.4	11.7
2012q4	1.1	3.5	5.9	-7.0	1.6	10.3	1.8	3.0	4.1	9.9	15.8	21.7	-2.8	4.4	11.7
2013q1	1.0	3.3	5.6	-6.7	1.2	9.1	1.9	3.0	4.0	9.9	15.8	21.7	-2.7	4.5	11.6
2013q2	1.1	3.3	5.5	-6.6	1.2	9.1	2.0	3.0	3.9	9.8	15.8	21.8	-2.6	4.5	11.6
2013q3	1.2	3.3	5.5	-6.5	1.3	9.0	2.1	3.0	3.9	9.7	15.8	21.9	-2.6	4.5	11.6
2013q4	1.3	3.4	5.5	-6.4	1.3	9.0	2.2	3.0	3.8	9.7	15.8	21.9	-2.5	4.6	11.6
2014q1	1.1	3.1	5.1	-6.1	1.0	8.2	2.3	3.0	3.8	9.1	15.2	21.3	-2.5	4.6	11.6
2014q2	1.2	3.1	5.1	-6.0	1.1	8.2	2.3	3.0	3.7	9.1	15.2	21.4	-2.4	4.6	11.6
2014q3	1.3	3.2	5.1	-6.0	1.1	8.1	2.4	3.0	3.6	9.1	15.2	21.4	-2.4	4.6	11.6
2014q4	1.3	3.2	5.0	-5.9	1.1	8.1	2.4	3.0	3.6	9.0	15.2	21.4	-2.3	4.6	11.6
2015q1	1.3	3.1	4.9	-5.7	1.0	7.7	2.4	3.0	3.5	8.7	14.9	21.0	-2.3	4.7	11.6
2015q2	1.3	3.1	4.8	-5.6	1.0	7.6	2.5	3.0	3.5	8.7	14.9	21.0	-2.2	4.7	11.6
2015q3	1.4	3.1	4.8	-5.6	1.0	7.6	2.5	3.0	3.4	8.6	14.8	21.1	-2.2	4.7	11.6
2015q4	1.4	3.1	4.8	-5.5	1.0	7.6	2.5	2.9	3.4	8.6	14.9	21.1	-2.2	4.7	11.6

Table A 4 Continued

Quarters	Singapore			South Korea			Taiwan			UK			USA		
	L	Base	U	L	Base	U	L	Base	U	L	Base	U	L	Base	U
2008q1	12.0	12.0	12.0	30.3	30.3	30.3	1.6	1.6	1.6	12.3	12.3	12.3	7.5	7.5	7.5
2008q2	-0.1	-0.1	-0.1	23.5	23.5	23.5	1.9	1.9	1.9	-6.5	-6.5	-6.5	-2.5	-2.5	-2.5
2008q3	-14.7	-14.7	-14.7	-4.8	-4.8	-4.8	0.7	0.7	0.7	-16.6	-16.6	-16.6	-13.4	-13.4	-13.4
2008q4	3.3	3.3	3.3	-27.0	-27.0	-27.0	-3.8	-3.8	-3.8	-14.6	-14.6	-14.6	-16.6	-16.6	-16.6
2009q1	-2.3	-2.3	-2.3	-42.1	-42.1	-42.1	-9.2	-9.2	-9.2	-21.4	-21.4	-21.4	-18.5	-18.5	-18.5
2009q2	-10.6	-10.6	-10.6	-38.0	-38.0	-38.0	-16.9	-16.9	-16.9	-6.0	-6.0	-6.0	-11.6	-11.6	-11.6
2009q3	9.2	9.2	9.2	-27.0	-27.0	-27.0	-11.2	-11.2	-11.2	1.9	1.9	1.9	4.4	4.4	4.4
2009q4	0.0	0.0	0.0	-13.3	-13.3	-13.3	-3.7	-3.7	-3.7	-4.5	-4.5	-4.5	1.2	1.2	1.2
2010q1	3.4	3.7	3.9	12.1	13.9	15.7	-10.2	-5.3	-0.4	4.8	6.0	7.2	-0.3	2.0	4.4
2010q2	2.4	3.6	4.8	3.8	9.7	15.6	-7.6	-3.0	1.7	3.3	5.3	7.4	0.3	2.3	4.4
2010q3	0.9	3.5	6.2	-0.5	6.3	13.1	-5.6	-0.8	4.0	1.2	3.8	6.4	0.8	2.5	4.2
2010q4	1.5	3.6	5.8	1.8	7.5	13.2	-4.2	-0.1	3.9	2.3	5.0	7.6	1.1	2.7	4.3
2011q1	1.8	3.8	5.9	4.9	11.2	17.5	-3.7	0.4	4.4	3.0	5.9	8.8	1.5	3.0	4.6
2011q2	1.8	3.9	5.9	5.2	11.3	17.3	-3.5	0.5	4.4	3.1	5.9	8.7	1.7	3.1	4.5
2011q3	1.9	3.9	5.9	5.5	11.3	17.1	-3.3	0.5	4.4	3.1	5.8	8.6	1.8	3.2	4.5
2011q4	1.9	3.9	5.9	5.7	11.3	16.9	-3.2	0.6	4.4	3.7	6.8	9.8	1.6	2.7	3.9
2012q1	1.8	3.8	5.7	5.5	10.8	16.1	-3.0	1.0	5.0	3.5	6.4	9.3	1.9	3.0	4.1
2012q2	1.8	3.8	5.7	5.7	10.8	15.9	-3.0	1.0	5.0	3.5	6.3	9.2	2.0	3.0	4.1
2012q3	1.9	3.8	5.7	5.8	10.8	15.8	-2.9	1.0	4.9	3.5	6.3	9.1	2.0	3.1	4.1
2012q4	1.9	3.8	5.7	5.9	10.7	15.6	-2.9	1.0	4.9	3.5	6.3	9.0	2.1	3.1	4.1
2013q1	2.2	4.2	6.2	5.5	10.1	14.6	-2.8	1.2	5.1	3.5	6.2	8.9	2.1	3.0	3.9
2013q2	2.2	4.2	6.2	5.6	10.0	14.5	-2.7	1.2	5.1	3.5	6.2	8.9	2.1	3.0	3.9
2013q3	2.2	4.2	6.2	5.6	10.0	14.4	-2.7	1.2	5.1	3.5	6.1	8.8	2.1	3.0	3.9
2013q4	2.2	4.2	6.2	5.7	10.0	14.3	-2.6	1.3	5.1	3.5	6.1	8.7	2.2	3.0	3.9
2014q1	2.2	4.2	6.2	5.4	9.5	13.6	-2.6	1.3	5.1	3.4	6.1	8.7	1.8	2.6	3.3
2014q2	2.2	4.2	6.2	5.5	9.5	13.5	-2.5	1.3	5.1	3.4	6.0	8.6	1.8	2.6	3.3
2014q3	2.3	4.2	6.2	5.5	9.5	13.4	-2.5	1.3	5.1	3.4	6.0	8.5	1.9	2.6	3.3
2014q4	2.3	4.2	6.2	5.5	9.4	13.3	-2.4	1.3	5.1	3.4	5.9	8.5	1.9	2.6	3.3
2015q1	2.4	4.3	6.3	5.7	9.6	13.5	-2.4	1.4	5.1	3.3	5.7	8.2	1.6	2.2	2.8
2015q2	2.4	4.3	6.3	5.8	9.6	13.5	-2.3	1.4	5.1	3.3	5.7	8.1	1.6	2.2	2.8
2015q3	2.4	4.3	6.2	5.8	9.6	13.4	-2.3	1.4	5.1	3.3	5.7	8.1	1.6	2.2	2.8
2015q4	2.4	4.3	6.2	5.8	9.6	13.3	-2.2	1.4	5.1	3.3	5.6	8.0	1.6	2.2	2.8