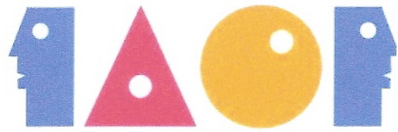


THE INTERNATIONAL JOURNAL OF  
ORGANIZATIONAL INNOVATION

VOLUME 9 NUMBER 4 APRIL 2017

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SENIOR ENTREPRENEURSHIP THEMES:  
AN AUSTRALIAN PERSPECTIVE

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Abstract

Senior entrepreneurship may be either a career option or a form of entrepreneurial activity in later life. This article investigates how senior entrepreneurs interact within defined entrepreneurial themes, and provides a narrative of recommendations to enhance active ageing. Based on a qualitative study of 90 Australian respondents, we suggest how senior entrepreneurs perceive their entrepreneurial environment, particularly around themes of motivations, other people's attitudes, measures of success, satisfaction, opportunities, barriers, skills, education and training, support, networks and benefits. We argue that if senior entrepreneurship is to be enhanced, entrepreneurs and policy need to be aware and sensitive to the diversity of themes influencing entrepreneurial activities.

Keywords: senior-entrepreneurship, opportunity and necessity entrepreneurs

Introduction

Senior entrepreneurship – startup entrepreneurial activity for people aged 50 or older – is increasingly emphasised internationally by scholars and policy makers as a strategy to tackle socio-economic challenges emerging from ageing populations (Kibler et al., 2014; Moulton and Scott, 2014). Studies underline that senior entrepreneurship brings social and economic benefit to the senior cohort as well as to

society in general. From the perspective of senior entrepreneurs, being involved in startup activities may provide benefits of work-life balance, income generation and active ageing; notwithstanding subvergent age discrimination from previous employment (Kautonen, 2012). Socio-economic benefits of senior entrepreneurship may include reduced costs to the welfare system, overcoming unemployment amongst older people, economic prosperity, and deployment of mature

workers' human capital (Maritz, 2015). These benefits are thought to be facilitated by active ageing and retaining seniors in active work (Pilkova et al., 2014).

Previous workplace incongruences and discrimination have motivated many senior entrepreneurs to participate in startup activities (Tervo, 2015). However, previous discrimination is only one of many reasons for senior participation in entrepreneurial activities.

Two lines of argumentation may best explain the surge in interest in senior entrepreneurship. The first is as populations' age; the number of mature business founders will likely increase. The second is based on the promotion of entrepreneurship in older age segments as a prospective policy option, usually in the form of government intervention to enhance the innovative capacity of economies (Kautonen et al., 2008). Whichever line of argumentation plays out, entrepreneurial themes surrounding senior entrepreneurship will be affected in various ways. For example, Tervo (2015) found that senior entrepreneurs are usually more productive than their younger counterparts; due to their prominence of being opportunity and habitual entrepreneurs.

This research adds to the entrepreneurship body of knowledge, being the first ever-qualitative empirical study to exclusively examine Senior Entrepreneurship in Australia. It is based on a qualitative in-depth analysis of 90 early and existing stage entrepreneurs who have started their business after the age of 50. Findings contribute by identifying and exploring significant entrepreneurial themes to Australia's

senior entrepreneurs; particularly regarding motivations, attitudes barriers, benefits, education and support mechanisms.

The purpose of the paper is to discuss themes appropriate to senior entrepreneurship, through analysis of informed commentary of these themes, we aim to enhance understanding of senior entrepreneurship as an option to active ageing. The paper proceeds as follows: Section two provides an overview of senior entrepreneurship in Australia. Section three explains the entrepreneurial themes adopted in the study, and section four the research methods employed in this study. Section 5 examines how participants responded to in-depth questions on the identified themes. The final sections include discussion and conclusions, avenues for further research and implications for practitioners and policy makers.

#### Senior Entrepreneurship in Australia

Similar to that of most developed nations, Australia's population is ageing: a result of sustained low fertility and increasing life expectancy. Accordingly, the number of Australians aged 50+ will increase by 4.2% between 2012 and 2030, representing 36.5% of the Australian population (Productivity Commission, 2013). The 2015 Australian Intergenerational Report places emphasis on seniors living longer, healthier, and their participation in the workforce after they reach traditional retirement age.

With respect to entrepreneurship, among innovation-driven economies, Australia's total entrepreneurial activity (TEA) rate – measured at 10.5% in

2012 (GEM 2013) – ranks second only to that of the United States. Within the age group 55-64, Australia has a TEA rate of 8%, which is approximately 3 percentage points above the average rate of innovation-driven economies. These figures provide a good indication of Australian senior entrepreneurship activity, yet opportunistic when we consider, for example, higher rates in the UK and USA.

However, higher rates in the UK and USA may well be the result of sustained initiatives in these economies, such as the PRIME and Kauffman Foundation initiatives. By contrast, Australia has a significant lack of entrepreneurship related government policy and initiatives aimed at the 50+ market. Which raises questions as to whether we should ignore government intervention as a means of accelerating senior entrepreneurship (the potential effects of which are largely unknown at this stage).

Previous research emphasises push and pull factors as precursors to seniors engaging in entrepreneurial activity. The former is the process whereby individuals exploit opportunities as a late career option – often referred to as ‘opportunity entrepreneurs’. By contrast, the latter refers to those individuals who participate in startup activities due to having no other option – often referred to as ‘necessity entrepreneurs’ (Maritz, 2004). However, if we are cognisant only of push and pull factors, one can only assume significant increases in opportunity and necessity prevalence rates. Neglecting consideration of other themes – that may influence an individual’s propensity to engage in senior entrepreneur-

ship and the likelihood of adaptive outcomes – limits our understanding of the senior entrepreneurship ecosystem. A more nuanced approach is explored in the next section.

### Senior Entrepreneurship and Entrepreneurial Themes

Regardless of whether seniors engage in entrepreneurship due to being necessity and/or opportunity driven, they are likely to experience entrepreneurship in unique ways and to varying dimensions (Isele and Rogoff, 2014). Themes identified within the broader entrepreneurship literature in which to explore this uniqueness are outlined below and shown in Figure 1.

Motivation refers to the social value placed on entrepreneurship and its desirability and feasibility as a career and employment option (Kautonen et al., 2014).

Other people’s attitudes to seniors participating in entrepreneurial activities have a significant social effect on their participation decisions (Kibler et al., 2014).

Barriers and difficulties include those variables which inhibit or negatively influence entrepreneurial activity (Kibler et al., 2012)

Opportunity refers to the favourability of the business environment for entrepreneurship (Lundstrom and Stevenson, 2005); Benefits include those variables providing positive influence toward entrepreneurial activity (Maritz, 2015).

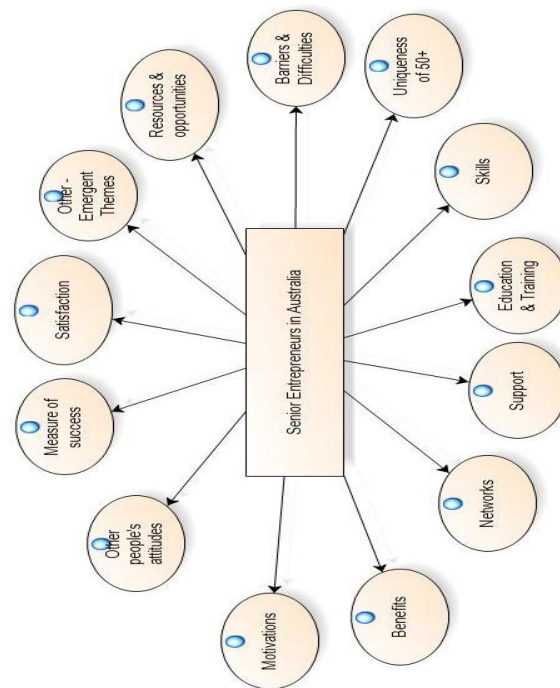


Figure 1: Entrepreneurial Themes associated with Senior Entrepreneurship

Skills refer to the technical, business and entrepreneurial skills and know how (Kautonen, 2012). Support refers to organisational, government and institution support provided to mature aged individuals involved in entrepreneurial activities (Kautonen and Minniti, 2014; Sigmund et al., 2015).

Education and training not only identify generic education qualifications, but the perceived value of entrepreneurship education and training on senior entrepreneurship prevalence (Maritz and Brown, 2013). Networks refer to formal and informal entrepreneurship networks, virtual and face-to-face.

Measures of success include financial and social measures, with prevalence to social entrepreneurship activities (Weller et al., 2014).

Satisfaction is reflective on perceptions of original intentions of self-employment (Kibler, 2013).

Other emerging themes include notions of inclusive entrepreneurship, selective entrepreneurship and regional entrepreneurship (Tervo, 2014).

#### Research Methods

Our inductive study uses qualitative methodology and follows an interpretative approach to provide an in-depth exploration of entrepreneurial themes associated with early and existence stage senior entrepreneurs. We examined a subset of 90 individuals aged 50 years and over. Individuals participated in either one-to-one semi structured interviews (19), focus groups (12), a workshop, or attended one of four networking events in major centres across Australia. A combination of purposeful sampling and self-

selection sampling techniques were employed in this study. Participants self-selected into the study through responding to requests for participants advertised through Adage ([www.adage.com.au](http://www.adage.com.au)), Mentorloop ([www.mentorloop.com.au](http://www.mentorloop.com.au)) and Seniorpreneur Meetup groups in Victoria and Queensland.

Prior to conducting one-to-one interviews and focus groups, a list of entrepreneurial themes and associated questions were developed to guide dialogue. Selection of these themes (refer to Figure 1) and questions were informed from a review of academic literature as well as from insights gained through attendance at senior entrepreneurship workshops and events. Exploration of themes was facilitated through content analysis.

Demographic information was collected from one-to-one interview and focus group participants. Interview and focus group questions were adapted and recorded during interviews to facilitate a conversation style dialogue.

Interviews and focus groups were audio recorded and the audio was subsequently transcribed. Analysis of data was undertaken using the qualitative analysis software package NVivo. We acknowledge that there are challenges in developing analytical generalisations from qualitative research; however, our aim was not to develop scales and ordinal measures of dimensions. Instead, we purposefully selected sen-

ior entrepreneurs with various entrepreneurial characteristics to provide inferences of Australian senior entrepreneurs. We further acknowledge how expectations on ageing emerge within societal discourse, despite such discourse representative over all participants.

## Findings

### *Verifying Senior Entrepreneurship Themes*

This section provides an analysis and discussion of the entrepreneurial themes shown in Figure 1. Demographic information is provided in Table 1. 30% of respondents were female, also representative of the two entrepreneurship networks mentioned in this paper. Industries were predominantly service related, across consulting, healthcare, IT, engineering, finance and education. Respondents reported many years of business experience, with 40% of respondents accountable for starting two or more businesses.

### *Motivations*

Participants were asked to describe their main motivation for starting or running their own business. Analysis of participant's responses revealed four higher order categories of response. These include: motivations: financial, achievement, lifestyle and altruistic. Each are outlined below.



Table 1. Demographic Information

ID	Age	Country of Birth	Employment Status	Gender	Highest Level of Education	Marital Status	Years as an AU Resident	Industry	Number of Businesses Started	Number of Employees	Prior Business Experience (years)
SE101	60-64	Australia	Self-employed	Male	Postgraduate degree	De facto	NA	Consulting	2	1	25
SE102	60-64	Australia	Self-employed	Male	Postgraduate degree	Married	NA	Healthcare	6	0	12
SE103	60-64	Australia	Self-employed	Female	Unassigned	Unassigned	NA	Unassigned	Unassigned	0	0
SE201	65-69	Australia	Self-employed	Female	Postgraduate degree	Single	NA	Machinery	0	0	43
SE202	65-69	South Africa	Self-employed	Male	Postgraduate degree	Married	NA	Multi	5	1	10
SE203	55-59	Australia	Self-employed	Female	Postgraduate degree	Other	NA	Consulting	0	0	0.75
SE204	55-59	Australia	Self-employed	Female	TAFE certificate	Married	NA	Internet	1	0	1.5
SE205	55-59	Australia	Casual	Male	Bachelor degree	Married	NA	Not Applicable	0	0	0
SE206	60-64	Denmark	Self-employed	Male	Postgraduate degree	Married	36	IT & Governance	3	0	14
SE302	65-69	USA	Self-employed	Male	Postgraduate degree	Married	4	Hospitality	3	0	19
SE303	65-69	Hungary	Self-employed	Female	Postgraduate degree	Married	5	Confectionary	1	0	12
SE501	65-69	England	Self-employed	Male	Postgraduate degree	Married	59	Engineering	1	0	27
SE502	55-59	Australia	Between jobs	Male	TAFE certificate	Married	NA	Not Applicable	0	0	0
SE503	55-59	Scotland	Between jobs	Male	Postgraduate degree	Married	35	Not Applicable	0	0	0
SE504	50-54	Australia	Self-employed	Male	Postgraduate degree	Married	NA	Consulting	Unassigned	Unassigned	4
SE505	50-54	Australia	Unemployed	Female	Postgraduate degree	Single	NA	Not Applicable	0	0	0
SE506	55-59	Canada	Self-employed	Male	Postgraduate degree	Single	5	Consulting	1	0	10
SE507	50-54	Australia	Self-employed	Male	Postgraduate degree	Married	NA	Not for Profit	7	0	33
SE508	60-64	India	Unemployed	Male	Postgraduate degree	Married	9	Not Applicable	0	0	0
SE509	60-64	Australia	Self-employed	Female	Postgraduate degree	Single	NA	Business Services	2	0	4
SE510	55-59	Australia	Full-time	Male	TAFE certificate	Divorced	NA	Not Applicable	0	0	0
SE511	50-54	Australia	Self-employed	Female	TAFE certificate	Married	NA	Health/Wellbeing	3	0	20
SE512	60-64	Hong Kong	Unemployed	Female	Bachelor degree	Single	47	Not Applicable	0	0	0
SE513	55-59	Australia	Self-employed	Male	TAFE certificate	Other	NA	Finance	4	1	23
SE514	55-59	Australia	Self-employed	Male	Bachelor degree	Married	NA	Accounting/Finance	2	0	3
SE515	60-64	Australia	Self-employed	Male	equivalent	Married	NA	Finance/Tourism	1	0	33
SE516	55-59	Australia	Self-employed	Male	Bachelor degree	Single	NA	Services	2	15	11
SE517	55-59	Australia	Unemployed	Male	Bachelor degree	Married	NA	Not Applicable	0	0	0
SE518	60-64	France	Self-employed	Male	Postgraduate degree	Married	Unassigned	Finance	2	7	29
SE519	60-64	Other	Self-employed	Male	Postgraduate degree	Married	Unassigned	Unassigned	Unassigned	0	0
SE520	60-64	Australia	Self-employed	Male	Postgraduate degree	Married	NA	Education	4	2	21

Financially oriented motivations appeared to originate from either (a) the need to secure a source of income (which was lost due to redundancy or failed attempts to re enter paid employment), or (b) a perception of entrepreneurship as being 'less risky' than paid employment. In the first scenario, participants claimed that re-entering the workforce after a redundancy was nearly impossible to achieve. Despite entrepreneurship providing an alternative means of income generation, it appeared to be engaged in begrudgingly – paid employment was the participants' preferred option. Such participants appeared frustrated and at times angry, and appeared 'pushed' into entrepreneurship.

"I'm only doing [entrepreneurship] because I don't have another choice. I thought I could easily land a job... Only to discover that you're considered over the hill, feeble and stupid... I don't have that option of employment, that's what I'm saying." SE506

"To be able to work for yourself is a less vulnerable position than being at the whim of some company that might turn around and decide to knock you out sometime." SE504

In the second scenario, self-employment appeared to represent a 'less risky' option (financially) compared to being employed within an organisational setting. This was attributed to age discrimination in Australia's workforce towards people aged 50 years or above: participant's expressed feeling vulnerable due to perceiving employers as overvaluing the contributions of younger workers and neglecting older

workers' contributions. Nearly every participant remarked as to the presence of age discrimination in Australia's workforce.

"The biggest thing is the freedom."  
SE303

Lifestyle oriented motivations include: freedom, autonomy, creating excitement, and alleviating boredom. Where these motivations were cited within the data, the participant appeared 'pulled' into entrepreneurship due to perceptions that entrepreneurship would facilitate these lifestyle characteristics.  
Other People's Attitudes

#### *Positive Attitudes*

When asked to describe others' attitudes to the participant starting or running a business, twice as many participants described experiencing positive attitudes compared to the number of participants who described experiencing negative attitudes.

"Friends are very supportive because they know I've been trying to get a full-time job for two years having been made redundant." SE505

Analysis of the data revealed the domain of entrepreneurship to be somewhat liberated from the age-related discrimination participants noted as existing in paid employment.

#### *Negative Attitudes*

Negative attitudes tended to originate from those who were financially dependent upon the participant – moti-



vated by a fear that the participant would not be able to financially provide for the dependent.

“Initially there was a bit of anxiety about ‘will we get enough revenue to keep going’... from a family point of view it's that fear of cash flow... I've got children and all that kind of thing.” SE504

However, negative attitudes might better be described as ‘apprehensive’ attitudes, which appear linked to others’ fears that the participant may not succeed, or fears that time spent working on the venture might take time away from the family. Importantly, where descriptions of age related discrimination (in entrepreneurship) were cited, these descriptions were of situations potentially happening to others rather than reflective of the participants personal experience.

### *Barriers*

The more experienced entrepreneurs within the study described the barriers to entrepreneurship as being either non-existent or negligible. 37% of participants reported no barriers existing in relation to seniors engaging in entrepreneurship.

“There are no barriers to entrepreneurship by seniors other than one’s mindset... there is no barrier other than the one that we believe is there and if you believe it's there it's a huge barrier.” SE520

More experienced entrepreneurs appeared to show little empathy towards those who were not as successful as themselves. More experienced entrepre-

neurs appeared to attribute their own success to their personality traits and ‘hard work’ rather than to external factors; they also tended to describe others who were not succeeding in entrepreneurship as lacking these traits.

By contrast, approximately half of the participants described numerous barriers to entrepreneurship – these descriptions arose from participants who appeared ‘pushed’ into entrepreneurship. Barriers included: health, self-confidence, or family situation (i.e., having children/financial dependents). Barriers related to acquiring finance were noted to be common to all entrepreneurs and not necessarily age related. Barriers to entrepreneurship were generally viewed as common across all generations.

Several participants appeared to hold the opinion that an individual’s greatest barrier to entrepreneurship is to be currently employed in a ‘comfortable job’. Participants who had been running businesses for many years noted that they would perhaps be ‘very different people’ today if they had stayed working in corporate environments, and also that they were unlikely to have worked in an employed environment in the first place. This raises questions as to whether people employed for the majority of their lives are the same kind of people that are likely to engage in entrepreneurship. One participant noted that waiting until someone is at retirement age to introduce them to entrepreneurship is too late.

Financial barriers were cited by 40% of participants. Most notable of these financial barriers was the perceived risk that if capital was lost it

would not be able to be earned back in their remaining years.

“What [seniors] invest in the business is basically everything they've got where the younger person... can invest everything they have into the business... they know that they've still got another 30 years, maybe 40 years of working life in front of them where the senior entrepreneurs don't have that.” SE101

Findings in relation to barriers in accessing capital for seniors were conflicting. In some cases the participant claimed they could not secure any capital and in other cases participant referred to sources of capital being abundant for seniors.

“We just know for a fact that the banks don't like looking out for oldies.” SE502

Education related barriers appeared to exist with respect to lack of training, or perceptions that the participant's skills were not ‘up to date’. One established entrepreneur remarked that he knew very few senior people who had made an ongoing commitment to education in the form of continuing study.

“I found the senior entrepreneurs probably suffer a lot more than the young ones because of their lack of flexibility and lack of education.” SE101

Where participants acknowledged health related barriers, they also described ways in which they had accommodated through changes to the ways in which they ran their business (e.g., through increased delegation), which suggests that seniors may outsource to a

greater degree than younger entrepreneurs.

### *Opportunities and Benefits*

In general, being of senior age was considered an advantage in running a business.

“I think the older you get you've got a little bit more perseverance and you can deal better with failures and disappointments.” SE202

“You've grown beyond the flippancy of youth.” SE501

“I think the more your leverage your experience the better it's going to be.” SE504

Age-associated advantages included: wisdom, experience, communication skills, access to networks and other resources (e.g., capital). Perceptions of age related advantages include:

“Experience is everything when you're running a business. Makes a senior just stand out miles ahead.” SE502

“I think being part of an older group we strategically can grasp very quickly what needs to be done” SE504

### *Skills*

Selling skills was seen as a fundamental skill, which should be developed in order to succeed in business. One participant claimed that selling skills are essential yet lacking in Australia's senior population:

“The greatest skill for me for an entrepreneur is the ability to sell. Most senior people I know are unable to sell a \$2 raffle ticket. The selling skills of Australians are pathetic.” SE520

“It's farcical for me to think that I'm going to develop into a salesman. I'm a high thinking introvert. I don't develop. I don't need sales skills because it's not going to happen. I will be amateur no matter how many courses you go to. What I actually need is to try to partner in some way.” SE506

### *Support*

Just over half of the participants responded that they were aware of support to assist them in starting or running their own businesses.

“There are always resources available it's a question of how you tap into them.” SE504

Cited sources of support include: government grants, tax incentives, programs such as the New Enterprise Incentive Scheme (NEIS), Austrade, small business mentoring services, as well as one participant noting that support was obtained through the HECS.

“I don't see there being any initiatives out there that would fit my scenario.” SE501

However, despite support being known, one third of participants who were aware of support also noted that the available support did not fit their needs, as current support was too general, too basic, or offered in a way that did not

suit their needs (e.g., was paper based information where the participant wanted face-to-face advice). Additionally, existing support services had excluding criteria. In some cases, analysis of participants' data showed that the participant was aware of support, yet when asked if support was available to them (i.e., to seniors) they replied that it was not.

“I'm not aware of any initiatives that exist for seniors in running their own businesses.” SE501

This perhaps indicates that current forms of support may need to be re-branded so that seniors feel included/invited to take up current offerings. Participants also indicated that they would like to see government support schemes compliment the way in which they run their businesses. For example, existing government incentives to employ someone on senior age are unlikely to be accessed, because seniors who are ‘employing’ (i.e., providing paid work to) other seniors are doing so on a contractual basis.

Participants largely spoke unfavourably towards government efforts to assist seniors in entrepreneurship. Non-government sources were spoken of in more favourable terms.

### *Education and Training*

Education was generally described as an enabler. For example, one participant spoke of needing to complete training in order to increase the scope of services his business offered, another described obtaining training in order to ful-

fill regulatory requirements so that he may continue to operate, another spoke of education as contributing to his self-confidence (in starting a business). When asked what further training participants would desire, responses were noted to have an absence of description relating to specific skills, instead participants described wanting the ability to come together with their peers and educators to create an environment where they problem solve and gain practical knowledge they could apply to their own business. Interactive training was desired over passive learning. Preferred delivery of education is as follows: 56% preferred face-to-face deliver, 22% preferred online learning, and 22% preferred a blended approach (i.e., some face-to-face and some online learning).

### *Networking*

The majority of participants described having involvement in at least one networking group. This finding is however expected in light of sampling methods. Desired characteristics of networking include attending events representative of their age group and skill level and the presence of a sharing culture. In some cases attending networking events was seen as taking time away from their business.

### *Measure of Success*

Financial rewards, as well as the ability to help others were noted equally as being the most popular measures of success amongst participant descriptions.

“Well just to be able to get a business up and running with next to no capital I would say was pretty amazing.” SE502

To a lesser degree, success was described in terms of seeing their business being realised and then reaching (or surpassing) a level of sustainability. Beyond sustainability, financial success appears to be measured by their business (financially) providing a desired lifestyle. Success was also measured in terms of being able to provide help to others in the community.

### *Satisfaction*

In regards to whether participants felt satisfied with their experience of running their business, twice as many described being satisfied than not being satisfied. Satisfaction appears to be derived by the participant’s ability to achieve a desired lifestyle from entrepreneurship, and also from the ability of the participant to help others/contribute to society.

“At 58 how long can you wait, I jumped, and I'm still having the ride of the dream. I love it.” SE303 Satisfaction also appears to be linked to the congruence between perceived results and actual achievements. As two participants noted when asked if they were satisfied with running their business:

“I'd have to say no... I came to be part of something bigger... I mean I've really been unable to find clients who are bold enough to do new things. That's my disappointment.” SE506

“Yes and no. I'd like it to be a lot more... successful than it is at this point in time.” SE509

#### Other Themes Arising From The Data

##### *Others Influencing Entrepreneurial Intentions*

Where participants referred to another person influencing their decision to start a business, in nearly every case, the other person was an entrepreneur. Influence occurred predominantly through one of the following scenarios. The first was through ‘indirect inspiration’, for example, the participant listened to a talk given by another entrepreneur and was inspired to start their own business. The second was through ‘networking’, where the participant gained confidence from being in a supportive environment and having contact with existing or aspiring entrepreneurs. Finally, through ‘direct assistance’, whereby other entrepreneurs had provided assistance to the participant in setting up their business.

This suggests that entrepreneurs may be a source of support and inspiration for fledgling entrepreneurs. It also suggests that people who have access to entrepreneurs may be more inclined to start their own business compared to people who don't have access to entrepreneurs.

##### *Rebranding Of Seniors Required*

A recurring theme within the data was the unfavourable manner in which ‘seniors’ are represented and perceived by society. One participant expressed a strong dislike for the term ‘senior’ – not-

ing that it held derogatory connotations. Several participants expressed concern over the way their age group is stereotyped and suggested actions be taken akin to a rebranding exercise.

“I think we have to reposition older people in this society. I'm just appalled by some of the stereotypes that I see. This should be made really cool and funky to be older now and launching these things.” SE506

“There should be public recognition and a media campaign to encourage senior-preneurship. So it's recognised as a desirable career choice and has a high status and that it's covered in the media.” SE302

#### Discussion and Conclusions

The global importance of ageing is becoming increasingly important within policy and scholarly debates; particularly as populations live longer, healthier and remain active during the later years in life (The Intergenerational Report, 2015). Senior entrepreneurship has been touted as a significant initiative to enhance active ageing, providing both social and economic outcomes, not only to senior entrepreneurs, but the communities in which they operate (Maritz, 2015). However, if senior entrepreneurship is to offer solutions to active ageing, specific themes or variables need to be carefully addressed.

Our study adds to this debate by investigating senior entrepreneurs' perceptions and responses to specific themes within their immediate business and social environments. Our analysis demonstrated both positive and negative



judgements across respondents. We do, however, argue that such responses may be attributable to the type of senior entrepreneur. For example, habitual senior entrepreneurs were more confident and appeared to exhibit higher entrepreneurial self-efficacy; whereas novice senior entrepreneurs sought greater support from networks. We found that entrepreneurial intentions may vary considerably between individuals and should be accounted for when encouraging people to engage in entrepreneurship. Furthermore, there are distinct response variances from those who were pulled into entrepreneurship as opportunity entrepreneurs, as compared to those pushed into entrepreneurs as necessity entrepreneurs. This distinction responded to significant differences in responses. For example, those pushed into entrepreneurial activities had lower entrepreneurial self-efficacy and confidence levels.

Our analysis highlighted that experience of entrepreneurship appears to be linked to prior experiences in paid employment. For example, where entrepreneurship was sought due to no other option to secure an income (that is, inability to secure paid employment) participants' level of satisfaction with entrepreneurship appears low and descriptions of age-related discrimination are nearly always present. Entrepreneurs who were pulled into entrepreneurship due to wishing to pursue an identified opportunity or through a desire to change their lifestyle appear to describe entrepreneurship in a positive light. Other people's attitudes towards seniors in entrepreneurship were more noted as being positive than negative.

Being aged 50 or above appears to be an advantage when starting or running a business, due to previous work experience and the acquisition of resources such as capital, networks and communication skills. Other entrepreneurs appear to be the best source of support and influence when senior entrepreneurs start their own businesses (Sigmund, 2015). Family, friends and close relatives generally provided adequate support, albeit varying under mitigating circumstances (see, for example, Killer et al., 2014). Barriers to entrepreneurship were largely common across generations, with respondents often citing 'no barriers'; or if barriers exist, they are due to one's mindset. From an ageing perspective, a significant barrier was included. This included having financial dependents and risk capital which respondents perceive as not having time to earn back.

An interesting finding, particular from habitual and experienced senior entrepreneurs was the transition from paid employment to senior entrepreneurship. Participants suggested encouraging those in organisational employment to embrace (or learn about) entrepreneurship prior to facing redundancy or forced exit from employment. Similarly, 'having a comfortable job' was repeatedly cited as a considerable barrier to starting a business. Education and training initiatives were highlighted to bridge the gap between work-place based skills and entrepreneurship-based skills. Similarly, ongoing education in entrepreneurship received positive responses, particularly in a blended mode, consisting of face-to-face and online training initiatives. Lack of, and access to specialised government

support was identified as an immediate opportunity for government intervention to enhance senior entrepreneurship prevalence.

Overall, respondents' perceptions and attitudes to the entrepreneurial themes were similar to the leading literature in senior entrepreneurship. We did however identify an interesting approach to discrimination and ageism. Respondents advised of negative perceptions to words such as 'seniors' and 'aged care', and were distinctly vocal when discussing discrimination. All respondents personified active age discrimination in the workforce, but such age discrimination was non-existent in senior entrepreneurship. The entrepreneurship domain appears somewhat liberated from age-related discrimination compared to the domain of occupational employment.

#### Directions for Future Research

Since this is first empirical investigation dedicated to senior entrepreneurship in Australia, we suggest similar qualitative studies across a wider sample and region. We also suggest further in-depth examination of the different types of senior entrepreneurs. Finally, we suggest a follow up quantitative study, examining the themes used in this study. Such a study may validate the themes, and move towards developing a scale for analysis of senior entrepreneurship. We believe this study serves as a starting point for the development on new measures in senior entrepreneurship.

#### Implications for Practitioners and Policy-Makers

Analysis of themes identified significant implications for both practitioners and policy-makers. From a pure policy perspective, the study identified the lack of support directly related to senior entrepreneurs. Examples of implications included tax concessions, education and training. From a practitioner perspective, a highlight included initiatives between the transitions of full-time employment to that of senior entrepreneurship. Prior experiences in paid employment may influence the outcome of entrepreneurial endeavours. It was also identified that specific skills are required to proceed into senior entrepreneurship; due to entrepreneurship skills varying significantly to normal business and employment skills. Networks were identified as catalysts to senior entrepreneurship; involvement dependant on the type of entrepreneur. Contact with other entrepreneurs may be a source of positive influence and assistance in achieving entrepreneurial goals. Lastly, and most significantly, the data provides evidence that age based discrimination is not significant in senior entrepreneurship; in itself a motivating factor to increase senior entrepreneurship prevalence.

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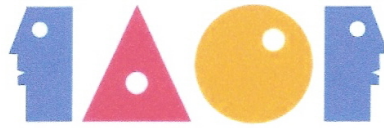
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THE PART OF RELIABILITY IN THE SERVQUAL SCALE: AN  
INVARIANCE ANALYSIS FOR CHAIN RESTAURANTS IN TAIWAN

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Abstract

The issues of measurement invariance across groups in SERVQUAL have received very few considerations. However, literature revealed there is the significant relationship between gender and service quality. The SERVQUAL Scale is the most popular instrument for assessing service quality in current service industry. This quantitative study was to examine the measurement invariance across gender for the part of Reliability in SERVQUAL Scale for chain restaurant business in Taiwan. The total of 200 consumers from four chain restaurants of Taiwan joined this research. The outcomes indicated the Taiwan version of Reliability 5-item scale achieved strict measurement invariance across gender groups. The models of factor loading, structural co-variances and measurement residuals



across gender were invariant. This study also generated the recommendations for chain restaurants business in Taiwan and suggested prospect academic studies.

Key Words: service quality, SERVQUAL, reliability, measurement invariance, chain restaurant, Taiwan

### Introduction and Literature Review

SERVQUAL Scales was created by Parasuraman, Zeithaml, and Berry (1988). This scale engages the answer of the differences between anticipation and awareness on a number of particular criteria. The SERVQUAL Scales provided five dimensions to measure the service quality, such as tangible, responsiveness, reliability, empathy, and assurance.

Since service quality has been described as the critical factor to sustain the proficiency for company development, the SERVQUAL has become the most popular instrument for measuring service quality. Even though this questionnaire has applied broadly to perform studies for service quality in industries or countries, very few studies have examined the issues of the measurement invariance for SERVQUAL Scale. In addition, numerous researchers (Baird 1976, Blustain 2000, Canary and Hause 1993) have suggested theories for gender difference in numerous facets on psychology and manner, such as social talents, communications, work approaches and so on. People also have pay much attention on the issue of the increasing woman buying power for those years, and the studies for gender differences in consumer behavior have become important topic for current academy researcher and marketing administrators in business.

Research by Meyers-Levy and Maheswaram (1991), and Mitchell and Walsh (2004) revealed gender difference will lead to different buyer behavior. Mitchell and Walsh (2004) also claimed gender differences resulted in different decision making process. These theories and studies suggested that there is the significant relationship between gender and service quality. Hu (2014) conducted a study to examine the measurement invariance across gender in the version of the part of Tangibles in SERVQUAL Scale for retail chain stores business in Taiwan. The results indicated the Taiwan version of Tangible 5-item scale only achieved partial measurement invariance.

However, in another study, Hu, Liu, Su and Huang (2016) conducted a research to examine the measurement invariance across gender in the version of the part of Responsiveness in SERVQUAL Scale. The results indicated the Responsiveness 5-item scale achieved strict measurement invariance across gender. These result explained the measurement invariance across gender for SERVQUAL Scale maybe differently depend on individual parts. Current researches need to develop more studies to verify how measurement invariance across gender issues effect the SERVQUAL Scale. Therefore, this research expanded previous research and applied SEM approach to evaluate the measure-

ment invariance across gender for the component of Reliability in SERVQUAL Scale in chain restaurant business of Taiwan.

### Research Design and Hypotheses

Since previous studies and theories have the gap for invariance analyses issues in SERVQUAL Scale, the purposes and the significance for this research were: (a) to examine the measurement invariance across gender for the part of Reliability in SERVQUAL Scale in chain restaurant business of Taiwan, (b) to have the recommendations for managerial application of chain restaurant business, and (c) to identify areas for future scholarly inquiry. Byrne (2010) suggested the procedure for multi-group invariance tests are: (a) factor loadings, (b) factor covariance, and (c) structural regression paths. Jöreskog (1971) recommended the first step to measure the equality of covariance structure are the test of null hypothesis. The groups are considered to have equivalent covariance structures if  $H_0$  cannot be rejected.

Following this concept, the researcher proposed three null hypotheses as follows.

**Hypothesis 1:** Assuming the measurement weights for 5 items is invariant across gender.

**Hypothesis 2:** Assuming the structural co-variances for 5 items is invariant across gender.

**Hypothesis 3:** Assuming the measurement residuals for 5 items is invariant across gender.

Jöreskog (1971) also suggested the group data should perform the signal group tests first as group data are considered to have equal covariance indexes. Thus, conducting a configurable test is necessary to verify if males and females share the similar indicators for model fit. If this occurred, configurable invariance would exist and follow up invariance analyses are unnecessary. However, Marsh and Hocevar (1985), and Byrne, Shavelson, and Muthén (1989) claimed the strict invariance requirement is typically hard to satisfy. And they recommended an easier approach and suggest a small portion of no invariant items will not affect the comparisons for all group in invariant measurement level, while the no invariant items need to identify.

Moreover, Cheung and Rensvold (2002) suggested other statistic methods to test the between-group invariance of CFA models, such as the statistics of  $\Delta$  CFI,  $\Delta$  Gamma hat, and  $\Delta$  McDonald's NCI criteria are utilized. A value of  $\Delta$  CFI smaller than or equal to  $-0.01$  indicates that the null hypothesis of invariance should not be rejected. For  $\Delta$  Gamma hat and  $\Delta$  McDonald's NCI, the critical values are  $-0.001$  and  $-0.02$ , respectively. Little (1997) examined practical and theoretical issues for testing measurement equivalence of psychological constructs. For practical aspect for testing the issues of invariance measurement, McGraw and Jöreskog (1971) suggested to verify the acceptable criteria of measurement equivalence, a modeling underlying principle may be justified if overall model fit is acceptable, and use the value of  $Rho$  (should be around  $.90$ ). Tucker and Lewis (1973)

recommended the value of  $\Delta$  Rho ( $\Delta$  TLI) should be less or equal to .05 to achieve measurement invariance across the test groups.

### Methodology

The five items of Reliability in this research were little modified from the SERVQUAL Scales (Parasuraman et al, 1988). Following Five Likert Scale: strongly disagree, disagree, neutral, agree, strongly agree, the five items were

- (a) Service person provides me the necessary goods for me.
- (b) Deal with service person is safe.
- (c) I trust service person.
- (d) Service person is professional and (e) Quality of service and good is consistent.

Kenny (1979) suggested four indicators are better than less three indicators, while five indicators are slightly better than four indicators, and more than 5 indicators are useless and unnecessary. Bollen (1989), Kline (1998), and Mulaik (1994) also agreed with this view.

Previous studies by Hu (2011, 2012, and 2013) have demonstrated the validity and reliability for this scale are reasonable and acceptable. The customers from four chain restaurants in the Kaohsiung city of south Taiwan attended this research. The pretest was conducted with Item Analysis in 50 samples. The researcher applied the method of random sampling. Each restaurant randomly invited volunteer customers who ordering meals in stores to participate the questionnaire survey. The total number of

valid responses was 200 (not including 20 invalid response), providing an adjusted response rate of 91%. The testing procedures for this research are including: (1) conducting a configurable test for all models, (2) testing the three hull hypotheses in strict manner, and (3) examining the value of  $\Delta$  CFI and  $\Delta$  TLI.

### Analysis of Results

The Structure Equating Modeling (SEM) by Analysis of Moment Structure (AMOS) software was utilized to test the model structure and hypotheses in this study. The factor analysis for five Reliability items with three models was showed as Figure One, Figure Two, and Figure Three. The results of configurable test provided the facts of the configurable invariance of the construct for all groups. Meanwhile, Hair, Black, Babin, Anderson & Tatham (1992) suggested the factor loading value should no less than .4. Therefore, all the items meet the criteria.

The outcomes of multi-groups analysis for the unconstrained and the three constrained models were listed as Table one. The unconstrained model showed an acceptable baseline model for both male and female. The multi-sample analysis also showed the indexes of model fit for three constrained models (measure weights, structural covariances, and measurement residuals) across gender, and these indexes indicated the three constrained models were accepted.

Figure One: Factor Analysis for Reliability Items

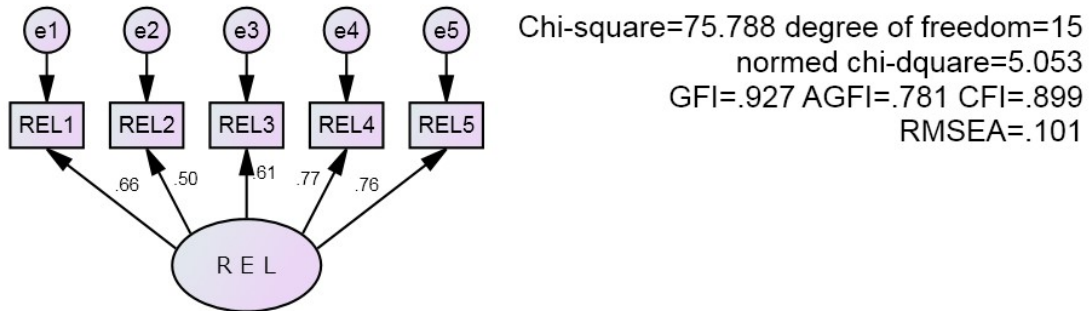


Figure Two: Factor Analysis for Reliability Items for Male Group

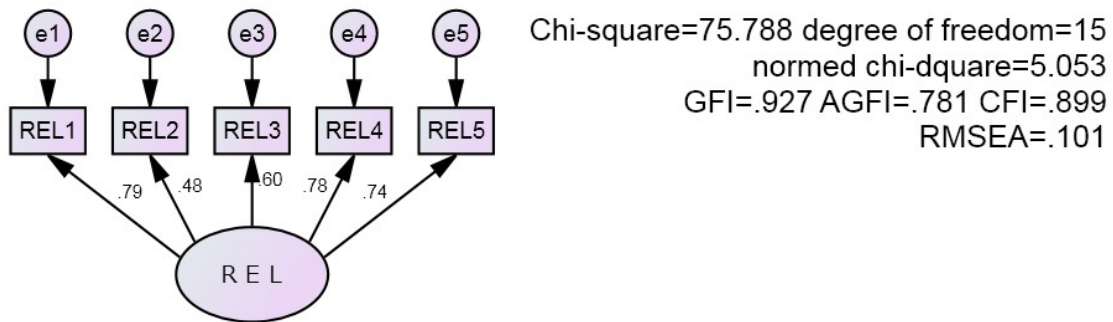


Figure Three: Factor Analysis for Reliability Items for Female Group

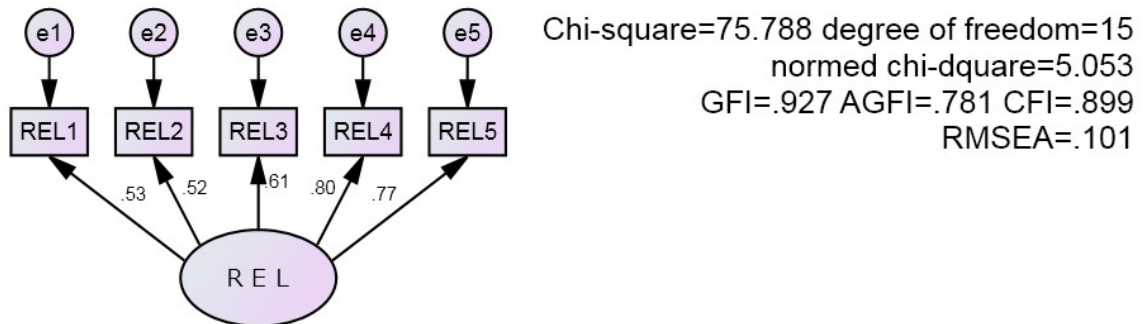


Table One: Model Fit Indexes for Models

Model	$\chi^2$	DF	P	$\chi^2/DF$	GFI	AGFI	RMSEA
Unconstrained	75.788	15	.000	5.053	.927	.781	.000
Measurement weights	78.408	23	.000	4.409	.925	.854	.008
Structural co-variances	79.259	25	.000	3.170	.925	.864	.016
Measurement residuals	87.983	35	.000	2.514	.920	.897	.108

Table Two: Nested Model Comparisons

Model	DF	$\chi^2$	P
Measurement weights	8	2.620	.956
Structural co-variances	2	0.851	.653
Measurement residuals	10	8.724	.559

The test results for nested model comparisons were showed in Table Two. The  $\chi^2$  difference test ( $\chi^2(8)= 2.620$ ,  $p>.05$ ) between baseline model and constrained model for measurement weights was not significant, indicating the factor loadings across gender in this scale were invariant, and Hypothesis 1 was not rejected. In addition, the result of the  $\chi^2$  difference test between baseline model and constrained model for structural co-variances ( $\chi^2(10)=3.471$ ,  $p>.05$ ) was not

Significant, indicating that, aside from the factor loadings, structural co-variances of this scale was invariant across the gender and Hypothesis 2 was not rejected. Finally, the result of  $\chi^2$  difference test for measurement residuals ( $\chi^2(20)= 12.195$ ,  $p>.05$ ) was not significant, indicating the measurement residuals across gender in this scale were invariant, too. Therefore, all three null hypotheses are not rejected in this research.

Table Three: Baseline Comparisons for CFI Test

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Unconstrained	.880	.761	.902	.799	.899
Measurement weights	.876	.839	.909	.880	.908
Structural co-variances	.875	.850	.911	.892	.910
Measurement residuals	.861	.881	.912	.925	.912



Table Four: Nested Model Comparisons for TLI Tests

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	8	2.620	.956	.004	.004	-.078	-.082
Structural co-variances	10	3.471	.968	.005	.006	-.089	-.094
Measurement residuals	20	12.195	.909	.019	.020	-.120	-.126

After examining the values of  $\Delta$ CFI and  $\Delta$ TLI, the results separately shown in Table 3 and Table 4. The results in Table 3 indicated all  $\Delta$ CFI values are less than .01, and all  $\Delta$ TLI values in Table 4 are less than .01 ( $P > .05$ ). Both  $\Delta$ CFI and  $\Delta$ TLI values indicated the items achieve measurement invariance across the test groups.

#### Conclusions and Suggestions

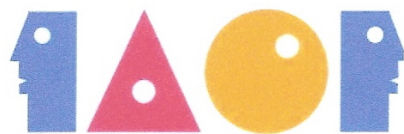
From the results for loose tests, both  $\Delta$ CFI and  $\Delta$ TLI values indicated all items achieve measurement invariance across the gender groups. The results of strict tests also indicated this Taiwan version of Reliability 5-item scales of SERVQUAL Questionnaire meet strict measurement invariance across the gender, including invariance of factor loadings, structural co-variances and measurement residuals. The results consist with the test by Hu et al. (2016) and indicated the Responsive

ness 5-item scale achieved strict measurement in variance across gender. However, the results did not consist with the views of Meyers-Levy and Maheswarm (1991), and Mitchell and Walsh (2004) suggested gender differences will lead to dissimilar buyer actions. Although this model was fully measurement invariance, Milfont and Fischer (2010) claimed full measurement invariance is questionable to hold in reality. Based on the research by Hu (2014), the part of Tangibles in SERVQUAL Questionnaire is partial measurement invariance across the gender. Those studies revealed the researcher should keep strict manner to conduct research for multiple items in questionnaire for the issues of measurement invariance across group. And this study suggested the part of Reliability in SERVQUAL Scale is measurement invariance across genders. Scholars may apply these items for conducting studies for service industry, specially exploring the service quality for the chain restaurant business in Taiwan.

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## MANAGING INVARIANCE OF DESTINATION IMAGE ACROSS GENDER TO RURAL TOURISM

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### Abstract

Rural tourism is an important means of regional economic development because it permits new infrastructure to be developed and helps retain existing amenities. Developing the competitive strategy, however, is a challenging task for many marketers because it is changing dramatically in the face of intense competition, increasing customer sophistication, and rapid technological advances. How to foster tourists' revisit intention for marketers have become more and more important. Destination image was found to be one of the most important antecedents of visit intention. This study was aimed at investigating the invariance of destination image across gender in rural tourism context. Questionnaire survey was employed to collect the data. Applying the quota sampling technique in Kengtin region in Taiwan, a total number of 278 usable samples were obtained, resulting in a response rate of 92%. The findings showed that the property of measurement weights and structural residuals across the gender was equivalent and the measurement residuals were not. The scales developed by previous studies only achieved partial measurement invariance in Taiwanese rural tourism. Some suggestions were offered to the marketers.

Keywords: invariance, destination image, rural tourism

### Introduction

Individual factors of consumers, particularly gender, play a major role in the choice of a destination. However, the relative importance of gender is a recent topic: little effort is

traditionally made of the differences between the attitudes of males and females especially related to rural tourism context. Current study is encouraged to fill this gap.

Firstly, the essence of rural tourism should be the development of better destination image with its tourists. The tourism marketplace is becoming more highly competitive due to the rocket growth rate to tourists in Hengchun peninsula, the bottom of Taiwan. Developing the competitive strategy, however, is a challenging task for many marketers because the tourism industry is changing dramatically in the face of intense competition, increasing customer sophistication, and rapid technological advances (Tavitiyaman, Qu, & Zhang, 2011). Of all the antecedents, destination image was found to be one of the most important antecedents of visit intention (Chen & Tsai, 2007; Chen & Phou, 2013). In large part, tourists choose a destination and understand the image of a destination through the Internet. The difference of gender on perceived destination image would have higher probabilities comes from the trust and the acceptance of the Internet to the Internet.

Moreover, past researches have demonstrated that feelings of males have traditionally been more favourable than that of females. Females tend to show greater risk aversion and less trust in the use of the Internet. Males score more highly for atti-

tude and intention to use and for their instrumental motivation for acceptance of the Internet (Sanchez-Franco, Ramos, & Velicia, 2009). However, none of study examines the difference of destination image across gender. Therefore, this study is aimed at investigating the invariance of destination image across gender in rural tourism context.

In this study, destination image involves subjective knowledge of a destination (i.e., whether it is expensive, exotic, rural, cold, or developed) (Ekinici, 2003) and is defined as the sum of beliefs, ideas, and impressions that a tourist holds about a destination (Chen & Phou, 2013). It comprises natural environment, entertainment environment, destination brand (Chen & Phou, 2013), cultural environment and atmosphere (Chen & Tsai, 2007; Martin & Bosque, 2008).

Based on the theory concept (Chen & Tsai, 2007; Chen & Phou, 2013), the purposes and the significance for this study were: (a) to examine the measurement invariance for destination image across gender in rural tourism context in Taiwan, (b) to generate the recommendations for managerial application of rural tourism context, and (c) to identify areas for future scholarly inquiry. Byrne (2010) suggested the tests for multi-group invariance are: (a) factor loadings, (b) factor covariances, and (c) structural regression paths. Following this concept, the researcher proposed three hypotheses as follows.



**Hypothesis 1:** Assuming model measurement weights to be variant for gender groups.

**Hypothesis 2:** Assuming model structural covariances to be variant for gender groups.

**Hypothesis 3:** Assuming model measurement residuals to be variant for gender groups.

## Materials and Methods

A questionnaire survey was employed to collect the data. To ensure validity, this study is constructed on the basis of scales adopted, in large part, from previous studies, using existing scales for measuring destination image (Chen & Tsai, 2007; Chen & Phou, 2013; Martin & Bosque, 2008). Fifteen items were adopted. Likert scales (1-5) with anchors ranging from “strongly disagree” to “strongly agree” are used for all questions. All of these scales have been shown to be reliable and valid, based upon prior research. A questionnaire was prepared for collecting rating and other information. Items measuring the various constructs were distributed about in the questionnaire to reduce halo effects.

The empirical study was carried out in Kenting region, an important and famous coastal destination in southern Taiwan, during June to August in 2015. Individuals over the age

of 18 years and who were visiting the attractions within the Kenting region were considered to be the target population. Applying the quota sampling technique, a total number of 300 questionnaires were delivered and 278 usable samples were obtained, resulting in a response rate of 92%.

The respondent profile is summarized. The great majority of the respondents were aged below 50 but over 21 (63.6%) with a slight majority of female visitors (51.4%). In all, 56.9% had a university degree or higher qualification. The great majority of the respondents had a monthly income more than NT \$30,000, and 60.8% were revisiting Kenting.

## Results

The Structure Equating Modeling (SEM) by Analysis of Moment Structure (AMOS) software was applied to test the model structure and hypotheses. The factor analysis for five components of destination image was showed as Figure 1. The results of multi-sample analysis for the unconstrained and the three constrained models were listed as Table 1. The unconstrained model showed an acceptable baseline model for both males and females. The multi-sample analysis also showed the indexes of model fit for three constrained models - measure weights, structural covariances and measurement residuals, across gender,

Standardized estimates  
 F Unconstrained  
 CMIN=11.195 DF=6 P=.083  
 GFI=.984 AGFI=.922  
 CFI=.995 RMSEA=.056

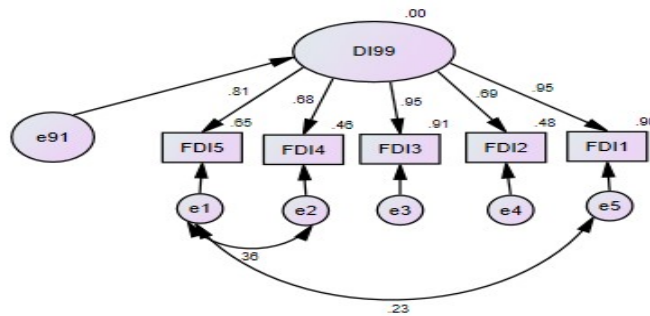


Figure 1. Factor analysis for five components of destination image

and these indexes indicated the three constrained models were accepted. (See Table 2.)

The test results for nested model comparisons were showed in Table 2. The  $\chi^2$  difference test ( $\chi^2(4)= 6.796, p>.05$ ) between baseline model and constrained model for measurement weights was not significant, indicating the factor loadings across gender in this scale were equivalent.. The  $\chi^2$  difference test between baseline model and constrained model for structural residu-

als ( $\chi^2(5)= 8.699, p>.05$ ) was not significant, indicating the structural residuals across gender were equivalent.

However, the  $\chi^2$  difference test between baseline model and constrained model for measurement residuals ( $\chi^2(10)= 29.702, p<.05$ ) were significant, indicating the measurement residuals across gender were not equivalent. The findings supported H3, while not support H1 and H2.

Table 1. Model Fit Indexes for Unconstrained and Constrained Model

Model	$\chi^2$	DF	P	$\chi^2/DF$	GFI	AGFI	CFI	RMS EA
Unconstrained	11.19	6	.083	1.86	.984	.922	.995	.056
Measurement weights	17.99	10	.055	1.79	.974	.923	.992	.054
Structural residuals	19.89	11	.047	1.80	.972	.924	.991	.054
Measurement residuals	40.89	16	.001	2.55	.944	.896	.976	.075

Table 2. Nested Model Comparisons

Model	CMIN	DF	P
Measurement weights	6.796	4	.147
Structural residuals	8.699	5	.122
Measurement residuals	29.702	10	.001

Conclusions

The results indicated that the scale developed by previous studies (Chen & Tsai, 2007; Chen & Phou, 2013; Martin & Bosque, 2008) only achieved partial measurement invariance in Taiwanese rural tourism. The property of the measurement residuals across the gender was not equivalent, while the property of measurement weights and structural residuals across the gender was equivalent in this scale. Milfont and Fischer (2010) claimed full measurement invariance is questionable to hold in reality. This finding partially filled up the gap of previous studies. The measurement of destination image could be applied to Taiwanese rural tourism context while the measurement residuals should be concerned carefully. Moreover, atmosphere revealed the highest factor loadings for both male and female, indicating that the image of place to rest, relaxing and peaceful was important. Marketers in Kengtin region should concerned first when shaping image of a destination. Furthermore, the contributions of natural environment were not high for both male and female, so that marketers in Kengtin region should not promote the place only on the basis of natural environment.

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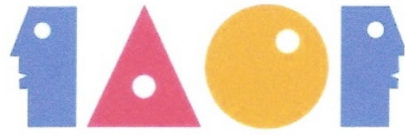
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## STOCHASTIC VOLATILITY FORECASTING MODELS FOR FUTURES INDEX VOLATILITY

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### Abstract

By using stochastic volatility (SV) models, this study uses data on the daily futures index of futures market, namely the Taiwan Futures Index, Dow Jones Futures Index, Nikkei 225 Futures Index, and FTSE Futures Index, in the period 2010 to 2015 for comparing the forecast ability of alternative stochastic futures index representations. We develop a new concept for volatility models. The objective is to integrate an artificial neural network into a stochastic volatility model for estimating futures index volatility. The results suggest that the combined stochastic volatility and artificial neural network model outperforms other models in estimating the futures index of the all cases.

Key Words: Grey Residual, Artificial Neural Network, Stochastic Volatility, Markov Chain Monte Carlo

### Introduction

Modeling the volatility of a financial time series by using stochastic volatility (SV) models has received substantial attention in the theoretical

and empirical finance literature. Nowadays, a variety of forecasting methods have been proposed to estimate the SV models. Moreover, SV models offer a powerful alternative to GARCH-type models for explaining the well-documented time varying volatility

(Danielsson, 1994; Geweke, 1994b; Kim, Shephard and Chib, 1998; Abanto-Valle et al., 2015).

Since the raised significant influence of volatility risk in modern pricing and risk management theories (Çelik and Ergin, 2014; McAleer and Medeiros, 2008), more and more extensive studies attempt to explore the volatility of asset pricing, diversify investment, and risk management (Byun and Kim, 2013). Studies using volatility models have considered only the prior price change or the news impact for deriving parameter estimates and have not considered several unexpected factors and changes with time. To estimate SV methods, Markov chain Monte Carlo (MCMC) is one of the most efficient tools. In this paper, we consider SV models and extend previous work by integrating the grey residual with SV models by using Bayesian MCMC estimation algorithms. MCMC algorithms have been used extensively

for estimating univariate SV models (Meyer, Fournier and Berg, 2003; Berg, Meyer and Yu, 2004; Lancaster, 2004; Selçuk, 2004; Yu, 2006). We develop a straightforward procedure for combining the grey residual and SV models. The results show that the out-of-sample forecast ability improved.

The remainder of the paper is organized as follows. In Section 2, we describe the methodologies adopted in the empirical process. Section 3 presents the data analysis and comparisons among the considered SV models for several futures index. Conclusions are provided in the final section, the results suggest that the combined stochastic volatility and artificial neural network model outperforms other models in estimating the futures index of the all cases.

(Editor's Note: Some of this article has been reformatted into single column text to facilitate easier reading of formulas.)

## Models

For illustrative purposes, we use futures index return as our research object. The series of futures index returns comprises the mean-corrected returns,  $\{y_t\}$ , derived from the following transformation.

$$y_t = \log(x_t) - \log(x_{t-1}) - \frac{1}{n} \sum_{i=1}^n (\log(x_t) - \log(x_{t-1})), t = 1, 2, \dots, n.$$

where:  $\{x_t\}$  denotes the exchange rate at  $t$ .

### *The Stochastic Volatility (SV) Model*

The SV model used for analyzing the collected data can be written in the form of a nonlinear state–space model (Harvey, 1989). A state–space model specifies the conditional distributions of observations given unknown states. Given the underlying latent volatilities,  $\theta_t$ ,  $\{y_t\}$  in the observation equations is expressed as follows:



$$y_t | \theta_t = \exp\left(\frac{1}{2}\theta_t\right)u_t, \quad u_t \stackrel{i.i.d.}{\sim} N(0,1), \quad t = 1, 2, \dots, n.$$

**The unknown states are assumed to follow a Markovian transition over time (therefore, state-space models are often referred to as “hidden Markov models”), and they are expressed by the following state equation:**

$$\theta_t | \theta_{t-1}, \mu, \phi, \tau^2 = \mu + \phi(\theta_{t-1} - \mu) + v_t, \quad v_t \stackrel{i.i.d.}{\sim} N(0, \tau^2), \quad t = 1, 2, \dots, n,$$

where  $\theta_0 \sim N(\mu, \tau^2)$ .

The state  $\theta_t$  determines the amount of volatility on day  $t$ , and the value of  $\phi$ ,  $-1 < \phi < 1$ , measures the autocorrelation present in the logged squared data. Thus,  $\phi$  can be interpreted as the persistence in the volatility, the constant scaling factor  $\beta = \exp\left(\frac{\mu}{2}\right)$  as the model volatility, and  $\tau$  as the volatility of log volatilities (cf. Kim *et al.*, 1998).

A full Bayesian model consists of the joint prior distribution of all unobservables, here the three parameters,  $\mu, \phi, \tau^2$ , and the unknown states,  $\theta_0, \theta_1, \dots, \theta_n$ , and the joint distribution of the observables, here the daily returns  $y_1, \dots, y_n$ . Bayesian inference is then based on the posterior distribution of the unobservables given the data. In the following, we will denote the probability density function of a random variable  $\theta$  by  $p(\theta)$ .

**By successive conditioning, the joint prior density is:**

$$p(\mu, \phi, \tau^2, \theta_0, \theta_1, \dots, \theta_n) = p(\mu, \phi, \tau^2) p(\theta_0 | \mu, \tau^2) \prod_{t=1}^n p(\theta_t | \theta_{t-1}, \mu, \phi, \tau^2).$$

We assume the prior independence of the parameters  $\mu$ ,  $\phi$ , and  $\tau^2$ , and the use the prior values employed by Kim *et al.* (1998). We employ a slightly informative prior for  $\mu$ ,  $\mu \sim \text{unif}(0, 1)$ . We set  $\phi = 2\phi^* - 1$  and specify a beta ( $\alpha, \beta$ ) prior for  $\phi^*$  with  $\alpha = 20$  and  $\beta = 1.5$ , providing a prior mean of 0.86 for  $\phi$ . A conjugate inverse gamma prior is selected for  $\tau^2$ , where  $\tau^2 \sim IG(2.5, 0.025)$ . Furthermore,  $p(\theta_t | \theta_{t-1}, \mu, \phi, \tau^2)$  is defined using the state equation, the likelihood  $p(y_1, \dots, y_n | \mu, \phi, \tau^2, \theta_0, \dots, \theta_n)$  is specified using the observation equation and the following conditional independence assumption:

$$p(y_1, \dots, y_n | \mu, \phi, \tau^2, \theta_0, \dots, \theta_n) = \prod_{t=1}^n p(y_t | \theta_t).$$

**According to Bayes' theorem, the joint posterior distribution of the unobservable in the data is proportional to the prior times, and the likelihood is presented as follows:**

$$p(\mu, \phi, \tau^2, \theta_0, \dots, \theta_n | y_1, \dots, y_n) \propto p(\mu) p(\phi) p(\tau^2) p(\theta_0 | \mu, \tau^2) \prod_{t=1}^n p(\theta_t | \theta_{t-1}, \mu, \phi, \tau^2) \\ \times \prod_{t=1}^n p(y_t | \theta_t).$$

### *The Stochastic Volatility and Artificial Neural Network (ANN- SV) Model*

We fit a model with one additional parameter by using the prior of the common parameters  $\mu, \phi$ , and  $\tau^2$  in the model described in the previous subsection, which is referred to as the SV model. An artificial neural network (ANN) structure for state transitions is specified as follows:

$$y_t | \theta_t = \exp\left(\frac{1}{2} \theta_t\right) u_t, \quad u_t \stackrel{i.i.d.}{\sim} N(0,1), \quad t = 1, 2, \dots, n. \\ \theta_t | \theta_{t-1}, \mu, \phi, \tau^2 = \mu + \phi(\theta_{t-1} - \mu) + \varphi \sum_{h=1}^s \xi_h \psi(z_t \lambda_h) + v_t, \quad v_t \stackrel{i.i.d.}{\sim} N(0, \tau^2), \\ t = 1, 2, \dots, n.$$

$$\psi(z_t \lambda_h) = \left[ 1 + \exp\left(\lambda_{h,0,0} + \sum_{d=1}^v \left[ \sum_{w=1}^m \lambda_{h,d,w} z_{t-d}^w \right] \right) \right]^{-1}$$

$$z_{t-d} = \frac{\varepsilon_{t-d} - E(\varepsilon)}{\sqrt{E(\varepsilon^2)}}$$

$$\frac{1}{2} \lambda_{h,d,w} \sim \text{uniform}[-1, +1]$$

***This model is constructed by adding nonlinear terms to the SV model to account for nonlinear effects that are not captured by basic ARCH models. This model considers the transfer function in the ANN, and used to describe the non-linear relation among variables.***

Data Description and Empirical Results

*Parameter Estimation and Diagnostics*

Parameter estimates for GARCH and the SV models are presented in Table 1. The data consist of several time series of the daily futures index {xt} of the Taiwan Futures Index, Dow Jones Futures Index, Nikkei 225 Futures Index, and FTSE Futures Index from January 5, 2010 to December 31, 2015. Data from January 5, 2010 to December 31, 2014 are used for in-sample forecasts, and

data from January 5, 2015 to December 31, 2015 are used for out-of-sample forecasts. The OpenBUGS software is used for computing the posterior distri-

bution in the SV and ANN–SV models. For the two models, we consider burn-in and follow-up periods of 10,000 and 100,000 iterations, respectively.

Table 1. Estimates of unknown parameters of models for futures index from January 5, 2010 to December 31, 2014

	Taiwan	Dow Jones	Nikkei 225	FTSE
Panel A: GARCH model				
$\mu$	0.0099*** (0.0032)	37.1005*** (13.2668)	46.2889*** (10.4348)	264.5053*** (1.7640)
$\alpha$	0.0393*** (0.0061)	0.0903 (0.1147)	0.1356 (0.0976)	1.0415** (0.4542)
$\beta$	0.9508*** (0.0080)	0.4267** (0.2061)	0.2062 (0.1817)	-0.0165*** (0.0001)
Panel B: SV Model				
$\mu$	-0.0946 (0.2275)	-0.7444*** (0.1745)	0.3024*** (0.1114)	-0.1948** (0.129)
$\phi$	0.9762*** (0.0124)	0.8861*** (0.0234)	0.8316*** (0.0395)	0.7218*** (0.0389)
Panel C: ANN-SV Model				
$\mu$	0.422* (0.2658)	0.1364* (0.1328)	0.1782* (0.1625)	0.0887* (0.0850)
$\phi$	0.8739*** (0.0307)	0.9051*** (0.0242)	0.8149*** (0.0474)	0.742*** (0.0366)
$\varphi$	-0.0282 (0.0325)	-0.1227*** (0.0516)	0.0683 (0.0721)	1.046*** (0.0473)

Figures in parentheses represent standard errors

Table 1. lists the results obtained using general models. GARCH parameters are the same as those described in relevant literature. The stationary situation shown in Panel A is stratified on the basis of  $\alpha + \beta = 0.9902 < 1$ . The SV and ANN–SV, models are shown in Panels B and C respectively, in Table 1. Generally, the estimates are considered significant at the 5% level.

### Comparison of Model Forecast Performance

To evaluate the out-of-sample forecast performance of each model relative to that of another model, we calculate the root mean square error (RMSE). The RMSE of the forecasts is calculated using the following equation:

$$RMSE = \sqrt{\frac{\sum_{i=1}^n \tau_i^2 - (\overline{\tau_i^2})^2}{n}}$$

where  $n$  is the sample size,  $\tau_i^2$  is observed values and  $\overline{\tau_i^2}$  is modeled values at time  $i$ .

Table 2. shows the forecast performance of each model. The results are reveal that the forecast performance of the ANN–SV model higher than the forecast performance of the other models for estimating the futures index of the Taiwan, Dow Jones, Nikkei225 and FTSE. Moreover, the integrate an artificial neural network into a stochastic volatility model for estimating futures index volatility that offers a powerful forecast performances than the GARCH model to estimate the futures index volatility for all cases.

Table 2. Out-of-sample forecast performance results

Futures Index RMSE	Taiwan	Dow Jones	Nikkei 225	FTSE
GARCH	3.2099	16.2049	44.7589	264.2947
SV	3.1814	2.2740	3.8455	2.4809
ANN - SV	3.0346	2.2291	3.8200	2.4740

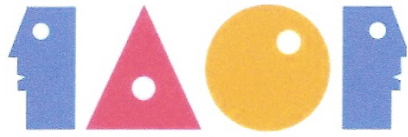
### Conclusion

Although a variety of forecasting methods have been proposed to estimate the SV models, this study is the first one to integrate an ANN model into a SV model for estimating volatility. Because computers can manage complicated computing requirements, determining SV by using MCMC algorithms may pose an attractive alternative to a GARCH model.

In this study, we develop a series of SV models for determining the conditional futures index volatility and compare the results with those of general models by using out-of-sample data. To evaluate the out-of-sample forecast performance among models, we calculate the RMSE for measuring the forecast ability of each model. The ANN–SV model outperforms other models in estimating the futures index of the all cases.

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## THE IMPACT OF FINANCIAL CONDITION AND CORPORATE SOCIAL RESPONSIBILITY TO THE AGGRESSIVENESS OF COMPANY TAX IN JAKARTA ISLAMIC INDEX

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### Abstract

Aggressiveness tax is an action of aggressiveness tax which gives a marginal benefit by saving the tax (tax saving) to company. The aggressiveness of this tax is influenced by financial factor and non financial. Thus, this research is dedicated to analyze some factors which is influential to the company aggressiveness tax based on perspective of financial condition and corporate social responsibility (CSR).

This research is an empiric study which uses purposive sampling technique in taking a sample. The data is found by the company that its stock registers in Jakarta Islamic index (JII) period 2010 – 2013. For technique analyzing is using multiple linear regressions.

The result of this research indicates that financial condition is predicted by profitability has a negative influence. Even though, liquidity, leverage and CSR do not have significant influence to aggressiveness tax. Whereas, it indicates that CSR cost is spent by company to give contribution to the society is not as an instrument for doing aggressiveness tax.

Keywords: Financial condition, corporate social responsibility (CSR) and Aggressiveness of tax

### Introduction

One of the tax functions is the budgetair function which is indicated to fill in cash state as roles to obtain and

being used to cover expense of country, thus it is needed the awareness and the dicipliner subject to tax for understanding the tax roles. On the other hand, the company assumes as a burden where it



will decrease profit of the company and give effect to the company becomes aggressive in the tax (Chen, et al., 2010).

According to Frank, et al. (2009); Krisnata and Supramono (2012), aggressiveness is an experimental action income tax by using tax avoidance or tax evasion. Even though all of the aggressive does not break the rule of company, even though as many as chance which is used by the company, it will more aggressive to the tax. Fatharani (2012) explains that the aggressive tax action will give contribute marginal benefit or marginal cost. The marginal benefit which may get of the tax saving that is significant for the company. But then the marginal cost that is appear where they appear of the tax cost it might be action by getting tax of doubt when is done of investigation, the decreasing price of company's stock, reputational cost, and political cost.

Financial condition of the company can be measured using the ratio of profitability, liquidity, and solvability/leverage (Bambang, 1998). Research on profitability and liquidity ratios are associated with non-compliance tax have been done by Mustikasari (2007), liquidity and leverage ratios against tax aggressiveness (Krisnata and Supramono, 2012), as well as profitability and CSR to tax aggressiveness (Lanis and Richardson, 2012).

The previous studies showed profitability and liquidity company proved that the factor which influence obey of company tax role, it is caused profitability will emphasize the company to report its tax. (Slemrod, 1992; Bradley, 1994 in

Mustikasari, 2007; Siahaan, 2005; and Aini, et al. (2013). According to Bradley (1994) and Siahaan (2005) stated the company which has low liquidity indicated undisciplined tax to become survive current company's cash. According Krisnata dan Supramono (2012), the company is might used a debt to fill the operational needs and companies' investment. However, the debt will cause permanent (fixed rate of return) called interest. If the debt is greater, the taxable income will be smaller because of tax incentives on debt interest increases. It will have an implication to increase of purposing debt by the company. The result Showed, it is of Ozkan (2001) mentioned the company that has a high tax liability will have higher debt, so that the company deliberately high owed to reduce the tax burden. It is an action of aggressiveness tax. Besides condition financial indicator, the factor which can influence the aggressiveness of company tax is from corporate social responsibility (CSR). Thus, if the company aware to the important of CSR, the company will be more know the function tax for the society, this research connect with Watson (2011) and Lanis and Richardson (2012).

This research has aimed to integrate some of the previous study and analyzing the influence financial condition which projected profitability, liquidity, and leverage variable, and also the function of CSR to aggressiveness company tax. Another case is in object which is used in this research is a company which listed in Jakarta Islamic index in 2010–2013 period. The object selection research is from company which listed in Jakarta Islamic index. A company which

listed in Jakarta Islamic index is a company which chosen by the company which become expected a model to other company in the operational process, where it is not unsure contain of gambling, money lender (riba) and not produce goods or service which has unsure mudharat as role from syariah supervisor council, so expect the Company which listed in JII as a company which not doing a aggressiveness tax.

#### Theory and Hypothesis Development

##### *The Influence of Profitability toward Aggressiveness of Company Tax*

Company profitability had proved was a factor which influenced company loyalty in obeying tax role, because of the profitability would emphasized company to report its tax (Slemrod, 1992; Bradley, 1994 in Mustikasari, 2007; Siahaan, 2005; dan Mustikasari, 2007).

A company which has high profitability indicated reporting tax with fair than a company which has lack of profitability. The company has lack of profitability generally realizing financial difficulty and indicating undisciplined tax. (Mustikasari, 2007). Based on the explanation above can be formulated:

**H1:** the profitability can influence negative effect to aggressive of company tax.

##### *The Influence liquidity toward Aggressiveness of Company Tax*

A company which has high liquidity showed high company capability in

fulfills short term period debt with valuable property. When the ratio is higher than company liquidity it might be good financial condition company, thus, it could be warrant of cost with showed tax (Krisnata and Supramono, 2012).

According to Bradley (1994); Siahaan (2005); and Mustikasari (2007) also gave an evidence that company was difficulty liquidity might not obey the role of tax and indicate avoiding the tax. This action was done by the company for defending its cash. Even though, company which has high liquidity will have lack aggressiveness tax. Based on the explanation above can be formulated as follows:

**H2 :** the liquidity can influence negative effect to aggressiveness of company tax.

##### *The Influence leverage toward Aggressiveness of Company Tax*

Ozkan (2001); Choi (2003); Krisnata and Supramono (2012) explained that where a company which has more high burden tax to apply for debt in order to get benefit from the reduction of the interest on the debt so that the taxes paid will be smaller.

According Yoehana (2013), when the company select to pay its operations more with debt, then the company will have a low value CETR. This is because the interest components cost in the loan can be used as a deduction tax. Based on these descriptions can be formulated hypothesis. Below is the hypothesis:

**H3:** the leverage can influence positive effect to aggressiveness of company tax.

### *The Influence CSR to Aggressiveness of Company Tax*

According to Watson (2011) in their study had proved that CSR activity was done by American company consisted could be limited the aggressiveness company tax. Avi-Yonah (2008) in Lanis and Richardson (2012) stated that company can be correlated with CSR, if the payment tax was done by company had implication to wide society.

Lanis and Richardson (2012) argued that payment of company tax in company should have some consideration values to society and other stakeholder. By some reason, if CSR was higher than the company, it can be might that the company is not aggressive to tax, it will make the company will loss of reputation and positive impact in stakeholder.

Based on the explanation above can be formulated as follows:

**H4 :** the CSR can influence negative effect to aggressiveness of company tax.

### Research Design

#### *Sample Description*

The population in this research is a company which listed in Jakarta Islamic index in 2010- 2013 period. The gathering sampling method used purposive sampling method where method to get

sample based on criteria and certain consideration target in choosing the sample. The explanations of those are as follows:

1. The company listed in Jakarta Islamic index (JII) in 2010 – 2013. Based on national syariah supervisor council and BAPEPAM – LLK role no. IX.A.13 about publish of syariah effect. There are four requirements that must be completed by stocks to enter in JII ([www.wikipedia.org](http://www.wikipedia.org)) :
  - a. Emiten is not operating the attempt gambling and playing which content of gambling or forbidden selling.
  - b. It is not the conventional financial institution which is implement the usury system, including banking and conventional insurance.
  - c. To effort that cannot be done produce, to distribute, selling forbidden food product.
  - d. To not operate the producing business, distributing, and providing goods / services which can make breaking behavior.

In addition, the companies which calculated in Jakarta Islamic Index is selected as follows ([www.idx.co.id](http://www.idx.co.id)):

- a. The stocks will be selected based on the Lists of Islamic Securities (DES) was agreed by Bapepam - LK.
- b. Choosing 60 stocks of the Syariah Securities List in order to get of

- largest market capitalization over the past 1 year.
- c. From 60 stocks, 30 stocks were selected based on the level of liquidity that was the value of transactions in the regular market during in one of year.
  2. The company published financial report and annual reports which consistently in 2010-2013.
  3. The Company did not realize a loss when did this research past. This is because it will cause the value to be negative CETR so would complicate the calculation (Yoehana, 2013).
  4. The company which served the financial report ended December 31, (Yoehana, 2013).
  5. The Company which used rupiah as a unit value in its financial report. (Fatharani, 2012 and Yoehana 2013).

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Description :

- |                                      |  |
|--------------------------------------|--|
| $\alpha$                             | = constant   |
| $\beta_1, \beta_2, \beta_3, \beta_4$ | = Regression of Coefision                          |
| Y                                    | = Company tax aggressiveness was measured by CETR. |
| X1                                   | = Profitability                                    |
| X2                                   | = Liquidity  |
| X3                                   | = Leverage   |
| X4                                   | = Disclosing CSR item company i in period          |

Based on the criteria, it was found 30 companies sample during observation (2010-2013) period. Thus, the total of the sample is 52, can be seen in Table 4.1.

#### *Dependent Variable*

The dependent variable which is used is the aggressiveness of company tax proxied by Cash Effective Tax Rate/CETR (Y).

#### *Independent Variable*

The independent variables that used in this reasearch are profitability (X1), liquidity (X2), leverage (X3), and corporate social responsibility/corporate disclosure (X4).

#### *Base regression model*

To prove the hypothesis that has been formulated, then used the analysis of regression. The data Analysis in this research can be formulated as follows:

Table 1. The Operational Definition of Variables

Variable	Definition	Formula
Profitability (X1)	The capability of the company to get benefit. Profitability is proxied by the returning on assets / ROA (Bambang, 1998; Fatharani, 2012; Mustikasari, 2007).	$\frac{\text{Pre Tax Income}}{\text{Total Assets}}$
Liquidity (X2)	The capability of the company has to fill short-term obligations. Liquidity is measured by the current ratio (Bambang, 1998; Krisnata and Supramono, 2012)	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$
Leverage (X3)	The use of financial resources which has a permanent load (Bambang,, 1998; Krisnata and Supramono).	$\frac{\text{Debts Total}}{\text{Assets Total}}$
CSR (X4)	The number of items that was revealing of corporate social responsibility expected a number of 78 items (Sembirng 2005; Lanis and Richardson, 2012).	$\frac{\text{Number of Items Disclosed}}{78 \text{ Items disclosure}}$
Company tax aggressiveness (Y)	Cash Effective Tax Rate (CETR) is the effectiveness of tax payments by the company (Krisnata and Supramono, 2012).	$\text{CETR} = \frac{\text{TotalTaxPaid}}{\text{PreTaxIncome}}$

## Result

### *Descriptive Analysis*

The data description in each variable is used in analysis is followed at Table 2.

Based on Table 2, the average value was obtained on the profitability that was proxied by return on assets (ROA) was equal to 0,2407. It showed that the average return on assets (ROA) in the company of samples in 2010-2013 was amounted to 24,07 percent. It means that in every rupiah of the assets were

used by companies could generate a profit of IDR 0,2407. The lowest profitability was 2,43 percent and the highest profitability was rate of 53,96 percent.

The average value on the liquidity that was proxied by current ratio was about 2,796. This indicates that the average current ratio of the sample companies which was researched at 2010-2013 period was amount 2,796, or 279,62 percent. It means that in every rupiah of current liabilities was secured by current assets of Rp. 2,7962. The Lowest liquidity value was 45 percent and the highest liquidity value was 698,54 percent.

Table 2. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Profitability	52	,0243	,5396	,240763	,1237237
Liquidity	52	,4500	6,9854	2,796271	1,6955451
Leverage	52	,1332	,6813	,335118	,1476762
CSR	52	,3462	,6282	,483481	,0422041
CETR	52	,1273	1,3241	,317514	,1838222
Valid N (listwise)	52				

The mean of leverage which is proxied by the debt to asset is 0.3351. It indicates that the mean of leverage of the sample company examined in 2010-2013 period is 33.51 percent, it means that 33 percent of funding in the company assets are financed by debt, while the rest is financed by stocks. The lowest leverage is 13.32 percent and the highest leverage is 68.13 percent. Standard deviation is 0.1476 which is smaller than the average is 0.3351, thereby leverage data dissemination is uneven, meaning that there is no difference between high data with one another.

The average value in the corporate social responsibility (CSR) was 0,4834. it indicated that the sample disclosure of company's CSR was analyzed in 2010-2013 was amounted to 48,34 percent. The lowest value of corporate social responsibility (CSR) was 34,62 percent and the highest value of corporate social responsibility (CSR) was 62,82 percent.

The average value of the corporate tax aggressiveness which was measured by CETR was equal 0,3175. It showed that the average corporate tax aggressiveness in the sample company in 2010-2013 was amounted 31,75 percent. The

value of lowest corporate tax aggressiveness was 12,73 percent and the value of the highest corporate tax aggressiveness was 132,41 percent.

#### Classic assumption Test

Normality Test results were obtained by Kolmogorov-Smirnov result was  $0,403 > 0,05$ , so it could be concluded that the data are normal distributed. Multicollinearity test results were obtained VIF, for each independent variable profitability was 1,085; liquidity was amounted 1,376; leverage was 1,380; and CSR at 1,113 was less than 10. Thus, the tolerance value each independent variable profitability was 0,922; liquidity was amounted 0,727; leverage was 0,725; and CSR was 0.942 was more than 0.1. Thus, the regression model in this research could be concluded that it was not crash multicollinearity.

Test result of heterokedisity with glejser test was obtained of significant value where each independent variable was greater than 0.05, the profitability was 0,016; liquidity was 0,392; leverage was 0,970; CSR was 0,811. Therefore, it could be indicated regression model in



this research that it was not indication of heteroscedasticity.

The result of Autocorrelation test with run test was obtained from significance value run test in regression model about  $0.575 > 0.05$ , then, the regression model where was proposed was not able

autocorrelation.

### *Hypothesis Testing*

Hypothesis testing that was proposed by using regression analysis. The analysis result can be seen at Table 3.

Table 3. Regression Test

Model		Coefficients <sup>a</sup>		Standardized		
		Unstandardized Coefficients	Std. Error	Coefficients	T	Sig.
1	(Constant)	,336	,284		1,183	,243
	Profitabilitas	-,630	,206	-,424	-3,057	,004
	Likuiditas	-,003	,017	-,031	-,201	,842
	Leverage	,006	,195	,005	,032	,975
	CSR	,291	,612	,067	,476	,636

a. Dependent Variable: CETR

From Table 3, the result of processing data with SPSS program 19. It was found the equality of final regression.

$$Y = 0,336 - 0,630 X1 - 0,003 X2 + 0,006 X3 + 0,291 X4 + e$$

Profitability was influential as significant to the corporate tax aggressiveness by negative correlation, this result was evidenced by significant value  $0.004 < 0.05$  and the regression coefficient -0.630. Thus, we could be concluded that H1 was accepted and the hypothesis that was assert of negative influence between the profitability to the corporate tax aggressiveness where was accepted.

Liquidity did not significant influential to the outcome of corporate tax aggressiveness. It was evidenced by the significant value  $0,842 > 0,05$ . It could be concluded that the H2 was rejected. So the hypothesis alleged that the existence was negative influential effect between liquidity to corporate tax aggressiveness was rejected.

Leverage did not significant influential to outcome of corporate tax aggressiveness. It was evidence by the significant value  $0,975 > 0,05$ . It could be concluded that the H2 was rejected. So the hypothesis alleged that the existence was positive influential effect between leverage to corporate tax aggressiveness was rejected.

CSR did not have an impact effect to the company tax aggressiveness with a positive connection; the result was evidenced by the significant value  $0.636 > 0.05$ . It could be concluded that the H3 was rejected, so the hypothesis that the alleged existence of a negative effect between CSR to company tax aggressiveness was rejected.

### Discussion

#### *The Influence of Profitability toward Agresivness of Company Tax (CETR)*

Profitability could be influence negative toward the corporate tax aggressiveness; it indicated that company had high profitability tended to report their tax honestly than companies which had low profitability. Some Companies that had low profitability usually had experience complication problem financial and it tended to tax noncompliance. As profitable a company, it tended to have a high effective rates and as if the company seem more less tax aggressive than the company less tax less profit-able. These results do not support the research Lanis and Richardson (2012); Gupta and Newberry (1997), who explains that profitability positively affect tax aggressiveness, but this result support the research of Mustikasari (2007) and Aini, et al . (2013), which proved that profitability had significant influence and a negative connection toward the company tax aggressiveness.

#### *The Influence of liquidity toward Agresivness of Company Tax (CETR)*

Liquidity was not influence significant toward the company tax aggres-

siveness with a negative connection. This condition occurred cause of the company has liquidity where it shared and traded on the JII by high rate, it was an average of 279.62 percent. A company which has good financial condition could be considered that it was a healthy financial and not have a problem with cash flow. So cash flow could be expected the costs that arise as tax and compare its obligation according to the applicable rules. (Slemrod, 1994 in Siahaan, 2005 and Bradley, 2004).

This result supported Krisnata and Supramono's research (2012), which stated that liquidity was not a significant and negative impact toward the company tax aggressiveness. There was no significant correlation between liquidity and corporate tax aggressiveness; it means that the stock which was sold was similar. It could be proved in the descriptive where the standard deviation value of the company whose shares are traded in the same relative JII. This is evident in the descriptive analysis in which average value of the current ratio (2.79). The average value indicated that had the rate of liquidation of the company that traded congruent in JII.

#### *The Influence of leverage toward Aggresivness of Company Tax (CETR)*

Leverage has not significant with positive effect of the aggressiveness corporate tax. This condition indicates that the higher of the leverage, the higher of aggressiveness of this tax. This condition is done to feel the operational needs and investment companies, it is possible the company used debt. However, the

relationship is not significant because it is according to the criteria of the incoming stocks in the category of sharia in Jakarta Islamic Index (JII) where the total debt does not exceed 45 percent. These results do not support the research Krisnata and Supramono (2012) who explained that leverage give the positive effect on tax aggressiveness.

#### *The influence CSR toward Aggressiveness of Company Tax (CETR)*

CSR does not significantly influence the tax aggressiveness towards a positive relationship. These results do not support the research Lanis and Richardson (2012) who explains that CSR negatively affect tax aggressiveness, but supports research Watson (2014) which shows that Corporate Social Responsibility (CSR) has positive influence on the aggressiveness of taxes when the lower financial conditions, but the effect disappeared when the financial condition of medium or high.

These results indicate that the higher the aggressiveness of CSR there is a tendency that the higher the tax, but not significant for the taxation laws in Indonesia there are restrictions on CSR activities that can be tax deductible, so the company can not use these loopholes to avoid tax.

#### Conclusion and Suggestions

##### *Conclusion*

Profitability was influence significantly with a negative correlation toward the corporate tax aggressiveness (CETR), it indicated that company had high prof-

itability tended to report its taxes honestly than companies which had low profitability.

Liquidity has no significant effect on the aggressiveness corporate tax (CETR) with a negative relationship. It shows the higher level of liquidity, the aggressiveness of company tax will be lower because the company is not experiencing difficulty in paying their tax obligations.

Leverage and CSR do not significantly influence to the aggressiveness of corporate tax (CETR) with a positive relationship. It shows higher leverage and disclosure of CSR in a company with the possibility of increasing the aggressiveness of corporation tax but the tax aggressiveness does not significantly increase. This condition indicates that the leverage in accordance with the criteria in the category of shares of sharia. It is also due to the character of the companies listed in JII is a reputable company that is keeping from aggressiveness action toward taxes because the company does not want to lose reputation in front of stakeholders.

##### *Suggestions*

For the company is expected the company do not do aggressiveness taxes because it will be impact the company's reputation. For the government needs to look for the prevention and settlement tax aggressiveness of the company the state will not be harmed. In addition, although JII is level of corporate tax aggressiveness performed on the company whose shares are traded at relatively low JII not even be said to be aggressive tax

because the tax aggressiveness average of 31,75 percent is more the effective than tax rate set by the government by 25 percent, therefore it needs to be a review of the criteria for adding company whose shares can go in order not to belong to aggressive tax.

The results of the independent variable coefficient determined in this research focus on describing the aggressiveness of tax (CETR) 9,7 percent, for further more research can add independent variables, such as the characteristics of ownership, tax reform, and political relations (Sari, 2010; Nugroho, 2011; Lanis and Richardson, 2012). In addition to add characteristic variable governance corporate (Sari and Martani, 2010; Lanis and Richardson 2011, Yoehana, 2013) in order to get better explain the aggressiveness of its tax.

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### Appendices

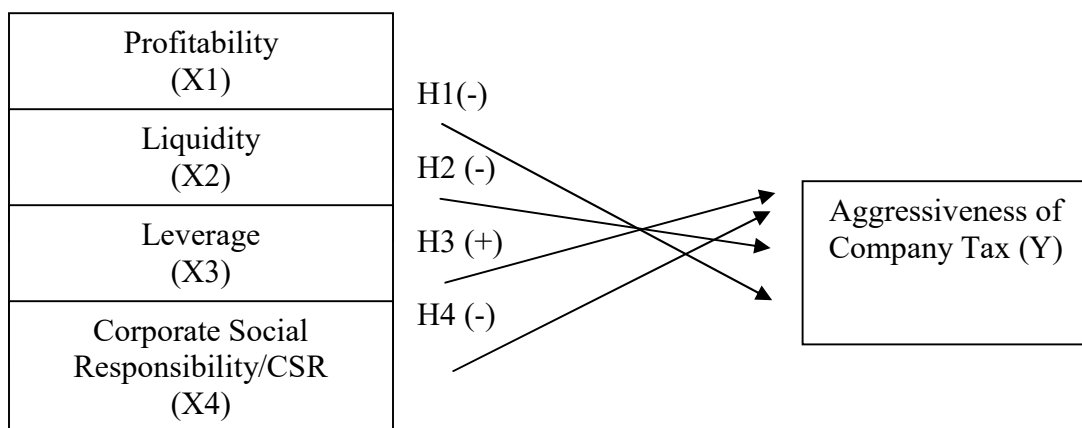
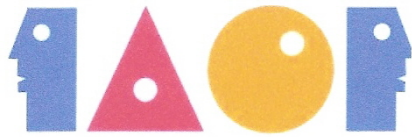


Figure 1. Research Design



Table 4. Distribution Sample

Sample Criteria	The Total of Companies
Companies' stocks which listed in JII (Jakarta Islamic Index) in 2010-2013 period.	30
Companies which stocks are not always traded in JII (Jakarta Islamic Index) 2010-2013 period	(16)
Companies which get of suffer financial lose in 2010-2013 period	(1)
Companies which stocks are always traded in JII (Jakarta Islamic Index) in 2010-2013 period.	13
The total sample of 13 companies x 4 years	52



## RELATIONAL BENEFITS, CUSTOMER SATISFACTION, AND CUSTOMER CITIZENSHIP BEHAVIOR IN CHAIN STORE RESTAURANTS

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### Abstract

This study is trying to explore relationships among relationship benefits, customer satisfaction, and customer citizenship behavior from the viewpoint of organizational citizenship behavior theory in chain store restaurants. The proposed model was tested employing data collected from 634 chain store restaurants patrons, using the structural equation modeling technique (SEM) analysis method. The research result is customer satisfaction has an intervening effect between relational benefits and customer citizenship behavior. Moreover, customer satisfaction with employees increase positive satisfaction with stores significantly. The results of subsequent analysis of the data are not only corresponding with previous research, but also provide better insights into the contemporary management style for chain store restaurants. In the end, this study will come out some suggestions in either academic or practical aspect.

Keywords: relational benefits, customer satisfaction, customer citizenship behavior, chain store restaurants.

### Introduction

Over the past two decades, relationship marketing has undergone a significant paradigmatic shift in marketing theory (Zhang et al., 2016; Samiee et al., 2015). Marketing theory and practice is now directed toward attracting, establishing, and maintaining long-term, profitable customer relationships (Daukseviciute & Simkin, 2016; Shang & Lin, 2010). The

core tenet of relationship marketing is the creation and maintenance of long-term customer relationships through the provision of both tangible and intangible relational benefits such as psychological benefits, social benefits, and special treatment benefits (Chen & Hu, 2010).

Moreover, customer satisfaction perpetuates voluntary customer participation in marketing (Beck et al., 2015).

Such voluntary customer participation in relationship marketing is a significant asset to a service firm. Since customers can enhance service production and delivery efficiency (Skarmeas, et al., 2016), service organizations can benefit from understanding the factors that lead to voluntary customer participation. In doing so, they can take advantage of this 'hidden asset': the customer. There is growing interest in the customer's role in relationship marketing; however, little empirical research exists that addresses the antecedents of voluntary customer participation behaviors (Schumann et al., 2014; Thompson et al., 2016).

Since interactions with the enterprises make customers decide their loyalty to, and relationship with, the company (Rogers, 2005). If the corporation cannot raise the quality of total customer experiences, then customers will not stay with it (Seybold, 2001). In order to provide a total customer experience, enterprises need to have a favorite and an identifiable brand name, develop a trust system and build an interaction model of customer drivers (Payne & Frow, 2005). Previous research has concerned itself more with customers' purchasing behaviors, but not non-purchasing behavior. If we can explore customer behavior models from the aspect of organizational behavior, it should be more interesting and challenging.

Organizational citizenship behavior (OCB) emphasizes the members actively assisting each other without any direct reward from the organization (Hart et al., 2016; Chan & Lai, 2017; Organ, 1988, 1990). Previous research

had discussed the effects of job satisfaction on OCB (Weikamp, & Göritz, 2016; Donovan et al., 2004). However, almost all research is limited in the field of organizational inter-members (Abu Bakar & McCann, 2016; Podsakoff et al., 1997) and ignores the value of customers. In terms of customer relationship management, customer value should be of concern (Chen et al., 2010).

Consequently, we integrate the concepts of customer relationship management and OCB to develop customer citizenship behavior (CCB). It emphasizes customers' non-purchasing behavior with retailers, and not being directly rewarded by the enterprise.

In summarizing the existing literature, it has been shown that satisfaction has been widely used as an overall measure of customer relational benefits, which are a key determinant of long-term marketing success (Hennig-Thurau et al., 2002). In addition, from the previous statement, we can infer that satisfaction impacts customer citizenship behavior; therefore, it is also a consequence of relational benefits (Ruiz-Molina et al., 2015). However, while existing studies emphasize the importance of relational benefits, customer satisfaction, and customer citizenship behavior, our understanding of how these factors interrelate is relatively weak.

Elucidating the relationships among these factors can aid business managers by providing a practical model for linking customer relational benefits and customer citizenship behavior. Business managers are under constant

pressure to develop more effective relational benefit programs to maximize customer citizenship behavior, but lack guidelines for doing so. This research aims to develop and test a theoretical model in which customer satisfaction mediates the relationship between a firm's relational benefits efforts and customer citizenship behaviors.

## Literature Review and Development Of Hypotheses

### *Relational benefits*

In the marketplace, customers not only purchase products but also receive and expect to receive relational benefits from a service provider (Chen et al., 2010; Chen & Hu, 2010). The existing literature operationalizes three types of relational benefits: psychological, social, and special treatment benefits (Hennig-Thurau et al., 2002). Psychological benefits include feelings of comfort, security, and reduced anxiety as a result of the relational experience (Grieve & Watkinson, 2016). Social benefits generally describe feelings related to the fraternization and friendships facilitated by the relational experience (Li & Lin, 2016). Special treatment benefits are broadly concerned with the implementation of additional services and considerations for 'preferred' customers (Schumann et al., 2014). It has been strongly believed that positive experiences in these key relational benefit dimensions are associated with increased customer satisfaction (Fornell et al., 2016; Hennig-Thurau et al., 2002).

### *Customer Satisfaction*

Customer satisfaction is the key mediator considered in relationship marketing and service quality theory (Fornell et al., 2016; Hennig-Thurau et al., 2002). In the history of marketing, many definitions of customer satisfaction have been postulated. Previous research suggests that relational benefits can influence consumer satisfaction (Ruiz-Molina et al., 2015; Chen et al., 2010). Psychological benefits indicate feelings of comfort, security, and reduced anxiety as a result of the relational experience (Grieve & Watkinson, 2016; Hennig-Thurau et al., 2002), which lead to perceptions of trustworthiness of the service provider (Agrusa et al., 2012; Morgan & Hunt, 1994). On a more practical level, psychological benefits indicate customers' confidence in what they will derive from the relationship with a service provider. These positive emotions cause customers to perceive fewer risks in relationships with a service provider, thus enhancing customer satisfaction (Rahimi & Kozak, 2017). Hennig-Thurau et al. (2002) postulated that psychological benefits affect a customer's level of satisfaction with a service firm's employees and with the firm itself by lowering anxiety concerning transactions with the firm.

In a service setting such as a chain store restaurant in particular, the customer's confidence regarding both the service employees and the service firm is critical in the satisfaction judgment, since customers prefer to visit a chain store restaurant with a positive brand image as well as one that offers

close interactions with service employees (Hyun, 2009). On this basis it is hypothesized that:

**H1:** Consumer perceptions of psychological benefits are positively related to customer satisfaction with service employees.

**H2:** Consumer perceptions of psychological benefits are positively related to consumer satisfaction with the service firm.

Another important dimension of relational benefits is social benefits. Social benefits are feelings related to the fraternization and friendships that are facilitated by the relational experience (Candi & Kahn, 2016; Reynolds & Beatty, 1999). Social benefits focus on the relationships themselves rather than on outcomes, and can be expected to be positively related to customer satisfaction. In addition, social benefit is a concept of mutual friendship, which helps to form a personal interaction, thus positively influencing customer satisfaction (Hennig-Thurau et al., 2002). Reynolds and Beatty (1999) confirmed this assertion by showing that social benefits have a positive impact on customer satisfaction with service employees. Based on the theoretical and empirical backgrounds, the following hypothesis is derived:

**H3:** Consumer perceptions of social benefits are positively related to customer satisfaction with service employees.

In addition to the relationship between social benefits and customer satisfaction with service employees, social benefits can also be expected to be related to customer satisfaction with a service firm. Social benefits indicate feelings related to the favorable interactions, such as fraternization and friendships, facilitated by the relational experience (Candi & Kahn, 2016; Gwinner et al., 1998). Su et al. (2009) have stated that social benefits reflect customers' overall satisfaction with a firm, which is obtained from favorable interactions between service providers and customers. Patrons communicate with restaurant employees and experience an emotional response to these exchanges (Jang & Namkung, 2009). In other words, social benefits engender customer satisfaction with a service firm. Based on the above arguments, the following hypothesis is therefore proposed:

**H4:** Consumer perceptions of social benefits are positively related to consumer satisfaction with the service firm.

The other important dimension of relational benefits, special treatment benefits, is broadly concerned with additional services and considerations for 'preferred' customers, and a positive relationship between special treatment benefits and customer satisfaction has been reported in related studies (Chen et al., 2010; Yen & Gwinner, 2003). Service firms offer special treatment benefits to increase customers' perceived switching costs (Hennig-Thurau et al., 2002). Providing complimentary meals or drinks and assigning desirable seating

to preferred customers are examples of special treatment benefits perceived by customers in chain store restaurants. It is the service employees who fulfill an organization's promises and deliver the perceived benefits to the customers.

Thus, it is expected that consumer perceptions of special treatment benefits are positively related to customer satisfaction with service employees and with the service firm. Based on the above discussion, we propose the following hypotheses:

**H5:** Consumer perceptions of special treatment benefits are positively related to customer satisfaction with service employees.

**H6:** Consumer perceptions of special treatment benefits are positively related to consumer satisfaction with the service firm.

Employees play a key role in creating an emotional connection with customers, and are charged with recognizing customers' desires for special treatment and fulfilling their customers' preferences. For this reason, service employees are critical in providing psychological, social, and special treatment benefits. Correspondingly, Bitner (1995) stated that satisfaction with service employees can result in overall satisfaction with a service firm. Service employees can engender feelings of trust and create the foundation for a consumer-firm relationship, thus aiding in creating satisfaction with the service firm (Hyun, 2010). Empirical studies further support this theoretical argument (Reynolds & Ar-

nold, 2000) and provide empirical evidence suggesting that interpersonal perceptions of service can influence firm-level outcomes and satisfaction. Therefore, we propose the following hypothesis:

**H7:** Satisfaction with service employees is positively related to consumer satisfaction with the service firm.

#### *Customer citizenship behavior*

Customer citizenship behaviour (CCB) is exhibited through voluntary and discretionary actions by individual consumers, which are directly expected but may aggregate into higher service quality and promote the effective functioning of service firms (Fowler, 2013). CCB refers to helpful, constructive gestures exhibited by customers that are valued or appreciated by the firm but are not related directly to enforceable or explicit requirements of the customer's role. CCB is expected to be more strongly predicted by customer satisfaction and socialization (Di et al., 2010; Groth, 2005), which can create a competitive advantage (Yi et al., 2013).

When a customer has an impact on a service delivery outcome, he or she feels an emotional involvement, thus increasing his or her satisfaction (Bitner et al., 1997). For these reasons, customers are considered 'partial employees' in the service industry. Comparing with employees' logical thinking, most customers are not only concerned with the economic exchange but also have strong needs of social identity. Satisfaction may be the main effective variable for the

public citizenship behavior, and this is also proved by past empirical research (Donavan et al., 2004). Because CCB does not basically focus on the immediate rewards or punishment but only on satisfaction, customers believe that organizations should have a comparative return in order to raise the willingness of CCB after their payment. Therefore, we propose the following hypotheses:

**H8:** Satisfaction with employees is related positively to CCB.

**H9:** Satisfaction with the service firm is related positively to CCB.

#### *The mediating effect of satisfaction*

One of the purposes of this research is to develop a practical model that demonstrates the links between customer relational benefits and CCB. Based on the existing theoretical and empirical backgrounds in these areas, a series of hypotheses was proposed. After integrating the hypotheses, a model was developed that describes the full mediating role of satisfaction. During the model development process, it was suspected that customer relational benefits could bear a direct impact on CCB. CCB occurs when customers believe that their expectations for relational benefits have been satisfied in the service delivery process (Rosenbaum & Massiah, 2007). However, in the chain store restaurant context, patrons show customer citizenship behavior not only when they feel satisfied with relational benefits, but also when they are dissatisfied with specific service interactions and point out problems to employees. For this reason, theo-

retically, customer satisfaction should exist between customer relational benefits and CCB.

There are several empirical studies from the theoretical and empirical backgrounds that have examined the direct relationships between customer relational benefits and CCB, the majority of which support the full mediating role of satisfaction in the relationship between two conceptual constructs (Reynolds & Betatty, 1999). In accordance with the existing theoretical and empirical backgrounds, this study posits that relational benefits influence CCB, but that their impact is fully mediated by customer satisfaction. On this basis it is hypothesized that:

**H10:** Psychological benefits has a positive impact on CCB through the mediating effect of satisfaction with employees.

**H11:** Social benefits has a positive impact on CCB through the mediating effect of satisfaction with employees.

**H12:** Special treatment benefits has a positive impact on CCB through the mediating effect of satisfaction with employees.

**H13:** Psychological benefits has a positive impact on CCB through the mediating effect of satisfaction with the service firm.

**H14:** Social benefits has a positive impact on CCB through the mediat-



ing effect of satisfaction with the service firm.

**H15:** Special treatment benefits has a positive impact on CCB through the mediating effect of satisfaction with the service firm.

## Methodology

### *Sample*

The sample of this study focuses on the customers of chain store restaurants. Questionnaires were used to collect the data for this study. A questionnaire submitted as a pre-test to determine possible shortcomings in comprehension and to confirm its suitability. A pilot test of the survey was conducted with 40 customers within one of the largest fast-food chain restaurants in the Taipei area, and they were asked to evaluate their perceptions.

Based on the results of the pre-test, some revisions of items on the questionnaire were made. Questionnaires were administered with the sample being randomly selected from the main chain store restaurants. Main city areas (including north, central, south, and east) were sampled. Each chain store restaurant has collected 400 samples (each area has 100 samples to avoid external validity for only one single area). Questionnaires were conducted by self-administered survey—self report by respondents. 1,600 questionnaires were sent and valid questionnaires numbered 634, after excluding invalid ones. Following are variable measurements and operational definitions. Participants are

asked to respond on a 5-point Likert-type scale ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (5).

### *Operational definition and variable measurement*

#### *Psychological benefits.*

Psychological benefits in this study include feelings of comfort, security, and reduced anxiety as a result of the relational experience. We use and adjust the measuring scales developed by Gwinner et al. (1998), Garbarino and Johnson (1999), and Hennig-Thurau et al. (2002). The measurement of psychological benefits comprises the following five items. Cronbach’s  $\alpha$  is 0.87

#### *Social benefits.*

Social benefits in this study generally describe feelings related to the fraternization and friendships facilitated by the relational experience. We use and adjust the measuring scales developed by Gwinner et al. (1998), and Hennig-Thurau et al. (2002). The measurement of social benefits comprises the following five items. Cronbach’s  $\alpha$  is 0.86.

#### *Special treatment benefits.*

Special treatment benefits in this study are broadly concerned with the implementation of additional services and considerations for ‘preferred’ customers. We use and adjust the measuring scales developed by Gwinner et al. (1998), and Hennig-Thurau et al. (2002). The measurement of special treatment benefits comprises the following four items. Cronbach’s  $\alpha$  is 0.84.

#### *Customer satisfaction.*

Customer satisfaction in this study can be defined generally as a positive affective reaction to the favorable appraisal of a consumption experience. We use and adjust the measuring scales developed by Reynolds and Beatty (1999). The measurement of satisfaction with employees and satisfaction with the restaurant were measured with three items each as following. Cronbach's  $\alpha$  is 0.88 and 0.85 respectively.

#### *Customer citizenship behavior.*

According to Organ's (1988) definition of OCB, we define CCB in this study as follows: (1) Altruism: customers actively assist certain companies or customers in the organizational-related tasks or questions and it is an unconditional customer behavior. (2) Conscientiousness: customers overtake the basic purchasing requirement of transaction procedures in certain roles. (3) Courtesy: customers will actively give advance notice to avoid mistakes happening in transaction or affecting other customers with the same problems. (4) Civic virtue: customers participate in and concern themselves with the existing questions of the organization. Because no reliable measure is found in the literature, the present authors use and adjust the measuring scales developed by Organ (1988). Each scale consists of five items. Cronbach's  $\alpha$  is 0.86, 0.82, 0.80 and 0.77 respectively.

#### *Common method variance*

In empirical research, CMV has been found to cause inflation or deflation in the intensity of variables' correlation (Peng et al., 2006). It includes advance

protection and post hoc testing to control CMV. Therefore, we use severity procedure to construct measurement tools of variables in questionnaire contents and considered carefully the wording in order to lower CMV to avoid interrupting respondents. In addition, we will also adopt the suggestion of Anderson and Bateman's (1997) in using Harman's single-factor post hoc analysis (Podsakoff & Organ, 1986) to test the CMV problem. After exploratory factor analysis, we found a single factor only explained a limited variance from non-rotation factor loading and the explanation percentage of a factor does not show a gathering appearance. It determines the result was not distorted from the same data sources. According to this logic and result, a single factor has only 9.37 per cent of varimax, showing that CMV is not significant in this study.

#### *Measurement model evaluation*

We assess the quality and adequacy of our measurement models by investigating reliability, and performing a confirmatory factor analysis (CFA) to evaluate construct validity regarding convergent and discriminate validity. First, reliability is supported by the fact that all Cronbach alpha values exceed 0.70, indicating acceptable reliability levels (Nunnally, 1978). Moreover, all of the composite reliability measures are above 0.60, corresponding to Bagozzi and Yi's (1988) minimum values of 0.60. As a result, we can conclude that all constructs yield satisfactory reliabilities. Second, convergent validity is supported by the fact that the overall fit of the models is good, that all loadings are

highly statistically significant ( $p < 0.01$ , all  $t$ -values  $> 2$ ) (Anderson and Gerbing, 1988; Hair et al., 2006). In light of the large sample size and the large number of variables, all statistics supported the overall measurement quality (Anderson & Gerbing, 1992). Third, discriminant validity is supported by the fact that the square roots of average variance extracted (AVE) are higher than the correlation coefficients of constructs (Fornell and Larcker, 1981). As the variance extracted in each measure meets this criterion, suggesting adequate discriminant validity. Therefore, the measures were deemed adequate for testing the hypothesized model.

## Results

### *Sample characteristics*

Returned valid questionnaires are female (54.2%) and male (45.8%), mostly range from 21 to 30 years old (34.1%), next are 31 to 40 years old (28.6%). Second, in the average monthly income, the highest percentage is NTD 40,000 to 50,000 (36.5%), followed by NTD 30,000 to 40,000 (30.7%). As for the occupation, the top one is Armed services, civil servant and educator (30.1%), followed by the business (24.7%), student for 18.7%, and manufacturing for 11.2%. To the education degree, university is most (53.6%), followed by college (26.3%), the high school is accounted for 15.9%.

### *Relational benefits and satisfaction with employees and with the service firm*

Hypotheses H1 – H6 propose that relational benefits influence consumer satisfaction with employees and the service firm. In particular, psychological benefits bear a positive effect on satisfaction with employees ( $\gamma_{11} = .381$ ,  $t$ -value = 7.310,  $p < .01$ ) and on satisfaction with the service firm ( $\gamma_{21} = .286$ ,  $t$ -value = 3.738,  $p < .01$ ), thus supporting H1 and H2. Meanwhile, social benefits bear a significant effect on satisfaction with employees ( $\gamma_{12} = .315$ ,  $t$ -value = 2.865,  $p < 0.01$ ), and on satisfaction with the service firm ( $\gamma_{22} = .249$ ,  $t$ -value = 2.417,  $p < 0.01$ ). These results support H3 and H4. Furthermore, we hypothesize that special treatment benefits are associated with both satisfaction with employees (H5) and with the service firm (H6). With regard to satisfaction with employees, this prediction suggests a stronger positive coefficient ( $\gamma_{13} = .320$ ,  $t$ -value = 4.556,  $p < .01$ ), and the path coefficient for satisfaction with the service firm is also significantly positive ( $\gamma_{23} = .427$ ,  $t$ -value = 6.556,  $p < .01$ ), thus supporting H5 and H6.

### *Satisfaction with employees and with the service firm, and CCB*

Hypotheses H7 – H9 address the relationship between satisfaction with employees and satisfaction with the service firm, and CCB. H7, which predicted that satisfaction with employees is positively associated with satisfaction with the service firm, was supported with a positive standardized coefficient of .407 ( $t = 10.202$ ,  $p < .01$ ). Satisfaction with employees ( $\beta_{31} = .418$ ,  $t$ -value = 12.261,  $p < .01$ ) and satisfaction with the service firm ( $\beta_{32} = .540$ ,  $t$ -value = 16.217,  $p$

< .01) have a significant positive effect on CCB, thus supporting H8 and H9.

*The mediation effects*

Tables 1. & 2. report the total, direct and indirect effects of each variable on dependent variables (DVs). Results revealed that all variables had direct effects on CCB. The total effects of relational benefits on CCB were the sum of direct and indirect effects through sat-

isfaction with employees and satisfaction with stores. In order to verify the mediate effect of satisfaction with employees and satisfaction with the service firm (H10-15), we also adopted the idea of Morgan and Hunt (1994) to propose competitive model verifying the mediate effect. The way of verifying refers to Baron and Kenny (1986) and it also adopts from William et al. (2003) by using SEM.

Table 1. Variables' direct, indirect, and total effects (Satisfaction with employees)

Latent Variables	Latent DVs	Direct effects	Indirect effects	Total effects
Satisfaction with employees	CCB	0.418**	N/A	0.418**
Psychological benefits	Satisfaction with employees	0.381**	N/A	0.381**
	CCB	0.515**	0.159*	0.674**
Social benefits	Satisfaction with employees	0.315**	N/A	0.315**
	CCB	0.478**	0.132*	0.610**
Special treatment benefits	Satisfaction with employees	0.320**	N/A	0.320**
	CCB	0.573**	0.134*	0.707**

# \*p < 0.05, \*\*p < 0.01; # N/A: Not Available

Table 2. Variables' direct, indirect, and total effects (Satisfaction with stores)

Latent Variables	Latent DVs	Direct effects	Indirect effects	Total effects
Satisfaction with stores	CCB	0.540**	N/A	0.540**
Psychological benefits	Satisfaction with stores	0.286**	N/A	0.286**
	CCB	0.515**	0.154*	0.669**
Social benefits	Satisfaction with stores	0.249**	N/A	0.249**
	CCB	0.478**	0.134*	0.612**
Special treatment benefits	Satisfaction with stores	0.427**	N/A	0.427**
	CCB	0.573**	0.231*	0.804**

# \*p < 0.05, \*\*p < 0.01; # N/A: Not Available

Table 3. The mediation effects

	Model 1	Model 2	Model 3	Model 4
Psychological benefits	0.475**		0.152*	0.151*
Social benefits	0.451**		0.137*	0.139*
Special treatment benefits	0.512**		0.186*	0.192*
Satisfaction with employees		0.412**	0.322**	
Satisfaction with stores		0.521**		0.383**
R <sup>2</sup>	0.45	0.48	0.43	0.44
Adjusted R <sup>2</sup>	0.39	0.41	0.36	0.37
F Value	57.34***	69.53***	56.18***	59.23***

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

From Table 3, we know the first three conditions models all attain the requirement. In 4<sup>th</sup> condition, there are significant positive effects of satisfaction with employees and satisfaction with store on CCB, which proves, satisfaction with employees and satisfaction with stores are important mediator. Since psychological benefits, social benefits, and special treatment benefits has significant effect on CCB, but the effect dropped from 0.475 to 0.152, 0.151, from 0.451 to 0.137, 0.139, and from 0.512 to 0.186, 192, respectively, showing satisfaction with employees and satisfaction with stores has the partial mediation. H10~15 are thus partially supported.

#### Conclusion And Future Research

According to our research purpose and research hypotheses, we conclude with the empirical analysis result as follows.

First, according to the verified result of H1~6, we know all sub-dimensions of relational benefits bear

strong positive impacts on customer satisfaction with employees. In particular, it was revealed that psychological benefits bear a stronger impact on satisfaction with employees than any other dimensions (.381,  $p < .05$ ). For many years, the importance of psychological benefits has been emphasized in relationship marketing (Gwinner et al., 1998; Hennig-Thurau et al., 2002). Psychological benefits build customers' trust in a service provider and induce comfortable feelings in customers (Hur, Park, & Kim, 2010), thus reducing the perceived risks in the customer-company relationship. With regard to the relationship between relational benefits and satisfaction with a company, it was revealed that a positive relationship exists between special treatment benefits and satisfaction with the service firm (.427,  $p < .05$ ). It was confirmed that providing special service to each patron significantly helps to enhance a service firm's image, thus increasing satisfaction with the company (Hyun, 2009).

Second, according to the results of H7, the finding that satisfaction with

employees influences satisfaction with the service firm (.407,  $p < .05$ ) supports the belief that service encounters play an important role in building overall customer satisfaction in the service context.

Third, according to the results of H8~9, the results of data analysis also indicate that customer satisfaction bears a significant impact on CCB. This means that, when customers are satisfied with employees and with the service firm through service exchanges, they become favorable supporters of the service providers and of the service firm. Therefore, patrons' satisfaction is a critical factor for service firms in stimulating voluntary customer performance. Finally, we know from mediation effective analysis, because relational benefits bear an effect on CCB through the mediating roles of satisfaction with employees and with the service firm.

In summary, in accordance with the existing theoretical backgrounds (Kim, Ok, & Gwinner, 2010), relational benefits bear a positive effect on creating CCB; however, the effectiveness of these benefits is mediated by satisfaction with employees and with the service firm.

#### *Contributions and implications*

Beyond the theoretical implications, the findings of this study possess critical practical implications for restaurant marketers and managers. As data analysis revealed, when patrons felt psychological benefits from service providers, they showed a high level of satisfaction. Therefore, in order to provide greater

psychological benefits to patrons, restaurant managers should conduct appropriate employee training and efficient marketing strategies that maximize these benefits. It is also critical to reduce psychological conflicts with patrons, which are a negative indicator in a relationship and thus bear a negative impact on patron's relational benefits (Hyun, 2009).

It was also revealed that providing social benefits is critical in inducing patron satisfaction. Therefore, employees should attempt to remember revisiting patrons' names and titles so that they can respond to them in the most appropriate and friendly manner possible. Furthermore, employees should strive to remember their patrons' interests in order to be able to discuss topics of interest to their customers. Through these methods, patrons can experience greater social benefits, thus forming a more cohesive relationship between the patron and the service provider. In addition, it is advantageous to provide special treatment benefits to patrons.

Restaurants should provide complimentary meals and/or drinks and assign preferred seating to valued customers in order to create feelings in patrons that "I am specially treated by service providers". Such positive feelings lead to a high level of satisfaction, thus inducing positive behavioral intentions. As data analysis indicates, satisfaction with employees and with a service firm induce positive voluntary customer participation. In other words, from the perspective of social exchange theory, customers that are satisfied with employees and with a service firm contribute to improving ser-



vice quality by providing useful suggestions, comments, and other forms of feedback. Hence, service firms should consider providing monetary and/or non-monetary rewards to customers that offer constructive feedback. Such favorable feedback can result in positive future customer behaviors, thus enhancing the restaurant's revenue.

#### *Limitations and Future Research*

Despite its theoretical and practical implications, two limitations of this study should be addressed. First, the proposed model in this study was tested with data collected from chain store restaurant patrons in Taiwan. For this reason, the ability to cross-culturally generalize the results is therefore limited to some extent. Future research may attempt to further verify or extend the proposed model with different study popu-

lations. Second, in the data analysis, the root mean square residual (RMSR) did not meet the acceptable cutoff point (.125). Typically, an RMSR value of less than .08 is considered a good fit; however, this value is sensitive to sample size and to the number of parameters in the model (Byrne, 2001; Boyd, 1994). In contrast, the goodness-of-fit index (GFI) offers a measure of fit which is independent of sample size, and robust against non-normality. In this study, even though the RMSR did not meet the acceptable cutoff point, all other parameters (including GFI) showed good model fit. It was therefore suspected that the possible reason was the sample size or the number of parameters involved in the model. Future research may attempt to test the proposed model with a smaller or larger sample size, or with a more parsimonious or complicated model.

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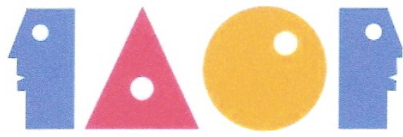


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## SHOCK ABSORPTION IN EAST ASIA COUNTRIES

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### Abstract

The main purpose of this paper is to analyze the interregional risk sharing and consumption smoothing channels, international fiscal transfer systems, capital markets and credit markets. Based on Asdrubali et al. (1996), we use a panel VAR model to decompose the cross-sectional variance in GNP based on the National Accounting Identity among 10 East Asian countries. We found that 15% of shocks to GNP are smoothed by capital markets, 14% of them are smoothed by the international fiscal transfer system, and 3% of them are smoothed by credit markets. The most important is that about 74% of shocks are not smoothed within the region of East Asia countries. Compared to Kim and Wang (2006), those East Asia countries, the channel of capital markets play the major role in smooth the GDP shocks, but different with Kim et al, their major channel is credit markets. One possible explanation is due to the getting closer capital trade relation between Taiwan and East Asian countries.

Keyword: Shock Absorption; East Asia Countries

### Introduction

Many countries, including developed and developing countries, are considering participating some kinds of monetary or economic unions, such as U.S., European Monetary Union

(EU), Association of Southeast Asian Nations (ASEAN) and any other monetary union. Since the monetary or economic unification has taken mechanisms of stabilization that is able to insure against the risk of idiosyn-

cratic output shocks in the region of a currency area.

Countries can share country-specific income shocks through various market or non-market mechanisms, which are known as “consumption risk sharing”. Therefore, the higher the degree of the consumption risk sharing, the more output shocks they can absorb. Hence, the fluctuation of a business cycle within a monetary union will be less. Several mechanisms discussed in literatures can smooth the idiosyncratic output shocks of a monetary union. We discuss as follows.

Beginning with Sala-i-Martin & Sachs (1992), they thought that the tax/transfer system in the US smooths up to 40% of an output shock to a state, and much less in Europe. Several studies, under different econometric assumptions and techniques employed, estimated the level of risk sharing channel in which a fiscal transfer system smoothed the output shocks (Von Hagen, 1992; Atkeson and Bayoumi, 1993; Goodhart and Smith, 1993; Bayoumi and Masson, 1995; Arreaza, Sorensen and Yosha, 1999). They support the result of Sala-i-Martin & Sachs (1992). We call the channel of international fiscal transfer system smoothing.

Another channel of risk sharing had long been identified by the finance literature, which is the issue of portfolio diversification. Beginning with Arrow and Debreu’s Model on equilibrium contingent claims, it stress that the output accruing from cross-section asset ownership provides an important risk sharing against shocks. Countries within a monetary union may smooth their consumption thorough adjusting their asset portfolio. For example, they can lend and borrow from a credit market within a monetary union. Following the concept of cross-sectional asset portfolio, French and Poterba (1991), Atkeson and Bayoumi (1993) tested it using several industrial countries and US states. In addition, Wincoop (1994) investigated OECD countries under the same sort of concept. We call the channel of credit market smoothing.

Finally, capital markets also play an important role to smooth the output shocks. Countries within a monetary union can share output shocks through a cross-ownership of productive assets, such as cross-regional asset income, cross-regional labor income, capital income...etc. Backus et al. (1992); Obstfeld (1994); Baxter and Crucini (1995); Stockman and Tesar (1995); Lewis (1996) use the concept of portfolio diversification (productive assets),

and applied to some developed countries. We call the channel of capital market smoothing.

Numbers of previous studies discussed the role of these three channels in providing consumption risk sharing across regions or countries. However, most of them focus only on one channel. The influence of these three channels when combining together is seldom pointed. Asdrubali et al. (1996) integrated three consumption risk sharing channels in a single framework, and use a variance decomposition method to estimate the level of consumption risk sharing. Applying to U.S. states, for the period 1963–1990, they found that an output change is smoothed on average for 39% by capital market, 13% by international fiscal transfer system, and 23% by credit markets. However, 25% of the shocks remain unsmoothed. Their results show that the market channels, capital and credit market, seems be preponderant. With the same integrated framework, Sørensen and Yosha (1998) use countries in EC (European Community) and OECD for the period from 1966 to 1990 and compare to the U.S. states. They found that all international smoothing, about 30% of a shock to a country's output are absorbed through domestic credit markets. However, the most important is that a large propo-

sition of output shock, about 60%-70%, remains unsmoothed.

Beside Sørensen and Yosha, subsequent studies have refined the methodology used by Asdrubali et al.' (1996). For example, Alberola and Asdrubali (1997) add the risk sharing through migrations, and found that capital and credit markets in Spain smooth 23% of an output shock each. Del Negro (1998) analyzes shocks to permanent rather than current output. They found the levels of consumption risk sharing through capital and credit markets are 63% and 20% for Italy and 48% and 56% for the UK, respectively. Asdrubali (1998) distinguishes the risk sharing from an inter-temporal smoothing. Athanasoulis and van Wincoop (2001) separate out the unpredictable output shocks; Melitz and Zumer (1999) add additional variables in their regression. Beside, the other paper, such as Dedola et al. (1999), applies the setup to different countries. Asdrubali and Kim (2003) use a panel VAR model to improve upon the existing methodologies for analyzing the interregional risk sharing and consumption smoothing channels. In the application to the US and OECD countries, Asdrubali and Kim (2003) conclude that for the U.S. and OECD countries, an output shocks is smoothed on average for 35.8%, -0.5%



through capital market respectively, 15%, -0.5% through an international fiscal transfer system respectively, 13.5%, 22.3% through credit markets respectively. However, 35.8% and 78.7% of shocks for the US and OECD countries remain un-smoothed.

All literature regarding inter-regional consumption risk-sharing just focus on western countries. This paper tries to estimate the smoothing level of East Asia countries. The main purpose of this paper is to analyze the inter-regional risk sharing and consumption smoothing channels among East Asia countries. In addition, we compare our results of the level of three smoothing channels with the level of OECD and US that are estimated in previous literature. Based on Asdrubali et al. (1996), we use a panel VAR model to decompose the cross-sectional variance in GNP based on the National Accounting Identity.

The rest of this paper is organized as follows. Section 2 describes the empirical methodology used. Section 3 presents our empirical results for East Asia countries, Section 4 concludes our findings.

### Methodology

Before Asdrubali et al. (1996), all the channels of risk sharing are rela-

tively un-connected. So before we following the Asdrubali' concept, that integrated all the channels in a whole framework, we discussing all the risk sharing channels separately in the original thought, they are: first, Sala-i-Martin & Sachs (1992) they thought that tax and transfer system can smoothes output shock; second, Arrow and Debreu's model on equilibrium contingent claims with international portfolio diversification allocation, and final, capital markets also play an important role to smooth the output shocks. We show as following.

### *Decomposing cross-sectional variance of income*

A number of previous studies have focus on the separated role of these channels in providing consumption risk sharing. Asdrubali et al. (1996) integrated all the risk sharing channels in a single framework. So, following the variance decomposition method developed by Asdrubali et al. (1996), we analyze the channels of consumption risk sharing among East Asian countries. Asdrubali et al. (1996) use a single empirical framework and integrates all the smoothing channels discussed in the previous empirical literature. Taking advantage of their simple and single framework, we decomposes the inter-regional income shocks into

various channels of risk sharing, including the role of fiscal stabilization (international transfer), capital markets

and credit markets, and un-smoothed part.

(Editor's Note: some of the following sections are formatted to single column to facilitate easier reading of the complex formulas.)

Asdrubali et al. (1996) developed a framework for quantifying the amount of interregional risk sharing achieved at each of these levels of smoothing within a region. The main idea is to decompose the cross-sectional variance for a given idiosyncratic output shock into several channels. Let denote  $\beta_K$ ,  $\beta_F$ ,  $\beta_C$  are the fractions of shocks to GDP smoothed through capital markets, the government fiscal system, and the credit markets separately, and  $\beta_U$  is the fraction that un-smoothed. The above method yields a relation of the following type,

$$1 = \beta_K + \beta_F + \beta_C + \beta_U .$$

Let's consider the following equation that is held for any given period t,

$$GDP^i = \frac{GDP^i}{GNP^i} \frac{GNP^i}{DPI^i} \frac{DPI^i}{C^i} C^i ,$$

where GDP, GNP, DPI, C denote per capita gross domestic product, gross national product, gross disposable income, and the sum of private and government consumption separately.

In addition,  $i$  denotes  $i$ th country. Our variables are defined as follow:

- GDP
- GNP = GDP + net factor income form abroad
- DPI = GNP + net transfers from abroad
- C = DPI – gross national saving

GNP includes dividend, interest, and rental income payment across countries (net factor income form abroad); DPI includes international transfers. (Net transfers from abroad). In order to obtain the level of all smoothing channels from the identity in (1), we first take logarithm and its difference form on both side of Eq. (1). After that, we

multiply both sides by  $\Delta \log \text{GDP}_i$  and then calculate their expectations. With these processes, we can then obtain the following decomposition of the cross-section variance in GDP.

$$\begin{aligned} \text{Var}(\Delta \log \text{GDP}) &= \text{cov}(\Delta \log \text{GDP}, \Delta \log \text{GDP} - \Delta \log \text{GNP}) \\ &+ \text{cov}(\Delta \log \text{GDP}, \Delta \log \text{GNP} - \Delta \log \text{DPI}) \\ &+ \text{cov}(\Delta \log \text{GDP}, \Delta \log \text{DPI} - \Delta \log \text{C}) \\ &+ \text{cov}(\Delta \log \text{GDP}, \Delta \log \text{C}) \dots \dots \dots (14) \end{aligned}$$

Divide the both sides by the variance of  $\Delta \log \text{GDP}$   $\{\text{Var}(\Delta \log \text{GDP})\}$ , we obtain the following.

$$1 = \beta_K + \beta_F + \beta_C + \beta_U \dots \dots \dots (15)$$

Where  $\beta_K$  is the coefficient in the regression of  $\Delta \log \text{GDP} - \Delta \log \text{GNP}$  on  $\Delta \log \text{GDP}$ . This coefficient explains the percentage of smoothing an output shock through capital markets.  $\beta_F$  is the slope of  $\Delta \log \text{GNP} - \Delta \log \text{DPI}$  with respect to  $\Delta \log \text{GDP}$ , which explains the percentage of smoothing a output shocks through international transfers.  $\beta_C$  is the coefficient of  $\Delta \log \text{DPI} - \Delta \log \text{C}$  on  $\Delta \log \text{GDP}$ , which explains the percentage of smoothing a output shocks through credit markets.  $\beta_U$  is the slope of  $\Delta \log \text{C}$  with respect to  $\Delta \log \text{GDP}$ , which explains the percentage of smoothing output shocks that remains un-smoothed.

At the practice level, panel seemingly unrelated regression (SUR) can be estimated:

$$\begin{aligned} \Delta \log \text{GDP}_t^i - \Delta \log \text{GNP}_t^i &= v_{K,t} + \beta_K \Delta \log \text{GDP}_t^i + u_{K,t}^i \\ \Delta \log \text{GNP}_t^i - \Delta \log \text{DPI}_t^i &= v_{F,t} + \beta_F \Delta \log \text{GDP}_t^i + u_{F,t}^i \\ \Delta \log \text{DPI}_t^i - \Delta \log \text{C}_t^i &= v_{C,t} + \beta_C \Delta \log \text{GDP}_t^i + u_{C,t}^i \\ \Delta \log \text{C}_t^i &= v_{U,t} + \beta_U \Delta \log \text{GDP}_t^i + u_{U,t}^i \dots \dots \dots (16) \end{aligned}$$

where  $v_{K,t}$ ,  $v_{F,t}$ ,  $v_{C,t}$ ,  $v_{U,t}$  are time fixed effects in panel data model, the  $\beta$ s coefficients will then be weighted average of a year-by-year cross-sectional regression. Those time fixed effects are capturing the year-specific impacts on the growth rate, especially the aggregate output, i.e. GDP.

Application to 10 East Asia countries

- C (total consumption) = GDI - gross national saving.

### Data

Our variables are defined using in National Accounts as follow:

- GDP (gross domestic product)
- GNP (gross national product) = GDP + net factor income from abroad,
- DPI (gross disposable income) = GNP + net transfers from abroad,

Eleven variables are in terms of per capita, and use National Account Data in Penn World Table, for annual data. As for estimate period, we estimate the empirical model for whole sample period, 1970-2010, and four sub-period of 1970-1979, 1980-1989, 1990-1999 and 2000-2010. The results are shown in Table 1.

Table 1. Consumption smoothing and risk sharing (%): East Asia countries

	$\beta_K$	$\beta_F$	$\beta_C$	$\beta_U$
1970-1979	-6%	22%	40%	44%
1980-1989	32%	-1%	-7%	76%
1990-1999	11%	-8%	45%	62%
2000-2010	16%	8%	-6%	82%
1970-2010	15%	14%	-3%	74%

### Empirical Countries

In our estimate system, the empirical countries are including 10 East Asian countries, including: Indonesia, Malaysia, Philippines, Singapore, Thailand, Hong Kong, China, South Korea, Japan, and Taiwan.

### Empirical Results

The empirical results are showed in Table 1. First, for the whole sample

period, 1970-2010, we find that 15% of shocks to GNP are smoothed by capital markets, 14% are smoothed by the international fiscal transfer system, and -3% are smoothed by credit markets. The most important result is that the unsmoothed part is around 74%, so only 26% is smoothed. Interregional capital markets play a more important smoothing role than credit market and fiscal transfer system smoothing, but only 15% is smoothed by capital markets. International transfer system also plays a positive role in East Asia.

Second, we separately estimate the level of three smoothing channels of 10 East Asian countries for periods from year 1970-1979, 1980-1989, 1990-1999 and 2000-2010. We found that for the earlier period (1970-1979), -6%, 22% and 40% of GNP shocks were smoothed by capital markets, credit markets and international fiscal transfer systems respectively, while the remaining 44% of shocks were not smoothed. On the other hand, for the second estimation period (1980-1989), capital market smoothed 32% of GNP shocks. -1% and -7% of GNP shocks were smoothed by credit market and international fiscal transfer system respectively. And the ratio of GNP shocks that are smoothed is 76%. For the third estimation period (1990-1999), capital market smoothed 11% of GNP shocks. -8% and 45% of GNP shocks were smoothed by credit market and international fiscal transfer system respectively. And the ratio of GNP shocks that are smoothed is 62%. For the fourth estimation period (2000-2010), capital market smoothed 16% of GNP shocks. 8% and -6% of GNP shocks were smoothed by credit market and international fiscal transfer system respectively. And the ratio of GNP shocks that are smoothed is 82%. These results show both capital and international fiscal transfer system play a more important role on smoothing

GNP shocks among 10 East Asian countries. The financial liberation among East Asian countries does not play much more role in smoothing cross-sectional variance of GDP. Furthermore, the role of Capital markets is limited by the huge percentage of non-smoothed ratio of GNP shocks.

Compared to Kim, Kim and Wang (2006), those East Asia countries, the channel of capital markets play the major role in smooth the GDP shocks, but different with Kim et al, their major channel is credit markets. We found that compared to our previous results, capital market (15%) plays an important role relative to credit market (-3%), while GNP shock ratio that are smoothed by the international fiscal systems and the non-smoothed ratio are remain the same (79%). One possible explanation is due to the getting closer capital trade relation between Taiwan and Southeastern countries.

#### Concluding Remarks

We analyze interregional risk sharing and consumption smoothing channels, international fiscal transfer system, capital markets and credit markets, among 10 East Asia countries. In methodologies, we use a panel VAR model that Asdrubali et al. (1996) de-

veloped to estimate the degree of three consumption smoothing channels and construct data that allow us to decompose the cross-sectional variance in GNP based on the National Accounting Identity. We found that 15% of shocks to GNP are smoothed by capital markets, 14% of them are smoothed by the international fiscal transfer system, and -3% of them are smoothed by credit markets. The most important is that about 74% of shocks are not

smoothed within the region of East Asia countries. Compared to Kim, Kim and Wang (2006), we found that capital market plays an important role relative to credit market (-3%), while GNP shock ratio that are smoothed by the international fiscal systems and the non-smoothed ratio are remain the same (79%). One possible explanation is due to the getting closer capital trade relation between Taiwan and East Asian countries.

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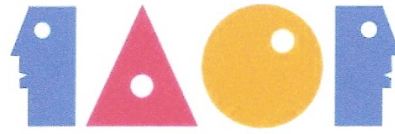
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## DISCUSSION OF THE CONCEPT FORMATION OF THE INDIVIDUAL IN CHINESE AND WESTERN VISUAL CULTURE

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### Abstract

We think that the portrait is a pictorial representation which captures the real exterior characteristics of every single man as individual, and including the transmission of meaning and behavior extent of human beings. Looking at facial images is more than a communicative activity for communicating messages; it includes mentalities related to cultures, aesthetics, religions, ethics and customs. Taking portraits as the object for discussion, this article attempts to analyze the different viewing aesthetic values regarding people's facial images in traditional Chinese and Western visual cultures, as well as their fundamental mentalities regarding "individual" differences.

Keywords: idea of individual, portrait, subject, form, difference between Chinese and Western cultures.

### Preface

Influenced by exchanges with Western cultures, Bochen genre and Western Royal genre occurred in Chinese portraits in the 17th century. Their expression contents and symbol systems, however, did not have big changes, following traditional compo-

sition forms as usual. The difference lies mainly in the aesthetic appreciation modes of Chinese and Western cultures for viewing individuals. Such difference influenced Chinese artists' creative ideas in visual expression, as well as the development direction of Chinese paintings in the 20th century. By analyzing the different Chinese and

Western mentalities in viewing portrait faces, this article attempts to explain the key differences in Chinese and Western cultures and arts.

#### Individuals Generated from “Qi”

Believing that souls last for every, Chinese people stick to animism and worship gods; and they derived the concepts of god and ghost from human soul. Ghosts are the ancestors of human beings, and they play the roles of gods. Paying homage to ancestors is a time-honored folk custom, which includes the ethical concept of family. The heaven is the supreme god in the universe, and the god of heaven grant orders to all, which is called the “Mandate of Heaven”; and the status of human emperor is granted by the “Mandate of Heaven”. That’s why the emperor is called the “Son of Heaven”, which implies the subordinate and ethic relations between the emperor and the heaven. Therefore, the individual images serving the needs of emperors occurred very early in China. But the mentality-related theory regarding these images has attracted little attention all along.

The explorations made by pre-Qin Dynasty thinkers on the natural orders of things in the uni-

verse are collectively called the “Way of Heaven”, from which the spiritual characteristics of Chinese intellectuals in entering and leaving the mundane world derived and established. Improvement in the rational senses of the society changed the primitive customs from burying slaves alive with the dead to using images in this regard. As a result, the painting of the dead started to occur in tombs. And the “Corpse Ritual” for paying homage to ancestors also changed to the practice of using earth-made figures. The image-related mentality and aesthetic appreciation, however, remained unnoticed, because ancient people believed that life was a flowing process of “Qi” instead of the existence of living form.

The idea of “Qi” coming from the heaven and being an intangible and flowing energy does not have significance in religions. Earthquake, a natural phenomenon, was deemed as a result of disaccorded heavenly and earthly “Qi” in the Shang and Zhou Dynasties. Ancient people believed that the stability and fluctuation of “Qi” also had a bearing on the rise and fall of a kingdom. Qi is one of the elements of ontology, and the basic element for nurturing all things. “Vitality (*Qi*) is a thing

that can be regarded as the stuffing of the body.” *“Human life is the coalescence of vital breath (Qi). When it coalesces there is life; when it dissipates there is death.”* “Qi” runs through the process of life changing from intangible to tangible and then back to intangible. Its characteristics of hiding in human body and invisibility are deemed as the origin of ghost and ethics theories.

The ancient Chinese outlook of human body, developed from the theory of “Qi”, first occurred in the Han Dynasty, defining three important ideas for making Chinese portraits.

1. The concept of human body structure: The heaven operates with “Qi”, and human beings live with “Qi” in their bodies. That’s why Chinese people reckon human body structure is compatible with the heaven. *“Hence, the head is round in order to resemble Heaven; the foot is square to resemble Earth. Heaven has the Four Seasons, Five Main Elements, nine sections, as well as three-hundred and sixty-six days. Accordingly, man also has four limbs, five internal organs, nine apertures and three hundred and sixty-six joints. Heaven has wind, rain, hot*

*and cold weather. Similarly, man also has giving, taking, joy and fury. Hence, the gall relates to cloud, the liver relates to wind, the kidney relates to rain, the spleen relates to thunder, thus to reflect and suit Heaven and Earth, while the heart is in control.”* Ancient Chinese people have followed the ideas of understanding and analyzing human body structure with natural concepts. In the *Secrets of Portraying* written in the 19th century, the terms such as Five Sacred Mountains, Heaven, Earth, Sun and Moon are used for analyzing and naming facial elements. (Figure 1).

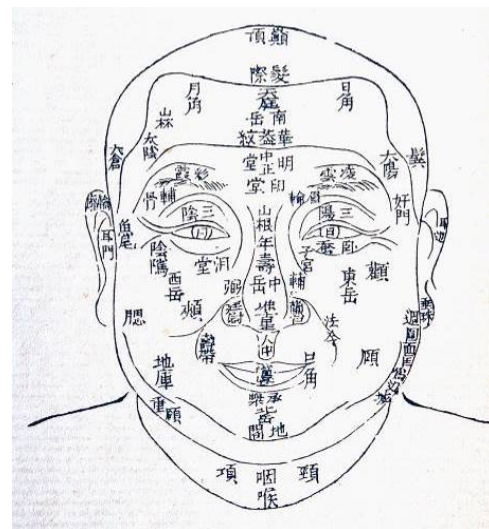


Figure 1. Image of the face on *Secrets of Portraying*

2. Sensory activities in viewing portraits: In the Chinese culture integrating Confucianism and Taoism, “Qi” as the fundamental element of human body has always been granted ethical and moral features. Hence the Chinese sayings: “The heaven consists of “Yin” and “Yang”, while human has both greed and kindness.” and “The vice and virtue of man depends on the ‘Qi’, the quantity of which decides the owner’s wisdom level” Chinese people believe that education can help hiding the bad and making known the good. Therefore, the portraits of emperors and ancestors (Figure 2, 3) also have the functions of “*educating* and moraliz-

ing people.” The classic *On Balance (Luneng)* says: “Though the portrait is not the real form of the mother, yet the son wells up on seeing it. This is because the sentiment of missing the mother is triggered by the “Qi” embodied in the image of the mother.” Mathias Obert *reckons* that the son’s *crying is not generated from observing the vivid “regeneration” of the mother in image; instead, the mother’s portrait includes and conveys the influence of “Qi”, causing the mourner to “echo” the influence and cry in “response”. Such echo of “Qi” and actual response represent the unique mode of traditional Chinese aesthetics in viewing portraits.*



Figure 2. *Portrait of Emperor Tianqi with the official clothing*, anonymous. Ink and color on silk. Palace Museum.



Figure 3. Traditional chinese portrait, anonymous. Ink and color on paper

3. Aesthetic appreciation in personage assessment and the portraits of intellectuals: Cao Pi (Emperor Wen of Cao Wei Dynasty) said: “*The intellectuals value “Qi”*, the quality of which is developed rather than acquired.” This was the first time “Qi” is used as an indicator in literary and art criticism. Ye Lang reckons that the “Qi” of literary works originates from the “Qi” of man. It then generates the Chinese philosophy of integrating human body’s internal and external environments. This means the “Qi” of arts is not only the spiritual accomplishments of the creator, but also includes his physiological activities. In the Wei and Jin

Dynasties, aesthetic posture, appearance, temperament and disposition, as well as the choices of intellectuals to shun politics and seek peace of mind in the mountains were valued in personage assessment, serving as ideal models in Chinese people’s life and aesthetic appreciation and promoting the development of portraits for intellectuals. (Figure 4).

From the “Qi”-based character viewing theories and modes we can generalize three differences between traditional Chinese and Western portraits:





Figure 4. *The Seven Sages of the Bamboo Grove and Rong Qiqi*.  
Mural painting. Nanking.

1. The ancient Chinese concept of human body structure was not influenced by Pitagoras' mathematical logic, as believed by Platon; instead, it was a rational form of wisdom. It was not like Aristoteles, who emphasized the sensory form expressed by arts in imitating external reality; and it was different from the perfect human body

proportions and structure described by Vitruvio. (Figure 5) This means that Chinese people do not take people's actual appearance as the form of beauty or the media for expressing beauty. On the contrary, they emphasize that man's inner and outer parts integrated in one and share the same characteristics with the heaven and nature.

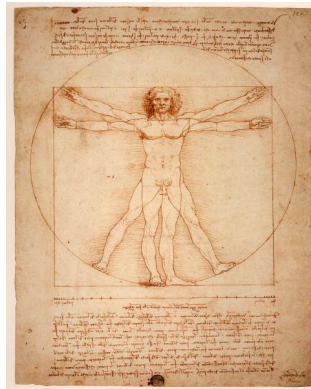


Figure 5. *Vitruvian Man*. Leonardo da Vinci, about 1487. Ink on paper. 34.4 x 25.5 cm. Gallerie dell'Accademia. Venice. Italy.

2. The natural kinship and ethical meaning included in the "Qi" of man-

kind encourage "response" and "conversion" between the audience and the



portrait. This means that the senses and emotions of Chinese people in viewing portraits are connected to their emotional relations with the portrayed persons. It is a communication activity at special venues or ceremonies, different from the public and open application in the Western world, such as statues on squares and portraits on coins. (Figure 6).



Figure 6. Portrait of Tito Flavio Sabino Vespasiano. Roman coin.

3. The ideas and standards of beauty in Chinese portraits fall into the scope of aesthetic appreciation in personage assessment. The contents of images are for recreating subjects that are in line with aesthetic appreciation ideals. They express the postures, demeanors and characters in life, emphasize the communication of spiritual symbols and feelings rather than actual appearances, which means that they are more

spiritual than physical. This further demonstrates the different natures between Chinese and Western portraits: the former expresses spirit through appearance while the latter focuses on depiction of reality. It also helps us understand why Chinese artists often use similar images and scenes in painting.

The ancient concept of man being generated by “Qi” resulted in that Chinese people downplay the corporal appearances of models and pursue the individual ideals of mankind. François Jullien reckons that Chinese people don’t think about reality but focus on expressing the common capacity (virtue) of the real world. The realistic depiction techniques in Chinese paintings, therefore, are only used in depicting faces. (Figure 7) They satisfy the needs of practical functions rather than visual aesthetics. The extraordinary expression of authenticity (like looking at a person in a mirror), even if it existed, has never been an important factor or standard for stimulating aesthetic appreciation. Moreover, folk superstitions and image taboos like ghost, color and shade also further marginalized the recreation of actual appearances, which is regarded by Chinese people as vulgar craftsman thinking and technique. When Chi-

nese people saw Western paintings for the first time, though marveling at the authenticity of images, they

did not think high of them; rather, they even feared photography.

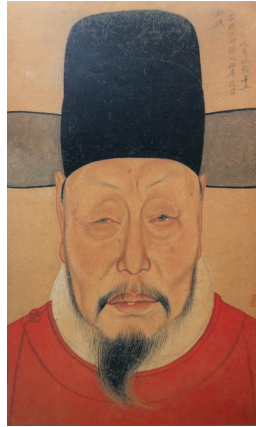


Figure 7. *Portrait of Liang Ying-Ge.*  
Anonymous. Ink and color on paper. 44.7 x  
27.4 cm. Nanking Museum.

#### Birth of Western Individuals

The religious concept of souls also influenced the development of Western images for individuals. There are murals depicting named people in Egyptian tombs and temples, (Figure 8) but these images were generated according to the proportions and rules of Egyptian images. (Figure 9) These images for serving gods, pharaohs and the dead (Ka), therefore, do not fall

into the scope of portrait. This shows an important characteristic of Western individual images: A form constructed on the basis of some clearly visible data and proportion theories, encompassing hope for and expression of mankind's spirit. The same characteristics can also be found in Greek imaging, whose purpose, however, is to establish the scope of ideal aesthetics on the basis of proportion theory.

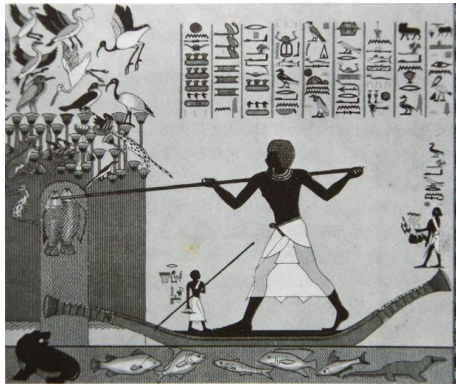


Figure 8. Mural painting from the tomb of Khnumhotep, anonymous. Karl Richard Lepsius: Denkmäler (1842)

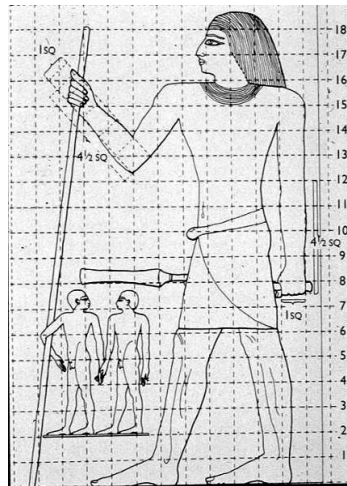


Figure 9. Egypt canon of proportions. Laurie Schneider Adams: Art Across Time.

During the Hellenistic period, form (*eidos*) is for carrying out two-dimensional discussion on visible and invisible (mental and sensory; spiritual and physical) main threads to lay the foundation for the aesthetics of Western arts. The sense of individual also originated from the Hellenistic period. Protagoras said: “Man is the measure of all things: of things which are, that they are, and of things which are not,

that they are not.” Socrates said: “Knowing yourself.” Both are important enlightenment to the singular characteristic, positioning and value of individuals. Therefore, though Greeks also used individual images on funeral and public display, they were not using these images entirely for the purpose of serving gods; they also used individual images to commemorate and glorify “person who have existed”. It is

a pity that no such painting has survived, and that existent arts are not sufficient to support the argument of individual images having a stand in the Hellenistic period. Todorov reckoned that Greek funeral arts do not express the characteristics of the dead, that the statutes on public areas were made by people of later time with questionable authenticity, and that these images show achievements rather than the individuals'

Rome carried forward most of Hellenistic art styles but with more authentic and detailed descriptions. Paintings expressing individuals rather than

funeral-related commemoration and accentuation of glory and achievements started to appear in this period.

Apart from the couple's actual appearance, the portrait of Paquius Proculo (Figure 10) also expresses their individual preferences through the artifacts in their hands. This satisfies the psychology of pure visual consumption and meets the requirements for portraits that are recognized in modern times, proving that it was an era conducive to personal development. And Fayum mummy portraits (Figure 11) integrate the diversified characteristics of Egypt, Greece and Rome.

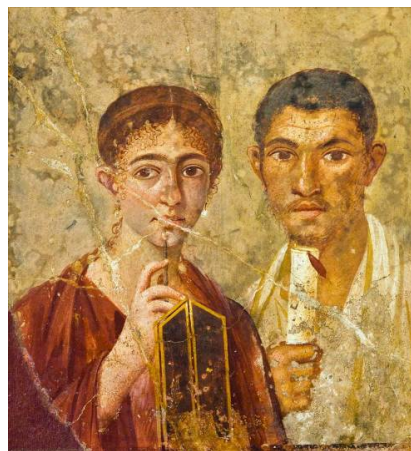


Figure 10. *The portrait of Paquius Proculo*. Fresco. Naples National Archaeological Museum, Pompeii.

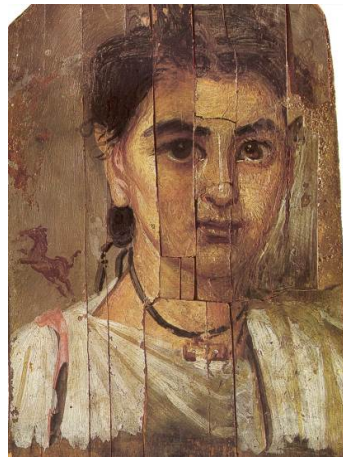


Figure 11. Portrait of Fayum, anonymous, about the second century, encaustic on wood, 18 x 37 cm. National Museum in Warsaw, Poland.

In the Middle Ages Christianity blocked the pipeline for individuals to connect with the God, and its art theories gradually changed Greek and Roman styles, and redefined the production criteria for individual images, as a result of influence from Neo-Platonism. Plotino advocated the aesthetic outlook of spirit higher than material and soul transcends body. His theories harmonized with the philosophical needs of Christianity in early stages and were assimilated and converted in later stages. Agustin believed that the form of God (*Forma dei*) is the only wisdom form in the world that worth having, and that sensory forms were secondary and interim. Jesus Christ, Notre Dame and Saints became the guidance for worldly people to approach the God. They monopolized the artistic expressions in the Middle Ages, but these arts served as reincarnation of Christian

teachings rather than rebuilding, simulating or recreating their physical appearances. In the Middle Ages people abandoned the attempt to draw with “objective” dimensions and turned to “table and chart” symbolism. It lies in that the God is the only eternity sensible to the audience, and that individual bodies are irrelevant.

The “table and chart” styles were not changed until the debut of gilded hand-written copies (Miniatura), which was sponsored by individuals in Northern Europe at the end of 14th century. *Très Riches Heures du Duc de Berry* (Figure 12) is not a painting of Christian story. It depicts visible scenes and things, as well as light shadows fading along time, changes in seasons and climate. That is to say, painting serves the audience’s visual needs. Later, many paintings in hand-

written copies started to integrate real elements. The Jesus Christ, Notre Dame and biblical characters in paintings were like special individuals, and the scenes also tended to render moments of Jesus Christ living in the world. Common characters around Jesus Christ also had more interpretation. For example, Joseph, Jesus Christ's foster father, had richer depiction and expression. (Figure 13).

In the 15th century, Robert Campin of Flemish painting genre painted the apparel and accessories of Notre Dame and Joseph as well as scenes, constructions and decorations in Flemish style, implying that the divine Jesus Christ and Mary also exited in the mundane world of the 15th century. Meticulous detailing of scenery and things renders the eternal nature of God through visible and sensible presentations in a metaphorical manner. Just like Tomas de Aquino said "It can be inferred from the words of Dionisio that beauty resides in glory and suitable proportion. As a matter of fact, he said that the God is beautiful as the 'root causes of glory and harmony among all things'. Therefore, the beauty of body lies in well proportioned limbs and light of appropriate colors."

Painting still served Christianity and expanded the objects of services. Johan Huizinga pointed out the double significance of Flemish altar arts: First, they were of exhibition significance at important ceremonies and for increasing the piety of church members. Second, it helped people remember pious donors. Religious figures and real characters were put in a same picture. In other words, it showed individuals' internal spiritual faith of individuals and external physical appearances.

Consequently, Western-style portraits were once again active. At that time, many Flemish painters painted portraits for people of different classes. These painters did not intentionally include social status symbols; they only faithfully recreated and depicted people. This means that the characters and psychological activities of an anonymous person can also be inferred from authentic and detailed expressions. Models gained legal exhibition grounds in paintings, and painters paid more attention to self-expression than before. Just like Jan van Eyck put his signature and personal motto on *Arnolfini Portrait* (Figure 14) and used a mirror to reflect himself in a bid to emphasize that the painter is an integral part of the painting scene.



Todorov reckoned that the most important factor of a painting was to “put viewing above feeling”, rather than making breakthroughs in symbols and styles, and that the creative conception of the painter was necessary for the purpose of completing the painting. Individuals occurred in Flemish paintings in the first half of the 15th century. Since then, Western paintings included individual images embodying the real world, and the trend continued until the end of the 19th century. The occurrence of Western individuals in paintings, therefore, also promoted the Western arts to develop in more than linear and singularly historical manners. After reviewing the evolution of the fundamental concepts of Chinese and Western individual images in the early stages, we came to such conclusions: The artistic differences between Chinese and Western portraits are not due to advanced ideological or material and technological reasons.

As mentioned above, a portrait embodies both spiritual and physical elements, which are interpreted differently in Chinese and Western portraits. Consequently, the expression of Chinese and Western languages must be subjected to the language of painting, or the purpose of creation. In brief, Eastern people

use intangible recognition to explain the existence of all things in the world, and portraits, which render individuals, have always been granted natural and ethical values in this education process, and served as the media for demonstrating ethics and norms. Western people use forms to express the supreme philosophy of ideas. From Egyptian gods to Greek perfection, to Roman reality, and to the humanity granted by Christian God, changes in forms and styles have demonstrated the philosophical needs and standards of Western people in different eras. When a human individual of the real world is authentically recreated in the painting art, it signified the advent of humanism era.

In line with this viewpoint, we hope to cite the theories of contemporary Spanish artist Ruiz de Samaniego to harmonize the concepts of intangible nature in Chinese and Western cultures. “All portraits operate at two levels: the level of analogy and flowcharting. The first is to allow recognition; the second, which is given through simplified under the schemes that generate visible structures, allows the recall. The analogy generates the resemblance, I recognize in it the person portrayed, flowcharting allows us to recognize in the box intangible and invisible essence



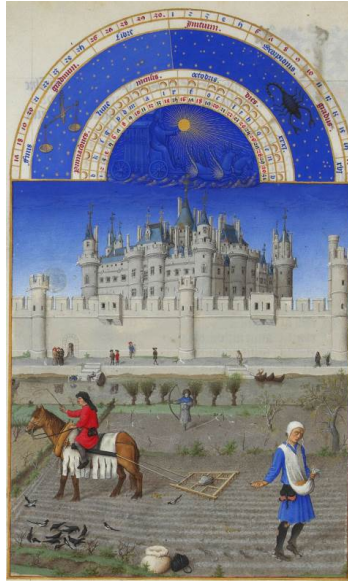


Figure 12. *Très Riches Heures du Duc de Berry* Hermanos Limbourg, Museo Condé.



Figure 13. Flight into Egypt. Jacques Coene. *Las Heures du Marechal Boucicaut*, Jacquemart-Andre Museum, Paris.



Figure 14. *Arnolfini Portrait*. Van Eyck, 1434. National Gallery of London.

that affects us as a species. Flowcharting avoided, thus absolute individuality, the irreducible singularity.”

#### Conclusion

This article attempts to compare the generation and meaning of individuals in Chinese and Western arts, for individuals are the fundamental element in modern cultural and artistic creations. While adapting to the era of image and media, in the development of visual art Chinese culture needs more reflection on the nature of its cultural arts, but not imitating superficial forms or indiscriminately using rigid symbols. The author hereby hopes that the analyses provided in this article may help Chinese artists explore and accept more diversified views and con

cepts in terms of heritage and innovation.

#### Acknowledgements

This project is supported by Fuzhou University ,and the research number is XRC201608.

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## STUDY ON WORK CAPACITY REQUIRED FOR *MICE* PERSONNEL

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### Abstract

The *MICE* (Meetings, Incentives, Conventions, and Exhibitions) industry is highly valued and actively developed in different countries of the world. It is popular and its development is vigorous in advanced countries in Europe and the U.S. In recent years, Taiwan's government actively promotes the development of the MICE Industry. However, with the growth of the MICE Industry in Taiwan, there is a serious shortage of professional talents for MICE. Hence, this study conducted an expert questionnaire by the Delphi Method and a questionnaire survey by the Analytical Hierarchy Process (AHP). From the perspectives of business employers in the MICE industry, it probed into students' capacity indicators in colleges and universities, as well as their work capacity, as required as MICE personnel. This study discussed the capacity indicators of the workplaces of the

MICE industry and cultivates their work capacity. The results suggest that the ranking of key factors of work capacity principal criteria required for MICE personnel are as follows: 1) attitude toward employment; 2) basic capacities and characteristics; 3) professional core capacity; 4) marketing capacity.

Key Words: MICE, Work capacity, AHP, Modified Delphi Method

## Introduction

After participating in WTO, Taiwan exchanges with different countries more frequently, and such trading and conferences result in a total output value of more than USD hundred billion in the global MICE (Meetings, Incentives, Conventions, Exhibitions) industry every year [1]. While Taiwan's government actively promotes the MICE industry, labor demands for the industry grow year by year. Hence, talent cultivation of MICE becomes an important issue. According to Chen Ru-hui, the international level of countries is associated with the number of international conferences and MICE, which not only reflects the development level of politics, economy, culture, and technology, but also represents the potential of social and economic development [2]. Therefore, with vigorous development of the MICE industry, the priority is to solve the said problem. However, He suggested that in order to deal with the problem, we should focus on school education. Talent cultivation in schools is the essential solution to the shortage of professional labor in the MICE industry [3].

The National Youth Commission, Executive Yuan, investigated college students' employability in 2009 [4], and according to the report, the industries suggest social freshmen's low employ

ability. Therefore, it is particularly important that university students cultivate their skills of employability during study. Currently, many literatures have mentioned indicators of core work skills; however, no studies have explored the weights of employability indicators of university and college graduates of MICE departments.

Hence, this study aims to probe into the view of the MICE industry regarding work capacity, as required for professional talents of MICE. The findings can serve as reference for curriculum planning in colleges and universities, which can respond to labor demands in the work market. Based on the research motives, this study aims to probe into the content of work capacity, employers' labor demands, and work capacity of university students in MICE departments of colleges and universities.

## Literature Review

### *MICE*

MICE first emerged in Europe in the 19th century. However, with higher degrees of globalization, the economic benefits of MICE are much more than initially expected.

The MICE Industry was originated at the Conference of Vienna from 1814

to 1816, and aimed to solve the problems of land and diplomacy. From September 1814 to June 1815, representatives of most European countries were in Vienna to deal with the problems caused by the French Revolution and the period of Napoléon. In the conferences, the main decisions were made by “four powerful countries” (Austria, Russia, Germany, and Britain). For the previous purpose, these powerful countries regularly hosted conferences. The period after 1815 was thus called “period of congress” or the “Congress System”. Historians called the conferences to maintain peace as a “congress system”. Nowadays, MICE becomes the proper noun of the MICE industry and incentive tours in foreign countries [5].

Chuang [6] suggested that the MICE industry includes general meetings: small scale meetings or training meetings hosted by firms or groups; incentive tours (Incentives): special traveling experience and meetings to accomplish the goals and rewards of enterprises or groups to encourage employees’ performance; (Conventions): large-scale conferences of firms or groups hosted in regular time, and the purpose is to accomplish specific topics or goals; exhibitions: it shows the products, techniques, and operational results of industry by displays.

Study on employability and work capacity

#### *Meaning of work capacity*

According to the definition of Wikipedia, “employability” means “the capacity to obtain the job, maintain the

job, and acquire a new job if necessary”. In addition, some scholars suggested that “employability” is generally developed by learning. British scholars, Harvey, Locke, and Morey indicated the essence of “employability”, as follows: “after learning, individuals have the capacity to obtain and maintain a job with good performance” [7]. For individuals, employability depends on knowledge, skill, and attitude, as well as methods to use assets and present content to employers when searching for jobs. In other words, work capacity not only allows individuals to accomplish, continue, and transfer to another work field, but also enhances value and capacity in the workplace. In addition, employability is individuals’ capacity to obtain the skills required by work in the labor market [8].

#### *Related studies on work capacity*

In 2006, The National Youth Commission investigated college graduates’ employment [9], and the findings demonstrated that college graduates and employers mentioned that “good work attitude” is the first key capacity. According to the report, employers appreciate the most “basic computer skills” of graduate students. Higher education should reinforce students’ “stability and resistance” and cultivate “expression and community capacity”. In studies on the factors of employees’ work capacity by AHP, Chang [10] treated human resource experts as subjects, and the results demonstrated the rankings of the total factors of individuals’ work capacity: (1) expression and community capacity, (2) team work, (3) adaptation, (4) technique, (5) following rules and ethics, as key work capacities.



## Delphi Method and Modified Delphi Method

### *Delphi Method*

According to MBA Lib, the Delphi Method was created by Helmer and Gordon in 1940s in the 20th century. In 1946, in order to avoid the problem of obedience to authority or majority in group discussions, the Rand Corporation of the U.S. first adopted the method for qualitative prediction. The method was then widely applied. The Delphi Method is the research method of quantitative and qualitative technology integration. In the process, upon specific issues, by anonymous experts and continuous written discussion, experts can construct consensus by professional knowledge, capacity, practical experience, and personal opinions to solve uncertain problems. The method has the advantages of questionnaire survey and conference discussion, and is based on structural information flow, anonymous group decisions, and experts' judgment.

### *Modified Delphi Method*

The Delphi Method process is upon continuous written communication and opinion expression, which leads to experts' common consensus. However, in the process, due to time, labor, and funds, there can be modification, which is called the Modified Delphi Method.

In addition, according to the view of Murry and Hammons, some studies modified the steps of the typical Delphi Method by skipping the brainstorming open-ended questionnaire survey. After review of a great number of literatures,

and with modification, the structural questionnaire is developed as the first-round questionnaire, called the Modified Delphi Method. Murry and Hammons indicated that the advantage of conducting a first-round survey by structural questionnaire is that it saves time. Moreover, by structural questionnaire, experts can focus on the research topic instead of questioning the open-ended questionnaire [11].

### *AHP*

AHP was the theory developed by Thomas L. Saaty at the University of Pittsburgh, U.S. in 1971. After 1980, AHP became more complete and it aimed to solve complicated and influential decision-making. It makes decisions for uncertain and incomplete problems according to the assessment criteria. AHP aims to systematically analyze problems by hierarchy. By pairwise comparison, it determines the relative importance of factors, and develops a ranking of plans in order to select the best one [12-18].

### Research Method

Through literature review, this study aims to recognize the work capacity factors required for MICE personnel. Through the modified Delphi Method questionnaire and modification, it establishes the indicators of different levels of MICE personnel's work capacity. Hence, by expert questionnaire of AHP, it designs questionnaire content and invites experts to complete the questionnaires. This study then reorganizes, analyzes data, and offers suggestions.

## *Research methodology*

### *Document analysis.*

By document analysis, this study reviews literature on the construction of employee work and professional capacity indicators of MICE as the theoretical base of weights of employees work capacity indicators, as required by MICE employers.

### *Modified Delphi Method.*

The Modified Delphi Method establishes assessment criteria, and according to data collection and literature review, it reorganizes demand as an objective level, principal criteria level, and sub-criteria level as the primary framework. Through the Delphi Method questionnaire survey, it obtains experts' and scholars' opinions, and analysis of the results is the base to design the "questionnaire of MICE personnel's work capacity".

### *AHP.*

By AHP, this study collects experts' opinions and complicated problems are simplified from top to bottom in order to construct the hierarchical framework. Upon qualitative and quantitative variables, the subjective and ambiguous comments of plans are quantified in order to develop the ranking, enhance decision-making quality, and avoid the risk of wrong decision-making [16, 17].

## *Research Subjects*

This study invites 5 scholars and experts of departments related to MICE in universities to participate in the Delphi questionnaire survey. The subjects are supervisors or employers of enterprises or consulting companies related to MICE in Taiwan for hierarchical analysis.

## *Research structure*

The research structure includes confirmation of research topic, establishment of research purposes, related literature review, design of research methods, confirmation of subjects, data processing and analysis, and proposal of conclusions and suggestions.

## *Research process*

This study probes into literature related to MICE and work capacity by document analysis. According to theories, it analyzes the work capacity valued by the MICE industry when selecting personnel, and develops dimensions and items by data. This study screens the factors obtained by the Modified Delphi Method.

By subjective judgments, it determines the factors that should be eliminated. According to necessity, it adds factors that are not included. After experts and scholars have common consensus, it finishes the modified Delphi questionnaire survey and completely establishes the dimensions and assessment criteria of the hierarchical framework in this study.

Finally, according to this framework, this study designs and distributes

formal questionnaires, and retrieves and organizes the data. Pairwise comparison of factors is used to determine the relative weights of dimensions and criteria. The steps and measures are as follows [12-18]:

Step 1: By document analysis, this study explores the definitions and classifies related literature. According to theories, it analyzes work capacity valued by the current MICE industry and establishes work capacity dimensions and items by reorganizing data.

Step 2: By literature review, it constructs hierarchical dimensions and factors as a modified Delphi questionnaire. Through experts and scholars reach common consensus. Thus, the researcher validates the dimensions and criteria of the hierarchical framework and items of the questionnaire.

Step 3: After confirming hierarchical dimensions and items, this study designs, sends, and retrieves hierarchical questionnaires, reorganizes data, and measures weights by AHP. According to the research findings, conclusions and suggestions are proposed.

The procedures are as shown in Figure 1. (Note: see all figures and Tables at the end of this article.)

### Results and Analysis

From the perspectives of MICE industry employers, this study aims to analyze work capacity currently valued by the MICE industry through the Delphi Method and AHP, and investigates,

explores, reorganizes, and analyzes the key factors of work capacity.

### *Results of Modified Delphi Method*

After the Modified Delphi Method questionnaire survey, according to experts' professional perspectives and suggestions of modification, this study reached expert consensus and accomplished the hierarchical framework of work capacity required for MICE personnel, as shown in Table 1.

### *Results of AHP*

In order to discuss the work capacity required for MICE personnel, this study adopted AHP to analyze the work capacity valued by employers in the MICE industry. In pairwise comparison of AHP, satisfy priority and transitivity of intensity are satisfied. However, in the process, some factors might cause errors, thus, consistency testing is required. Therefore, Satty suggested testing consistency of the pairwise comparison matrix by Consistence Index (C.I.) and Consistence Ratio (C.R.) [16]. The results of consistency testing are as shown in Table 2. The total weights and ranking of importance are as shown in Table 3:

### Conclusion

This study adopted the Modified Delphi Method and AHP to discuss the findings of "study on work capacity required for MICE personnel".

- 1) Level weights of principal criteria:  
At the level of principal criteria, the order of weights is as follows:

- (1) attitude toward employment,
- (2) basic capacities and characteristics,
- (3) professional core capacity,
- (4) marketing capacity.

2) Level weights of sub-criteria:

At the level of sub-criteria, the most important factors of different levels are as follows:

- (1) Basic capacities and characteristics: good communication and expression capacity (level weight 0.3974 and total weight 0.1220).
- (2) Professional core capacity: problem solving capacity (level weight 0.2513 and total weight 0.0714).
- (3) Attitude toward employment: active (level weight 0.3746 and total weight 0.1199).
- (4) Marketing capacity: consumer psychological behavior cognition

(level weight 0.2762 and total weight 0.0246).

Regarding the key factors of MICE personnel's work capacity, the top 10 of the total weights are shown according to importance:

- (1) Good communication and expression capacity
- (2) Active
- (3) Team work
- (4) Problem solving capacity
- (5) Project writing capacity
- (6) Positive and sincere attitude
- (7) Service sincerity
- (8) Organizational integration capacity
- (9) Emotional management
- (10) Information application capacity

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Table 1. Result of Modified Delphi Method Questionnaire Survey

MICE personnel's work capacity required	Basic capacities and characteristics	Good communication and expression capacity Information application capacity Positive and sincere attitude Thoughts of leadership innovation Spirit of lifelong learning
	Professional core capacity	Project writing capacity Language capacity Problem solving capacity Organizational integration capacity Project management Knowledge of industrial trends
	Attitude toward employment	Active Service sincerity Team work Emotional management
	Marketing capacity	Consumer psychological behavior cognition Market survey and analysis Public relation skill Promotion skill Business negotiation capacity

Table 2. Result of Consistency Test

Level of principal criteria	C.I.	C.R.	Level of sub-criteria	C.I.	C.R.
MICE personnel's work capacity	0.0509	0.0566	Basic capacities and characteristics	0.0977	0.0872
			Professional core capacity	0.0808	0.0652
			Attitude toward employment	0.0709	0.0787
			Marketing capacity	0.0487	0.0435

Table 3. Total Weights and Ranking of Importance

	Level of principal criteria	Weights	Ranking	Level of sub-criteria	Level weight	Ranking	Total weight	Ranking
MICE personnel's Work capacity	Basic capacities and characteristics	0.3068	2	Good communication and expression capacity	0.3974	1	0.1220	1
				Information application capacity	0.1644	3	0.0505	10
				Positive and sincere attitude	0.2228	2	0.0684	6
				Thoughts of leadership innovation	0.1186	4	0.0364	11
				Spirit of lifelong learning	0.0968	5	0.0397	13
	Professional core capacity	0.2843	3	Project writing capacity	0.2506	2	0.0712	5
				Language capacity	0.1077	4	0.0306	12
				Problem solving capacity	0.2513	1	0.0714	4
				Organizational integration capacity	0.2141	3	0.0608	8
				Project management	0.0961	5	0.0273	14
	Attitude toward employment	0.3203	1	Knowledge of industrial trends	0.0802	6	0.0228	16
				Active	0.3746	1	0.1199	2
				Service sincerity	0.2080	3	0.0666	7
				Team work	0.2594	2	0.0830	3
	Marketing capacity	0.0885	4	Emotional management	0.1580	4	0.0506	9
				Consumer psychological behavior cognition	0.2762	1	0.0246	15
				Market survey and analysis	0.2439	2	0.0217	17
				Public relation skill	0.1743	3	0.0155	18
				Promotion skill	0.1580	4	0.0141	19
				Business negotiation capacity	0.1476	5	0.0131	20



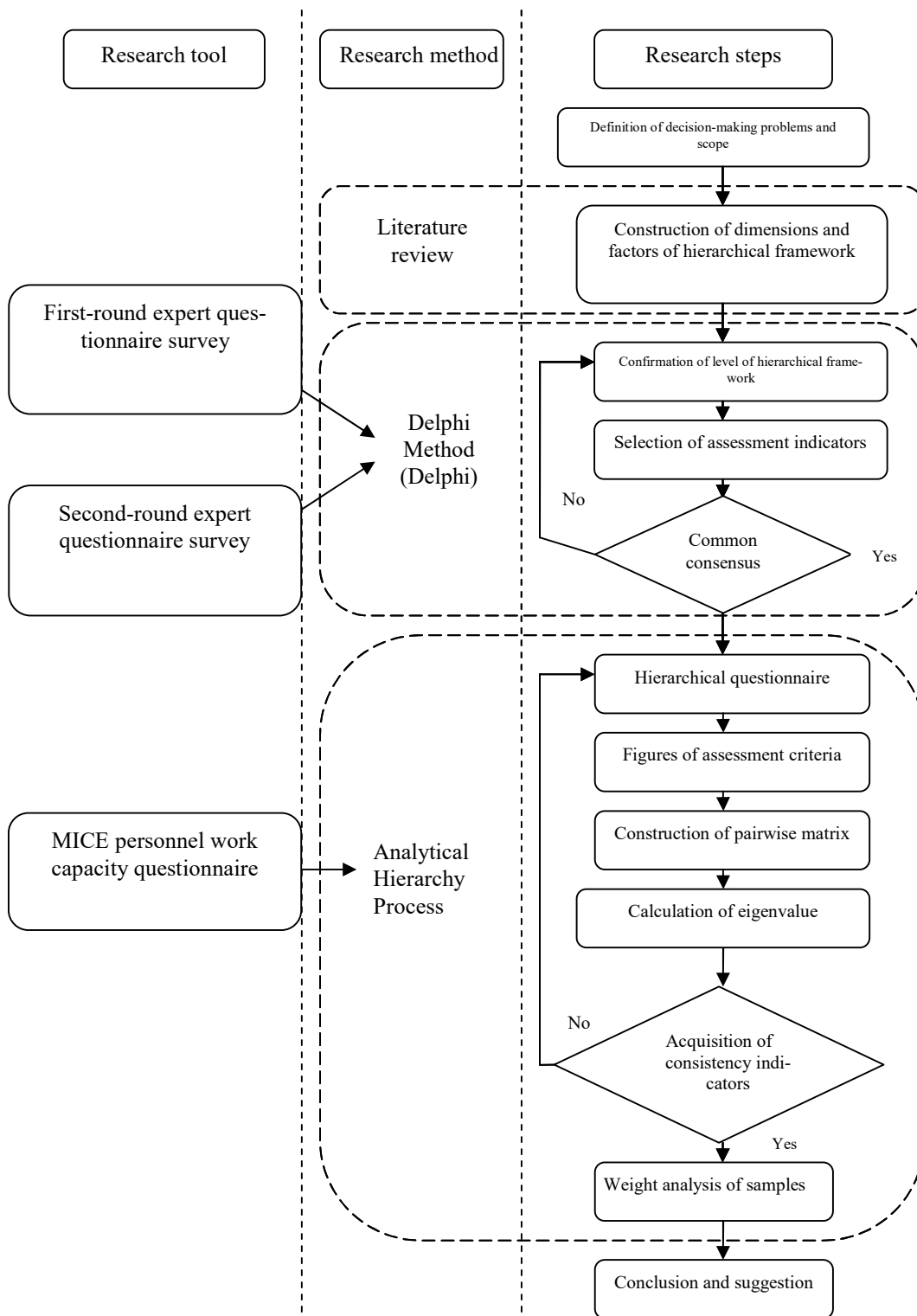
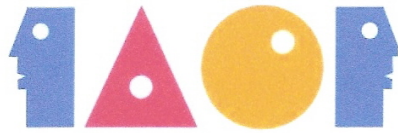


Figure 1. Research Flow



THE SURVIVAL STUDY ON MORTGAGE LOAN DEFAULT  
STAGES BY MARKOV CHAIN

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Abstract

Shifting probability of credit status of past due or non-performing loans across stage has always been the center of attention not only for banking institutions but also for academicians. Mortgage loans' changing credit status has a major influence on bank's required reserve for capital adequacy against possible default loss. This study use the Markov Chain to study the probability of shifting credit status and to estimate average survival delinquency of non-performing loans across stages, using the mortgage data collected from one of Taiwanese major banking institutions over a period of ten years (2001-2010). The study result shows that the probability distribution of mortgage loans can be classified in to the following five stages: 86.89% belong to normal, 2.12% need special mention, 0.56% turn out to be doubtful, 0.63% classify as

substandard, and, finally, 9.8% become actual loss. The probabilities for past-due loans to return back to its previous stage are 5.64%, 3.86%, 2.3% and 0.05% respectively, showing that mortgage loans once become past-due out of its regular repayment will not be easy for them to return to its previous credit status. This study also estimates average delinquent period for credit stages to be 23.61, 7.38, 4.24, and 2.40 years respectively, showing that the downward spiraling nature of non-performing loans with an ever shorter of life-cycle for worse credit.

Keywords : Mortgage loan, default risk, absorbing Markov chain

### Introduction

Credit and loan and are the main business and a major source of earnings for banking institutions. The quality of credit and loan operations has a tremendous impact on the soundness of banking operations. One of the causes of the 2007 U.S. subprime mortgage crisis is the excessive credit expansion for financial institutions to ignore risk related to real estate loans, particularly when such loans are from high-risk populations suffering from unemployment or falling real estate prices. Bad loans did not occur instantly when credit is first given. Overdue credit happens gradually during the process when economy deteriorates causing households without the ability to repay and home prices to fall largely below the actual loan amount. A significant portion of those overdue bad loans will cause the rapid rise in the Non- Performing Loans (NPL) ratio for financial institutions, resulting in a serious erosion of profit, and causing a chain reaction of bankruptcy and escalated financial crisis. The century-old Leh-

man Brothers declared bankruptcy in 2008 which caused a domino effect, not only hitting the U.S. economy, but also triggering a global financial tsunami. Such disaster may be explained by the fact that banks recently owns excessive amount of poor credits which may be the result of highly competitive banking environment and reckless credit imprudence, even reaching an alarming level in bank's NPL ratios. In order to correct this problem, the banking industry must make prudent and cautious decisions in the beginning of loan auditing process and also recognize the dynamic fact that credit status is not static. It shifts greatly throughout the life span of the loan credit. The change is more dramatic especially in the case of past due or non-performing loans. Only when banking institutions are fully aware of the dynamic nature of credit status can the banking institutions avoid making the same mistake again.

This paper focuses on the study of the shifting probability of credit status of past due or non-performing loans. In

this study, the samples are selected based on the number of different credit stages and the size of different scale from the cases of residential mortgage loans from a branch in southern Taiwan of a large scale national bank specialized real estate mortgage loans, so that the samples are representative and non-bias. During the 10-year period of study from 2001 to 2010, a total sample of 3470 cases are selected with 3455 cases of normal payments and 305 overdue repayments in order to understand the distribution of housing loans and their NPL status. According to Taiwanese banking regulations, 5 categories (or stages) of overdue loans and bad credit assets are defined as:

- Category I (stage 0): Normal Credit assets--normal payment (on interests and principals);
- Category II (stage 1): Special Mention--overdue 1 to 3 month stage;
- Category III (stage 2): Substandard--overdue for 4 to 6 months;
- Category IV (stage 3): Doubtful/ pre-write-off stage --overdue for more than six months;
- Category V (stage 4): Losses—actual write-offs.

This study uses the Markov Chain method to study the continuous process, transferral evolution, and shifting probability of loans across stages. The

purpose is to investigate the distribution status and transferrable probability of NPL loans in different stage to understand and forecast the probability of classification and its survival time in each of the stage for reference of the bank in auditing credit, extending credit, securing loan, and the need to attach mortgage life insurance to reduce bank's risk.

### Literature Review

Previous literature tried to explore the default factors of individual mortgage loans and the reason why loans deteriorate from poor credit into overdue or even NPLs. Due to the difference in sample data and methodology; these literatures have shown very diverse conclusions. The early works of Jung (1962), Page (1964) indicates that mortgage interest rate is the main factor for causing real estate loan overdue. Von Furstenberg (1969) showed that loan-value ratio, mortgage term, borrower age and income are important default factors. Many researches have tried to applied different methodologies and variables in empirical model test to come up with distinctive but sometimes confusing results. Very little attention is paid to investigate the embedded probability iteration by stage for worse credit. In this study, we apply Markov chain to estimate shifting probability and average survival rate among different stages of home

loan. Based on the probability information, the credit assessors may accurately predict default rate of home loans according to debtors' age and loan period, and then coordinate home and life insurance to reduce credit and risk exposure to enhance the quality of home loan. Due to the fact that default rate is significantly affected by borrowers' unique characteristics, i.e. age (von Furstenberg and Green 1974; Canner et al., 1991), marital situation (Canner et al., 1991), credit situation in the past (Grander and Mills, 1989), education and so on, earlier studies of delinquency attempt to identify the relationship among these important factors. Consistent with findings of previous default studies, three loan factors have consistent and positive effect on delinquency: loan-to-value ratio, presence of junior financing (Herzog and Earley, 1970) and age of mortgage (von Furstenberg and Green, 1974). A formal theoretical model recognizes that a number of loan and non-loan related effects beyond the housing unit can influence the default decision. Some other macroeconomic factors and specific conditions of loan agreement which may cause later delinquency include the following: interest rate of the loan (Jung, 1962; Page, 1964), value ratio of the loan (Jung, 1962; Page, 1964; von Furstenberg, 1969; Zorn and Lea, 1989; Lawrence et al., 1992; Kau and Keenan, 1999;

Deng et al., 1996, 2000), period of the loan (Page, 1964; von Furstenberg, 1969; Lawrence et al., 1992), the ratio of mortgage payments to family income (Lawrence et al., 1992), and owner-occupation rates (Zorn and Lea, 1989). The borrower-related personal effects are often used to predict the level of borrower conscientiousness toward repayment or the likelihood of recovery from a seriously destabilizing incident, such as unemployment (Vandell, 1978; Deng et al., 1996, 2000), death (Vandell, 1978), divorce (Vandell, 1978; Deng et al., 1996, 2000) or housing price collapse (Kau and Keenan, 1999; Deng et al., 1996, 2000), which will render default more likely. Their results show that unemployment and repayment have positive relation whereas economy growth rate and repayment negative relation.

Many literature applied the following methodologies to the study the issue of credit ratings such as multiple regression analysis (Jung, 1962; Page, 1964; von Furstenberg, 1969; von Furstenberg and Green, 1974; Vandell, 1978), discriminant analysis (Ingram and Frazier, 1982), Probit model (Morton, 1975), logistic regression analysis (Vandell and Thibodeau, 1985; Grander and Mills, 1989; Canner et al., 1991; Lawrence et al., 1992). Ingram and Frazier (1982) and Epley et al. (1996) apply the same analysis to test the significance of factors and classifi-

cation and finds that classification only has small difference in validity, but significant factors varies from one research to another. On the other hand, Epley et al. (1996) show that, when same methodology are applied, there are significant difference in validity to classification and positive or negative coefficients in the factors which influence on breaching the mortgage loan agreement. Since most of researchers use multi-variate methodologies, this study tries to use a different approach of Markov chain methodology to analyze the situation of loan default and the nature of changing probability among different stage of loan deteriorations. This study focuses on the deterioration and change of bad loans from overdue to foreclosure with the purpose to find out shifting probability of mortgage financing and average survival rate in stages before final write-offs as bad loans. Zhou, Bai-Long (2001), through absorbing Markov chain analysis, infer the average stop over time before a bank crisis occurs for the Farmer Credit Department in Taiwan. To further understand overall household mortgage overdue distribution and transfer situation under different stage, this article first arrange household mortgage loans from 2001 to 2010 according to FSB (2010) specifications, define 5 mortgage overdue lending stages for classification, then use absorption Markov chain

analysis to discuss the distribution of overdue loans across stages, and finally calculate the mortgage loan transfer probability before entering final absorption state.

### Research Design

This section first discusses research samples and sources, explain how NPL stage is divided, and finally introduce the research methodology.

### *Research Sample*

Since the restoration of Taiwan in 1946, rapid economic growth and house prices rising caused a surge in mortgage business. Due to the influence of internal and external factors, real estate cycles of booming and recession affected many household incomes and thus resulted in the generation of a large amount of overdue loans since 1995. Once mortgage credit default occurred, not only were households unable to repay their debts and thus suffered from foreclosure, but also the banking experienced great damage sometimes as serious as bank-runs. This article selected mortgage household samples from a branch of a large national bank in southern Taiwan's southern during the period of 2001-2010. According to the Financial Supervisory Commission (2010) specifications, as defined in the mortgage NPL stage, sample data are sorted and calculated through Markov chain

analysis method to explore transfer probability of mortgage holders during stages and to estimate the average survival time of the various NPL statuses.

### *Mortgage Overdue Stages*

As mortgage interest and principal repayment are influenced by the factors of real estate cycles and external economy, mortgage holders face a great deal of uncertainty and risk. There is a gradual process of stage occurrence from mortgage default to the end auction for doubtful accounts,

rather than overnight problems occurring. Mortgage over dues are part of a continuous NPL history of credit default and should be classified by the seriousness of NPL status and divided into 5 stages, with stage 0 to stage 4 representing credit default situation getting worse. In practice, mortgage classifications make default problems easier to distinguish and to deal with. Mortgage households NPL stage definitions are summarized as following (See Table 1):

Table 1. Mortgage households NPL stage definitions

Mortgage households NPL	Definitions
Stage 0	Category I: Normal Credit Assets
Stage 1	Category II: Special Mention
Stage 2	Category III: Substandard
Stage 3	Category IV: Doubtful
Stage 4	Category V: Losses

Source: FSC2001

### Markov Chain Analysis

This article uses absorbent Markov chain to estimate the phase of transition probability and average survival time of the overdue loans. The Markov chain and the concept of absorbent Markov chain analytical methods, formulas are summarized below. Let  $E_0, E_1, \dots, E_j, \dots (j=0,1,2,\dots)$  at any time represent a system completely and exclusive

result (status), initially at time  $t_0$ , the system may be in state, the  $(j = 0,1,2, \dots)$  at  $t_0$  when the system, and further assumed that the system in the state  $E_j$  unconditional probability Markov.

Recall that the entry  $P_{ij}$  of the matrix  $P_n$  is the probability of being in the state  $t_j$  after  $n$  steps, when the chain is started in state  $t_i$ . And the transitional probabilities in matrix form  $P$ :



$$P = \begin{bmatrix} I & \emptyset \\ R & Q \end{bmatrix} \quad \dots(1)$$

The first t states are transient and the last r states are absorbing.

Where I is an r-by-r identity matrix,  $\emptyset$  is an r-by-t zero matrix, R is a

non-zero t-by-r matrix, and Q is an t-by-t matrix. In this paper, the proposed absorbing Markov chain analyses of the concept of probability matrices are as follows:

$$\begin{bmatrix} 4 & 0 & 1 & 2 & 3 \\ 4 & 1 & 0 & 0 & 0 \\ \hline 0 & P_{04} & P_{00} & P_{01} & P_{02} & P_{03} \\ P = 1 & P_{14} & P_{10} & P_{11} & P_{12} & P_{13} \\ 2 & P_{24} & P_{20} & P_{21} & P_{22} & P_{23} \\ 3 & P_{34} & P_{30} & P_{31} & P_{32} & P_{33} \end{bmatrix} \quad \dots(2)$$

In an absorbing Markov chain, the probability that the process will be absorbed is 1. For an absorbing Markov chain the matrix I - Q has an inverse N and  $N = I + Q + Q^2 + \dots$

fundamental matrix for P. The entry  $N_{ij}$  of N gives the expected number of times that the process is in the transient state  $t_j$  if it is started in the transient state  $t_i$ .

For an absorbing Markov chain P, the matrix  $N = (I - Q)^{-1}$  is called the

$$\begin{bmatrix} 0 & 1 & 2 & 3 \\ 0 & N_{00} & N_{01} & N_{02} & N_{03} \\ 1 & N_{10} & N_{11} & N_{12} & N_{13} \\ N = (I - Q)^{-1} = 2 & N_{20} & N_{21} & N_{22} & N_{23} \\ 3 & N_{30} & N_{31} & N_{32} & N_{33} \end{bmatrix} \quad \dots(3)$$

$$\begin{bmatrix} T_1 \\ t = N e = T_2 \\ T_3 \\ T_4 \end{bmatrix} \dots(4)$$

Let  $t_i$  be the expected number of steps before the chain is absorbed, given that the chain starts in state  $s_i$ , and let  $t$  be the column vector whose  $i$ th entry is  $t_i$ . Then where  $c$  is a column vector all of whose entries are 1.  $e$  is the identity matrix. Each  $N_{ij}$  causes interest rates principal stage into different residence time of interest rates principal stage, for instance the  $N_{12}$  is unable to repay the loan phase residence time from 1 to 3 months overdue stage. And  $T_i$  represents the survival mean time of each stage before entering the absorption state, e.g.  $T_1$  overdue stage of 1 to 3 months into the mean survival time of write-off stage.

### Research Results

The overdue loans to total loans ratio of domestic banking sector showed a clear downward trend since the fourth quarter of 2001 until June 2011. The trend diagram in Figure 1 showed that overdue to total loans ratio gradually decreased from the ratio of 11.27% in the fourth quarter of 2001, to 11.74% in the first quarter of 2002, and further declining down to 0.61% in the fourth quarter of 2010, displaying considerable credit quality improve-

ment as well as recovery in overall economic climate and real estate business. This article use household mortgage sample from 2001 to 2010 for research object. Through absorption Markov chain analysis method, this study estimates probability under five stages of overdue loan conditions, transfer rate at different stages, and the average survival for each of the overdue loan conditions at different stages. From 2001 to the end of 2010, the mortgage sample had a total of 3819 Mortgage households to apply for loans. There were 1616 Mortgage households from 2001 and 3819 mortgage households at the end of 2010, a total growth of about 1.36 times. During this period, the average annual growth rate increased up to 9.80%. On the other hand, the NPL accounts grew from the number of 179 by 2001 to 305 mortgage households by the end of the 2010.

### *Summary of Household Overdue Loans in Stages*

Based on mortgages payment of interest and principal and debt transfer situation in two years, this article summarizes transfer probability for all overdue loans phase. Linear regression

analysis shows that mortgages transfer probability at all stages displaying a stable situation, which will not be affected by the time (t) effects as mortgage pass through stages. After detection stability of transfer probability at overdue lending stage, average transfer probability value is calculated from 2001 to 2010 for all mortgage households overdue lending stage. Due to geometry average nature, if any of the stage has 0 probability, all of the transfer probabilities will become 0.

Therefore geometry average is not suitable to calculate transfer probability, arithmetic average method is more appropriate to estimate estimates the average transfer probability for all overdue lending stage. Due to real estate boom in 2001, applications for

housing loan increased gradually. Limited by 1985 real estate downturn effects, transfer probability matrix exploit data from 2001 to 2010 for arithmetic average and calculate transfer probability for all overdue phases. Finally, through absorption Markov chain and anti-matrix operation to estimate the survival time of overdue lending stage.

#### Calculation of Transferral Probability across stages

In this paper, all NPL stage transition probability are calculated using the 2001-2010 mortgage households data and arithmetic mean to calculate NPL stage transition probability values (see Table 2).

Table 2. All NPL stage transition probability

Stage	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
Stage 0	0.9847	0.0148	0.0005	0	0
Stage 1	0.0564	0.5887	0.3267	0.0282	0
Stage 2	0.0386	0.0886	0.1795	0.6932	0
Stage 3	0.023	0.0248	0.0301	0.5398	0.3823
Stage 4	0.0005	0	0	0	0.9995

#### Markov Chain Analysis Results

After finding out the transfer probability matrix p via arithmetic mean for overdue loan phase, the Markov chain analysis explores average survival time before entering the bad debts write-off stage. The results

of the transfer of all stages of overdue loans are shown as following:



$$N = (I - Q)^{-1} = \begin{bmatrix} & 0 & 1 & 2 & 3 \\ 0 & 86.635 & 3.617 & 1.589 & 2.615 \\ 1 & 21.599 & 3.707 & 1.585 & 2.615 \\ 2 & 11.695 & 0.944 & 1.697 & 2.615 \\ 3 & 6.258 & 0.442 & 0.275 & 2.615 \end{bmatrix}$$

$$t = N e = \begin{bmatrix} 94.456 \\ 29.507 \\ 16.953 \\ 9.592 \end{bmatrix}$$

overdue up to 6 months stage (Category 3: Substandard) to write-off stage, and 2.398 (9.592/4) years for overdue more than six months (Category 4: Doubtful) to write-off stage. The process for overdue to reach write-off stage becomes faster because of the bank's practical need to deal with bad asset and the regulatory pressure to write-off and recover portions of bad asset in order to keep capital adequacy. This article performs sensitivity analysis on the transition probability and the result shows there is little difference in the average survival time for various stages of overdue loans and verify once again that the transition probabilities are stable. This Article added the definition of overdue loans not included in the majority of mortgage credit default warning model—the stage for overdue under 3 months (Category 2: Special Mention). The analysis results show that the average

survival time is 7.376 years for the special mention stage to reach the write-off stage, which is 16.238 years less than the 23.614 years required for normal payment stages (Category 1: Normal credit assets) to reach the write-off stage and the probability is only 3.86% for this stage to return to normal payment stage. The results indicate that the mortgage households which are overdue up to 3 months already exist some credit default alerts which is worthy for bankers to take note of. In addition, the average survival time 4 2.398 years of stage 3 to reach stage 4 shows that using the previous two year's information which obtained better information in prediction can be more useful for the establishment of a credit default warning model, whereas prediction result is less than ideal using the sample data from the last two years.

## Conclusion and Recommendation

This study use Markov chain analysis to estimate mortgage transfer probability and average survival time for all stages of overdue loans, based on the classification of domestic mortgage sample selected from a major bank branch in Southern Taiwan from year 2001 to 2010 according to FSC (2010) proposed five-stage process of overdue loans. The average probability distribution of the five stages of mortgage households NPL is summarized as following: 1) normal payment of interest and principal stages (Category 1: Normal Credit Assets) accounted for 86.89%; 2) overdue within 3 month stage (Category 2: Special Mention) accounted for 2.12%; 3) overdue 4 to 6 months stage (Category 3: Substandard) accounted for 0.56%; 4) overdue for more than six months stage (Category 4: Doubtful) accounted for 0.63% and the write-off stage (Category 5: Losses) accounted for 9.80% of the mortgage sample of a total of 3819 household mortgage cases. The calculation of transition probability for all stages of overdue loans reveals that the majority of households' mortgage remains in the normal payment stage (Category 1: Normal Credit Assets). The chances for households' mortgage to deteriorate into NPL without warning are minimal. The probability are 5.64%, 3.86%, 2.30% and 0.05%, respectively,

for household NPL mortgage from the most serious stage 4, 3, and lighter stage 2 to return to normal payment stages. In other words, it is worth noting that the once household mortgage enters into NPL stage, it will not be easy to for those overdue mortgage to return to normal payment stage. Thus, the banks should pay attention to changes in the conditions of the overdue loans to reduce bad debt losses. The estimation of NPL average survival time through fundamental matrix computation indicates that it takes 23.62, 7.38, 4.24, and 2.40 years, respectively, for household mortgage from previous 4 stages to reach final write-off stage. The more deterioration of NPL situation is, the shorter the average survival time across stage is. The risk will become relative higher once the mortgage life reach over 23 years. Thus it is appropriate to approve credit within 20 years to reduce risk exposure. However, Taiwanese banking practices frequently accept business loans up to a period of 30 years and thus increase significant degree of risk because the longer the life span of loans, the less its each phase amortization of principal, and thus the risk becomes higher for aging loans. Banking authority should be well aware of the relationship between loan risk and age and set a ceiling of limit on the life span of loans.

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