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CONTENTS

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EMPLOYABILITY AND JOB MOBILITY: CRITICAL SKILLS FOR NEW GRADUATES IN ASEAN

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ABSTRACT

This paper explores the level of student employability skill, and identifies factors that influence international mobility. The findings would help forecast employment trajectories of new graduates in the Southeast Asia labor market. The information will be especially useful for seven professional occupations including doctors, engineers, nursing, architecture, accountants, dentists, and surveyors. The sample sizes were 278 new graduates of five occupational programs; nursing, accountancy, engineering, doctor, and surveying, from Burapha University in 2012. The findings revealed that most respondents were male and graduated from engineering programs. We consider the intention of these new graduates to work aboard. The proportion of new graduates who have plans to work aboard and who have not was quite indifferent. Countries which new graduate would primarily expect to work in were Singapore, Malaysia, and Brunei. For graduates, self-assessed employability skill readiness for Southeast Asia labor market, the personal trait ranked first. Moreover, the most influential factor of new graduate job mobility was work experience, followed by higher wages, gaining promotions, life enhancement, and family concerns.

JEL: M 16, M50, M54

KEYWORDS: Employability, Job Mobility, International Mobility, New Graduates, Labor Market, ASEAN

INTRODUCTION

The Association of South East Asian Nations (ASEAN) market has been interesting for major countries over the world as a new consumer market due to the wealth of resources and huge quantity of people. Meanwhile, ASEAN has concern with group cohesiveness of 10 countries in the Southeast Asia region; Thai, Laos, Indonesia, Singapore, Malaysia, Philippine, Brunei, Myanmar, Cambodia and Vietnam. This concern stems from negotiation power and sharing resource within region. Moreover, these countries committed to the ASEAN Community in 2015 and aim to create a strong socio-culture community, economic community and security community.

In the ASEAN economic community (AEC), the ASEAN Summits have considered and approved the ASEAN single market concept. Under this program, ten countries can move goods, service, capital and skilled workers without inter-trade barriers, such as tariffs and regulations. This agreement will begin in 2020 and would strongly affect Thai workers if the government is not prepared to educate and fulfill people capacity, especially in 7 key professional occupations; doctors, engineers, nurses, architects, accountants, dentists, and surveyors that are the primary job mobility group.

The government, education ministry and academic institutes must concern the readiness of new graduates for AEC. Each year many students graduate from private and public academic institutes. A few of them cannot seek jobs. Thus, the education institutes play important roles in the labor market (Dekker, Grip, and Heijke, 2002) for guiding students on how to apply for job positions and plan their individual career roadmap.

Most new graduate applicants are over educated for their first jobs according to companies (Dekker, Grip, and Heijke, 2002). However, the quality of graduates have been a critical point. Not only is academic knowledge important, but also employability skill and job mobility. This paper aims to explore the level of student employability skill, and identify factors that influence international job mobility. The paper is divided into 5 parts. The first part is the introduction, the second part is a literature review, the third part describes the methodology, the fourth part presents the findings and the last part is a conclusion and discussion section.

LITERATURE REVIEW

Employability skills not only are basic skills necessary for getting, keeping, and doing well on a job, but also are attributes of employees that make them an asset to employers. Employability skills are generally divided into three skill sets; basic academic skills, high order thinking skills, and personal qualities that can be teachable by using a democratic approach. For example, teachers and parents should be good models. Students have opportunities to observe and learn workplace behavior that labor markets require. These methods increase student's awareness of values, attitudes and work responsibilities (Robinson, 2000).

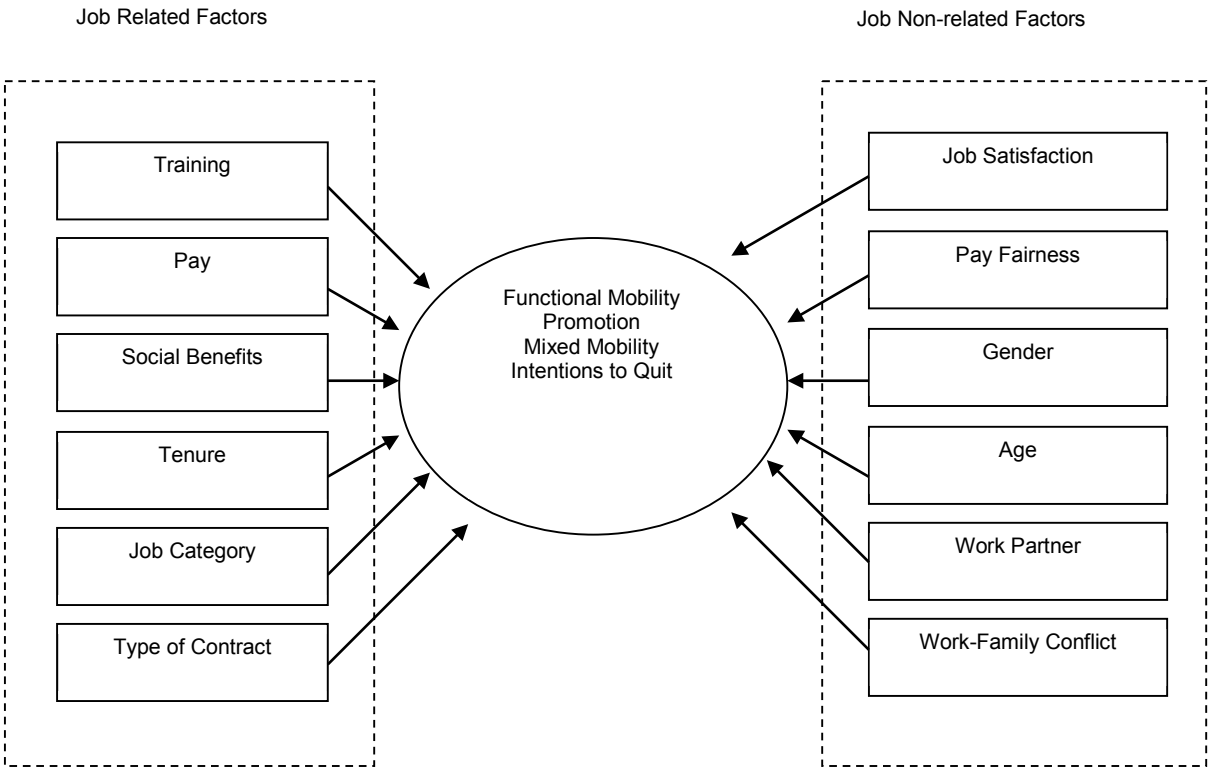
However, employability skills may change over time due to the evolution of knowledge, technology, and globalization. In 2011, Ju, Zhang and Pacha identified five employability skill that employers consider:
1. Basic skill – refers to ability to read with understanding, ability to listen actively, ability to speak so others can understand, and ability to convey ideas in writing. 2. Higher-order thinking skills refer to the ability to recognize and correct your own mistakes, ability to use critical thinking, ability to apply basic math, ability to solve problems, ability to negotiate and resolve conflict, ability to apply basic computer/technology skills, ability to make plans and work toward goals, ability to advocate for self, and ability to use creative thinking. 3. Basic work skills refers to the ability to be on time, ability to seek help when needed, ability to follow schedules, ability to cooperate with others and be a good team player, ability to stay with a task until finished, ability to work well with people from diverse backgrounds, and ability to monitor quality of work. 4. Social skills refers to ability to show respect for others, ability to use socially acceptable language, ability to accept authority, ability to maintain appropriate personal appearance (e.g., grooming, hygiene, and clothing), ability to accept criticism, and ability to control self and work without direct supervision. 5. Personal traits means demonstrating personal integrity/honesty in work, demonstrating responsibility in work, demonstrating ability to adapt to change, demonstrating motivation toward work, and demonstrating personal interest in work.

Job mobility has no single or widely accepted definition, but in the human resource management field, it refers to the flexibility of people to move to work in another place; such as other regions of the country or provinces, or even other countries. It refers to the freedom of workers to practice their occupation wherever opportunities exist. Thus, in this research, job mobility is defined as international mobility associated with the movement of individuals from one country to another for working or applying for new employment positions (Higher Education Institute, 2010), including move out or within ASEAN.

With regard individuals in early career stages, factors affecting job mobility across borders include cost of living, wage rate, and family concerns. Most workers search for firms that offer them the best opportunities; such higher wages, full time contracts, and job quality over the time of employment. Organizations seek persons who can maximize productivity and profit (Carroll and Powell, 2002). The term job mobility is often used to ask candidates about where they can live. It is a fancy way to let candidates know that moving residence will be beneficial to their career progression and organizational performance. Most companies appreciate pay allowances and expenses related to their movement, and family expenses when living aboard.

Previous research identified many factors that influence job mobility decisions, such job attractiveness which can be measured by the employee's perceptions about job benefits; such as job category, type of contract, pay fairness, benefit, and training (Carnicer, Sánchez, Pérez, and Jiménez, 2003; Granqvist, and Persson, 2005; Gesthuizen, 2009). Training can be divided into core training and career training. Dekker, Grip, and Heijke (2002) found career training influences mobility positively. Moreover, career opportunities, gaining promotion to a higher job level, influence the decision as well. Gesthuizen (2009) stated that job opportunity impacted job dissatisfaction and job characteristics on mobility.

Figure 1: Model of Labor Mobility (Carnicer, Sánchez, Pérez, and Jiménez, 2004)



In 2002, an OECD report revealed the new graduates were more self-confident. When they decided to apply for job or move to other countries, it depended on their own decision. Mostly, prior factors that related to job choosing were higher wages and work challenge opportunities (Organization for Economic Co-operation and Development (OECD), 2002: 3). Furthermore, the study of Luis Carmicer et al (2004, 199-219) found that gender and family concern influenced job mobility. Males tend to move to other countries more than females.

Lindberg (2009) studied international job mobility of the startup workers aged between 25-34 years old. Most participants attended student exchange programs when they studied in university. Carroll and Powell (2002), noted new graduates who have been aboard or had prior experience in international mobility, such in student exchange programs, tend to apply for international jobs more than new graduates who have been elsewhere. Doherty, Dickmann and Mills (2010: 378-400) found that applicants who had been aboard tend to work in other countries more than applicants who had not because the applicants who had never been aboard were concerned about work safety and comfortable living. Meanwhile, Csath (2008) studied international job mobility of Hungarian new graduates in an economic crisis period. He found the surprising result that new graduates need to work in their country even if they were unemployed because of fear to change environments.

METODOLOGY

This study used a survey approach to gather data, and employed simple descriptive statistics; such mean and standard deviation to analyze and describe new graduates' opinion in employability skill and job mobility for ASEAN. The paper employs *t*-tests and ANOVA to compare means between gender and occupational fields.

The populations were new graduates in five occupations; nursing, accountancy, engineering, doctor, and surveying, from Burapha University in 2012. These occupations were 5 of 7 professional occupations identified in ASEAN single labor market. Other professional occupations were not selected because the university has no related occupational programs. There are a total of 908 new graduated in five occupations. The author used Taro Yané function to calculate sample size and cluster random sampling to collect data. The sample size was 278 new graduates as show in Table 1.

Table 1: Population and Sample Size

Occupational Fields of New Graduated	Population	Sample
Nursing	146	45
Accountancy	112	35
Engineering	408	124
Surveying	212	64
Doctor	30	10

This table shows sample descriptive statistics.

The employability questionnaire was developed from employability skills of Ju, Zhang and Pacha (2011). These include basic skills, higher order thinking skills, basic work skills, social skills, and personal traits. There were 36 items in this section of the survey. To measure job mobility, the author developed question items from CHEERs Survey of Borghans and Golsteyn (2010) that consisted of five items. Both parts were five-point Likert scale ranging from 1 to 5 (strongly disagree to strongly agree).

FINDINGS

There were 665 returned completed questionnaires. The return rate was 73.23%. The respondents were 369 males (55.48%) and 296 females (44.51%). Graduates came from the engineering program (n = 251, 37.75%), followed by nursing program (n = 142, 21.35%) surveying program (n = 139, 20.90%), accountancy program (n = 112, 21.35%), and doctor program (n = 21, 3.15%). Considering intention to work aboard, 301 new graduates have plans to work aboard (45.30%) and 364 new graduates have not planned to work abroad (54.70%) as show in Table 2.

The results in Table 3 report expected ASEAN countries that new graduates would be most mobile to work in the future. The first ranking was Singapore (n = 454, 68.30%), followed by Malaysia (n = 135, 20.30%), Brunei (n = 94, 14.10%) Philippians (n = 91, 13.70%), Vietnam (n = 90, 13.50), Laos (n= 63, 9.50%), Indonesia (n = 45, 6.80), Burma (n = 20, 3.00%), and Cambodia (n = 14, 2.10%).

Table 2: Intentions to Work Abroad

Topics	Number of Employees	Percentage
Gender		
Male	369	55.48
Female	296	44.52
Occupational Field		
Nursing	142	21.35
Accountancy	112	16.85
Engineering	251	37.75
Surveying	139	20.90
Doctor	21	3.15
Intention to work aboard		
Have	301	45.30
Have not	364	54.70

This table shows intentions to work abroad. Respondent Characteristic (n = 665).

Table 3 Expected Job Mobility Countries

ASEAN Countries	Frequencies	Percentages
Singapore	454	68.30
Malaysia	135	20.30
Brunei	94	14.10
Philippines	91	13.70
Vietnam	90	13.50
Laos	63	9.50
Indonesia	45	6.80
Burma	20	3.00
Cambodia	14	2.10

Note: Select more than 1item (n=665)

Employability Skills and Job Mobility for ASEAN

For this part, new graduates have to self-assess their employability skill readiness for ASEAN. The personal trait ranked first ($\bar{x}$ = 4.22), followed by basic work skills ($\bar{x}$ = 3.93), social skills ($\bar{x}$ = 3.67), higher order thinking skills ($\bar{x}$ =3.60), and basic skills ($\bar{x}$ = 2.98). The factors influencing international job mobility of new graduates in by rank was work experience ($\bar{x}$ = 4.41), followed by higher wage ($\bar{x}$ = 4.28), gaining promotion ($\bar{x}$ = 4.19), living life enhancement ($\bar{x}$ = 4.14), and family concern ($\bar{x}$ = 3.99) as show in Table 4.

Table 4: Employability Skills for ASEAN

Factors	Mean	SD
Employability skill for ASEAN		
Personal traits	4.22	0.67
Basic work skills	3.93	0.68
Social skills	3.67	0.80
Higher order thinking skills	3.60	0.70
Basic skills	2.98	0.76
Factors influencing on job mobility		
Work experience	4.41	0.63
Higher wage	4.28	0.70
Gaining promotion	4.19	0.71
Living life enhancement	4.14	0.73
Family concern	3.99	0.87

This table shows employability skills for students from ASEAN. (N=665)

Regarding gender and factors influence international job mobility, Table 5 revealed gender and other factors influencing international job mobility was not significant with the exception of gaining promotion. This implies that opinions of male and female were not different.

When we test the occupational fields and factors that influence international job mobility we found occupational fields and most factors influence international job mobility were significant as show in Table 6. The statistic revealed the new graduates who came from different programs have different attitudes about factors that influence international job mobility including higher wages, living life enhancement, and family concerns.

Table 5: Gender and Factors Influencing on the Job Mobility

Factors influencing on job mobility	Male		Female		*t*
	Mean	*SD*	Mean	*SD*	
Work experience	3.89	0.91	4.02	0.85	0.14
Higher wage	4.17	0.72	4.14	0.73	0.06
Gaining promotion	4.33	0.75	4.43	0.59	0.00*
Living life enhancement	4.11	0.74	4.21	0.70	0.21
Family concern	4.24	0.74	4.30	0.69	0.95
Total	4.11	0.54	4.22	0.57	0.54

*This table shows Gender and other factors influence on job mobility. *p≤0.05*

Table 6: Occupational Field and Factors Influence on Job Mobility

Factors influencing on job mobility		Sum of Squares	*df*	Mean Square	*F*	*Sig.*
Work experience	Between Groups	4.743	7	0.678	.894	0.51
	Within Groups	498.219	657	0.758		
	Total	502.962	664			
Higher wage	Between Groups	17.202	7	2.457	4.773	0.00**
	Within Groups	338.227	657	0.515		
	Total	355.429	664			
Gaining promotion	Between Groups	4.387	7	0.627	1.570	0.14
	Within Groups	262.176	657	0.399		
	Total	266.562	664			
Living life enhancement	Between Groups	7.104	7	1.015	2.014	0.04**
	Within Groups	331.022	657	0.504		
	Total	338.126	664			
Family concern	Between Groups	6.927	7	0.990	2.029	0.04**
	Within Groups	320.357	657	0.488		
	Total	327.284	664			
Total	Between Groups	3.565	7	0.509	2.098	0.04**
	Within Groups	159.490	657	0.243		
	Total	163.055	664			

*This table shows occupation fields and other factors that influence job mobility. **p≤0.05*

CONCLUSION AND DISCUSSION

This paper explores the level of student employability skills, and identified factors that influence international job mobility. The findings would be beneficial to forecast employment trajectories of new graduates in the ASEAN labor market, especially the seven professional occupations examine in the paper: doctor, engineer, nurse, architect, accountant, dentist, and surveyor. The findings show that most respondents were male and graduated from an engineering program. Considering intention to work aboard of new graduates, the proportion of new graduates who have thought about working aboard and who have not was quite indifferent. Countries which new graduate would expect to work by rank are Singapore, Malaysia, and Brunei.

The most important factor that influenced the decision to work in ASEAN countries was work experience. This may be because working abroad would help graduates obtain a world view in terms of working style and general life. The study of Doherty, Dickmann and Mills (2010: 378-400), identified young workers

who work in a foreign country had key a motivation to travel and study the culture and traditions of other peoples.

The lowest rank factor influencing the decision to work in ASEAN was family concern. This may be because young worker have no family responsibilities. The study of the Organization for Economic Co-operation and Development (OECD) (2002: 3), found that new graduates had higher self-confidence. Therefore, the power to decide to apply for a job or move to another place depends on decisions of new graduate themselves. When new graduates assessed their employability skill readiness for ASEAN we found that the new graduates had less basic skills including the ability to use English language as a secondary language.

Further research, should study correlation between attending international exchange programs and factors influencing on job mobility of new graduates, including employment interviews or focus group techniques to find reasons for the decision to apply for jobs in other ASEAN countries.

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BIOGRAPHY

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EMOTIONAL INTELLIGENCE UNDERSTANDING AMONG REAL ESTATE PROFESSIONALS

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ABSTRACT

Having competency in emotional intelligence has proven to be an effective skill leading to an individual's overall success in the workplace. When working with real estate clients, awareness and proper application of emotional intelligence could benefit the realtor by meeting the needs of their clients. An online survey instrument was distributed through social media (Linkedin and Facebook). The survey addressed 17 questions ranging from the acknowledgement of the rules of engagement to denoting an agent's gender. Eighteen real estate professionals participated in the study. Survey results supported the conclusion that an awareness of emotional intelligence among licensed real estate professionals exists, and realtors could be trained on the topic of emotional intelligence. By noting the benefits of being aware of emotional intelligence and providing the appropriate application training, increased financial returns for the agent and greater customer satisfaction may be achieved.

JEL: M00, Z00

KEYWORDS: Emotional Intelligence, Real Estate Professionals, Realtor™

INTRODUCTION

Fair and appropriate compensation for work exists throughout the business environment. Success and promotion within the work environment depends upon the ability to get along with management, peers and clients. Regardless of the chosen field, the understanding and effective application of emotional intelligence (EI) has been proven to be an effective tool in providing positive benefits in the workforce (Kidwell, Hardesty, Murtha, & Sheng, 2011; Lam & Kirby, 2002; McCoy, 1997). For this study, the researchers focused on licensed real estate professionals. By possessing the EI skills, one can achieve greater financial success yielding in a greater agent-customer experience. This study analyzes data collected from a survey of licensed real estate agents. The researchers determined whether an understanding and application of EI can quantifiably improve Realtors'™ efficiency and effectiveness with clients and coworkers. The remainder of this document includes three sections: a) a literature review, b) a data and methodology area, and, c) concluding comments. The literature review includes a history of EI as it relates to sales and the real estate profession. Next, the method for obtaining the results and the data is presented in tabular format with a brief explanation. An analysis of the data and whether the hypothesis was supported will be discussed. Finally, we present concluding statements and offer suggestions for future research.

LITERATURE REVIEW

The purpose of this literature review was to identify the current literature available in the field of EI, sales, and real estate. Researchers used EBSCOHost, ProQuest, and Google Scholar to conduct their research. EI is a learned and practiced skill (Goleman, 1998). Few peer-reviewed journal articles were found on EI and real estate sales. Several studies were found on how individuals with high EI can enhance and increase the potential for positive outcomes (Carmelli, 2003; Deeter-Schmelz & Sojka, 2003; Landy, 2005; Sojka & Deeter-Schmelz, 2002). Real estate sales professionals could work to increase their EI to be successful

when working with clients (Crant, 1995; Cross, Brashear, Rigdon & Bellenger, 2007; Kidwell et al., 2011; Rozell, Pettijohn, & Parker, 2004). Mayer and Salovey (1997 called it, "The ability to perceive, integrate, understand and reflectively manage one's own feelings and other people's feelings" (p. 103). Research revealed a connection between EI and performance. EI as it relates to real estate sales has briefly been discussed in scholarly literature. Most of the peer-reviewed literature related to general sales efforts. By conducting this study, the results may benefit the field of real estate and in a greater sense may change the landscape of communications and relationships in business and academia.

Gardner (1983, 1993) introduced the theory of multiple intelligences and claimed humans were intelligent far beyond the traditional concept of math and language. Gardner's definition of intelligence was "the ability to solve problems, or to create products, that are valued within one or more cultural settings – a definition that says nothing about either the sources of these abilities of the proper means of 'testing' them" (p. x). People must broaden the concept of human intelligence by including a wider set of competencies. Gardner suggested eight intelligences (1999):

> *verbal-linguistic intelligence, the ability to possess spoken and written language skills (lawyers, speakers, educators);*
>
> *logical-mathematic intelligence, the ability to analyze problems logically and carry out mathematical operations, and conduct scientific inquiry (mathematicians, statisticians, scientists);*
>
> *musical intelligence, appreciation and recognition of rhythm and musical patterns (musicians, composers, performers;*
>
> *bodily-kinesthetic intelligence, the ability to use part of all of one's body to solve problems (athletes, dancers, surgeons, mechanics);*
>
> *spatial intelligence, the ability to view and manipulate wide areas of space (navigators, pilots, graphic artists, architects);*
>
> *interpersonal intelligence, the ability to understand the motivation and feelings of others (educators, salesperson, religious leaders, political leaders); and*
>
> *intrapersonal intelligence, the recognition and understanding of one's own emotions and desires and the "ability to use the information in productively regulating one's life" (p. 43).; and,*
>
> *naturalist intelligence, the recognition of flora and fauna (environmentalist, gardener, botanist, scientist).*

Goleman (1995) declared EI, Gardner's intrapersonal intelligence, as the ability to motivate oneself and continue in the face of frustrations, to control impulse and delay gratification, and to regulate one's moods. Beyond the traditional intelligence quotient (IQ) that measures verbal-linguistic and logical-mathematical intelligences as a predictor of academic success, Goleman believed IQ only contributed about 20% to the factors determining life success, while 80% of contributions were in other influences (McCoy, 1997, p. iii). People with high EI could enjoy a more satisfying and rewarding career and life (McCoy, 1997). For this reason, Gardner's intrapersonal and interpersonal intelligences are critical for sales people. Individuals who perform with high EI effectively handle frustrating circumstances. Goleman (1995) posited that interpersonal intelligence is the ability to perceive and relate to the emotions of others effectively. Both intrapersonal and interpersonal skills are essential in successful and productive sales people. Deeter-Schmelz and Sojka (2003) identified a high level of interpersonal skills as the link between a sales persons' EI and sales performance.

Tasso (2009) discussed a sensitive trust that related to EI. Much like EI, the ability to sell is not innate or inherent. A successful Realtor™ understands the needs of the client and the clients themselves. Kidwell et al. (2011) discovered that when using EI, real estate agents perform effectively. Success is the goal of a real estate professional. Golis (2011) discussed the relationship between EI and the intelligence quotient (IQ) and their relationship to success. Although individuals do not agree on the importance of EI in success, many sales professionals have been trained with no real credit given to the study of EI. Golis promoted that establishing better relationships can develop, thus increasing sales. Developing open relationships is a key factor in sales success.

Ritter (2011) defined EI by beginning to define emotional quotient (EQ), as Goleman has questioned whether IQ alone determines success. IQ is no longer the absolute indicator of overall success. Unlike IQ, EI can be improved by learning about it, practicing it, and improving it. Blocker (2010) described the quality of EI between agents and their clients that promotes specifically, that EI can produce a negative effect impact on sales performance. Noting a two-sided study, Blocker found that being on the same emotional wavelength, with their clients, is an important factor to creating value and promoting positive relationships. Real Estate Agents and their clients showed that the party possessing the most (strongest) EI determined in part, the success of a transaction. Training was emphasized to correct imbalances.

Sarkar (2010) conducted a study that attempted to account for the other 80% of the factors that contribute to overall success. Sarkar attempted to understand EI and that spiritual intelligence are related. Doehrman (2003) focused on the training and development in fostering true leaders (their ability to motivate others) involved effective communication, mainstream EI, and the appreciation of one's own, as well as others' intelligence and the ability to leverage strengths and minimize drawbacks. Doehrman supported the idea that leadership requires seasoned maturity, experience, and EI in order to develop time leadership. Doehrman fostered the notion that individual professional promotion depends on emotional dependency. Lam and Kirby (2002) discussed the importance of EI and its relation to performance and productivity. As an increasingly popular consulting tool, EI accounts for increases in individual cognitive based performance over and above the level attributed to traditional general intelligence. Emotional intelligence was broken down into three components: perceiving, understanding, and regulating. McCoy (1997) identified emotional hijacking as when people become enraged over trivial events. At times, emotions take over the entire experience and create a bigger situation than really exists (Goleman, 1995). Oftentimes, real estate decisions are made based on elements out of one's control, such as an economic bubble or the fiscal cliff. Clients turn to Realtors™ for answers and may get emotional when considering items that are beyond their control, thus creating an emotional meltdown or an emotional hijacking. A real estate agent with high EI could be better prepared to cope with emotional situations.

Kokemuller (2014) described the suitable careers, such as sales professionals, as having high EI to achieve positive results. Working well with others, controlling emotions and having empathy for others are paramount in the sales career field. Weisinger (2012) applied the importance of EI as it specifically related to Realtors™ and their individual success. Developing ones' EI through self-awareness and reacting appropriately in sensitive emotional situations are keys to success for anyone in the real estate profession. Naghavi and Redzuan (2011) stated that EI has been associated with satisfaction, adaptability, overall intelligence, personality, and emotional disorders. Naghavi and Redzuan described the difference between the genders. Their research supported that females have higher EI than males, yet, high EI in males provides a better predictor of achievement and success than in females.

DATA AND METHODOLOGY

The researchers conducted a pilot study using an online survey instrument. As presented in the Van Teijlingen, Rennie, Hundley, and Graham (2001) report, a pilot study may be completed in preparation for

a future study. Conducting a pilot study allows the researchers to modify the study questions, if needed (van Teijlingen et al., 2001). Survey research is commonly used in applied social research (Trochim, 2006). Kelley, Clark, Brown and Sitzia (2003) stated that the root of social surveys was in Victorian England where "social reformers" (para. 1) gathered information on the working class and poverty levels. The study was conducted using an Internet survey tool called Survey Monkey. One of the benefits of the survey methodology was the ability to create anonymity and reduce the chances of participants to influence other participants. Braidfoot and Swanson (2013) and Zobisch and Swanson (2013) used a similar research technique with success. Using an online survey instrument allowed for participants to remain anonymous. Eighteen participants completed the online survey at their own residence or office and could not be influenced by other participants.

RESULTS AND DISCUSSION

An introductory question (not included here) addressed the understanding of the rules to participate in this survey with 100% of participants responding that they were at least 18 years old. In question one, the participants were asked if they were currently a licensed real estate sales agent. Seventeen of 18 participants were currently licensed. Participants were asked where they received their license. Participants were licensed in 11 different states: Colorado (five), Arizona (three), California (one), Illinois (one), Iowa (one), Louisiana (one), Maryland (one), Oklahoma (one), Oregon (one), Tennessee (one), and Washington (one) (Table 1).

Table 1: Number of Licensed Real Estate Agents

Question	Yes	No	Other
1: Are you currently a licensed real estate agent?	17 (94%)	1 (6%)	CO (5), AZ (3), CA (1), IL (1), IA (1), LA (1), MD (1), OK (1), OR (1), TN (1), WA (1)

This table shows how many realtors participated in the survey and where the participants were from.

In this section of the survey, the researchers assessed the participants' knowledge of emotional intelligence. Participants indicated whether they had received any training on emotional intelligence. Almost 90% of the participants had heard of emotional intelligence, yet almost 90% of the participants had not received any formal training on emotional intelligence either as part of their real estate licensing or in another field of study. Almost 90% of the participants had experienced a situation where a client became distraught or emotionally upset (Table 2).

Table 2: Participants Who Heard of Emotional Intelligence, Were Trained, and Have Experienced an Emotional Situation on the Job

Question	Yes	No
2: I have heard of Emotional Intelligence	16 (89%)	2 (11%)
3: Have you had any formal training in emotional intelligence as a part of your real estate licensing course work or renewal?	2 (11%)	16 (89%)
4: Have you received emotional intelligence training as a part of another field of study?	8 (44%)	10 (56%)
5: When meeting with clients in the past, have you personally experienced a situation where a client became distraught or emotionally upset?	16 (89%)	2 (11%)

This table shows how many realtors had heard of emotional intelligence and whether they have received any training on emotional intelligence. The final question identifies the number of participants who have experienced an emotional situation on the job.

Looking at the responses in terms of groupings, disagreed and strongly disagreed are grouped together and agreed and strongly agreed are grouped together. Three themes emerge from the responses: 1) EI is

beneficial; 2) EI could be a part of real estate training, and 3) EI could improve productivity. Participants stated that EI is both a learned and an innate trait. Participants stated that EI training is valuable and could be implemented in the overall training for the real estate profession. Eighty-eight percent of participants believed that if training in EI could increase their productivity by 25% they would like to participate in training (Table 3).

Table 3: Overall Understanding of Emotional Intelligence

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6: I have a clear understanding of emotional intelligence.	0	2 (11%)	2 (11%)	8 (44%)	6 (33%)
7: I believe that using emotional intelligence in my work as a realtor is useful.	9 (50%)	6 (33%)	3 (16.6%)	0	0
8: I believe that emotional intelligence is only a talent you are born with.	4 (22%)	8 (44%)	4 (22%)	1 (5%)	1 (5%)
9: I believe that emotional intelligence is only a learned behavior.	3 (16.6%)	9 (50%)	3 (16.6%)	2 (11%)	1 (5%)
10: I believe that emotional intelligence is both a talent you are born with and a learned behavior.	0	1 (5%)	2 (11%)	8 (44%)	7 (39%)
11: I believe that using emotional intelligence in my work as a realtor could improve my job performance.	0	0	0	8 (44%)	10 (55.5%)
12: "Emotional intelligence is your ability to recognize and understand emotions in yourself and others, and your ability to use this awareness to manage your behavior and relationships" (Paterson, 2011, p. 80). When working with clients do you use emotional intelligence?	0	0	0	8 (44%)	10 (55.5%)
13: Bradberry and Greaves (2009) indicated that EI is "so critical to success that it accounts for 58% of performance in all types of jobs" and "is the single biggest predictor of performance in the workplace and the strongest driver of leadership and personal excellence" (p. 20). Based on this statement, should emotional intelligence be included in the primary curriculum for licensing of real estate professionals?	1 (5%)	2 (11%)	4 (22%)	6 (33%)	5 (27.7%)
14: Do you think that emotional intelligence should be included as a continuing education unit (CEU) for real estate sales professionals?	0	2 (11%)	4 (22%)	5 (27.7%)	7 (39%)
15: When dealing with an emotionally distraught client, did you feel comfortable with the situation and confident in knowing what to do?	1 (5%)	1 (5%)	4 (22%)	6 (33%)	6 (33%)
16: Would training in dealing with an emotionally distraught client be beneficial to you?	0	0	3 (16.6%)	7 (39%)	8 (44%)
17: If appropriate training in emotional intelligence could increase your productivity by 25% or more, would be of interest to you?	0	0	2 (11%)	8 (44%)	8 (44%)

This table reflects participants' opinions on emotional intelligence explaining their knowledge and understanding of EI and their ideas on incorporating training into the real estate profession.

CONCLUDING COMMENTS

The purpose of this study was to assess the current level of understanding and significance of EI among real estate professionals. In this pilot study, licensed realtors were found via social media (Linkedin and Facebook) and responded to 17 questions. The results of the study reflected a positive relationship between EI and realtor economic rewards and client satisfaction. Having an EI competency has proven to be an effective skill for sales people (Kidwell et al., 2011). The understanding and the application of EI appears to be an effective tool in providing positive benefits in the workplace. By possessing the necessary skills, in this discipline, one can increase his or her chances of greater financial success and improvements in interpersonal skills. Although the researchers found a strong awareness of EI among the participants, they indicated a lack of training in EI skills. Formalized EI training could increase their success, both in maintaining a strong client base and having greater financial rewards.

Strengths and limitations of the study exist. A strength was the ability to generalize these results throughout the overall population of real estate professionals. A limitation of the study included the self reporting of participants. Future research will be conducted in the area of EI and real estate professionals, specifically, a Delphi study establishing the expert opinions on implementing EI in the real estate field.

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BIOGRAPHIES

Dr. Andree Swanson is a full-time Assistant Professor in the Forbes School of Business at Ashford University. She earned a Bachelor's degree in Business Administration and Management from the University of Maryland European Division, a Masters of Human Relations from the University of Oklahoma, a Masters of Arts in Organizational Management from the University of Phoenix, and a Doctorate in Educational Leadership from the University of Phoenix. She has specialized in distance learning, and values teaching students with diverse backgrounds and schedules. "Having earned my degrees from both traditional classrooms and online learning systems, I value the interactive and responsive instructor." In addition to acting as an educator, Dr. Swanson has worked as a corporate trainer, at one point becoming the national training manager for a rental company. Andree and her husband, Craig, enjoy their family, genealogical research, Facebook, and travel. They also own four Irish Setters and have two champions Wilson and Stewie, and one up and coming *Kamikaze Ozzie.* See Dr. Swanson discuss Ashford's Master of Arts in Organizational Management program. - See more at: www.ashford.edu/community/12732.htm#sthash.wHF3udlt.dpuf

Dr. Paula J. Zobisch is an Assistant Professor in the Forbes School of Business at Ashford University. She earned her PhD in Adult Education from Capella University. Her Master of Business Administration with an emphasis in Marketing and her Bachelor of Science in Business are from the University of Central Oklahoma. Dr. Zobisch has over 20 years experience in the marketing field and has worked in business-to-business industrial sales and as a director of marketing for a 3M distributor. She teaches marketing management, consumer behavior, and marketing research courses at Ashford. Dr. Zobisch says, "I am a perfect example of how an adult can be successful and grow while attending school. I earned all of my degrees while working full time and raising a family, in addition to maintaining a home as a single parent. It seems the more I learn, the more I am aware how much there still is to learn." She resides in Broken Arrow, Oklahoma, and has two adult sons and four grandchildren. Dr. Zobisch enjoys outdoor activities, jumping the waves on her Sea Doo, is a certified Krav Maga instructor, and is currently working on her black belt, second level, in the Executive Black Belt Club in Tae Kwon Do. - See more at: http://www.ashford.edu/community/business-paula-j-zobisch.htm#sthash.k18DxW3e.dpuf

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REVERSE LOGISTICS PRACTICES IN PHARMACEUTICAL MANUFACTURING INDUSTRY: EXPERIENCES FROM GHANA

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ABSTRACT

This paper examines reverse logistics practices in the pharmaceutical manufacturing industry in Ghana. The sample were selected on hierarchical levels using stratified sampling methods. With a 100% response rate, data gathered from both primary and secondary sources were analyzed using quantitative and qualitative techniques. The research revealed a gap in the flow of reverse logistic activities; from drug returns to its disposal. Most returns were from wholesalers with the end consumer playing little or no role. Drugs were frequently disposed of by burning in open containers or through open uncontrolled non-engineering dumps. However such practices are recommended as a last resort in the extant literature. We recommend adoption of an enterprise system such as enterprise resource planning (ERP) for drugs reverse logistics activities and implementation of an efficient method for drug disposal by pharmaceutical manufacturing companies in Ghana.

JEL: M11, M19, I10

KEYWORDS: Reverse Logistics, Supply Chain, Waste Disposal, Pharmaceutical Industry, Ghana

INTRODUCTION

Recently, considerable attention has been given to the study of reverse logistics in the pharmaceutical manufacturing industry. Ample time and resources are now being devoted to the understanding of reverse logistics practices by companies who previously did not do so. Almost all businesses must deal with some nature of return due to issues of marketing returns, quality problems, overstock, goods brought back for refurbishing or re-manufacturing. Learning to manage reverse flow is of key importance for various industries since return rates differ significantly from business to business (Rogers and Tibben-Lembke, 2001).

Reverse logistics involves the collection of goods from end consumers, sorting of the goods received, disposal of goods and retrieval of components at various stages in the supply chain and remanufacturing processes (Bhavin, 2010). Various reasons such as warranty failures, incorrect product orders or shipment, damaged products, product recalls, reusable packaging materials and product upgrading account for reverse flow (Kabir, 2013). In the pharmaceutical industry, reasons for product returns are often associated with damages and product expiry, counterfeits, product recalls and clinical trial recoveries (Bhavin, 2010). Issues of temperature excursion and product expiry are often not evidenced in Ghana and can cause losses and negative side effects. For instance temperature excursions can reduce effectiveness, reduce shelf life, or alter the potency of a drug and make it harmful. Counterfeit and stolen product continue to be a major threat

in the pharmaceutical manufacturing industry (World Health Organization, 2010). Improper management of returned drugs can involve rerouting into the black market and relabeled for sale or disposed of into sewerage and landfill. This would have negative impact on the health of the people and the environment in the long term. Another aspect has to do with securing and proper disposal of returned products. Thus, it is increasingly important to implement an improved reverse logistical chain to provide a cost effective, tract and trace options for the pharmaceutical supply chain.

The remainder of this paper is organized as follows: The next section examines literature on reverse logistics practices. The subsequent section briefly describes the methodology employed, outline and analyzed results obtained from the data. The final part of this paper will discuss the conclusion and recommendation respectively.

LITERATURE REVIEW

The success of any industry in today's highly competitive business environment depends to a large extent on supply chain effectiveness. Competition has extended from business to business to competition between supply chains (Anindya, 2003). Supply chain describes all direct and indirect parties who comes together to fulfill a customer's needs (Chopra and Meindl 2007). Management understands that mistakes from any member of the supply chain can affect the operation and profitability of the organization. Reuse of material is a common practice in supply chains. However, the backward or reverse supply chain has long been overlooked by some companies. Such reverse supply chain is referred to as reverse logistics.

Originally reverse logistics was defined as the process of recapturing value through planning, implementing and controlling effective and efficient flow of materials from customer's end towards the origin (Murphy and Poist, 1989; Kroon and Vrijens, 1995). A more environmental oriented definition was given by some authors describing it as a process of becoming environmentally efficient through recycling, waste disposal, reusing material and material reduction (Stock 1998; Carter and Ellram, 1998, Giuntini and Andel 1995). This is considered green logistics by others (Rogers and Timben-lembke, 1999). Most of these definitions focus on the return process but reverse logistics is more recently defined as the management of assets across various industries and disciplines. This does not only focus on the returns process but on other areas such as order fulfillment, customer service, parts management and end of life manufacturing (Pinna and Carrus, 2012). According to De Brito and Dekker, 2004, four perspectives need to be considered in analyzing the reverse logistics process; the "Why" referring to the reverse logistics driving force; the "What" describing the product type, the "How" in reference to the recovery process and the "Who" referring to the facilitators of the reverse.

The nature of work in this industry differs from other manufacturing industries as such, products returned and retrieved in times of reverse logistics are seldom repaired or resold but instead destroyed and disposed-off properly (Kabir, 2013). Blumberg in 2008 indicated that the general direction of global pharmaceutical reverse comprises recall management, disposal & destruction, Asset recovery & liquidation, Rebalancing & restocking of products as well as Optimization of transportation & shipping costs. The ability to track, retrieve and manage return product in the entire supply chain is of prime importance in the pharmaceutical manufacturing sector. Lots of pharmaceutical products are unable to be recovered in times of reverse logistics. It was estimated that only 3-4 % of pharmaceutical products are returned to manufacturer for disposal (Sartori, 2010).

Majority of pharmaceutical reverse logistics concerns deal with counterfeit and drug expiry, low shelf live, unscrupulous mediators and improper disposal of unused and unwanted pharmaceuticals (Kan and Subzwari, 2009). It has been estimated that in developed countries approximately 1% of pharmaceutical trade involves counterfeit drugs. This ranges from 30% to 40% in developing countries (World Health Organization, 2010). Also 80% of waterways tested in the USA showed traces of common medication

(Amporful, 2012). In Ghana, 20% of chronic diseases like kidney disorders have been attributed to the intake of expired drugs (Addo, 2005). Due to this, a lot of consideration is taken into account with reverse activities in pharmaceutical manufacturing industry, among these include; accurate tracking and visibility, batches and expiry control, cold chain requirements, proper storage and disposal.

DATA AND METHODOLOGY

The population for the study included managers, assistant managers, supervisors and staffs of pharmaceutical manufacturing companies in Ghana. The total sample size was fifty-two respondents. Qualitative and quantitative tools were applied in collection, processing and analyzing the data. To ensure the representative of various departmental members, stratified sampling was used to categorize the population into four strata based on hierarchical levels as follows; managerial level, deputy managerial level, supervisory level and staff level. The data collection methods employed was questionnaires and personal interview. The questionnaire was comprised of both closed and open-ended questions and was self administered. Key informants were interviewed using structured and semi- structured questionnaire. The study also sourced data from secondary sources such as journals, research books and the internet. The data was collected in May 2013 using the cross sectional method.

RESULTS AND DISCUSSION

Respondent View on Product Returns

Table 1 shows, 96.154 % respondents answered yes to the fact that drugs were allowed to be returned to their company whereas 3.846% answered no, indicating a high level of knowledge in reverse logistics processes with regard to drug returns. When respondents were asked about the frequency of drug returns, 57.692% of respondent stated that drugs were returned when the need arose; 1.923% answered daily, 3.846% said weekly, 7.692% said monthly, 5.769% answered quarterly, 15.385% answered annually and 7.692% respondents had no knowledge. When a follow up question was asked to ascertain the reason for return of the drugs, 65.385% of the responses stated reason of damage to the drug content or its package. 9.615% shared similar response but added that, drugs are sometimes ordered for recall from the market by the Food and Drugs Board (FDB). In addition, 3.846 % of respondents stated that, aside from FDB mandatory orders, drugs are mostly returned when their life span was exceeded (expired). An additional 3.846% ascribed drug return to expiry only. 3.846% said it was solely due to FDB order. The remaining 13.461% gave other reasons, among which include 1.) Damaged drug/package and expired drugs, 2) Damage drug/package and temperature excursion damages, 3) Temperature excursion damages only, 4) Wrong shipment only, 5) Wrong shipment and FDB order, 6) Wrong shipment and expired drugs.

The respondents view indicates that, drug returns were dependent on prevailing circumstances. Nevertheless, it could be deduced that, damage to drug contents or its package were noticeable to most customers and hence triggered returns as opposed to temperature excursion damages and drug expiry. In responding to the question about which partner(s) often returned the drugs, 44.231% of respondents revealed that drugs were mostly returned by wholesalers. 25% said by retailers; 19.231 % opined that both wholesaler and retailer returned drugs while 11.538% of the respondent had no prior knowledge. This meant any partner of the chain, aside from the end consumer is allowed to returned drugs. This could be attributed to the fact that most pharmacies do not accept prescription drug returns as it is illegal to dispense such drugs (Greenberg, 1988). The integrity of the returned prescription drugs cannot be guaranteed hence once received and must be destroyed. Moreover, it can be attributed to the fact that end users usually do not receive refund for drug returns, hence are not compelled to return.

Table 1: Respondents View on Product Returns

	Frequency	Percentage	Cumulative Percent
Are products allowed to be returned to the organization			
Yes	50	96.154	96.154
No	2	3.846	100
Total	**52**	**100**	
How often are product returned			
Daily	1	1.923	1.923
Weekly	2	3.846	5.769
Monthly	4	7.692	13.461
Quarterly	3	5.769	19.230
Annually	8	15.385	34.615
Other reasons	34	65.385	100
Totals	**52**	**100**	
What reason account for the return of products			
Damage to product/ package (A)	34	65.385	65.385
Wrong shipment (B)	1	1.923	67.308
Expired drugs(C)	2	3.846	71.154
FDB order(D)	2	3.846	75.000
Temperature excursion damages (E)	1	1.923	76.923
Wrong shipment & expired drugs (B and C)	1	1.923	78.846
Damage product/package & expired product (A and C)	2	3.846	82.692
Damage product/package & FDB order (A and D)	5	9.615	92.307
Damage product/package & temperature excursion damages (A and E)	1	1.923	94.230
Wrong shipment and FDB order (B and D)	1	1.923	96.153
Expired drugs and FDB order (B and D)	2	3.846	100
Total	**52**	**100**	
Which partner(s) often return products			
Wholesalers	23	44.231	44.231
Retailers	13	25.000	69.231
Wholesalers and Retailers	10	19.231	88.462
No fore knowledge	6	11.538	100
Total	**52**	**100**	

The table shows respondent views on reason for product return, how often products are return and partners of the chain that often return product. The various question respondents were asked are presented in the first column. The subsequent columns consist of the various frequencies, their percentage and cumulative percent obtain from their responses

Respondent Views on How Companies Obtain and Dispose of Returned Drugs

Table 2 shows results of how companies obtain and dispose of returned drugs. The results show companies received such returns 75% of respondents stated that the department responsible goes for the drug when notified. Some 9.615% of respondents said drugs are sent to a central location point provided by company. Another 3.846% stated by retailers and 5.769% noted the drugs are returned by the wholesalers. Some 3.846% stated drugs were returned by both the retailers and wholesalers.

Another 1.923% of respondent stated that drugs sale/marketing department goes for it or it is returned by the wholesaler. This implied that companies have a system to receive return drugs and also bore most of the cost during drug return confirming why 75% of the respondents chose that answer. The respondents further indicated that aside from the above reasons, their company also resorted to drug recalls when a drug exceeded its shelf live. The reason was to protect the product brand and build customer loyalty. When respondents were asked of other means by which their company could receive the drugs, (56%) stated that their company could have a central designated location where the entire drug will be deposited and collected by the company. Another 20% stated that all drugs could be sent to the wholesales' end to enable the company to collect directly from them (16%) said drug could be collected on a daily basis. Another 4% suggested the use of the media as a medium to inform and collect drugs from the customers the company deals with.

Table 2: How Does the Company Obtain Returned Drugs?

Channels	Frequency	Percentage	Cumulative Percent
the product are sent to a central location point provided by the company (A)	5	9.615	9.615
The department responsible go for the product when notified (B)	39	75.000	84.615
Product are returned by wholesalers(C)	3	5.769	90.384
Product are returned by Retailers(D)	2	3.846	94.230
The department responsible go for the product when notified & product are returned by wholesalers (B and C)	1	1.923	96.153
Product are returned by wholesalers & retailers (C and D)	2	3.846	100
Total	**52**	**100**	
What disposal method(s) is/are used to handle expired drugs			
Burning (A)	38	73.077	73.077
Landfill (B)	4	7.692	80.769
Incineration (C)	1	1.923	82.692
Sewer (D)	1	1.923	84.615
Burning and landfill (A and B)	3	5.769	90.384
Landfill and Incineration(B and C)	2	3.846	94.230
Burning and Incineration (A and C)	2	3.846	98.076
Landfill and sewer (B and D)	1	1.923	100
Total	**52**	**100**	
What disposal method(s) is/are used to handle damage drugs			
Recycle(A)	18	34.615	34.615
Salvages(B)	9	17.308	51.923
Landfill(C)	6	11.538	63.461
Burning (D)	14	26.923	90.384
Landfill and salvage (B and C)	5	9.615	100
Total	**52**	**100**	
What method(s) are employed for wrong shipments			
Re-deliver	49	94.231	94.231
Donate	1	1.923	96.154
No fore-knowledge	2	3.846	100
Total	**52**	**100**	

The table describes respondents view on the method(s) used to dispose of expired, damaged, and wrongly shipped drugs. The column labeled methods employed represent the methods used. The corresponding frequency, percent and cumulative frequency of various responses to method employed is depicted in the next three columns

Some 73.077% of respondents stated that, expired drugs are disposed through burning. Landfill was given by 7.692% of the respondents. "Burning and Landfill" was given by 5.769% of the respondents. Besides this , "Burning and Incineration", "Landfill and Incineration" as well as "landfill and sewer" were given by 9.615%. The remaining 3.846% gave other methods such as only "Incineration" and "sewer" as depicted in Table 2. In answering the reason for the chosen methods above, 34.615% out of the 73.077% respondents who chose burning stated it prevents theft and drugs being consumed by third parties. Preventing the drug from entering the production floor was given as a reason by 11.538% respondents and 7.692% respondents said burning completely destroys the drug avoiding residue. However, 19.231% said it was the only option available but hope to use better mechanisms in the near future. Some 5.769% out of the 7.692% respondents who chose landfill stated that it protects the environment by preventing air pollution. The remaining 1.923% specified that landfill method for disposing expired drugs was the best option available. All the 7.692% respondents who chose "Burning and Incineration" as well as "Landfill and Incineration" gave reason of total destruction of drugs avoiding any remains. A total of 11.539% had no idea about why such methods were used.

The survey confirms that, incineration which is better than burning in the open air is hardly used by the companies. The use of burning can be attributed to the cost involved in the use of incineration. Even though

incineration prevents the release of toxic pollutants, it is economically expensive and hence is rarely used by developing countries (Salah, 2010; World Health Organization 1999).

By our analysis of the data collected, 34.615% of respondents stated their company recycles damaged drugs. 17.308% said their company salvages damaged drugs. Landfill was given by 11.538% respondents. 9.615% respondents stated that the company adopt "Landfill and Salvage" and 26.923% said burning was used for damaged drugs. Some 21.154% out of the 34.615% responded who choose recycling specified that active ingredient of the damage drug can be reused. The remaining 13% said recycling saves their company cost. All 17.308% respondents who chose salvage specified that not all damaged drugs could be recycled hence the need to select the good from the bad. Some 7.692% out of the 11.538% respondents who chose landfill gave reasons of preventing air pollution while the remaining 3.846% of the respondents said they had no ideas of the reason for such method. The 9.615% respondents who chose (landfill and salvage) stated that damaged drugs due to package were sorted out and repackaged while those due to the drug itself were destroyed by landfill. All 26.923% who choose burning stated damage product could not be recycled hence needs to be burnt thoroughly.

Concerning disposal options, a majority of respondents (94.231%) said their company re-delivers the drug to the rightful customer. Some 1.923% said the company donates and 3.846% said their company recycles. In answering the reason for the chosen methods, all respondents 94.231% who chose "re-deliver" stated that the drug was not faulty in any way. The remaining 5.769% respondents who chose donate and recycle had no idea of why such methods were used.

Respondent View on Disposal of Drugs by Partner of the Chain

This part of the questionnaire was to solicit the role of partners in drug disposal. A mean of 4.3077 obtained from the assessment showed respondent disagreement to the statement. The standard deviation of 0.98097 showed the proximity of various responses to each other as shown in Table 3 below. Most respondent were of the view that disposal of drugs should be the sole responsibility of the manufacturing company. Despite these revelations, drug manufacturing companies had little control on disposal of drug after sale to subsequent partners of the chain. This explains why many agencies, such as FDB, Drug Association often offer consumer help on appropriate disposal of drug. Many of such documents are made available for customers view.

Table 3: Should Disposal of Drugs Be Done by Any Partner of the Supply Chain

Frequency	*Minimum*	*Maximum*	*Mean*	*Standard deviation*
52	*1.00*	*5.00*	*4.3077*	*0.98097*

The table presents overall result on respondent view on disposal of drugs should be done by any partner of the chain. The first column represents the total number of responses. The subsequent columns represent the minimum and maximum responses as well as the mean responses and the deviation from the mean.. The result of the table was obtained using the variable following variable weight: 1 = "Strongly Agree"; 2 = "Agree"; 3 = "Neutral"; 4 = "Disagree"; and 5 = "Strongly Disagree". This depicted a strong disagreement to the statement.

Respondent Views on Difficulty with Reverse Logistics Practices

Asked if the company experiences any form of theft or pilferage in the course of returning drugs, 59.615% of respondents were uncertain. 38.462% of respondents stated no, that such incidents do not occur when returning drugs. Only 1.923% said yes that such incidents do occur. A follow up question asked about measures put in place to curb incidents, the respondent said strict supervision has been put in place to mitigate this problem. In responding to the question of whether drugs get damaged in the course of transporting them back to the company as a result of wrong shipment, 48.077% of the respondents said no whilst 3.8% respondents answered yes to the question. However, 48.077% were not sure if drug gets damaged when being returned. Combined, this indicates that theft and pilferage barely happen when

returning drug. This can be attributed to tight security and supervision.

Table 4: Theft and Damage Challenges with Regard to Returned Drugs Management

	Frequency	Percentage	Cumulative Percent
Does the company experience theft in the course of managing the returned drugs			
Yes	1	1.923	1.923
No	20	38.462	40.385
Not sure	31	59.615	100
Total	**52**	**100**	
Does drugs get damage when returning wrong shipments			
Yes	2	3.846	3.846
No	25	48.077	51.923
Not sure	25	48.077	100
Total	**52**	**100**	

The table shows respondent views on returned drug management with regards to theft and damages. The various question respondents were asked are presented in the first column. The subsequent columns consist of the various frequencies, their percentage and cumulative percent obtain from responses to the question in the first column.

Challenges Companies Face in Practicing Reverse Logistics

In responding to the challenges faced by companies practicing reverse logistics, half of respondents stated the expense to be a major challenge their company faces. Time consuming was also given by 21.154% of the respondents as a challenge. Furthermore, 15.385% specified that practicing reverse logistics requires extra work. Some 5.769% of respondents were not sure of any other challenges that their company faces. The remaining four, 7.692%, of respondents answered that not all drugs are able to be obtain in time of reverse logistics. An overall assessment on reverse logistics challenge was also carried using the likert scale in Table 5. A 1.981 mean of mean was obtained implying an overall agreement to the statement. A mean of the standard deviation of 0.814 further gives indication of the proximity of the various responses to each other. In other words, the responses are clustered around the mean of 1.981 as depicted in Table 5.

The general views of the respondents suggest that the cost of collecting and disposing of drugs is expensive. This is depicted in Table 5 by a mean of 2.00. Analysis of answers from respondents was clustered around the mean. A standard deviation of 0.758 was obtained. These showed the proximity of various responses to each other. Furthermore, respondents viewed the cost of disposing drugs as more expensive (mean of 1.8846) compared to the cost of collection and returning the drugs (mean of 2.1154). Respondents noted that even though reverse logistics is a drain on their organization's resources, it is also of great importance to the organization. This assertion is ably depicted by a mean of 1.5962 and standard deviation of 0.79852 in Table 5.

Management Measures Put in Place to Improve Reverse Logistics Practices

Some 40.385% of respondent's specified management ensures that staff members who collect drugs from the market were well trained and equipped to handle the return of drug effectively and efficiently. Also tightening of inspection to ensure proper supervision and prevent theft was affirmed by 19.231% of respondents to be another measure put in place by management. Some 15.385% answered that their company ensures proper bar coding of every drug to enable easy recall. Furthermore, 9.615% of the respondents said their company maintains good customer relationships to enable easy communication and recall. While 9.615% said they had no idea of the measures put in place by management, 5.769% of the respondents stated that tracking of sold drugs is a measure put in place by management to improve reverse logistics activities.

Table 5: Respondent View on Reverse Logistics Challenges

	Frequency	Minimum	Maximum	Mean	Standard deviation
Reverse logistics is difficult to practice	52	1.00	5.00	2.1731	0.87942
Reverse logistics affects your finance	52	1.00	5.00	1.7885	0.74981
Mean of mean/mean of standard deviation				**1.9808**	**0.814615**
Respondent view on cost of collecting and disposing of drugs					
It is very costly to collect and return drugs sold	52	1.00	5.00	2.1154	0.73174
It is very costly to dispose of drugs	52	1.00	5.00	1.8846	0.7835
Mean of mean/mean of standard deviation				**2**	**0.758**
Reverse logistics is important to my company	52	1.00	5.00	1.5962	0.79852

The table presents overall result on respondent view on challenges with reverse logistics practices and its importance to the companies. The question respondents were asked is presented in the first column together with the mean of means and mean of standard deviation. The subsequent columns represent the minimum and maximum responses as well as the mean responses and its deviation from the mean. The result of the table was obtained using the variable following variable weight: 1 = "Strongly Agree"; 2 = "Agree"; 3 = "Neutral"; 4 = "Disagree"; and 5 = "Strongly Disagree". This depicted a strong disagreement to the statement

CONCLUSION

This research examined reverse logistics practices in the pharmaceutical manufacturing industry using the mixed method approach (quantitative and qualitative) to gather primary data. With a response rate of 100%, data gathered was analyzed descriptively. Findings from the study revealed the companies have a system in place to aid in tracking and collecting drugs. Several reasons accounted for the return of products with damage products or packages accounting for the most returns. Among the companies supply chain partners, the wholesalers often return the product and collection of the return product was done solely by the marketing department which was responsible for the sale of the product. The literature review and primary data showed that reverse logistics is difficult to practice in the sense that, it was time consuming and negatively affecting the finances of the company. Also it was labor intensive since personnel that could have been used for other productive activities were deployed for the collection of products. Despite this, companies held reverse logistics in high esteem and this was attributed to the fact that, failure to engage in this practice results in loss of goodwill and customer loyalty and can also wreck the life of the company's customers and the environment at large. The companies also primarily disposed of expired drugs by burning in the open air with a major reason of total destruction of drugs component even though such methods were recommended as a method of last resort. This was attributed to cost factors which affect the effective implementation of appropriate disposal methods and the acquisition of IT software such as Enterprise Resource Planning (ERP) system, to enable the companies operate efficiently. We could not involve consumers in the research. Thus, this research lacks the input of consumers. We would therefore recommend that future research examine the views of retailers and consumers. This comparison will depict the actual picture of reverse logistics practices of the various actors in the pharmaceutical manufacturing supply chain.

The researchers recommend that companies should provide a central location point for the collection of returned product. This will reduce the costs involved in collecting drugs from multiple locations and saves time for other productive activities. Instead of burning drugs in the open air, we recommend the use incineration for the disposal of drugs. Incineration helps destroy toxic pollutants completely and prevent such toxic emission getting into the atmosphere. The use of incineration will also prevent the outbreak of fire. ERP system should be adopted in managing the return of products. Such a method will enable the company to gain insight and visibility into the supply chain activities taking place at distance customer location. This will help the companies better track the sold product to enable easy recall.

The companies could also introduce instance pressure-sensitive temperature indicators which enables labels integrate phase-change chemistry to irreversibly change color and provide a visual indication that thermal

parameters are being breeched. With this, the drug can be easily detected and the necessary action taken. The companies could also come out with a drug "take back day" program which can be organized periodically to enable drugs that are no longer needed by the customer or drugs that have expired to be collected from the market. Such programs can also be used to educate the consumers on the effect of improper disposal and consumption of expired drugs.

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INFORMATION TRANSMISSION EFFECTS BETWEEN A AND H DUAL LISTING SHARES

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ABSTRACT

The current study, taking A and H dual listing shares as the participants, aimed to investigate the effect of China's opening-up policy on the information transmission among dual listing shares. The results indicated that China's opening-up policy strengthened the integration of dual listing share and attracted more companies to collect funds via dual listing, making information transmission more frequent. Overall, with policies gradually unfolded, the co-movement between A and H shares grew closer, leading to the consistency in price discovery contribution ratio of A and H dual share markets. On the other hand, regression was employed to analyze factors resulting in the price difference of A and H stocks. The results revealed that information asymmetry was the most significant factor, followed by liquidity and exchange rate.

JEL: C32, G18

KEYWORDS: A Shares, H Shares, Dual Listing, Price Discovery, Information Share Model

INTRODUCTION

The Chinese stock markets have grown rapidly since 2000. Despite controls from policies and regulations, the stock markets in Shanghai and Shenzhen still attract a huge surge of investments, domestic as well as foreign. The stock markets are gradually moving from a closed one to an open market. The foreign fund into A shares and domestic fund into H shares have also shifted to supervised limited capital flow. The energy of a capital market lies in the capital flow, and capital inflow and outflow inevitably affect stock price. With China's opening-up policy towards stock markets, capital flow and information transmission have been the direct factor leading to the price co-movement of A and H shares.

The response and co-movement to information of the stock prices of an asset in different markets serve to explain the relationship and influence among different markets. Finding this kind of relationship and pattern and investigating factors of co-movement among different capital markets benefit research concerning the use of one market to predict the future stock price of another market, the information transmission among markets, and the relationship of response rate to new information between the two markets. One of the major functions of the secondary market is price discovery. When a company enters the market simultaneously in several exchanges, price discovery is no longer domestic; instead, its stock price is determined by all market information. When market information influences asset price, it means that the market has made a contribution to the asset price. The greater the contribution, the faster the stock price of the asset responds to new information. Hasbrouck (1995) stated that price discovery is a process in which the financial market digests new information and adjusts to balanced price. If the capital market could swiftly respond to the impact from new information, the market would immediately transmit the information to other markets. Different response rates of stock price to information were the main factor that determined the lead-lag relationship among stock markets (Mech, 1993; Hameed, 1997).

Stock markets in Mainland China have headed for internationalization and liberalization with the following measures: the establishment of stock exchanges and securities commission, the enforcement of Securities

Acts, the approval of domestic investment in B shares, the overseas listing of large state-run companies, the practice of QFII (Qualified Foreign Institutional Investors) System, the conclusion of CEPA (Mainland and Hong Kong Closer Economic Partnership Arrangement), the implementation of QDII (Qualified Domestic Institutional Investor), the opening of foreign capital to underwrite/tutor companies for listed ones, and the announcement of Through Train Plan.

Since late 1970s, foreign banks and transnational financial institutions have been swarming into Hong Kong due to a series of financial liberalization policy adopted by the Hong Kong government, including the removal of regulations of foreign exchange and gold, the act to unfreeze bank license, and the cancellation of deposit interest tax. Hong Kong Stock Exchange, a liberal and international capital market, has been the second largest IPO center after exceeding New York Stock Exchange in 2006, indicating that Hong Kong has become the ideal location for international investors to expand business in Asia. Between 2003 and 2006, Hong Kong and China signed a four-year CEPA agreement, which facilitated the goods, service and business investment between the two places, strengthened the economic and trade relationship, and promoted regional integration. The aforementioned has positively influenced how China attracts foreign capital and has helped foreign capital to better understand listed companies in China.

In terms of international economy, Chinese business has gradually stepped towards offshore stock markets. Meanwhile, as Chinese economy keeps growing rapidly, major stock exchanges around the globe have targeted on China, attracting Chinese companies to become listed one in offshore stock exchanges. Well-organized domestic Chinese companies, therefore, become targets worth fighting for. In addition, there are many advantages when Chinese business enters Hong Kong market. First, the open channel to financing after a company becomes a listed one helps garner international capital, beneficial to the long-term development of the company. Second, a company's influence and international image could be expanded by virtue of the international financial center that Hong Kong holds. Third, Hong Kong capital market is large in scale and mature, resulting in high participation among investors/retail investors and high market liquidity. Fourth, Hong Kong does not regulate foreign exchange and does not impose tax on dividend or stocks sold. Fifth, A shares could be issued in Mainland China when a company become a listed one in Hong Kong. As international capital liquidity grows liberalized (particularly stock exchanges' continual reinforcement of alliance in the process of competition and cooperation), dual listing of a company also becomes a common phenomenon.

If the international capital market circulates liberally and efficiently, stock prices should stay the same and dual (or multiple) listing stocks should have the same anticipated cash flow and risk characteristics, uninfluenced by the location where a company becomes listed. However, most emerging markets would impose restrictions on foreign investors. China is no exemption, dividing stocks in Shanghai, Shenzhen, and Hong Kong respectively into A shares, B shares, and H shares based on an investor's identity. Stock prices differ due to the division of stock markets. The dispute about over-/under-estimation has been existing in China's stock markets, such as premium in A shares. Different price behaviors have been existing in A shares and H shares. To investigate if China's gradual adjustment of government policies leads to different effects on the two markets, the current study, based on stock prices of A and H dual listing companies, examined the cointegration between the two markets, with an aim to understand changes of balance and information transmission between the two markets. In addition, the leading position of one market in terms of price discovery was analyzed. Different hypotheses proposed by previous researchers were also verified, for the purpose of providing useful information regarding the interrelationship among different markets.

The remainder of the paper is organized as follows. Section II briefly reviews previous researches on co-movement of stock markets between China and Hong Kong and the information transmission of stock prices in stock markets. Section III describes the data and the methodology and introduces the theoretical framework of information share model. Section IV analysis the empirical results. A brief summary concludes the article in Section V.

LITERATURE REVIEW

The literature is replete with empirical evidence regarding the co-movement of stock markets between China and Hong Kong. Most researchers, while probing into China's stock markets, generally believed the market segmentation in China's stock markets (Bailey, 1994; Yang, 2003; Chakravarty, Sarkar, and Wu, 1998; Ma, 1996; Fung, Lee, and Leung, 2000). Researches considered the reform and liberalization of capital markets in China beneficial to market cointegration. Wang and Iorio (2007) stated that high cointegration existed between A and B shares as well as between A and H shares. Luo, Sun and Mweene (2005) found that after the reform, information transmission between the two stock markets became more frequent, symbolizing a long-term balanced relationship. Therefore, the opening-up policy helps improve market segmentation and information transmission, and indirectly promotes the co-movement among markets. Thus, the investigation into the lead-lag relationship among stock markets and price discovery benefits the understanding of which market holds the leading position.

Yang (2003), examining SSE A Share, SSE B Share, Shenzhen Index A, Shenzhen Index B, Red chips stocks, and Hong Kong H Shares, found that there was no sign of cointegration among the six markets between 1995 and 2000. Wang and Iorio (2007) found that between 1995 and 2004, high cointegration existed between A and B shares as well as between A and H shares. Chen (2005) investigated changes before and after China's policy that Hong Kong investors could directly buy stocks of A shares, and found that before the opening-up policy, H shares was more influential in terms of price. After the opening-up policy, frequent information transmission and prominent information spillover resulted in more mutual influence on stock prices between the two markets. Qiao, Li, and Wong (2008), focusing on China's derestriction on B shares investment, found dual causality in B and H share stock markets before the policy change, while B shares held the leading position after the policy change, evidencing that changes of government policies were important factors in affecting market changes.

In previous literature regarding price information transmission, Poon and Fung (2000) analyzed the information transmission of stock prices in SSE Index, Shenzhen Index, Red chips stocks, and Hong Kong H shares, and found that mutual influence existed among stock markets. Wang and Jiang (2004), investigating 16 dual listing companies between 1996 and 2001, stated that no significant causality was found in stock price returns of A and H shares, suggesting that previous stock price returns of A shares (H shares) could not be used to predict the current stock price returns of H shares (A shares). Luo et al. (2005) indicated that in terms of price discovery contributions, A shares held the leading position in terms of information. Investigating dynamic information transmission of 76 companies of A and B dual listing shares, Chan, Menkveld, and Yang (2007) found that prior to the opening of allowing Chinese people to buy B shares, the stock market of A shares dominated B shares in price discovery. However, after the opening-up policy, the stock market of B shares took the lead in price discovery.

Based on the aforementioned information, the current research found that studies concerning factors affecting the stock price information transmission in A and H shares remained inconsistent. As stock markets in China keeps opening up, more and more overseas capital has invested in A shares via QFII (Qualified Foreign Institutional Investors). Meanwhile, more and more institutional investors choose to invest in Hong Kong market through QDII (Qualified Domestic Institutional Investor). Numerous scholars have proposed different hypotheses and extensively discussed factors that affected stock prices of A and H shares.

Information Asymmetry

Researchers have proposed that due to language barrier, different accounting system and the lack of reliable information, foreign investors face more challenges of obtaining information than domestic investors, thus creating information asymmetry (Chakravarty et al., 1998; Wang and Jiang, 2004). However, Tian and Wan (2004) stated that compared with domestic investors, foreign investors were mostly experienced institutional investors, possessing more resources and technologies to analyze new information in the local area. Myers and Majluf (1984) stated that large-scale companies faced relatively fewer information

asymmetry and obtained external financing opportunities more easily. Eng and Mak (2003) suggested that the bigger the company, the more information the company would disclose to solve information asymmetry in the capital market. Investors could obtain correct information with relative ease, thus reducing information asymmetry.

Transaction Costs

Fleming, Ostdiek, and Whaley (1996) stated that markets with lower transaction costs responded quicker to new information, thus having higher price discovery ability. However, some scholars used numerous bid-ask spreads to evaluate investors' execution cost, and found that the high the cost, the lesser the deals from investors having information, thus lowering liquidity. Therefore, a market's response rate to new information might also drop (Huang and Stoll, 1997).

Liquidity

Amihud and Mendelsohn (1986) proposed liquidity premium theory, in which liquidity was an important influential factor in asset pricing. The expected yield of low-quality liquid assets is high, and vice versa. The enhancement of stock liquidity lowers a company's capital cost. Jain-Chandra (2002) found that many companies used dual listing to enhance stock liquidity, and those investors tended to trade in high-quality liquid markets. Hasbrouck (1995) suggested that price discovery of New York Stock Exchange and its stock trading volume were positively correlated.

DATA AND METHODOLOGY

In the current article, companies of A and H dual listing shares in Taiwan Economic Journal ranging from 2000/1/1 to 2009/12/31 were examined. For each share we use Thomson DataStream to obtain daily information on a wide set of variables including share price, total market value (to evaluate size as the proxy variable of information asymmetry), and the trading volume (number of shares traded for a stock on a particular day). We collect daily data on the bid and ask share prices to evaluate the spread as the proxy variable of investors' transaction cost rate. A shares are traded in RMB, while H shares in HKD. Therefore, before the relevant analyses, stocks in H shares were converted into RMB based on the exchange from HKD to RMB. Exchange was also retrieved from Thomson DataStream. To simplify analyses, the exchange from HKD to RMB was hypothesized to remain the same within a day. Up to the end of December, 2009, there were 60 companies of A and H dual listing shares. Due to insufficient information of three companies, 57 listed companies were included in the final data analysis.

Stocks that belong to a company yet are issued and traded in different markets normally maintain a balanced relationship in the long run. However, certain deviation is inevitable in the short run. That is, the two stocks have a common change trend (a.k.a. common factor), referring to the common valid price that the two market prices implicate, resulting from common valid information on the market. The information of a market makes contribution to the price discovery of an asset when the market information affects the asset price. Hasbrouck (1995) proposed the information share model (ISM), one of the models widely employed to investigate the common factor of price discovery in the field of market microstructure. ISM decomposes the variance of common factor and defines price discovery based on the contribution rate that new information of each market makes to common factor variance. To accurately quantify the long- / short-term relationship between A shares and H shares and the contribution to price discovery, the current study adopted Hasbrouck's (1995) ISM to determine if a common long-term trend existed between two unbalanced price series. Cointegration relationship between two markets was utilized to construct error correction model, with which common factor contribution was analyzed. In doing so, the current study could not only specify which market held the leading position but also confirm the information advantages of each market in terms of quantity.

In addition to the use of ISM to determine the price discovery of dual listing stocks, Johansen's cointegration test was adopted to investigate the co-movement of A and H dual listing stocks. Due to the page limitation,

tests widely applied to relevant financial empirical literature, such as unit root test, cointegration test, structural break test, and vector autoregression, were skipped. The introduction of ISM was as follows: ISM measures the contribution that new information in the market makes to the common factor variance, using the variance of common factor moderator variable to evaluate price discovery; that is, to evaluate the relative contribution that the market makes to the given common factor moderator variable variance. This kind of contribution rate is also known as information share. Considering the two price series with first-order stationarity $Y_t = (y_{1t}, y_{2t})'$, the difference $Z_t=\beta' Y_t= y_{1t} - y_{2t}$ was the error correction term. ISM starts with vector error correction model (VECM) illustrated in equation (1):

$$\Delta Y_t = \alpha\beta' Y_{t-1} + \sum_{i=1}^{k} \Phi_j \Delta Y_{t-1} + e_t \quad (1)$$

Where α and β' were the error correction and cointegration vector, $\alpha\beta' Y_{t-1}$ was the long-term dynamic balanced relationship, Φ was the coefficient vector that lag period corresponded to, k was the quantity of vector in the lag period, $\sum_{j=1}^{k} \Phi_j \Delta Y_{t-j}$ was the unbalanced short-term dynamic relationship, e_t was the random moderator variable irrelevant to the series. The average was 0. Adjust covariance equation (2):

$$\Omega = \begin{bmatrix} \sigma_1^2 & \rho\sigma_1\sigma_2 \\ \rho\sigma_1\sigma_2 & \sigma_2^2 \end{bmatrix} \quad (2)$$

where σ_1^2 and σ_2^2 were the variance of new information and ρ was the correlation coefficient.

The current study set cointegration on the price series of A and H shares $P_{i,t} = [P_{i,t}^A, P_{i,t}^H]$ issued by *i* company. The error correction model was illustrated in equation (3):

$$\Delta P_{i,t} = \alpha_i Z_{i,t-1} + \sum_{j=1}^{k} \beta_j \Delta P_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

where k was the best-fit lag phases determined by the minimum SBC (Schwartz Bayesian criterion). $\varepsilon_{i,t}$ was the residual vector. The error correction term was $z_{i,t}=\beta_i' P_{i,t}$, $\alpha_i = [\alpha_i^A, \alpha_i^H]$ was the error correction vector, and $\beta_i = [\beta_i^A, \beta_i^H]$ was the cointegration vector. ISM converted Equation (3) into the vector moving average form in equation (4) and the cointegration form in equation (5):

$$\Delta Y_t = \psi(L) e_t \quad (4)$$

$$Y_t = Y_0 + \tau\psi\left(\sum_{s=1}^{t} e_s\right) + \psi^*(L) e_t \quad (5)$$

where Y_0 was the constant vector that reflects its average price difference, τ was the row vector, $\psi^*(L)$ was a matrix polynomial in the lag operator. Equation (5) included common factors of all prices. ψe_s was the component of price variation, defined as the common valid price of two markets (common factor) (Hasbrouck, 1995). The next was to decompose the variance of common factor moderator variable ψe_t. The increment ψe_t was the component of the price change that was permanently impounded into the stock price and was presumably due to new information. The variance of the term is $\psi\Omega\psi'$. When sequential correlation did not exist among VECM residual terms (i.e., covariance matrix Ω was a diagonal matrix), then $\psi\Omega\psi'$ only contained two elements in the diagonal line. The first (second) element referred to the contribution that the impact of the first (second) market made to the common factor. The proportion of this for market j relative to the total variance was defined as market j's information share in Equation (6). The relative information sharing of two markets was expressed in equation (7):

$$S_j = \frac{\psi_j^2 \Omega_{jj}}{\psi\Omega\psi'} \quad (6)$$

$$\frac{\psi_1^2\sigma_1^2}{\psi_2^2\sigma_2^2} \tag{7}$$

When the new information of market price was significantly correlated, Equation (6) was not tenable. To solve the problem of correlation, Cholesky's factorization was employed to eliminate the current correlation among new information share. If positive correlation existed among new market information, then the information share of the first variable was the largest and that of the last variable was the smallest. The information share of the j market would be defined as equation (8):

$$S_j = \frac{([\psi M]_j)^2}{\psi\Omega\psi'} \tag{8}$$

where $[\psi M]_j$ was the *jth* element of the row matrix ψM. M was expressed in equation (9):

$$M = \begin{bmatrix} m_{11}, & 0 \\ m_{12}, & m_{22} \end{bmatrix} = \begin{bmatrix} \sigma_1, & 0 \\ \rho\sigma_2, & \sigma_2(1-\rho^2)^{1/2} \end{bmatrix} \tag{9}$$

This matrix satisfied $\Omega = M_i M'_i$, therefore information share of A and H shares could be expressed in equation (10) and (11):

$$S_i^A = \frac{[\gamma_i m_{i,11} + (1-\gamma_i) m_{i,12}]^2}{[\gamma_i m_{i,11} + (1-\gamma_i) m_{i,12}]^2 + [(1-\gamma_i) m_{i,22}]^2} \tag{10}$$

$$S_i^H = \frac{[(1-\gamma_i) m_{i,22}]^2}{[\gamma_i m_{i,11} + (1-\gamma_i) m_{i,12}]^2 + [(1-\gamma_i) m_{i,22}]^2} \tag{11}$$

where γ_i was the weight of common factor of ith market.

The factorization imposed a hierarchy that maximizes the information share on the first price and minimizes the information share on the last price. An upper bound for a market's information share could be obtained by permuting ψ and Ω to place that market's price first. A lower bound could be obtained by permuting to place that market's price first (Hasbrouck, 1995). In addition, the stronger the correlation of information among markets, the higher the upper bound and the lower the lower bound. Baillie, Booth, Tse, and Zabotina (2002) proved that the average of upper bound and lower bound served to explain information share. To further investigate factors that affected price difference, the current study defined company size, transaction volume rate, transaction cost rate, and exchange rate as the independent variables. The rate of H shares (converted into RMB) minus the stock price of A shares relative to the stock price of A shares was the calculation basis of dependent variable (i.e., price difference). Negative (positive) average price difference in the sample periods was defined as the discount (premium) of H shares relative to A shares, expressed in equation (12):

$$PD_{i,t} = \frac{(P_{i,t}^H * EXRATE - P_{i,t}^A)}{P_{i,t}^A} \tag{12}$$

where PD was price difference, P^A and P^H respectively referred to as daily closing price of A and H shares, EXRATE was the exchange rate from HKD to RMB. Independent variables were discussed as follows:

Size

The current study adopted Guo and Tang's (2008) employment of total market capitalization to evaluation size, serving as the proxy variable of information asymmetry. The equation was defined in equation (13):

$$SIZE_{i,t} = \log\left(MV_{i,t}^A + MV_{i,t}^H\right) \tag{13}$$

where SIZE was the logarithm of total market capitalization. MV^A and MV^H were daily total market capitalization of A and H shares, respectively. In general, the bigger the company, the more consistent information the investors (domestic or foreign) received, the easier the information was noticed by investors or institutions, and the more transparent the information disclosure, thus lowering information asymmetry. Therefore, the current study anticipated that there was an inverse relationship between company size and price difference.

Transaction Volume Rate

Transaction volume rate was defined as equation (14):

$$\mathrm{VOL}_{i,t} = \frac{\mathrm{VOLUNME}_{i,t}^{H}}{\mathrm{VOLUNME}_{i,t}^{A}} \quad (14)$$

where VOL was the transaction volume rate, and $VOLUNME^A$ and $VOLUNME^H$ were the daily transaction volume of A and H shares, respectively.

Amihud and Mendelsohn (1986) proposed liquidity premium theory, in which liquidity was an important influential factor in asset pricing. The expected yield of low-quality liquid assets is high, and vice versa. The enhancement of stock liquidity lowers a company's capital cost and enhances company value. Datar Naik, and Radcliffe (1998) used stock turnover rate as the evaluation indicator for liquidity, and found that the liquidity of non-financial stocks traded in NYSE had significant explanatory power over stock profits. Transaction volume rate was employed in the current study as the proxy variable for liquidity. Higher transaction volume rate led to bigger liquidity that H shares had towards A shares, and vice versa. The smaller (bigger) the liquidity premium required by foreign investors in H shares, the smaller (bigger) the price difference. Therefore, the current study anticipated that there was a reverse relationship between transaction volume rate and price difference.

Transaction Cost Rate

The transaction cost rate was defined in equation (15):

$$\mathrm{SPREAD}_{i,t} = \frac{\mathrm{SPR}_{i,t}^{H}/\mathrm{P}_{i,t}^{H}}{\mathrm{SPR}_{i,t}^{A}/\mathrm{P}_{i,t}^{A}} \quad (15)$$

where SPREAD was the bid-ask spread rate. SPR^A and SPR^H were daily bid-ask spread of A and H shares, respectively.

The current study adopted Huang and Stoll's (1997) employment of SPREAD as the proxy variable to evaluate investors' transaction cost rate. The higher the bid-ask spread, the higher the cost. Investors who had information reduced transaction. Liquidity as well as a markets' response rate to new information dropped consequently. Generally speaking, the higher the bid-ask spread, the bigger the stock price differences between A and H shares. Therefore, the current study anticipated that there was a positive relationship between transaction cost rate and price difference.

Foreign Exchange Risk

Domowitz, Glen, and Madhavan (1997) investigated dual listing stocks in Mexico and proved that foreign exchange risk was an important factor that affected foreign investors to evaluate risks. Financial statements of many H shares listed in Hong Kong were not presented in HKD, while HKD was the currency used in Hong Kong stock market. Therefore, fluctuations in exchange influenced the operation and stock price of a company. The scope of influence differed depending on whether the structure of a company's cost of revenue was mainly expert cost or import cost. Thus, the current research took exchange as the fourth explanatory variable. The regression model based on the exchange from HKD to RMB was expressed in equation (16).

$$PD_{i,t} = \alpha_i + \beta_1 SIZE_{i,t} + \beta_2 VOL_{i,t} + \beta_3 SPREAD_{i,t} + \beta_4 EXRATE_{i,t} + e_i \quad (16)$$

where α_i was the constant term, and e_i was the error term.

RESULTS AND DISCUSSION

Sample Period

To investigate the dual listing stock markets under the opening-up policy in China's stock markets, the current research divided the information into three subsamples. Phase 1 (2000/1/1~2004/7/12) referred to the period before China allowed Hong Kong investors to buy A shares via Hang Seng Bank Limited. Phase 2, 2004/7/13 to 2006/4/12, referred to the official practice of QDII (Qualified Domestic Institutional Investor) announced by the People's Bank of China. Phase 3, 2006/4/13 to 2009/12/31, covered the period after the practice of QDII. The current research also adopted Chow's (1960) breakpoint test (i.e., using F-test to decide the breakpoint that caused structural change) to examine the appropriateness of dividing collected information into the aforementioned three subsamples. In phase 1, 2004/7/12 was set as the breakpoint, the results of Chow's examination revealed that the proportion of structural change reached 89%. In phase 2, the examination of 2006/4/12 as the breakpoint indicated that the proportion of structural change reached 88%. The results suggested that the three subsample of A and H dual listing shares were representative samples.

Analysis of Cointegration

Johansen's (1988) cointegration test was employed to investigate the co-movement relationship between A and H dual listing shares. To non-normally distributed sample, cointegration test could also reach robustness. Johansen trace λ_{trace} and λ_{max} were employed to examine the cointegration vectors of A shares and H shares respectively in the three subsample phases. Johansen and Juselius (1990) stated that when the two statistical results were inconsistent, λ_{max} was utilized to determine the cointegration relationship among variables and to further confirm the number of cointegration vectors.

The results in Table 1 revealed that dual listing companies with cointegration in phase 1 accounted for 12 dual listing companies (42.9%). There were 16 dual listing companies without cointegration (57.1%), suggesting that China's opening-up policy that allowed the investment in B shares indirectly stimulated the stock markets in Shanghai and Shenzhen. In addition, QFII (Qualified Foreign Institutional Investors) allowed foreign institutions to trade in A shares and bond market with limited funds, and made large foreign institutional investors originally restricted to the investment in B shares and HKEx capable of investing in A shares because of the opening-up policy, indirectly promoting the cointegration of the two stock markets. In this sample period, A and H dual listing shares possessed partial cointegration, suggesting that markets were not entirely segmented. The number of companies with cointegration might seem fewer; however, compared with Yang's (2003) findings that no integration was found among the six stock markets (i.e., SSE A Share, SSE B Share, Shenzhen Index A, Shenzhen Index B, Red chips stocks, and Hong Kong H shares) between 1995 and 2000, the opening-up policy has affected the mutual connection of dual listing stocks.

In phase 2, there were nine companies with cointegration and 21 without cointegration (70%), indicating that the opening-up policy for Hong Kong to invest in A shares did not enhance the co-movement between stock markets of A and H shares. The long-term balanced relationship between the two stock markets could not be clearly observed. Possible reasons might be that reform of non-tradable shares, practiced less than one year, had little impact on the market, and that H shares was connected with international capital. Therefore, consequences as the result of reform within a short period of time could not be clearly observed. In phase 3, there were 29 companies with cointegration and 28 without cointegration. Although the proportions were equally matched, the number of companies with cointegration grew by 2.2 times (from 9 in the previous phase to 29 in the current phase), yielding an increased mutual connection of dual listing stocks in this phase. Possible reasons might be that in addition to QFII that drew international funds injection, QDII invested China's funds in H shares. The circulation of funds in the two markets increased

the long-term balanced relationship among stock prices. Another possibility might be that follow-up influences as the result of reform of non-tradable shares improved the problem of insufficient liquidity in non-tradable shares, strengthening China's business system. The internationalization of A shares expedited the link between the two capital markets, making dual listing stocks possess more long-term balanced relationship than ever before.

Table 1：Summary of Johansen Cointegration Test

Period	Cointegration / %	Non-Cointegration/ %
phase 1 (2000/01/01~2004/07/12)	12 / 42.9%	16 / 57.1%
phase 2 (2004/07/13~2006/04/12)	9 / 30%	21/ 70%
phase 3 (2006/04/13~2009/12/31)	29 / 50.9%	28 / 49.1%

This table summarizes the Johansen's (1988) cointegration test for A and H dual listing shares in three phases. Column 2 shows the number and ratio of dual listing companies with cointegration. Column 3 shows the number and ratio of dual listing companies without cointegration.

Analysis of Price Discovery Contributions

Considering that information share model (ISM) required prices of A shares and H shares must meet cointegration in the sample period, the current study divided the period ranging from 2000/1/1 to 2009/12/31 into three sample periods, respectively investigating price discovery contributions of 35 A and H dual listing companies with cointegration (see Table 2). The results in Table 2 revealed that in phase 1, the average price discovery contribution of the H shares was 61.3%, while that of the A shares was 38.7%, suggesting that H shares had the leading position in terms of information. H shares responded quicker to new information than A shares. In phase 2, the average price discovery contribution of the H shares was 44.9%, while that of the A shares was 55.1%. Compared with phase 1, A shares had the leading position in terms of price discovery. Due to the initial opening of Hong Kong investment in A shares, no significant long-term balanced relationship was found in stock prices of A and H dual listing stocks.

In phase 3, the average price discovery contribution of H shares was 52.5%, while that of the A shares was 47.5%. Compared to the two previous phases, differences in contribution ratio of price discovery between the two markets shrank. Possible reasons might be that China's opening-up policy on stock markets led to more frequent information transmission between A and H shares, improving the uncirculated information characteristic of the previous stock markets in China. The leading position of one stock market was not significantly located in terms of the information processing speed. Therefore, the increase of co-movement between A and H dual share markets led to a gradual consistency in price discovery contribution ratio of A and H dual share markets.

Table 2：Ratio of Price Discovery Contributions

Period	Average Information Share of H Shares	Average Information Share of A Shares
Phase 1 (2000/01/01~2004/07/12)	61.3%	38.7%
Phase 2 (2004/07/13~2006/04/12)	44.9%	55.1%
Phase 3 (2006/04/13~2009/12/31)	52.5%	47.5%

This table shows the results of average contribution to price discovery for A and H dual listing shares. Column 2 shows the average information share of H shares dual listing companies. Column 3 shows the average information share of A shares dual listing companies.

Analysis of Factors That Affected Stock Price Differences

Companies might go overseas listing to collect funds, to increase risk sharing, and to lower cost of capital (Stulz and Wasserfallen, 1995), or opt for dual listing to enhance liquidity, to expand markets, to eliminate information asymmetry, or to gain the effect of price difference. Many researchers analyzed the price difference in dual listing stocks and found that premium existed in offshore stocks. However, discount was found in China's stock markets. For example, Bailey (1994) found that relative to A shares, discount existed in B shares. Su and Chong (2007) included H shares and Red chips stocks in data analysis and also found the sign of price discount, revealing the specialty of foreign capital stocks. Bailey, Chung and Kang (1999), analyzing the stock markets in 11 countries, such as Swiss, Mexico, Singapore, Taiwan, and China, found

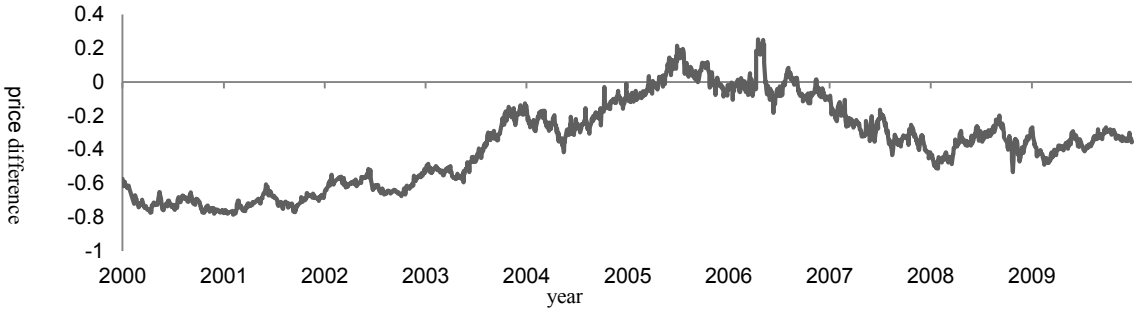
that except for the discount of China's B shares relative to A shares, price premium existed in foreign capital stocks in other countries. To investigate factors that affected price difference, the current study followed the aforementioned analysis, taking 35 dual listing companies with cointegration as the participant and analyzing factors concerning discount, premium, and stock price difference. Discount (premium) of H shares relative to A shares was illustrated in Table 3. Daily price difference was detailed in Figure 1. The results in Table 3 revealed that not all H shares had discount towards A shares, with premium (five companies) larger than discount (four companies) in H shares in phase 2. The information suggested that the opening-up policy for Hong Kong to invest in A shares and reform of non-tradable shares increased stock liquidity and improved the price discount of offshore distribution. Although in phase 3, discount of H shares relative to A shares appeared again, the shortening of the range of price discount indicated that price differences of A and H dual listing shares gradually shrank.

Table 3：Summary Discount / Premium of H Shares Relative to a Shares

Period	Number of Discount / %	Number of Premium / %
Phase 1 (2000/01/01~2004/07/12)	12 / 100%	0 / 0%
Phase 2 (2004/07/13~2006/04/12)	4 /44.4%	5 / 55.6%
Phase 3 (2006/04/13~2009/12/31)	28 / 96.6%	1 / 3.4%

This table summarizes the daily average to price differences in three phases. The discount (premium) means the average to price difference of H shares relative to A shares is negative (positive) in sample period. Column 2 shows the number of company with negative value and the ratio of cointegrated dual listing companies. Column 3 shows the number of company with positive value and the ratio of cointegrated dual listing companies.

Figure 1: Average Price Difference Chart



This figure shows the daily average to price difference of H shares relative to A shares for fully sample period.

Price differences of A and H dual listing shares have remained hotly debated. The current study carried out a regression analysis based on company size (SIZE), transaction volume rate (VOL), transaction cost rate (SPREAD), and exchange rate from HKD to RMB (EXRATE). The results of regression in Table 4 showed that size was the most salient factor. The number of companies that reached significance in all three subsample periods amounted to 91%, suggesting that the bigger the company, the more transparent and public the information disclosure. Investors found it easier to obtain correct information regarding the company in a stock market, thus indirectly lowering the problem of information asymmetry. The bigger the company, the fewer the information asymmetry, and the smaller the price difference. The findings were consistent with anticipated results, verifying the hypothesis of information asymmetry.

Many reseachers took transaction volume and transaction cost as evlauation indicators of market liquidity. In terms of transaction volume rate, the number of companies reaching significance in all three subsample periods were respectively 41.7%, 66.7%, and 72.4%, suggesting that transaction volume was more important in price differences. Negative regression coefficients indicated the bigger the transaction volume rate, the smaller the price difference. Moreover, the results of transaction cost rate revealed the number of companies that reached significance in phase 1 and phase 3 were higher than 65.5%, and that positive correlation was found, suggesting the bigger the bid-ask spread rate, the higher the transaction cost, and the smaller the liquidity. The results of regression echoed Hu and Wang's (2008) findings that liquidity and information asymmetry had more explanatory power in explaining the price differences of A and H shares.

With regard to exchange rate, the number of companies that reached significance in all three subsample periods were respectively 100%, 77.8%, and 93.1%, revealing that exchange rate had significant effect on price difference. However, positive and negative regression coefficients in the last two sample periods were almost equivalent to each other (44.4% vs. 51.7%), indicating that positive or negative effect that exchange rate had on price difference differed from cost structures of companies' revenue or other different conditions.

CONCLUSIONS AND SUGGESTIONS

The results in the current study revealed that with China's opening-up policy that allowed for foreign investment institutions' investment in A shares, market segmentation had started to fade away since the practice of dual listing stock markets in 2000. H shares held the leading position in terms of information transmission. The opening-up policy for Hong Kong to invest in A shares and reform of non-tradable shares derestricted the investment scope of A shares, increased the liquidity of dual listing stocks in A shares, and enhanced the information transmission A shares had toward H shares. In addition, relative to H share stocks, A share stocks had the leading position in price discovery. The implementation of QDII and the opening for Chinese people to invest in H share stocks improved the problem of insufficient liquidity in non-tradable shares. In addition, the opening-up policy attracted more companies to collect funds via dual listing. The closer fund liquidity between A and H shares not only expedite stock liquidity but also shortened the range of price discount of offshore distribution.

Table 4：Regression Summary of Price Differences

Period / Factors	Number of Significant* / %	Sign of Coefficient	Number of sign / %
Phase 1 (2000/01/01~2004/07/12)			
SIZE	11 / 91.7%	-	7 / 58.3%
VOL	5 / 41.7%	-	9 / 75%
SPREAD	9 / 75%	+	8 /66.7%
EXRATE	12 / 100%	-	10 / 83.3%
Phase 2 (2004/07/13~2006/04/12)			
SIZE	9 / 100%	-	4 / 44.4%
VOL	6 / 66.7%	-	7 / 77.8%
SPREAD	5 / 55.6%	+	5 / 55.6%
EXRATE	7 / 77.8%	-	4 / 44.4%
Phase 3 (2006/04/13~2009/12/31)			
SIZE	27 / 93.1%	-	16 / 55.2%
VOL	21 / 72.4%	-	16 / 55.2%
SPREAD	19 / 65.5%	+	24 / 82.8%
EXRATE	27 / 93.1%	-	15 / 51.7%

This table shows the summary of regression estimates of the equation: $PD_{i,t} = \alpha_i + \beta_1 SIZE_{i,t} + \beta_2 VOL_{i,t} + \beta_3 SPREAD_{i,t} + \beta_4 EXRATE_{i,t} + e_i$ *where PD denotes the dependent variable of price difference of H Shares Relative to A Shares. The independent variables are SIZE, VOL, SPREAD and EXRATE denote the company size, transaction volume rate, transaction cost rate, and exchange rate, respectively. Column 2 shows the number of A / H shares that yield significant effects in subsample period. Column 3 shows the sign of coefficient. Column 4 summarizes the number of A or H shares which coefficient has the same sign with column 3. * indicates significance a t the 5 and 1 percent levels.*

Overall, in terms of co-movement in dual listing stock markets, H shares held the leading position, meaning that information was transmitted from H shares to A shares. China's opening-up policy led to more frequent information transmission and increased co-movement between A and H shares, leading to a gradual consistency in price discovery contribution ratio of A and H dual share markets. In addition, factors that affected price difference included information asymmetry, transaction cost rate, transaction volume rate, and exchange rate, among which information asymmetry was the most significant influential factor. The major contributions of the current study lay in the adoption of dual listing companies (rather than stock market indices) and the investigation in price differences, providing investors with dual listing information transmission and factors affecting price differences at company level. In addition, the three sample periods based on major capital market reform policies yielded a better understanding of co-movement relationship in dual listing stock markets before and after the practice of the given policies. Moreover, the understanding of the trend of stock prices based on information transmission and price discovery of dual listing companies in two stock markets not only served as an evaluation indicator in investment decision-making but also facilitated future research into arbitrage of dual listing stock markets. However, dual listing shares in different markets may have their own characteristics. The results can only be applied to a particular sample and may not be inferred to other markets. Follow-up studies may extend to other markets.

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A COMPARATIVE ANALYSIS OF REVERSE MORTGAGES: EVIDENCE FROM PUERTO RICO AND THE UNITED STATES

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ABSTRACT

This paper is a comparative and descriptive analysis of reverse mortgage loans originated in the United States and Puerto Rico from 2010 to 2012 and examines whether differences exist between both jurisdictions and the possible reasons for the latter. The study also compares the average profile of a reverse mortgage borrower in the United States and Puerto Rico. The number of new reverse mortgages generated in the United States and in Puerto Rico decreased from 2010 to 2012. However, during that same time period, the interest rate charged in Puerto Rico on reverse mortgages was higher than in the United States. There was also a reduction in the age of the average borrower. The distribution or the uses of the borrowed funds in Puerto Rico is consistent with prior studies performed in the United States.

JEL: G21, H31

KEYWORDS: Reverse Mortgages, Home Equity, Elderly Consumers, Home Equity Conversion Mortgage

INTRODUCTION

From 2000 to 2005 the individual residential market in the United States (U.S.) and in Puerto Rico (P.R.) exhibited sustained price increases (housing bubble). The financial markets in the U.S. took advantage of that bubble to aggressively promote a product known as a reverse mortgage loan ("reverse mortgage"). Reverse mortgages allow elderly consumers to obtain cash during their pre and post-retirement years using their primary home as collateral without having to abandon the property. As a result of the aforementioned housing bubble, there was a significant increase in the demand for reverse mortgages in the U.S. Although reverse mortgages were initially offered in P.R. in 1993, demand for this type of financing did not increase until 2010. The objective of this investigation is to perform a comparative and descriptive analysis of reverse mortgages originated in P.R. and the U.S. from 2010 to 2012. This study contributes to the household finance literature by studying the use of reverse mortgages by senior citizens as a financial planning tool. The results are compared with data on reverse mortgages in the United States to examine whether differences exist between both jurisdictions and the possible reasons for the latter. The rest of this paper is organized as follows. The next section presents the prior research and the institutional background, followed by the research motivation. The following section presents the research design and methodology. The last two sections present the results and conclusions.

LITERATURE REVIEW AND INSTITUTIONAL BACKGROUND

Evolution and Regulation of Reverse Mortgages in the U.S.

Shan (2011) defines a reverse mortgage as a loan granted to elderly housing owners that transforms their home equity in a source of cash that does not require the payment of interest or principal until the last of

the surviving borrowers dies (in the case of a couple), or the borrower moves permanently from the house. Michelangeli (2008) defines these instruments as private loans insured by the U.S. government designed for home owners that have their net worth tied to their homes but have little or no cash. Szymanoski, Enriquez and DiVenti (2007) state that reverse mortgages receive their name because the observed payment pattern is the opposite of a traditional mortgage (forward mortgage).

There are different types of reverse mortgages that depend on the way the borrowers receive the funds. According to the Department of Housing and Urban Development (HUD), the six possibilities are: Lump Sum, Tenure, Term, Line of Credit, Tenure and Line of Credit (also known as "Modified Tenure"), and Term and Line of Credit (also known as "Modified Term"). A Lump Sum reverse mortgage (LSUM) refers to the receipt of the net equity in the borrowers' residence in one single amount. In a Tenure reverse mortgage (TEN), the borrowers receive equal monthly payments as long as at least one borrower lives and continues to occupy the property as a principal residence. In a Term reverse mortgage (TERM) the borrowers receive equal monthly payments for a selected or fixed number of months. A Line of Credit loan (LOC) consists of a financing arrangement where the borrowers receive a series of unscheduled payments or installments and in an amount of their choosing until the approved line of credit is exhausted. Tenure and Line of Credit (TNLC) is a combination of a line of credit and scheduled monthly payments for as long as one of the borrowers remains in the home. Term and Line of Credit (TMLC) refers to a combination of a line of credit plus monthly payments for a fixed period of months selected by the borrowers. The first known case of a reverse mortgage in the U.S. is from 1961, but it was not until 1989 when the first mortgage of this type was insured by the federal government (Donohue, 2011). From 2000 to 2007 there was a significant increase in the number of reverse mortgages generated in the U.S. (Bishop and Shan, 2008; Shan, 2011 and Nakajima, 2012). Reverse mortgages have also gained popularity in non-U.S. countries such as Australia (Reed, 2009).

Bishop and Shan (2008) suggest that the increase in reverse mortgages in the U.S. from 2000 to 2005 could have occurred due to several reasons: the housing bubble, low interest rates, owners' confidence in using their homes as collateral for obtaining loans and a growing awareness of the availability of reverse mortgages. Helm (2008) also identifies demographic factors such as the increased average life expectancy and the number of persons entering retirement age that belong to the segment of the population known as "baby boomers". McGarity (2007) states that unlike the Depression-era generation that was much more conservative and felt the need to leave a legacy to their heirs, baby boomers do not have the same priorities and understand that they can use their home equity to meet their economic needs.

According to Bishop and Shan (2008) 90% of the reverse mortgages originated in the U.S. are classified as Home Equity Conversion Mortgages (HECM), which are loans insured by the Federal Housing Administration (FHA), which is part of HUD. The remaining non-FHA insured reverse mortgage loans are known as proprietary reverse mortgages, which are offered by private sector banks and mortgage companies. To qualify for an HECM loan, the borrower must be at least 62 years old, live in the residence and the property must either not have a mortgage lien or the amount of the loan must be low (Bishop and Shan, 2008). In addition, the borrower must not be delinquent on any federal debt. The borrower's income level or credit score does not affect the eligibility for a reverse mortgage. The amount borrowed depends on the appraised value of the residence, the age of the youngest residence owner (in the case of a couple) and the expected interest rates. Del Vecchio, Hopson and Hopson (2009) also find that as a general rule, the cash received from a reverse mortgage rarely exceeds 50% of the home equity. Age is important because the older a borrower is, the life expectancy is lower, and there is less time for the loan balance to increase. Lower interest rates also allow a prospective borrower to borrow a larger amount because there will be a lower balance of accrued interest when the loan termination occurs (Godfrey and Malmgren, 2006).

Pursuant to HUD Mortgagee Letter No. 00-10 dated March 8, 2000, HUD requires all interested borrowers in obtaining a HECM loan to attend a financial counseling session. On September 28, 2006, HUD added the requirement that an applicant's heirs (children or relatives) must also attend a financial counseling session (HUD Mortgagee Letter No. 06-25) prior to the approval of the HECM loan requested by the applicants. The regulations do not require that the applicants and their children attend the financial counseling sessions at the same time.

According to Rose (2009) the interest rate on these mortgages in the U.S. increased because of their use as a mechanism to supplement the income of retirees. In the U.S. and P.R. retirees depend on their savings and Social Security benefits (and pension plans if they have them) to pay their personal expenses, including their medical costs. Many retirees have seen the balance of their savings and the value of their investment portfolios shrink due to lower interest rates and bear markets. However, since 2006 the demand for this product has stabilized. According to Nakajima and Telyukova (2013), reverse mortgages were used by only 2.1% of the eligible elderly consumers in 2011. The observed reduction in demand for reverse mortgages seems to be due to several factors. Sinai and Souleles (2007) note that retirees have increased their aversion to the risk of having to move from their residence and if they do move, they do not want to move to a smaller house. Michelangeli (2008) finds that retirees value their houses over consumption and they perceive reverse mortgages as a very risky and specialized product. Nakajima and Telyukova (2013) suggest that the costs imposed by lenders make reverse mortgages a very expensive alternative to raise cash in case of an emergency.

In 2006, HUD's Office of Policy Development and Research disclosed that the average age for a borrower of a reverse mortgage is 74 years and the average loan amount is $159,000 on a house valued at $289,000, which represents 55% of the appraised value (Detwiler, 2008). A survey made by Reverse Market Insight, Inc. in 2009 revealed that 75% of reverse mortgage borrowers used 75% of the borrowed funds to pay other debts (Yeary, 2009). In March 2012 the MetLife Mature Market Institute found that the average age of reverse mortgage borrowers decreased from 76 in 2000 (77 years in 1990) to 71.5 years. This reduction is partially attributed to the reduction in housing prices, low interest rates paid on savings and fluctuations in stock markets. The study also revealed that 66% of loan applicants initiated the process to reduce their debts and to meet their precarious financial situation (Elmer, 2012).

The typical fees and charges in a HECM loan include a mortgage insurance premium (initial and annual), third party charges, origination fee, interest, and servicing fees. The initial mortgage insurance premium (MIP) charged at closing can be 2% (Standard HECM) or .01% (HECM Saver) of the lesser of the appraised value of the home, the FHA HECM mortgage limit of $625,500, or the sales price. The annual MIP will be 1.25% of the mortgage balance. Third party charges are the loan's closing costs that include the appraisal fee, title search and insurance, surveys, inspections, recording fees, mortgage taxes, credit checks and other fees. The origination fee will be based on the appraised value of the residence. If the value of the home is less than $125,000, the fee is capped at $2,500.

If the value of the property exceeds $125,000, the first $200,000 of the value will be assessed a fee of 2%, and 1% for the excess over $200,000, with a maximum fee of $6,000. The servicing fee imposed by financial institutions is a monthly charge added to the loan's balance ($30 to $35) depending on the frequency of the adjustment of the loan's interest rate. On June 17, 2011, Bank of America and Wells Fargo & Co., two of the leading banks in the generation of reverse mortgages, decided to abandon this market (Bernard, 2011). On May 2, 2012, MetLife Bank, a subsidiary of MetLife Insurance Company and the third largest bank in this type of financing, announced its decision to withdraw from this segment (Carrns, 2012). Among the reasons provided by these banks to withdraw from the reverse mortgage market are the generalized reduction in housing prices in the U.S. and the difficulties in evaluating the financial situation of the applicants for these types of loans (Nakajima, 2012). Carrns (2012) suggests

that the exit of these three banks market will allow the entry of more efficient smaller banks specialized in this type of financing.

Advantages and Disadvantages of Reverse Mortgages

A study made in Australia found that many senior citizens are unfamiliar with all of the implications of reverse mortgages (Reed, 2009). Reverse mortgages present advantages and disadvantages. On the one hand, borrowers may obtain cash by using their residence as collateral and, by paying an insurance premium, also obtain protection against the possible reduction in the value of the property (Nakajima, 2012). On the other hand, reverse mortgages could discourage savings among senior citizens. In addition, property owners are exposed to the risk of having to move from their house after having obtained the loan and paid the loan's closing and origination costs. Nakajima (2012) also indicates that moral hazard problems could increase if property owners fail to carry out the periodic repair work necessary to maintain or protect their home.

Although reverse mortgages do not require the repayment of the amount borrowed to the lender, a borrower must continue to pay real property taxes and hazard insurance on the property used as the collateral for the reverse mortgage. If a borrower does not make these payments, a default occurs on the reverse mortgage and the lender may terminate or cancel the loan. On average, 50% of reverse mortgages generated in the U.S. are terminated (cancelled) in seven years, which after considering the closing and origination costs, results in a very expensive type of financing (Del Vecchio, Hopson and Hopson, 2009). Tergesen (2013) reports a current increase in the number of reverse mortgages in default in the U.S. as compared to 2011. In April 2013, approximately 10% of the almost 600,000 reverse mortgage loans were in arrears (8% in 2011).

Development and Regulation of the Reverse Mortgage Market in P.R.

As a territory of the U.S., P.R. is subject to federal laws and regulations. Commercial banks doing business in P.R. are subject to federal laws and are insured by the Federal Deposit Insurance Corporation (FDIC). The Office of the Commissioner of Financial Institutions of Puerto Rico (OCIF, by its acronym in Spanish) is the local financial regulatory entity and works closely with the FDIC and other financial institutions such as mortgage banks and credit unions. Reverse mortgages were initially offered in P.R. in 1993, but demand for this type of financing did not increase significantly until 2010. OCIF started to compile statistical data for this type of loan during the first quarter of 2010. Law Number 164 dated July 29, 2011 (Consumer Protection Law of Reverse Mortgages) established the regulatory framework for financial institutions that grant this type of loans. On January 4, 2012, OCIF issued Regulation 8132 (Regulation of the Consumer Protection Law of Reverse Mortgages) to establish the rules that must be followed by all financial institutions that "provide, manage, originate, process or grant reverse mortgage loans".

Research Motivation

OCIF started to compile data on reverse mortgages granted in P.R. during the first quarter of 2010, whereas the starting point for the literature in the U.S. is towards the end of the 1980's. An exploratory study by Cardona and Castro (2012) noted that, from 2010 to 2012, there has been an increase in the number of financial institutions in Puerto Rico offering reverse mortgages accompanied by a reduction in the number of loans granted and in the average loan amount during that same period. The expected contribution from this investigation is to develop a profile of reverse mortgages, borrowers, and volume tendencies in P.R. and compare it with similar data for reverse mortgages generated in U.S. The next section presents the data and the research methodology.

METHODOLOGY

Data

We use data from different sources. The HUD Puerto Rico Field Office provided us with information related to the endorsed HECM loans in the U.S. and P.R. during the fiscal years ended on September 30, 2012, 2011 and 2010, respectively. OCIF provided us with aggregate information for the reverse mortgage loans originated by financial institutions in P.R. from the first quarter of 2010 to the first quarter of 2012. A mortgage bank in P.R. provided us with information from a sample of reverse mortgages originated during the same period as the information provided by OCIF. The information provided by the mortgage bank includes age, gender, marital status (married or unmarried) and geographical location of the property, origination date and loan amount, weighted average interest rate, closing and origination costs, amount paid to cancel the existing lien on the property (if applicable) and the net remaining cash. In addition, Consumer Credit Counseling Services of P.R. (CCCS) provided us with the number of financial counseling sessions offered to consumers interested in obtaining reverse mortgages from the first quarter of 2010 to the first quarter of 2012, which was used to measure the interest in this product and how it has changed during the aforementioned period.

Shan (2011) uses U.S. zip codes to identify to identify the concentration of loans by geographic area. Since we did not have available information for the properties' zip codes, we used the senatorial district of the municipality where the home is located using the classification criteria used by the P.R. State Elections Board. We were unable to obtain information about the motivations or reasons for the applicants to apply for the reverse mortgages or their indebtedness before applying for the loans. We use the data and the information obtained to develop an average profile of the reverse mortgage borrower, the approved loan type, and any relationships between the data, such as interest rates. We assign a different number to each financial institution to protect their identity. The name of each borrower is also protected because each loan is only identified by a random number assigned by the mortgage bank.

RESULTS

Comparisons between Puerto Rico and U.S. Averages

Table 1 presents HECM loans endorsed by HUD in the U.S. and in P.R. during fiscal years (FY) 2010, 2011 and 2012. For FY 2010 (2010) there were 79,063 HECM endorsements in the U.S. and 1,746 in P.R. For FY 2011 (2011) the number of cases in U.S. decreased to 73,109, (a 7.5% decrease), and to 1,684 in P.R (a 3.6% decrease). For FY 2012 (2012) the number of cases in U.S. decreased to 54,591 and 1,522 in P.R. HECM loans generated in P.R. in 2010 represent 2.2% of the loans generated in the U.S, 2.3% in 2011 and 2.8% in 2012. The average interest rate in U.S. and P.R. for 2010 was 3.61% and 4.41%, respectively, which represents a net US-PR spread of 0.80%. For 2011, the average interest rate decreased in U.S. to 3.22%, whereas in P.R., the average rate increased to 4.61%., which represents a net US-PR spread of 1.39%. In 2012, the average interest rate in U.S. increased slightly to 3.30%, whereas in P.R. the interest increased to 4.63%. Therefore, the net US-PR spread increased from 2010 to 2011 by 0.59% and decreased by 0.06% from 2011 to 2012. The fluctuations between fiscal years may be attributed to a combination of perceived slight increase in borrowers' risk and/or related transaction costs.

Table 1: HECM Reverse Mortgage Loans Endorsed By HUD in the U.S. and P.R. from Fiscal Years 2010 to 2012

Period	Region	Cases Endorsed by HUD	Average Interest Rate (%)	Average Maximum Claim Amount	Avg. Monthly Set Aside for Taxes and Insurance	Average Borrower's Current Age
FY2010	U.S.	79,063	3.61	$306,691.50	$0.45	78
	P.R	1,746	4.41	$232,917.04	$0.00	76
FY2011	U.S.	73,109	3.22	$285,339.43	$0.37	77
	P.R	1,684	4.61	$228,486.34	$0.00	73
FY2012	U.S.	54, 591	3.30	$271,154.96	$0.00	76
	P.R	1,522	4.63	$191,347.90	$0.00	76

Source: Data was provided by the Single Family Data Warehouse (SFDW) of the Puerto Rico HUD Field Office.

During 2010 the average maximum claim (loan) amount in U.S. was $306,691 and $232,917 in P.R. During 2011 the average maximum claim (loan) amount decreased to $285,339 and $228,486 in U.S. and P.R., respectively. During 2012 the average maximum claim (loan) amount decreased to $271,155 and $191,348, in U.S. and P.R., respectively. The decreases in the average U.S. and P.R. amounts from 2010 to 2012 are possibly attributed to a larger decrease in real estate values in the U.S. compared to P.R.
The average total loan amount in the U.S. includes an average monthly reserve of $0.45 for real property taxes and insurance, whereas in P.R. it is $0.00. Property taxes on real estate located in P.R. are usually lower than the U.S. because of a $15,000 property tax exemption on the assessed value of a home owner's principal residence. Veterans from the U.S. Armed Forces may also qualify for an additional $4,000 exemption. Assessed property values in P.R. are determined based on real estate values as of January 1, 1957. As a result, many homes pay either no taxes or very small property taxes after considering the aforementioned exemption granted by law.

The average borrowers' age for 2010 in the U.S. is 78 years and in P.R. is 76 years. In 2011 the average age decreased in both U.S. and in P.R. to 77 and 73, respectively. The average age decreased in the U.S. by one year, whereas in P.R. it decreased by three years. Table 2 presents the different types of HECM Reverse Mortgage loans endorsed by HUD in the U.S. and P.R. from 2010 to 2012. In 2010, the LOC was the most commonly granted reverse mortgage in the U.S., followed by LSUM. LOC loans account for 83.3% of the loans granted that year, while LSUM loans are 10.3%, which implies that together, they represent approximately 94% of the HECM loans granted in the U.S. that year. During 2010, in P.R., approximately 85% of the loans granted were of the LOC type, followed by TEN loans (12%). The combination of LOC and TEN loans represent 97% of the reverse mortgage loans granted in P.R. that year. The demand for the other HECM loan types was negligible. In 2010, most of the approved HECM loans both in the U.S. and in P.R were of the LOC type. Possible explanations for this behavior may include the possibility that the borrower wants to have a pre-approved line of credit in case of an emergency without having to request an additional loan or to obtain cash ("net cash payout") from a property that is debt-free.

During 2011 the reverse mortgage market in the U.S. experienced a significant change. LSUM became the loan type with the highest percentage of loans granted accounting for almost 50% of the total. LOC lagged behind with a drastic reduction from 83.3% in 2010 to 44% in 2011. In P.R., LOC remained as the reverse mortgage type with the highest amount of cases, but decreased from approximately 85% in 2010 to 57% in 2011. The observed reduction in the number of cases of the LOC type was due to an increase in the number of cases of the LSUM and TEN types. The TEN category accounts for 22.4% of the loans while LSUM represents almost 20%. The observed shift in the U.S. from LOC to LSUM during 2011 was not as dramatic in P.R., where the documented preference is for LSUM and TEN. This shift to LSUM, both in P.R. and in the U.S., might be attributed to the need for borrowers to generate cash from their properties ("net cash payout") to pay for medical or living expenses, repay other loans, or to enjoy

life as soon as possible. Another possible explanation for the shift in U.S. to LSUM has to do with the entry of specialized (smaller) financial institutions in the reverse mortgage market. These specialized entities do not have the same manpower or infrastructure to handle the monitoring complexities required to manage reverse mortgages other than LSUM. Interest rates on reverse mortgages are the highest in the loan types with highest demand. During 2010, the average interest rate charged in a LOC in the U.S. was 4.73%, while for a LSUM it was 5.47%. The same pattern is observed during 2011.

Table 2: Types of HECM Reverse Mortgage Loans Endorsed by HUD in the U.S. and P.R. from Fiscal Years 2010 to 2012

Period	Region	Loan Type	Cases Endorsed By HUD	Cases As A Percentage Of FY Total Loans (%)	Average Interest Rate (%)	Average Borrower's Current Age	Average Maximum Claim Amount	Average Monthly Set Aside For Taxes And Insurance
FY 2010	U.S.	Lump	8,160	10.32	5.47	74	$251,849.16	$0.00
		Term	486	0.61	2.74	79	$303,620.58	$0.00
		Line of	65,825	83.26	4.73	75	$262,842.01	$0.00
		Term	2,095	2.65	2.70	81	$337,672.68	$1.37
		Tenure	1,136	1.44	3.30	78	$307,551.57	$0.00
		Tenure	1,361	1.72	2.73	82	$376,612.97	$1.34
		Total	**79,063**	100.0	**3.61**	**78**	**$306,691.50**	**$0.45**
	P.R	Lump	39	2.23	5.11	72	$178,158.97	$0.00
		Term	9	0.52	3.85	76	$231,111.11	$0.00
		Line of	1,482	84.88	5.07	74	$184,099.15	$0.00
		Term	3	0.17	3.32	88	$374,000.00	$0.00
		Tenure	212	12.14	5.64	73	$204,133.02	$0.00
		Tenure	1	0.06	3.49	70	$226,000.00	$0.00
		Total	**1,746**	100.0	**4.41**	**76**	**$232,917.04**	**$0.00**
FY 2011	U.S.	Lump	36,170	49.47	5.08	72	$238,503.52	$0.00
		Term	424	0.58	2.45	78	$299,424.53	$0.00
		Line of	32,189	44.03	3.62	74	$252,683.13	$0.00
		Term	1,921	2.63	2.44	79	$304,950.05	$1.04
		Tenure	1,226	1.68	3.30	76	$268,831.47	$0.27
		Tenure	1,179	1.61	2.43	80	$347,643.88	$0.94
		Total	**73,109**	100.0	**3.22**	**77**	**$285,339.43**	**$0.37**
	P.R	Lump	332	19.71	5.16	71	$174,286.24	$0.00
		Term	3	0.18	5.19	78	$304,166.67	$0.00
		Line of	968	57.48	5.30	73	$171,614.62	$0.00
		Term	2	0.12	3.24	73	$313,000.00	$0.00
		Tenure	378	22.45	5.26	73	$177,850.53	$0.00
		Tenure	1	0.06	3.49	74	$230,000.00	$0.00
		Total	**1,684**	100.0	**4.61**	**74**	**$228,486.34**	**$0.00**
FY 2012	U.S.	Lump	33,784	61.89	4.92	72	$230,564.06	$0.00
		Term	290	0.53	2.77	77	$253,574.14	$0.00
		Line of	17,584	32.21	3.39	74	$248,750.78	$0.00
		Term	1,282	2.35	2.79	79	$299,789.39	$0.09
		Tenure	816	1.49	3.12	76	$270,021.29	$0.00
		Tenure	835	1.53	2.79	79	$324,230.08	$0.00
		Total	**54,591**	100.0	**3.30**	**76**	**$271,154.96**	**$0.00**
	P.R	Lump	1,120	73.59	5.07	72	$157,383.68	$0.00
		Term	3	0.20	5.06	75	$157,333.33	$0.00
		Line of	276	18.13	5.15	74	$154,761.81	$0.00
		Term	1	0.07	2.75	86	$330,000.00	$0.00
		Tenure	122	8.02	5.14	73	$157,260.66	$0.00
		Tenure	0	-	-	-	-	-
		Total	**1,522**	100.0	**4.63**	**76**	**$191,347.90**	**$0.00**

Source: Data was provided by the Single Family Data Warehouse (SFDW) of the Puerto Rico HUD Field Office

The LSUM loans continue to have the highest interest rates with 5.08% and LOC have the second highest interest rate with 3.62%. In P.R. the interest rate situation during 2010 was different. The TEN loan category has the highest average interest rate (5.64%), among all types; while LOC has the third highest

rate at 5.07%. Similar to the U.S. in 2010, LSUM in P.R. has a high average interest rate of 5.11%. In 2011, both TEN and LOC remain as the loans that charge the highest interest rates of 5.30% and 5.26%, respectively. When it comes to the age of the average borrower, the observed trend is that younger borrowers select the most commonly granted types of reverse mortgages and also the most expensive alternatives, which suggests a negative correlation between the average age of borrowers and risk. The results seem to suggest that financial institutions might be charging higher amounts to borrowers they expect to live longer. LOC borrowers in 2010 and 2011 in U.S. have an average age of 75 and 74 years, respectively, whereas LSUM borrowers in 2010 and 2011 have an average age of 74 and 72 years, respectively. In P.R. the borrower tends to be younger. LOC borrowers in 2010 and 2011 have an average age of 74 and 73 years, respectively, while TEN borrowers in both 2010 and 2011, respectively, have an average age of 73 years. Table 2 also presents the average maximum claim amount by type of reverse mortgages loans generated in the U.S. and P.R. during 2010 and 2011. The data presents the following patterns. The HECM loans most commonly granted in the U.S. during 2010 and 2011 (LOC and LSUM), represent the loans with the lowest average claim. During the same period, one of the least granted types of loan (TNLC) has the highest claim amount with $376,612 and $347,643, in 2010 and 2011, respectively. During 2010 in P.R., the average claim for the LOC reverse mortgage loans amounted to $184,099, one of the lowest average claim amounts for 2010. During 2011, the LOC and LSUM categories represent the HECM loans with the lowest average claim. TMLC, one of the categories with the smaller number of cases, has the highest maximum claim in P.R. for 2010 and 2011.

However, in 2011 and 2012, the most frequently generated HECM loan in the U.S changed to LSUM, whereas in P.R. there was a change from 2011 to 2012, with the LSUM type replacing the LOC type as the most common reverse mortgage. The observed changes in the U.S. and P.R. might be due to increased cash flow needs of the borrowers or the entry of specialized (smaller) financial institutions generating reverse mortgages. In connection with the average monthly amount set aside for real property taxes and insurance, properties with higher values, on average, tend to have higher amounts set aside for these purposes. In the U.S., TMLC and TNLC tend to have higher amounts set aside for 2010 and 2011. In addition, these loan types tend to have the lowest interest rates. This may be due to the fact that reverse mortgages with higher interest rates have property taxes and insurance fees included in the average interest rate charged or as part of the amounts to be financed. In P.R. there are no charges for this purpose for any of the loans, although they might be included as part of the amounts financed or as an additional financing cost. As previously mentioned, many borrowers pay either no real property taxes (or a very small amount) on their principal residence after considering the exemption granted by law.

The 50 States versus Puerto Rico

To better understand the reverse mortgage market in the U.S., we compare the available data by state. We include 52 jurisdictions: the 50 states, Washington, D.C. and Puerto Rico. The U.S. Virgin Islands were excluded because of missing data. Table 3, Panel A, presents the number of reverse mortgages granted by state for fiscal years 2010 to 2012, population and the ratio of loans as a percentage of each state's population. We observed that the most populated state during the three fiscal years (California) is the state with the highest number of reverse mortgages granted each year from 2010 to 2012. In 2010, Florida had the second highest number of loans granted, followed by Texas, New York and Maryland. P.R. had the 14th highest number of loans among states and territories and occupied the 28th position in terms of population. In 2011, Texas had the second highest number of reverse mortgages granted, followed by Florida, New York and Pennsylvania. P.R. had the 13th highest number of loans among states and territories and occupied the 27th position in terms of population. In 2012, Texas continued to be the state with the second highest number of reverse mortgages granted; New York, Florida and Pennsylvania followed, respectively.

Table 3: HECM Reverse Mortgage Loans Granted by Jurisdiction in the U.S. and P.R. from Fiscal Years 2010 to 2012

Panel a: Reverse Mortgages Per Capita Form										
	Number of Reverse Loans Granted			Population			Reverse Loans Per Capita (%)			
State	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**	**Trendd**
AK	91	95	52	714,146	722,718	731,449	0.013	0.013	0.007	↓
AL	1,128	1,216	924	4,785,401	4,802,740	4,822,023	0.024	0.025	0.019	↓
AR	653	728	531	2,921,588	2,937,979	2,949,131	0.022	0.025	0.018	↓
AZ	1,679	1,448	961	6,413,158	6,482,505	6,553,255	0.026	0.022	0.015	↓
CA	11,058	9,849	6,949	37,338,198	37,691,912	38,041,430	0.030	0.026	0.018	↓
CO	1,412	1,375	1,075	5,047,692	5,116,796	5,187,582	0.028	0.027	0.021	↓
CT	1,198	1,062	766	3,575,498	3,580,709	3,590,347	0.034	0.030	0.021	↓
DC	614	585	390	604,912	617,996	632,323	0.102	0.095	0.062	↓
DE	459	393	274	899,792	907,135	917,092	0.051	0.043	0.030	↓
FL	7,109	4,969	3,355	18,838,613	19,057,542	19,317,568	0.038	0.026	0.017	↓
GA	1,954	1,746	1,114	9,712,157	9,815,210	9,919,945	0.020	0.018	0.011	↓
HI	425	325	231	1,363,359	1,374,810	1,392,313	0.031	0.024	0.017	↓
IA	282	361	271	3,050,202	3,062,309	3,074,186	0.009	0.012	0.009	↓
ID	536	498	303	1,571,102	1,584,985	1,595,728	0.034	0.031	0.019	↓
IL	2,650	1,877	1,428	12,841,980	12,869,257	12,875,255	0.021	0.015	0.011	↓
IN	790	790	670	6,490,622	6,516,922	6,537,334	0.012	0.012	0.010	↓
KS	295	352	274	2,859,143	2,871,238	2,885,905	0.010	0.012	0.009	↓
KY	382	451	414	4,347,223	4,369,356	4,380,415	0.009	0.010	0.009	↔
LA	1,141	1,228	1,099	4,545,343	4,574,836	4,601,893	0.025	0.027	0.024	↓
MA	1,766	1,532	1,115	6,555,466	6,587,536	6,646,144	0.027	0.023	0.017	↓
MD	3,228	2,488	1,551	5,785,681	5,828,289	5,884,563	0.056	0.043	0.026	↓
ME	367	378	299	1,327,379	1,328,188	1,329,192	0.028	0.028	0.022	↓
MI	1,064	794	637	9,877,143	9,876,187	9,883,360	0.011	0.008	0.006	↓
MN	823	1,037	534	5,310,658	5,344,861	5,379,139	0.015	0.019	0.010	↓
MO	1,025	942	756	5,995,715	6,010,688	6,021,988	0.017	0.016	0.013	↓
MS	397	528	496	2,970,072	2,978,512	2,984,926	0.013	0.018	0.017	↑
MT	326	335	207	990,958	998,199	1,005,141	0.033	0.034	0.021	↓
NC	1,550	1,885	1,523	9,560,234	9,656,401	9,752,073	0.016	0.020	0.016	↔
ND	41	53	25	674,629	683,932	699,628	0.006	0.008	0.004	↓
NE	218	237	141	1,830,141	1,842,641	1,855,525	0.012	0.013	0.008	↓
NH	387	336	254	1,316,807	1,318,194	1,320,718	0.029	0.025	0.019	↓
NJ	3,093	3,016	2,212	8,799,593	8,821,155	8,864,590	0.035	0.034	0.025	↓
NM	725	625	432	2,065,913	2,082,224	2,085,538	0.035	0.030	0.021	↓
NV	435	403	287	2,704,283	2,723,322	2,758,931	0.016	0.015	0.010	↓
NY	4,624	4,341	3,923	19,395,206	19,465,197	19,570,261	0.024	0.022	0.020	↓
OH	1,145	1,216	978	11,537,968	11,544,951	11,544,225	0.010	0.011	0.008	↓
OK	650	642	610	3,760,184	3,791,508	3,814,820	0.017	0.017	0.016	↓
OR	1,804	1,344	899	3,838,332	3,871,859	3,899,353	0.047	0.035	0.023	↓
PA	2,886	3,295	2,634	12,717,722	12,742,886	12,763,536	0.023	0.026	0.021	↓
PR	1,746	1,684	1,522	3,722,000	3,694,000	3,667,000	0.047	0.046	0.042	↓
RI	248	232	187	1,052,528	1,051,302	1,050,292	0.024	0.022	0.018	↓
SC	1,258	1,287	900	4,637,106	4,679,230	4,723,723	0.027	0.028	0.019	↓
SD	71	93	53	816,598	824,082	833,354	0.009	0.011	0.006	↓
TN	1,203	1,338	1,321	6,357,436	6,403,353	6,456,243	0.019	0.021	0.020	↔
TX	6,307	6,671	4,865	25,253,466	25,674,681	26,059,203	0.025	0.026	0.019	↓
UT	1,059	998	987	2,775,479	2,817,222	2,855,287	0.038	0.035	0.035	↓
VA	3,125	2,811	1,907	8,023,953	8,096,604	8,185,867	0.039	0.035	0.023	↓
VT	131	138	100	625,909	626,431	626,011	0.021	0.022	0.016	↓
WA	2,378	1,829	1,272	6,742,950	6,830,038	6,897,012	0.035	0.027	0.018	↓
WI	795	889	577	5,691,659	5,711,767	5,726,398	0.014	0.016	0.010	↓
WV	176	181	166	1,854,368	1,855,364	1,855,413	0.009	0.010	0.009	↔
WY	141	175	138	564,554	568,158	576,412	0.025	0.031	0.024	↔
Panel B: Descriptive Statistics for All Jurisdictions Excluding P.R.										
Average	1,516	1,400	1,041	6,065,298	6,109,645	6,155,177	0.025	0.024	0.017	
Std.Dev...	2,011	1,780	1,296	6,839,909	6,907,158	6,974,698	0.016	0.013	0.009	
N̆	51	51	51	51	51	51	51	51	51	
Panel C: Descriptive Statistics for P.R.										
Average	1,746	1,684	1,0522	3,722,000	3,694,000	3,667,000	0.047	0.046	0.42	
N	1	1	1	1	1	1	1	1	1	

Source: Data was provided by the Single Family Data Warehouse (SFDW) of the Puerto Rico HUD Field Office.

In 2012, P.R. became the jurisdiction that had the 10th highest number of loans among states and territories and occupied the 27th position in terms of population. The evidence suggests there is an increase in the use of this financial instrument in P.R. in comparison with other states and territories.

We calculated the ratio of reverse mortgages to the jurisdiction's population to compare the number of reverse mortgage loans per state (reverse *loans per capita*). As a percentage of its population, Washington, D.C. had the highest percentage of reverse loans per capita each year for the 2010 to 2012 period. In 2010, Maryland holds the second position with 0.056% of loans to population ratio. However, in 2011 and 2012, P.R. became the jurisdiction with the second highest proportions of loans to population with 0.046% and 0.042%, respectively. North Dakota is the jurisdiction with the lowest number of reverse loans granted for the three-year period. This statement holds even when compared to other jurisdictions while using the reverse loans per capita ratio.

Table 3, Panel B, presents the aggregate descriptive statistics for 51 jurisdictions (excluding P.R.) for fiscal years 2010 to 2012. Panel C presents descriptive statistics for P.R. On average, P.R. has 13% more reverse loans granted than the other U.S. jurisdictions in the sample. The average number of reverse mortgages granted in the U.S. jurisdictions has decreased from 2010 to 2012. This change represents almost a 31% decrease in the average number of loans granted. The average number of loans granted in P.R. decreased by 13%. This change is lower than the observed on average in other jurisdictions. The evidence seems to suggest that the Puerto Rican market for reverse loans has contracted, but not at the same pace than in other jurisdictions. The average population increased by 1% in the U.S. jurisdictions and in P.R. In the U.S. jurisdictions, the average reverse loans per capita decreased by 31% from 2010 to 2012. In P.R. the average number of reverse loans per capita decreased by 11% in the same period.

Table 4, Panel A, presents the average interest rate, average borrower's age and the maximum claim amount by jurisdiction. P.R. has the highest average interest rates each year from 2010 to 2012. North Dakota and South Dakota have the second and third highest average interest rates in 2010. However, these two states are positioned as two of the jurisdictions with the lowest number of loans granted in 2010. In terms of borrower's age, in 2010, North Dakota has, on average, the youngest borrowers, followed by Montana, South Dakota, Arkansas and Puerto Rico. In 2011, North Dakota is still the jurisdiction that has the youngest borrowers and P.R. drops to the 7th position. In 2012, Wyoming is the jurisdiction with the youngest average borrowers, while P.R. drops to 33rd position. In other words, the average borrower in P.R. is older in comparison with other states. Finally, the average maximum claim amount is higher in the state of Hawaii from 2010 to 2012. From 2010 to 2012, California, Delaware, Washington, D.C. and New York are the four states that follow Hawaii. In 2010, P.R. occupied the 28th position. In 2011 and 2012, it occupied positions 39th and 35th, respectively.

Table 4, Panel B, presents the aggregate descriptive statistics for average interest rate, borrower's age and the maximum claim amount. The information reflects data for 51 jurisdictions (excluding P.R.) for fiscal years 2010 to 2012. Panel C shows the descriptive statistics for P.R. On average, interest rates in the U.S. jurisdictions decreased by about 9%, while in P.R. they increased by 5% from 2010 to 2012. The average borrower's age decreased in P.R. and in the rest of the U.S. jurisdictions. In P.R. the average age decreased by 1%, while in other U.S. jurisdictions it decreased by 4%. The same trends can be observed for the average maximum claim amount. For the U.S. jurisdictions, the average claim amount decreased by 8%. The change in P.R. is more dramatic, where the average claim amount decreased by 18%. The different (higher) interest rates charged in P.R. in comparison with U.S. banks and the reduction in the average maximum claim amount in P.R. during the 2010-2012 period could be related but requires further analysis.

Table 4: Average Interest Rate, Borrower's Age and the Maximum Claim Amount of HECM Reverse Mortgage Loans by State from Fiscal Years 2010 to 2012

Panel a: Average Interest Rate, Borrower's Age and the Maximum Claim Amount For All Jurisdictions									
	Average Interest Rate (%)			**Average Borrowers' Age (Years)**			**Average Maximum Claim Amount ($)**		
State	2010	2011	2012	2010	2011	2012	2010	2011	2012
AK	3.40	1.77	1.82	78	72	71	299,612	295,207	256,321
AL	3.76	3.25	3.16	81	75	76	184,752	180,979	141,545
AR	3.78	3.82	3.29	75	76	74	219,467	156,678	206,462
AZ	3.51	3.01	3.19	78	75	75	255,618	237,110	210,528
CA	3.48	3.01	3.16	79	78	77	461,681	426,615	402,102
CO	3.52	3.01	3.16	78	76	73	246,976	294,328	240,199
CT	3.45	2.93	3.20	79	80	77	310,613	299,746	288,382
DC	3.74	3.35	3.39	80	78	72	407,645	398,582	405,238
DE	3.60	3.12	3.28	79	74	74	413,450	260,720	344,062
FL	3.60	3.09	3.25	79	77	76	245,173	221,230	230,363
GA	3.54	3.14	3.20	78	77	74	217,385	220,398	209,272
HI	3.51	2.88	2.95	78	75	75	486,421	508,293	471,296
IA	3.41	2.97	3.40	76	77	74	159,578	134,873	131,387
ID	3.56	3.18	3.30	77	74	75	250,578	224,074	175,610
IL	3.47	3.05	3.11	80	79	77	219,220	212,646	193,713
IN	3.42	3.12	3.32	79	75	75	133,224	163,843	157,654
KS	3.78	3.21	3.28	78	78	73	195,512	169,837	136,750
KY	3.51	3.15	3.30	78	76	76	193,829	171,636	134,821
LA	3.63	3.24	3.29	78	76	74	184,465	286,124	184,725
MA	3.43	2.93	3.15	77	76	74	340,920	338,681	308,585
MD	3.55	3.13	3.22	78	76	75	306,208	303,161	311,436
ME	3.44	2.98	3.23	77	73	75	259,750	227,266	256,768
MI	3.61	3.03	3.19	79	77	75	173,760	162,475	187,263
MN	3.41	2.93	3.19	78	76	76	229,752	216,874	216,345
MO	3.57	3.18	3.31	77	77	74	179,556	164,009	185,819
MS	3.79	3.20	3.67	77	78	73	143,686	172,239	191,883
MT	3.48	3.05	2.98	74	73	75	268,261	275,164	266,917
NC	3.40	3.05	3.25	78	77	74	242,049	225,765	209,881
ND	4.06	3.45	3.53	72	71	74	117,078	148,507	150,742
NE	3.42	3.01	3.27	78	76	77	157,099	201,807	165,250
NH	3.46	2.84	3.22	77	76	74	246,295	236,435	235,109
NJ	3.39	2.98	3.18	79	78	78	318,382	304,220	290,773
NM	3.66	3.00	3.35	76	75	75	292,505	259,874	266,701
NV	3.41	3.13	3.07	78	76	74	243,822	235,793	200,371
NY	3.44	3.06	3.25	79	78	77	399,672	383,249	371,490
OH	3.63	3.12	3.20	80	79	76	174,329	131,451	124,172
OK	3.61	3.31	3.31	81	74	74	168,676	133,407	157,764
OR	3.50	3.07	3.18	76	75	74	277,644	248,779	222,755
PA	3.48	3.15	3.33	78	78	75	212,508	209,232	194,088
RI	3.43	2.87	3.16	77	77	79	260,988	291,884	266,919
SC	3.57	3.08	3.29	77	75	74	228,368	241,690	222,463
SD	3.89	3.26	3.29	75	72	75	158,830	210,166	143,083
TN	3.70	3.19	3.36	78	75	75	216,989	221,294	150,985
TX	3.62	3.17	3.34	79	77	74	187,825	187,709	181,614
UT	3.58	3.03	3.29	76	75	75	234,217	212,808	221,163
VA	3.48	3.07	3.22	78	76	77	278,715	274,252	264,283
VT	3.45	3.01	3.25	76	76	73	299,015	319,534	240,386
WA	3.51	3.00	3.25	77	75	75	333,775	309,571	310,320
WI	3.64	3.06	3.19	78	76	76	206,019	211,843	182,858
WV	3.57	3.16	3.43	77	79	73	138,623	150,364	159,137
WY	3.86	3.09	3.58	77	77	71	230,818	234,682	207,819
Panel B: Descriptive Statistics For All Jurisdictions Excluding P.R.									
Average	3.56	3.08	3.23	78	76	75	247,281.04	241,315.76	227,168.08
Std. Dev.	0.15	0.24	0.24	1.64	1.88	1.60	82,551.08	77,784.82	76,367.21
N	51	51	51	51	51	51	51	51	51
Panel C: Descriptive Statistics For P.R.									
Average	4.41	4.59	4.63	76	74	75	232,901	196,606	191,348
N	1	1	1	1	1	1	1	1	1

Source: Data was provided by the Single Family Data Warehouse (SFDW) of the Puerto Rico HUD Field Office.

OCIF Data

Table 5 presents data provided by OCIF with respect to reverse mortgages originated in P.R. We observed an increase in the total number of reverse mortgages granted on a quarterly basis by financial institutions in P.R. during 2010, with the highest level in the fourth quarter of 2010. When we compare the first quarter of 2010 with the first quarter of 2011, we observe that there is a reduction in the number of cases closed of approximately 20%. This tendency continues throughout the first quarter of 2012 and may be attributed to the generalized reduction in residential real estate market prices. The average amount of reverse mortgages originated during the first quarter of 2010 amounted to $33.61 million. We observed continued increases in the following quarters, reaching the highest point in the fourth quarter of 2010 with $55.13 million in loans. During 2011 and the first quarter of 2012, we observed a tendency of contraction each quarter until it reaches similar levels to those of the first quarter of 2010. This tendency may also be explained by the generalized price reduction in the residential housing market.

The first quarter of 2010 reflects the start of a 70% percent increase in the number of financial institutions offering reverse mortgages in P.R. However, the number of cases closed did not increase but instead remains stable. This suggests that although there is more competition in this market, demand has not increased. According to Carrns (2012) after the exit of the three largest reverse mortgage lenders in U.S., it is expected that smaller institutions will target this niche market. During 2011, several U.S. financial institutions (Generation Mortgage and Sun West Mortgage) started operating in P.R. as non-depository financial institutions specializing in reverse mortgages.

Table 5: Quarterly Financial Activity of Reverse Mortgage Loans in P.R. from March 2010 to March 2012

Period (Quarter)	Total number of loans	Total loans ($)*	No. of Inst. granting loans during the quarter	No. of Inst. orig. loans during the quarter	Avg. loan amount generated by instit. ($)*	Wt. avg. interest rate (%)	Disc. ($)*	Average Discount per loan ($)*	Loan Orig. fees ($)*	Avg. orig. fee per loan ($)*	Orig. fees and discount as % of loan amount
3-2010	319	33,610	10	10	3,361	5.47	4	0.013	1,079	3.38	0.32
6-2010	459	49,767	12	11	4,524	5.44	32	0.070	1,491	3.25	0.34
9-2010	478	52,681	13	12	4,390	5.35	47	0.098	1,533	3.21	0.36
12-2010	492	55,133	13	11	5,012	5.27	107	0.217	1,572	3.20	0.33
3-2011	392	41,081	15	12	3,423	5.15	23	0.059	925	2.36	0.28
6-2011	362	37,457	15	10	3,746	5.14	0	-	1,149	3.17	0.31
9-2011	332	33,855	16	13	2,604	5.13	10	0.030	982	2.96	0.38
12-2011	339	34,400	17	15	2,293	5.16	17	0.050	990	2.92	0.44
3-2012	335	34,217	17	13	2,632	5.07	10	0.030	1,053	3.14	0.40

**Amounts in thousands of dollars (000). Source: The information presented in this table contains information provided by OCIF and amounts calculated for purposes of this investigation.*

Reverse mortgages originated each quarter by institution from 2010 to 2012 reflects that 2010 was the year with the highest dollar volume. During the fourth quarter of 2010, the average funds granted were $5.012 million, the highest amount in the sample period. In 2011, we observed a reduction in the volume. This might be due to a reduction in the number of cases closed and an increase in the number of financial institutions offering these loans. The average amount of funds granted per case during the sample period is $106,100. Detwiler (2008) finds that the average amount granted in the U.S. during 2006 was $159,000. We also observe a reduction in the weighted average interest rate. This is consistent with interest rates on U.S. 30-year mortgage loans from 2006 to 2011, as published by the Federal Home Loan Mortgage Corporation (Freddie Mac). Prior studies document that reverse mortgages have high origination and discount costs. We find that the average origination and discount costs related to these

loans are 3.2% for the first quarter of 2010 and decreased to 2.3% for the first quarter of 2011. Then for the same quarter in 2012 it increased again to 3.1%. These results concur with other U.S. studies (Shan, 2011).

P.R. Mortgage Bank Data

Table 6 presents data provided by a P.R. financial institution with descriptive information from a sample of reverse mortgages granted from 2010 to 2012. Although the average age of the borrowers is 70 years, 68% are between the ages of 62 to 70 years, and approximately 36% of them are between 71 and 81 years old. These findings are consistent with a study performed by MetLife in 2012 that finds that the average borrower's age in the U.S. is 71.5 years. With respect to gender, approximately 64% of borrowers are women and 36% are men. We find that 61% of borrowers are married and 39% are unmarried. Among the unmarried borrowers, 82% are women and 18% are men. The sample of reverse mortgage loans examined reflects that about 22% of the funds granted were used to cover closing and origination costs, another 22% was used to cancel existing mortgages and 56% of the funds were paid out to the mortgagees. These findings are similar to the empirical evidence obtained by Del Vecchio, Hopson and Hopson (2009) that the net amount received by the borrowers represents approximately 50% of the total loan amount.

CCCS Data

CCCS is the principal entity offering financial counseling services in P.R. During 2010 and 2011, CCCS offered financial counseling to 3,535 and 3,174 consumers, respectively, interested in obtaining reverse mortgage loans. In addition, they offered counseling services to 863 and 750 applicants during the first quarter of 2011 and 2012, respectively. This change represents a reduction in counseling sessions of 13%. We also calculated the ratio of loans granted to the number of sessions offered by CCCS. The results reveal that about 50% of applicants that received counseling services do not complete the loan process. The first quarter of 2012 reflects the same proportion. However, a lag may exist between the date of the counseling sessions and the loan's closing date. The evidence obtained from CCCS represents a limitation in this study because we do not have the data related to the number of financial counseling sessions offered by other authorized counseling entities in P.R. The next stage of this investigation will examine the strength of the relationship between the origination of reverse mortgages and other economic and demographic variables through regression and correlation analyses. The investigation intends to develop the public policy implications of the use of this instrument.

CONCLUSIONS

The objective of this paper is to perform a comparative and descriptive analysis of reverse mortgages originated in Puerto Rico and the United States from 2010 to 2012. The demand for reverse mortgages during the first half of the 2000-2010 decade increased in the U.S. due to several reasons, one of which was to generate additional sources of cash to absorb the increased cost of living expenses and mitigate the depleted savings and investments of senior citizens. Using data obtained from different sources we compare the reverse mortgage loans granted in the U.S. and P.R. from 2010 to 2012. We identify the differences observed and provide possible explanations. In addition, we develop an average comparative profile for reverse mortgage borrowers in the U.S. and P.R.

The number of reverse mortgages reported in the U.S. and in P.R. decreased from 2010 to 2012. The average interest rate also differs when comparing U.S. and P.R. reverse mortgages, and the average loan amount differs by almost 25%, with U.S. loans having higher amounts. This gap decreases in 2011 to approximately 20%. The different (higher) interest rates charged in P.R. in comparison with U.S. banks and the reduction in the average maximum claim amount in P.R. during the 2010-2012 period could be

related but requires further analysis. The average age of reverse mortgage borrowers decreased both in the U.S. and in P.R. from 2010 to 2012. This reduction seems to be associated with the fact that younger retirees are recurring to the use of reverse mortgages to offset the impact of several factors such as inflation, increased cost of living, depleted savings and investment portfolio accounts.

Table 6: Reverse Mortgage Loans Originated by a Mortgage Bank in P.R. During 2010 and 2011

Year	Marital Status	Gender 1*	Gender 2*	Age 1*	Age 2*	District	Approved Mortgage Amount ($)^	Amount paid to pay off existing mortgage lien ($)^	Closing costs and origination fees ($)^	Cash pay-out to Borrower (Cash paid by borrower) ($)^	Closing costs and Origination fees†	Net cash payout from the loan †	Balance paid of the existing mortgage lien†
2010	Not Married	F		65		Arecibo	43,200	25,287.25	11,436.26	6,476.49	26%	15%	59%
2010	Not Married	F		63		Carolina	24,076		11,317.15	12,758.85	47%	53%	0%
2010	Not Married	F		81		Humacao	77,640	383.40	12,858.77	64,397.83	17%	83%	0%
2010	Not Married	F		64		Arecibo	365,292	374,420.84	N/D**	(51,656.18)	N/D**	-	102%
2010	Not Married	M		79		Bayamón	73,830	7,376.71	14,270.57	52,182.72	19%	71%	10%
2010	Not Married	F		64		Bayamón	73,000		15,253.08	57,746.92	21%	79%	0%
2010	Married	M	F	78	69	Mayagüez	118,572		21,124.19	97,447.81	18%	82%	0%
2010	Married	M	F	70	68	Bayamón	62,040		14,069.64	47,970.36	23%	77%	0%
2010	Married	M	F	70	72	Carolina	60,516	28,952.14	15,174.99	16,388.87	25%	27%	48%
2010	Married	M	F	77	68	Bayamón	51,555	20,208.65	13,942.22	17,404.13	27%	34%	39%
2010	Married	M	F	69	70	Arecibo	121,176		21,811.96	99,364.04	18%	82%	0%
2010	Married	M	F	74	63	Bayamón	72,000		15,271.06	56,728.94	21%	79%	0%
2011	Not Married	F		68		Arecibo	59,185	36,456.77	13,920.26	8,807.97	24%	15%	62%
2011	Not Married	F		62		San Juan	162,322	1,303.17	24,512.37	136,506.46	15%	84%	1%
2011	Not Married	M		72		Bayamón	94,780	53,014.99	19,271.66	22,493.35	20%	24%	56%
2011	Not Married	F		73		San Juan	84,888	63,465.91	15,615.94	5,806.15	18%	7%	75%
2011	Not Married	F		70		Guayama	83,096		14,964.45	68,131.55	18%	82%	0%
2011	Married	M	F	66	66	Humacao	78,520	66,671.70	10,206.79	N/A**	N/A**	-	85%

*Source: The information presented in this table contains information provided by a mortgage bank in P.R. and amounts calculated for purposes of this investigation. *F = Female, M=Male; 1 and 2 =Main borrower; ^ Amounts in thousands of dollars (000); † Represent closing costs and origination fees, net cash payout to the borrower and the balance of an existing mortgage lien with respect to the approved amount of the reverse mortgage loan; **N/A = Not available.*

According to the data provided by OCIF, there has been a reduction in the number and the average amount of reverse mortgages originated in P.R. during 2011 and the first quarter of 2012. At the same time, the number of financial institutions offering this product in P.R. has increased. According to the sample data obtained from a financial institution in P.R, the average age of the borrowers is 70, most of whom are women and unmarried, and approximately 50% of the funds from the approved loans represent the net cash paid to the borrowers for their economic needs. The reduction in the number of loans granted in P.R., the borrower's average age and the distribution or the uses of the borrowed funds is consistent with other studies performed in the U.S. (Elmer, 2012, Michelangeli, 2008 and Detwiler, 2008). This study has certain limitations. The data obtained from HUD is for fiscal years ended on September 30, 2010 through 2012. The data obtained from OCIF, CCCS and a mortgage bank in P.R. was for natural years 2010 and 2011 and for the first quarter of 2012. Another limitation is that we do not have the data related to the number of financial counseling sessions offered by authorized counseling entities in P.R. other than CCCS. In addition, certain data is defined differently by each institution, for example HUD

uses average interest rates while OCIF uses weighted average interest rates. This limits our comparison between the available data sets.

According to Del Vecchio, Hopson and Hopson (2009), in the U.S., on average, 50% of reverse mortgages are terminated (cancelled) in seven years. In addition, the *Wall Street Journal* reported increasing default rates on reverse mortgages in 2013 as compared to 2011 (Tergesen, 2013). This area represents future research possibilities. Since the statistical data compiled by OCIF for reverse mortgages in P.R. starts in the first quarter of 2010, and assuming the same seven-year termination rate from the U.S. is observed in P.R., the questions for future research are:

What happens when senior citizens deplete the funds received from the reverse mortgages and have no means to pay real property taxes and hazard insurance on their homes?
What would be the policy implications of this situation?
How would (or should) financial institutions and state governments handle this situation?
How would the results in P.R. compare with the U.S.?

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IS A BRIGHTER FUTURE WAITING FOR THE U.S. CURRENT ACCOUNT BALANCE?

Mehdi Hojjat, Neumann University

ABSTRACT

This article uses cross sectional and times series data to forecast the U.S. current account balance and projects that the U.S. will have a surplus in that account in less than 10 years. This improvement will happen with the help of the energy sector; however, trade, service and income accounts will be also contributing. Both cross sectional and time series projections display a rather robust outlook for the U.S. current account balance. These predictions shatter many glooms and doom scenarios about the overreliance of America on Chinese capital to finance its deficit. By 2020, the U.S. could be in a position to actually finance the deficit of other countries.

JEL: F, F13

KEY WORDS: Current Account Balance, U.S. Trade Deficit, Balance of Payments, Cross Sectional Analysis of Trade Data

INTRODUCTION

The current account deficit is an important economic variable showing the level of competitiveness of a nation. Usually surpluses in a current account are associated with more employment and creation of higher paying jobs. So, it is desirable to have a surplus in this account rather than a deficit. According to the Federal Reserve Bank of New York (2009), the current accounts are divided into the following four sub-accounts.

Merchandise trade consists of all raw materials and manufactured exported, minus those that are imported. The difference is a Balance on Merchandise Trade. Services include tourism, transportation, entertainment, engineering and business services, such as law, management consulting and accounting. Fees from overseas amusement parks, such as Euro Disney, patents and copyrights on new technology, software, books, music and movies also are recorded in the service category. The difference between those receipts and payments makes the *Balance on Service*.

Income receipts include income derived from ownership of assets which are held abroad, such as dividends on holdings of stock and interest on securities. Again, the differences between what we received from foreigners and what we pay them in these categories is called ***Balance on Income***. Unilateral transfers represent one-way transfers of assets, such as worker remittances from abroad and direct foreign aid. In the case of aid or gifts, a debit is assigned to the capital account of the donor nation. Because of the double entry nature of the BOP accounting, if the U.S. provided gifts or humanitarian assistance, the entry is negative in this sub-account, and it values are entered as a positive number in Merchandise trade as export.

The U.S. current account deficit has been a subject of hot debates between researchers who believed the recent trend in the expanding the deficit will continues and those who believe the deficit gap is narrowing. As Table 1 shows, in 2009 the United States had a deficit in goods of $517 billion but a surplus in services of $138 billion, and Income of $ 70 billion. Adding Unilateral Transfers to these sums will result in a

negative balance of $392 billion. Therefore, in 2009, the U.S. had a deficit in its Current Account balance. U.S. has never had a surplus in its Current Account in the past 40 years.

Table 1: the U.S. Balance on Current Account, 2009 (Billions of Dollars)

Merchandise Trade Balance	−517
Balance on Services	+138
Balance on Income	+ 70
Balance on Merchandise, Services, and Income	− 309
Unilateral transfers	− 83
Balance on Current Account	−392

Source: U.S. Department of Commerce, Bureau of Economic Statistics, estimated based on the first nine month of statistics by the author

Since 2009, U.S. economy has substantially improved. Its current account has also improved and its capital account indicates a growing appetite by foreigners to invest in the United States. However, if the 2009 trend would have continued for a few more years, our worst fears and anxiety would have become a nightmarish reality. The following figure projects the U.S. current account balance if the 2009 crisis would have continued.

Figure 1: Previous Projection of the U.S. Current Account Balance ($000)

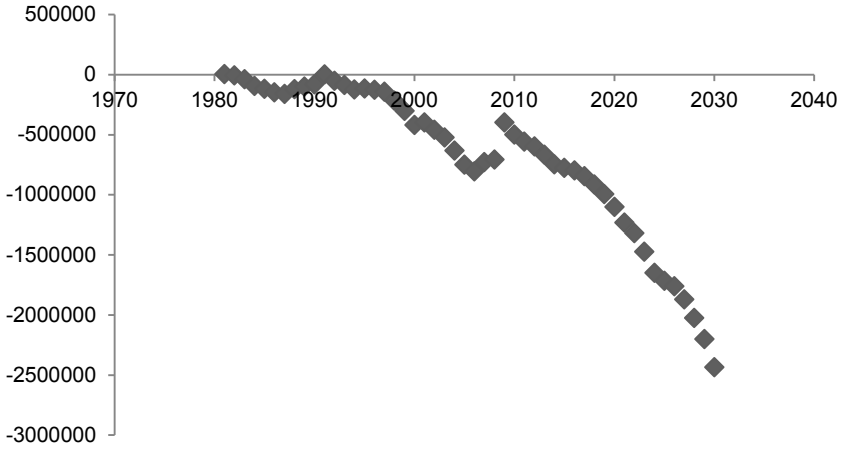


Figure 1 portrays dooms and glooms scenario for the U.S. current account balance believed by most researchers.

In the next section we review the literature in this subject, present data set and examine the inflection point on the U.S. current account balance. This inflection point is at the core of this article as it has been missed by previous researchers. By incorporating the inflection point in the data analysis, a robust picture of the U.S. current account balance will be revealed.

REVIEW OF LITERATURE

In 1998, Daniel Griswold (1998) from the Cato Institute wrote an article about the U.S. trade deficit. He wrote that article two years after the 1996 Asian financial turmoil. As he was projecting a deeper and deeper deficit for the U.S. current account balance, one of the main points of the article was the following: the U.S. trade deficit has no relationship with the U.S. unemployment rate. This point is still valid. In recent years, we observed inflection points in all trade data that make many of the previous trade analysis erroneous. In 1989, Howard (1989) who was one of the Directors working for the Governors of the Federal Reserve Bank predicted the recent path of the U.S. current account deficit and the consequent accumulation of external debts create a large, sharp depreciation of the dollar in the future. Others have worried about the implications of the United States as the world's largest "debtor nation," references to

the heavily indebted developing countries and the "debt crisis" have been voiced, as have been concerns about the growing foreign control implied by the growth in foreign claims on the United States. Except for 1990, Americans have run an annual current account deficit with the rest of world in every year since 1982. That unbroken string of deficits has colored much of the trade debate in the United States in the last two decades. Indeed, the deficit was partly to blame for a wave of angst in the late 1980s over so-called American "decline." Best-selling books such as Paul Kennedy's *The Rise and Fall of the Great Powers* and Clyde Prestowitz's (1989) *Trading Places: How We Allowed Japan to Take the Lead* caught the mood of the time. Throughout the 1980s and 1990s, the current account deficit has spawned worry about "unfair" foreign trade barriers, lost jobs, and America's ability to compete in the global marketplace. Kouparitsas (2005) in the Chicago Fed Letter stated that the size of the net export -exports less imports - has to fall by 3% to 3.5 % of GDP to maintain the confidence of foreigners to lend U.S. to finance its current account deficit. But he does not make any comments as how this can be done or if it is practical.

Rafig (2010) examined the time-varying time series processes of the interaction between government fiscal deficits, the current account balance and the real exchange rate for the U.K. and U.S**.** economies. He concluded that future fiscal deficit reductions alone cannot eliminate U.K. and U.S. current account imbalances. Overall, he expressed a negative view on the U.S. current account calamity. The concern over the growing size of the U.S. current account balance has been the subject of study by several other researchers (Cavallo, M. 2006 and Helbling, T. 2005). The culmination of these researches can be summarized by the work of Cavallo (2006) who related these concerns to the depreciation of the value of U.S. dollar. Indeed, between 2002 and 2004, the dollar declined by about 15% against a broad basket of currencies. She stated that the dollar valuation effects are necessary for smoothing the adjustment process to a more balanced U.S. current account. Unfortunately, Cavallo (November 2006) did not foresee that the U.S. current account imbalance can also be balanced by trade reversal in several categories that are the subject of this article.

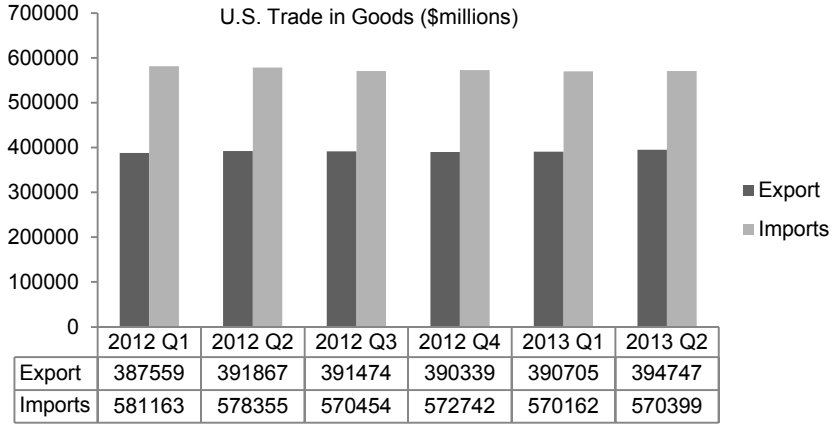
During the 2008 recession, the current account deficit disappeared, as trade and financing dried up. However, the factors that caused the deficit – high consumer debt, the U.S. Federal budget deficit and debt, and high savings rates in Japan and China -- still remain. The prediction by Kimberly Amadeo (2012) was that if these factors not addressed, they will eventually limit U.S. economic growth because she considered the deficit was unsustainable and it the greatest single threat to the global economy. My assertion is that since the U.S. economy is so large and comparatively stable, it is unlike other countries and can carry the current account deficit without a problem. In March 2014, New York Times (March 14, 2014) reported that big gains in exports and overseas investment income narrowed the United States' current-account deficit in the fourth quarter to the lowest level in 14 years. The imbalance fell to $81.1 billion in the fourth quarter of 2013, down from $96.4 billion in the previous quarter, according to the U.S. Commerce Department. That was the smallest gap since the third quarter of 1999.

One of the most volatile economic consequences of the global financial crisis was a decline in the U.S. trade deficit in 2009 and a subsequent improvement in the U.S. current account balance. After 2009, creation of new natural gas industry not only significantly reduced the U.S. import of energy products but also created thousands well-paying jobs in this industry. At the same time, a rising demand for U.S. exports to emerging markets such as the BRICK countries (Brazil, Russia, India, China and Korea) means higher demand for the U.S. dollar which maintains its value as the most important reserve currency in the world. In 2014, five years after the global financial crisis, I broaden Griswold's research from a mere trade balance to the U.S. current account balance and come up with a very different conclusion. In this article, we will examine recent data on the U.S. current account to see it diverges from the old declining pattern and then we will forecast its future trend.

DATA AND METHODOLOGY

The U.S. current-account deficit—the combined balances on trade in goods and services, income, and net unilateral current transfers—decreased to $98.9 billion in the second quarter of 2013 from $104.9 billion in the first quarter of 2013. The decrease in the current account deficit was accounted for by a decrease in the deficit on imported goods, an increase in the surplus on income, and an increase in the surplus on services. These changes were partly offset by an increase in net outflows of unilateral current transfers, such as government grants, government pensions and other transfers, and private remittances. The deficit on goods and services decreased to $117.8 billion in the second quarter from $122.6 billion in the first. The deficit on goods decreased to $175.7 billion in the second quarter from $179.5 billion in the first. Graph 2 shows the trend on the U.S. goods export and import. As shown in this, in the second quarter of 2013 (the latest available quarter as of this writing) goods exports increased to $394.7 billion from $390.7 billion. Exports in four of the six major end-use categories increased. The largest increases were in capital goods and in consumer goods. The increase in capital goods was largely due to an increase in civilian aircraft, engines, and parts. This rising trend of exports has its origin in 2009, after the global financial crisis.

Figure 2: Pattern of U.S. Export and Import of Goods



	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	2013 Q2
Export	387559	391867	391474	390339	390705	394747
Imports	581163	578355	570454	572742	570162	570399

Figure 2 shows deckling imports of goods and stable U.S. exports of goods in recent quarters. Source of Data: Bureau of Economic Analysis, Release Date: September 19, 2013. Retrieved from Table 2a.

In the second quarter of 2013, goods imports decreased to $570.4 billion from $578.3 billion a year earlier. Increases in five of the six major end-use categories were nearly offset by a substantial decrease in industrial supplies and materials. The largest increase was in automotive vehicles, parts, and engines, much of that in passenger cars. The decrease in industrial supplies and materials was mostly due to a decrease in petroleum and products . As the U.S. becomes more self-sufficient in the production of oil and natural gas, U.S. imports in this category will decrease. Large oil reserves found by Pioneer Natural Resources Company (stock symbol: PXD) in Texas will make U.S. the largest producer of oil in the world. In November 2013, U.S. production of oil exceeded its imports, and the U.S. became the largest producer of oil and gas in the world.

Thanks to hydraulic fracturing (or fracking) and the ability to drill horizontally, oil and gas production in the U.S. has skyrocketed. [Fracking is a drilling technique that blasts millions of gallons of water and chemicals to fracture rock formations deep beneath the surface and release gas and petroleum.] The production of natural gas by fracking technology has produced an abundance of this energy, to the point that the price of one thermal square foot (TSF) of natural gas in the US is 25 percent of the world price, $3.75 versus $15. This new trend means that U.S. is no longer an importer of Liquefied Natural Gas

(LNG) from such countries as Qatar or Nigeria. Furthermore, the terminals in the U.S. that were built for imports of LNG have been turned into export terminals and within two years the U.S. will become a major exporter of natural gas. Cheniere Energy, Inc (Stock Symbol: LNG) is investing in a LNG plant in Louisiana and other firms are investing in the Chesapeake region of Maryland. The cost of the liquefaction of natural gas is about $3 per TSF, adding an additional $3 for its transportation cost brings the U.S. (FOB) price of exporting natural gas to $9.75, which is well below the current world price of natural gas. As shown in Figure 3, this new trend in U.S. energy production, import and export is gradually changing the outlook for the U.S. balance on goods and the current account. The data suggest a decrease of 4 percent per quarter or 16 percent annually in imports of petroleum.

Figure 3: U.S. Trade in Petroleum Products ($Millions)

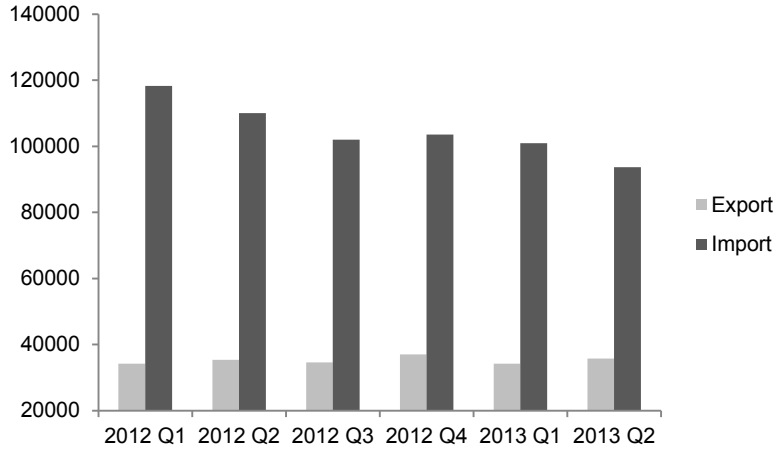


Figure 2 reveals a dramatic reversal on the U.S. reliance on imported oil, as the level of imports of petroleum products is declining and soon the level of export of petroleum products will be on the rise. Source of Data: American Petroleum Institute.

The rapid increase in U.S. natural gas output can be attributed to the extraction of the commodity from shale formations. Natural gas as well as crude oil production has contributed to the U.S. producing 14 percent more of its own energy needs now compared to 2005, according to data from the Energy Information Agency. Assuming the Department of Energy will issue export permits, by 2015, U.S. will start exporting natural gas from Louisiana, Texas and Maryland LNG terminals. Since 2011, four such projects have been approved. The most recent decision was made in September 2013, when Dominion Resources (stock symbol: D) received approval for the Cove Point terminal on the Maryland shore of the Chesapeake Bay. To date, the DOE has authorized 6.37 billion cubic feet of LNG from the plant to be sold overseas. The expected export of LNG based on $12 per cubic feet, will have a great impact on the U.S. current account balance. Table 2 reports the expected additional export of LNG.

Table 2 : U.S. Projected Export of LNG

	2014	**2015**	**2016**	**2017**	**2018**	**2020**
Annual Export of LNG (billion CF)	1	2	3	4	5	6
Export Price per Cubic Feet	$12	$12	$12	$12	$12	$12
Additional Export of LNG ($b)	$12	$24	$36	$48	$60	$72

Table 2 presents a cross sectional projection of U.S. export of LNG based on the assumptions that the recent trend in LNG production continues and the U.S. government issue export permits.

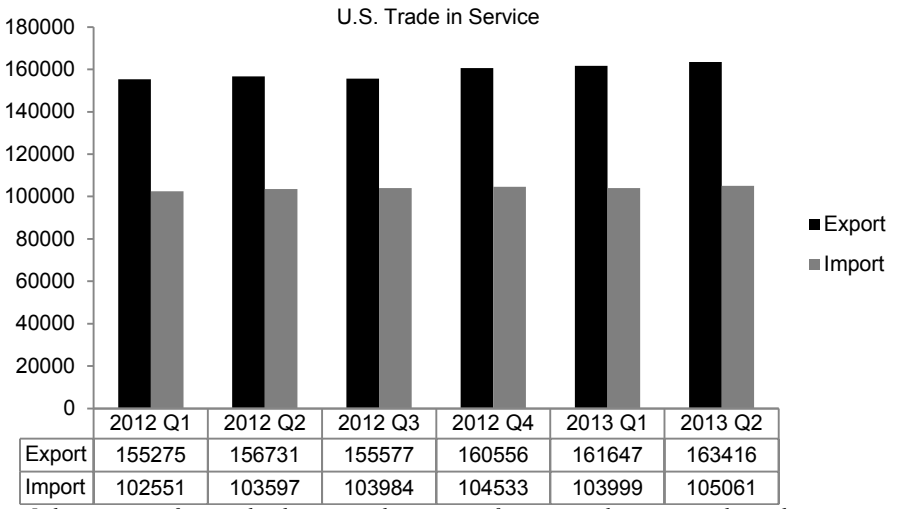
There are also improvements in the U.S. export of manufactured goods. In December 2013, Automotive News (December 13, 2013) reported about the rebound in the U.S. auto industry. "Saudis driving Ford F-150 pickups and Chinese coveting Jeep SUVs mean more automobiles are filling up ships leaving U.S. ports, boosting revenue for vessel operators and, in turn, helping cut automakers' per-vehicle shipping costs." General Motors, Ford, Toyota and BMW are among the firms reporting higher car exports from their U.S. plants to Asian and European countries. In 2013, the United States exported a record 2 million cars and light trucks, and shipments in 2014 are rising over the previous year, according to Commerce Department data (December 18, 2013). Figure 4 shows the recent improvement in the U.S. balance of goods.

Figure 4: Improvement in the U.S. Trade Balance in Goods

Figure 4 demonstrates a rather sharp improvement in the recent balance of merchandise trade which is the largest category in the U.S. current account. Source of Data: Bureau of Economic Analysis, Release Date: September 19, 2013. Retrieved from Table 2a.

The surplus in services increased from $56.8 billion in the first quarter of 2013 to $57.9 billion in the second quarter of 2013. As shown in the following graph, this increase has started in 2012.

Figure 5: U.S. Trade in Services ($Millions)



	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	2013 Q2
Export	155275	156731	155577	160556	161647	163416
Import	102551	103597	103984	104533	103999	105061

Figure 5 shows export of service has been more than import of service resulting in a surplus in this category of the U.S. current account. Source of Data: Bureau of Economic Analysis, Release Date: September 19, 2013. Retrieved from Table 3a.

Services exports increased to $169.2 billion from $167.2 billion. Exports increased in five of the seven major services categories. More than half the increase was in other private services, primarily in financial services and in business, professional, and technical services. As shown in Figure 6, the import of services has remained rather flat and has stabilized at around $111 billion. In recent years, the largest increases were in travel categories as more Americans are now financially comfortable and able to travel overseas. With a stable import and a rising export of services, the surplus in the service trade has been rising.

Figure 6: U.S. Trade in Services ($Millions)

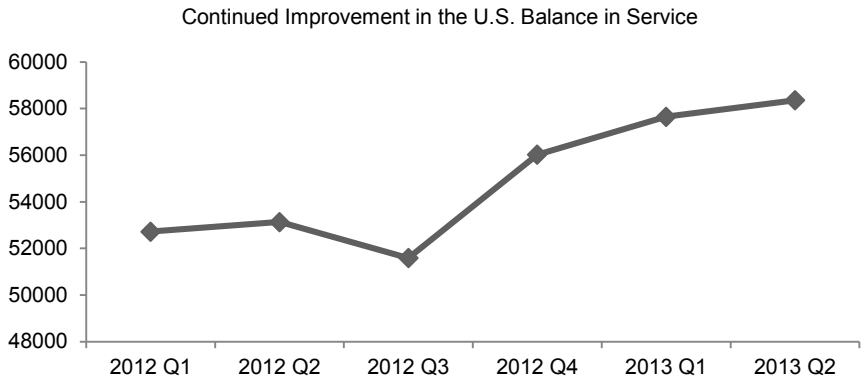


Figure 6 shows improvement of the U.S. Balance on Service with a rather strong uptrend line. Source of Data: Bureau of Economic Analysis, Release Date: September 19, 2013. Retrieved from Table 3a.

The share of service in total exports is also on the rise. As shown in the following graph, the export of services in 1995 was only 26.4% of total export. In 2013, this share grew to 29.5 percent. This trend is expected to continue and will play a critical role in our projection of the U.S. current account balance. Quarterly data suggest a 4 percent increase per year in the export of services and the U.S. balance on service trade, thanks mostly to the U.S. advantages in the internet technology. However, interventionist policies in the sphere of the virtual world, as exposed by Edward Snowden, can create a protectionist policy among even our closest trading allies. This hegemony over service trade has to be respectfully maintained so it does not violate the rights of sovereign nations, including our close trading allies (BEA, September 2013).

Figure 7: Share of Goods and Services in U.S. Exports (BEA, 2nd Quarter 2013)

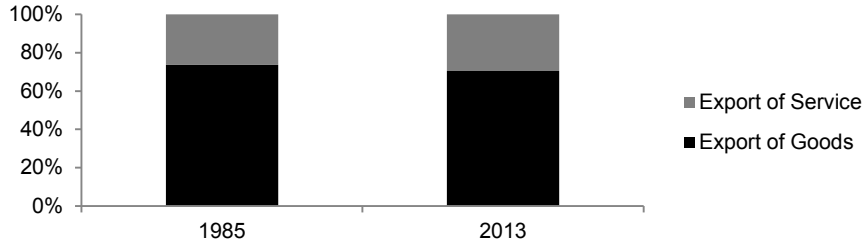


Figure 7 demonstrate the share of service as percentage of total export are on the rise, from 22 percent in 1985 to 30 percent in 2013. Source of Data: Bureau of Economic Analysis (BEA) for 2013 data. BEA and Haver Analytics for 1985 data. Retrieved from Economic Review. Second Quarter 201, page 33.

As shown in the following graph, in the second quarter of 2013, the surplus on income increased to $53.1 billion from $50.9 billion in the first.

Figure 8: U.S. Income Account ($Millions)

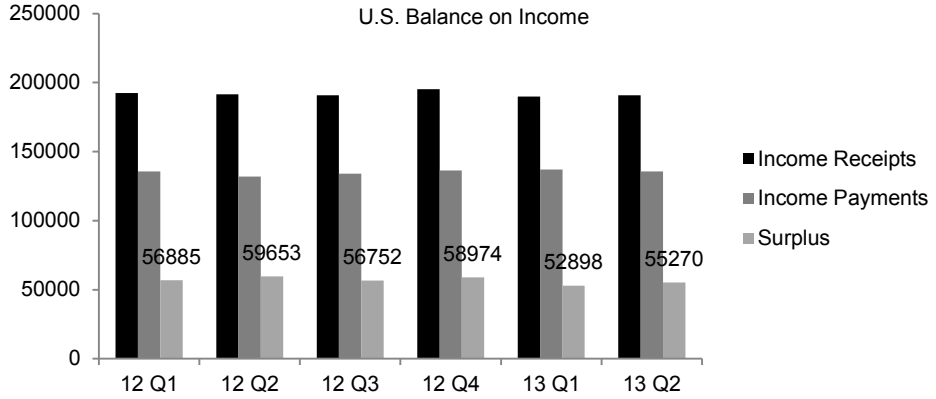


Figure 8 shows a sustainable surplus on balance of income as both income receipts and income payments are stable.
Source of Data: Bureau of Economic Analysis, Release Date: September 19, 2013. Retrieved from Table 4.

In the past several years, income receipts which consist of interest, dividends and direct investment on U.S.-owned assets abroad, have been within a range $190 billion per quarter. Income payments on foreign-owned assets in the United States have also been stable around $135 billion per quarter. Most of the payments in this category are interest payment by the U.S. government on its national debt which is nearing $17 trillion. Compensation of employees is a small and less volatile category of the U.S. income account. Receipts for compensation to U.S. residents paid by nonresidents are around $1.7 billion per quarter and payments compensation to foreign resident employees paid by U.S. residents are about $3.8 billion per quarter. Net unilateral current transfers to foreigners were $34.2 billion in the second quarter of 2013, up from $33.1 billion in the first. The increase was mostly due to an increase in net outflows of U.S. government pensions and other transfers that resulted from a decrease in fines and penalties received by the U.S. government from foreign corporations. U.S.

Government grants to foreigners also increased. As shown in Figure 9, except for 1990, Americans have run an annual current account deficit with the rest of world in every year since 1982. That unbroken string of deficits has colored much of the trade debate in the United States in the last two decades. Indeed, the deficit was partly to blame for a wave of angst in the late 1980s over so-called American "decline." Best-selling books such as Paul Kennedy's *The Rise and Fall of the Great Powers* (1987) and Clyde Prestowitz's *Trading Places: How We Allowed Japan to Take the Lead* (1988) caught the mood of the time. Throughout the 1980s and 1990s, the current account deficit has spawned worry about "unfair" foreign trade barriers, lost jobs, and America's ability to compete in the global marketplace. However, as this section will show none of these statements were true.

Beginning in the early 1990s, annual U.S. trade deficits reached unprecedented levels. After deficit reached $800 billion in 2006, and the deficit as a percentage of GDP approached the unprecedented level of 6% (see Figure 10). In the aftermath of the global financial crisis, however, the current account deficit started to shrink. By 2009, the account trade deficit was cut in half, to less than $400 billion, which shattered all doom and gloom projections in this area.

Figure 9: The U.S. Current Account Balance ($Millions)

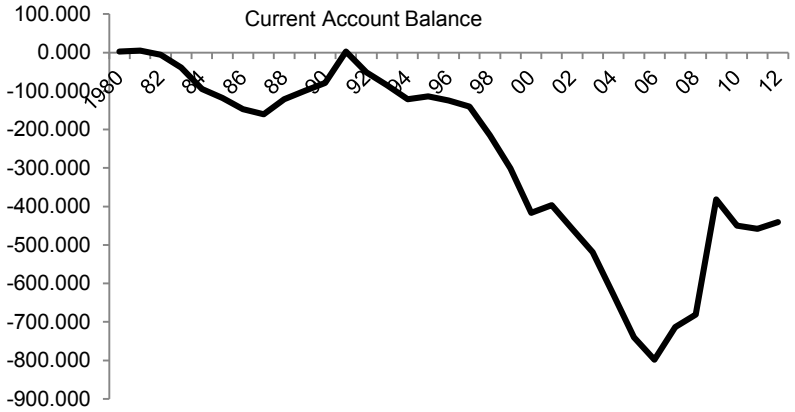


Figure 9 shows quarterly data of the U.S. current account balance from 1980 through 2013. The inflection point took place in the last quarter of 2006 and the improvement is continuing. Source of Data: U.S. Bureau of Census and Federal Reserve Economic Data. Retrieved from http://research.stlouisfed.org/fred2

Figure 10: The U.S. Current Account Balance as Percentage of GDP

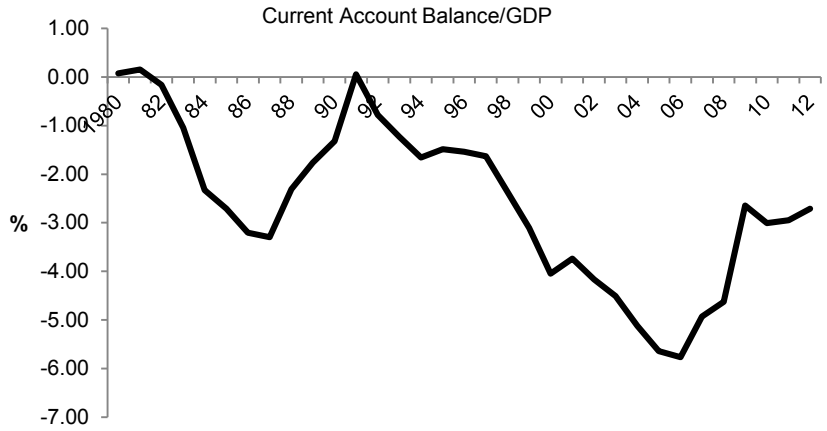


Figure 10 shows the U.S. current account balance as a percentage of U.S.GDP. Again inflection point happens in 2006 and the improvement is continuing. Source of Data: U.S. Bureau of Census and Federal Reserve Bank of St. Louis. Retrieved from http://research.stlouisfed.org/fred2

Researchers have identified a number of macroeconomic variables as indicators of the U.S. export growth. For example, Jun Nie and Lisa Taylor found that U.S. export growth depends on the economic growth in the rest of the world. Not many scholarly papers have examined the effects of growth in the service sector and petroleum production on the U.S. current account. Forecasting the U.S. current account balance in based on the following three assumptions:

Four percent improvement of trade in service per year
Increase in the export of LNG as shown in Table 2
A reduction of 4 percent per year in imports of petroleum products

Using quarterly and annual data, we can make the following projection for the U.S. current account balance.

Figure 11: Projected U.S. Current Account Balance ($B)

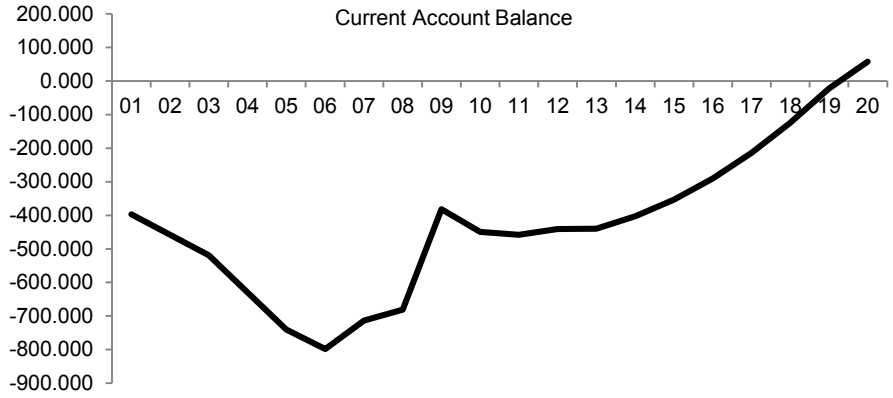


Figure 11 is the projection of the U.S. current account balance based on cross sectional analysis of trade and service accounts of the U.S. balance of payments account. The assumptions include 4 percent increase in the service account, four percent decline on petroleum imports and a gradual increase in LNG exports from Louisiana and Maryland LNG ports. For more information see Hojjat (2014): "Cross Sectional and Time Series Forecast of the U.S. Current Account Balance"

Using time series data we arrive at a similar projection. The following graph (Figure 12) shows the trend line for the current account deficit with the following equation:

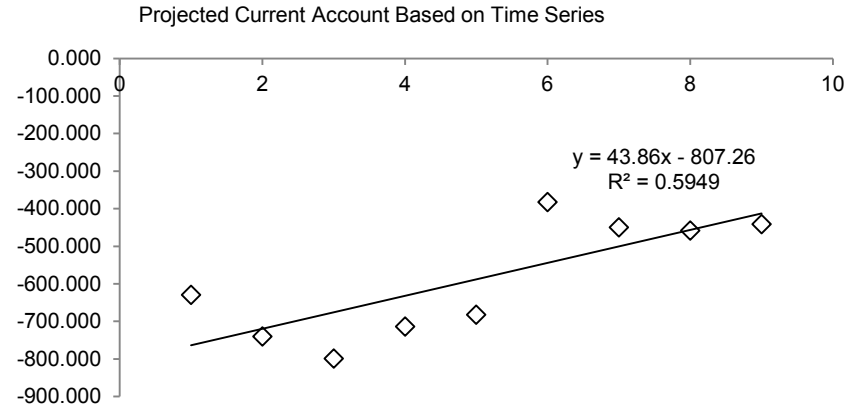
$$Y = 807.26 + 43.86\,T \qquad (1)$$

t- statistics (3.2)

R^2 0.5949

Where **Y** presents the U.S. current account balance and **T** presents the year, t-statistics is 3.2 which provide 98% confidence interval. Using the above equation, Table 3 projects the projection of the U.S. current account deficit for 2014 through 2020.

Figure 12 : U.S. Current Account Balance Using Time Series (2004-2013)



This regression line shows almost 60 percent of the variation in the current account data set is explained by the regression equation. Therefore, the equation has a high predictability power.

As shown in Table 3, this article makes a rather robust projection of the U.S. current account balance and is assets that by 2020, the U.S. will have a slight surplus in that account

Table 3: Projected U.S. Current Account Balance Using Time Series Data ($B)

2014	-193.22
2015	-149.36
2016	-105.5
2017	-61.64
2018	-17.78
2019	26.08
2020	69.94

Table 3 presents the projection of the U.S. current account balance, equilibrium will be achieved by 2018 and for the first time in 4 decades U.S. will have a surplus in the current account balance by 2020.

RESULTS

Both cross sectional and time series projections display a rather robust outlook for the U.S. current account balance. Both Figure 11 and Table 3 project that by 2020 U.S. will have a current account surplus. These predictions shatter many glooms and doom scenarios about the overreliance of America on Chinese capital to finance its deficit. By 2020, the U.S. could be in a position to actually finance the deficit of other countries.

CONCLUDING REMARKS

It was the objective of this article to dissolve the myths that existed regarding the over growing size of the U.S. current account balance and its adverse impact on U.S. economy. The times series and cross sectional projections clearly indicate that we are nearing an inflection point in the projection of the U.S. current account deficit. In this article we estimated that by 2020, the U.S. will post current account surpluses, thanks mostly to an improvement in the U.S. trade balance. Higher exports, especially the export of energy products and lower imports of energy will make this happen. The current account will also receive a boost from higher surpluses in the service and income accounts. Over time, as more statistics become available, we should test this robust projection and reaffirm or reject creation of inflection point in the current account data. This research can be expanded to encompass projections of the U.S. capital account and the status of the U.S. balance of payments.

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BIOGRAPHY

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COUNTRIES' COMPETITIVENESS ON INNOVATION AND TECHNOLOGY

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ABSTRACT

Innovation and technology are main sources of competitiveness. This study addresses two research questions. First, which economies are competitive in terms of innovation and technology? Second, what are the variables that determine competitiveness in innovation and technology? Analysis of Factorial of Correspondences (AFC), through the analysis of principal components methodology, is employed in this article. The analysis is divided into five phases as follows: a) reliability testing, b) the calculation of a matrix that expresses the joint variability of the variables, c) extraction of the optimal number of factors, d) the rotation of solutions for the ease of interpretation, e) estimation of the scores graphically, and f) determination of the competitiveness index.

JEL: O31, O32

KEYWORDS: Innovation, Technology, Competitiveness, AFC, Multivariate Analysis

INTRODUCTION

Innovation and technology are key components that define competitiveness strategy. Competitive forces such as intense global competition, fragmented and demanding markets, and diverse and rapidly changing technologies make it vital to define public policies centered on knowledge and to transform them for the well-being of society.

Evidence shows a strong contribution of young firms that implement innovation and technology to job creation (OECD, 2013). In modern times, innovation and implamentation of technology is crucial for governments and firms to compete in the domestic and international framework. Today, knowledge in all its forms plays a crucial role in economic processes. Nations which develop and manage effectively their knowledge assets perform better. Firms with more knowledge systematically outperform those with less. Individuals with more knowledge get better paid jobs. This strategic role of knowledge underlies increasing investments in research and development, education and training, and other intangible investments, which have grown more rapidly than physical investment in most countries and for most of the last decades. Policy framework should thus put central emphasis on innovation and knowledge-creation using the capacity of OECD economies. Technological change results from innovative activities, including investments such as R&D, and creates opportunities for further investment in productive capacity. In the long term, it creates jobs and more income. A main task for governments is to create conditions that induce firms to engage in the investments and innovative activities required for enhancing technical change" (Jaramillo *et al,* 2005).

At the macro-level, there is a substantial body of evidence that innovation is the dominant factor in national economic growth and international patterns of trade. At the micro-level, within firms, R&D enhances a firm's capacity to absorb and make use of new knowledge of all kinds, not just technological knowledge.

The aim of this work is to measure the impact of different variables that affect innovation and technology, as well as the real economy. The overall goal of this research is to obtain an index for competitiveness of

innovation and technology. Specifically, we study the economies of thirty-four countries, taking as a parameter the study international trade flow according to the Bank of International Settlements (2007). The economies considered were: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Cyprus, Korea, Estonia, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Luxembourg, Malta, Mexico, Netherlands, Norway, Portugal, Singapore, Slovakia, Slovenia, Spain, Switzerland, Sweden, United Kingdom, United States, and the Euro-zone.

The hypothesis for this work is that competitiveness of countries in innovation and technology is determined by high technology development and innovation; global investment in innovation and development; percentage positioning of investment and development in technology and innovation; and complementary indicators of technological development. Thirteen indicators were considered in the study: Exports of products of high technology (in dollars to current prices); exports of products of high technology like percentage of exports of manufacture; requests of patents of non-residents; requests of residents' patents; expense in research and development as percentage of the Gross Domestic Product (GDP); researchers dedicated to innovation and development (million persons); payments for copyright and licenses; articles in scientific and technological publications; specialists, technical personnel, in innovation and development; trademark applications by non-residents; trademark applications from residents; conclusion of college education as a percentage of education; and researchers as a percentage of population. These indicators were collected from the World Bank and International Monetary Fund data base for the year 2010.

The paper is organized as follows. In section two we present the literature reviewed. Section three presents the methodology used and selection of the data. Section four shows the principal results of the competitiveness analysis with the help of the Principal Component Analysis and section five provides concluding remarks.

LITERATURE REVIEW

In 1912 Schumpeter introduced the creative destruction concept as a process to grow through products, process and organizational activities innovation. The economy and society change when factors of production are combined in a novel way. Schumpeter suggests that invention and innovation are key to economic growth and those implementing the change are practically entrepreneurs. Penrose (1959) provides an explanatory logic that clarifies the causal links between resources, capabilities, and competitive advantage, thereby contributing further to the development of a theory of the firm based on resources, known as Resource-based View competitive advantage.

Nelson & Winter (1982), suggest that resources of the company are not only physical and human, but an important dimension is organizational routines. These routines are understood as required administrative mechanisms for the transformation of inputs into outputs. Company efficiency is a function of routines, which are the product of accumulated organizational history (path dependence). Disseminated throughout the company, these routines are not incorporated individually. In the perspective of the Resources Based View, mention of management strategies for capacity development (Wernerfelt, 1984) is made. Certainly, if the control of scarce resources by firms is the source of economic gains, then problems such as the acquisition of skills, knowledge and management know-how, and learning become central problems.

In recent years this dimension of skill acquisition, learning and accumulation of intangible assets has attracted interest from many disciplines of study. The theory of capabilities arises precisely to try to address these concerns in an environment where it is observed that companies considered winners in a global market are those that demonstrate responsiveness (timing), and an innovation fast and flexible product development, coupled with capabilities of managers to coordinate and effectively redistribute internal and external powers. This ability to acquire new competitive advantages is called dynamic capabilities. To

achieve dynamic capabilities it is necessary to continuously monitor markets and technologies, and have a willingness to constantly adopt best practices (Teece, et al., 1997).

There have been several theoretical studies and cross-empirical analyzes have focused their analysis on specific aspects of the sectors. Industrial economy studies have examined differences in concentration; vertical integration; entry; industrial; or strategic behavior dynamics and interactions between companies and have been linked to some underlying differences in technology; demand; entry barriers or other related sectorial context variables. Studies in the evolutionary tradition have focused on differences in knowledge, learning and innovation across sectors. Sectorial differences are related to the technological environment and knowledge as well as the accumulation of skills by companies. Similarly, the literature on innovation systems and technology has emphasized innovation processes in the interaction between agents and the role of non-business organization and institutions across sectors and technologies (Malerba, 1999).

There are several studies that frame the effects of innovation and technology impact in the economy as a factor of competitiveness. These works include the Innovation Union Scoreboard (2013). The Scoreboard gives a comparative assessment of the innovation performance of the EU27 Member States and relative strengths and weakness of research and innovation systems using 3 types of indicators (enablers, firm activities and outputs) and 8 innovation dimensions (human resources, open, excellent, attractive research systems, finance and support, firm investments linkages & entrepreneurship, intellectual assets, innovators and economic effects) capturing in total 25 different indicators. The main results of the grouping analysis show that most European countries have regions at different levels of performance. In France and Portugal at least one region falls in each of the 4 broader performance groups. Czech Republic, Finland, Italy, Netherlands, Norway, Spain, Sweden and the UK have at least one region in 3 different performance groups. This regional diversity in innovation performance also calls for regional innovation support programmers better tailored to meet the needs of individual regions.

The Oslo Manual is an obligatory step in the discussion of innovation and technology. It concentrates on two Schumpeter's categories, new and improved products and processes. The minimum entry set is "new to the firm" dealing with innovation at the level of the firm. This considers issues such as engaging in a complex set of activities with multiple outcomes, some of which, moreover, can reshape the boundaries and nature of the firm itself.

In 2001 the Bogota Manual was released. This Manual was elaborated by the Red Iberoamericana de Indicadores de Ciencia y Tecnología (RICYT) , the Organización de Estados Americanos (OEA) and the PROGRAMA CYTED. This manual was designed for a better understanding of the technological and innovation development of Latin America and the Caribbean. The manual accomplished this main goal considering fundamental aspects: a) the capture indicators consider the specificity of the technological innovation process in the region and b) the synthetic indicators allow the comparative analysis at an international level.

The Mexican Consultation Group of the FOBESII is another interesting study created to analyze the current educational, academic and scientific linkages between Mexico and the U.S., as well as to make recommendations to promote greater interaction. This Group is formed by Mexican experts from 35 institutions from the academic, public, private and social sectors. The research is divided into eight working groups: Relevance, Undergraduate Mobility, Graduate Studies, Academic Exchange, Technological Development and Innovation, Internships, Languages, and Promotion.

There are several indexes that seek to measure the degree of competitiveness of economies among them are: the global competitiveness index by country WEF 2012-2013, index WEF Global Competitiveness: Innovation 2008-2013, index of international competitiveness of IMCO, index IMD's competitiveness, among others.

Although these indices have a pillar or dimension that seeks to measure the innovation and technology degree, they are not entirely focused on the measurement of these variables. Therefore an index to measure not only the countries innovation and technology degree but also links these variables to the international trade flow performance of countries, can be very interesting. This allows for adding new elements to create strategies for the wellbeing of society and bringing new elements to the state of the art in technology and innovation advancement.

METHODOLOGY

Factorial Analysis is a multivariate statistical technique, which is the underlying structure in a data matrix. Factorial analysis allows us to solve the problem of analyzing the structure of interrelationships (correlations) present in a large number of variables and cases, defining a common number of underlying dimensions called components (Guillermo et al., 2010).

Due to the hypothesis consisting of four variables accounting for thirteen indicators, it is necessary to apply a method to see the dependency between each of the indicators. It is also necessary to observe the weight of each variable regarding the problem to be addressed. An ideal tool for this analysis is the Correspondences Factorial Analysis. An analysis of attraction-repulsion among types of different attributes (indicators) allows studies of proximity (similarity/dissimilarity) between the modalities of a single indicator; i.e. it allows the evaluations of homogeneity or substitution thereof (Miquel et al., 1997). For this, the projection of the modalities is presented on a metric space which applies the Analysis of Principal Components to aid in the simple causal interpretation of similarity-attraction behaviors (Kim & Mueller, 1978).

The selected indicators were taken from the statistical data World Bank for the year 2012. The indicators had to go through some filters such as the table of communalities and scree plot, as detailed later. Once the variable pass the test it can be included in the research, so that the variables are: high technology products export (US$), high technology products export (% of exp. of manufacture), Patent applications, non-residents, Patent applications, resident, Spending on R & D (% of the GDP), Researchers R & D (million people), Royalty payments, copyright and license, Scientific and technological publications, MR applications, non-residents, MR applications, residents, Conclusion of educ. top level. (% population) and Researchers (% population).

RESULTS

The Communalities shown in Table 1 indicate the degree of extraction that the study represents for each indicator or the proportion of the variance explained by factorial analysis (Perez, 2006). The principal components method assumes that one hundred per cent of the variance can be observed, so that all indicators are based on the extraction level of one (Kim & Mueller, 1978). It is important to note that if the indicator does not have a score above 0.500 it cannot be considered in the study because the indicator will not be representative for the analysis. In the study, herein, all the indicators are well represented. The indicator with the highest level of extraction was exports of products of high technology with a value of 0.883, followed by requests of residents' registered trademarks and requests of patents of non residents with 0.875 and 0.854 respectively (see Table 1).

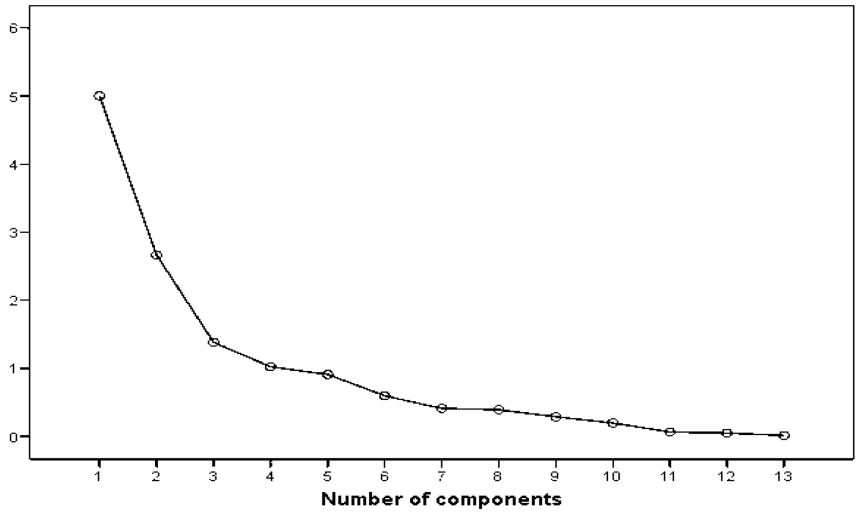
Table 1: Table of Communalities

Indicators	Initial	Extraction
Exports of prod. high technology (US$)	1.000	0.**883**
Exports of prod. high technology (% of exp. of manufacture)	1.000	0.827
Patent applications, non residents	1.000	**0.854**
Patent applications, resident	1.000	0.757
Spending on R & D (Research & Development) (% of the GDP)	1.000	0.831
Researchers R & D (million people)	1.000	0.840
Royalty payments, copyright and license	1.000	0.529
Scientific and technological publications.	1.000	0.755
Specialists in R & D (per million people)	1.000	0.812
MR applications, non residents	1.000	0.782
MR applications, residents	1.000	**0.875**
Conclusion of educ. top level. (% pobl.)	1.000	0.730
Researchers (% population)	1.000	0.797

This table shows the grade of extraction of indicators in order to determine if they are representative for the problem addressed. Method of extraction: Analysis of principal components. Source: Authors' calculations based on the results of the Factorial Analysis of Correspondences.

The scree plot shown in the graph illustrates the percentage of the variance represented by each factor or dimension (Kruskal, 1981), as well as the overall contained degree of reliability. A total of 77.50 percent of variance is represented. The first component shows 38.48 percent, the second component 20.50 percent, the third factor 10.63, and the fourth 7.87 percent (Figure 1).

Figure 1: Scree Plot



Source: Authors' calculations based on the results of the Analysis Factorial of Correspondences.

The Rotated Components Matrix solution, presented in Table 2, shows each of the indicators fall into a single component. The heavy components scores show the space on which the variables are positioned as the relation between the variables and their correlation (for those reproduced in the same component). In the first component, the indicators better represented are exports of products of high technology, patent applications residents and non residents, articles in scientific and technological publications, and trademark applications-residents and non residents. The second set of components are spending on research and development (R & D), R & D researchers, and the top level of education in percentage of the population. The third set of components deal with the exports of products of high technology, such as the percentage of exports of manufacture and researchers as percentage of the population. Finally, the fourth factor involves royalty payments, copyrights and licenses, and technical specialists in R & D.

Table 2: Rotated Components Matrix

Indicators	Components			
	1	**2**	**3**	**4**
Exports of prod. high technology (US$)	**0.884**	0.050	0.283	0.133
Exports of prod. high technology (% of exp. of manufacture)	0.106	0.049	**0.901**	-0.042
Patent applications, non residents	**0.857**	0.306	0.072	-0.144
Patent applications, resident	**0.802**	0.314	0.126	0.001
Spending on R & D (% of the GDP)	0.192	**0.853**	0.188	0.177
Researchers R & D (million people)	- 0.036	**0.885**	0.128	0.197
Royalty payments, copyright and license	0.256	0.173	0.333	**0.451**
Art. in scientific and technological publications.	**0.794**	0.346	0.000	-0.073
Specialists in R & D (per million people)	-0.172	0.111	-0.107	**0.871**
MR applications, non residents	**0.801**	-0.212	0.057	-0.303
MR applications, residents	**0.908**	-0.195	0.110	-0.007
Conclusion of educ. top level. (% pop.)	0.119	**0.821**	-0.190	-0.072
Researchers (% population)	-0.201	0.058	-0.**651**	0.574

This table shows in which component the variables can be better represented in the Extraction Method: Principal Components Analysis. 4 components extracted. Varimax with Kaiser Normalization. The rotation converged in 6 iterations. Source: Authors' calculations based on the results of the Analysis Factorial of Correspondences.

According to the first results obtained, variables are grouped based on components most associated with each other and their degree of the variance. The degree of variance is such (77.48) that the indicators can be integrated into four dimensions. The first factor contains variables related to technology and innovation development. These are represented by a 38.48 percent of the variance. The second factor gathers variables that show global investment in R & D with 20.50 percent. The third factor explains, with a variance of 10.63 percent, the positioning of investment and development in technology and innovation. The fourth factor concerns variables that relate to complementary indicators of technological development with 7.87 per cent of the variance (see Table 3).

Table 3: Proportion of Variance Explained by Each Factor

Factor	Sub-Dimension	Proportion Variance Explained
Factor 1	High development on technology and innovation	38.48 %
Factor 2	Global investment in R & D	20.50 %
Factor 3	Percentage positioning of the investment and development in technology and innovation	10.63 %
Factor 4	Complementary indicators of the technological development	7.87 %

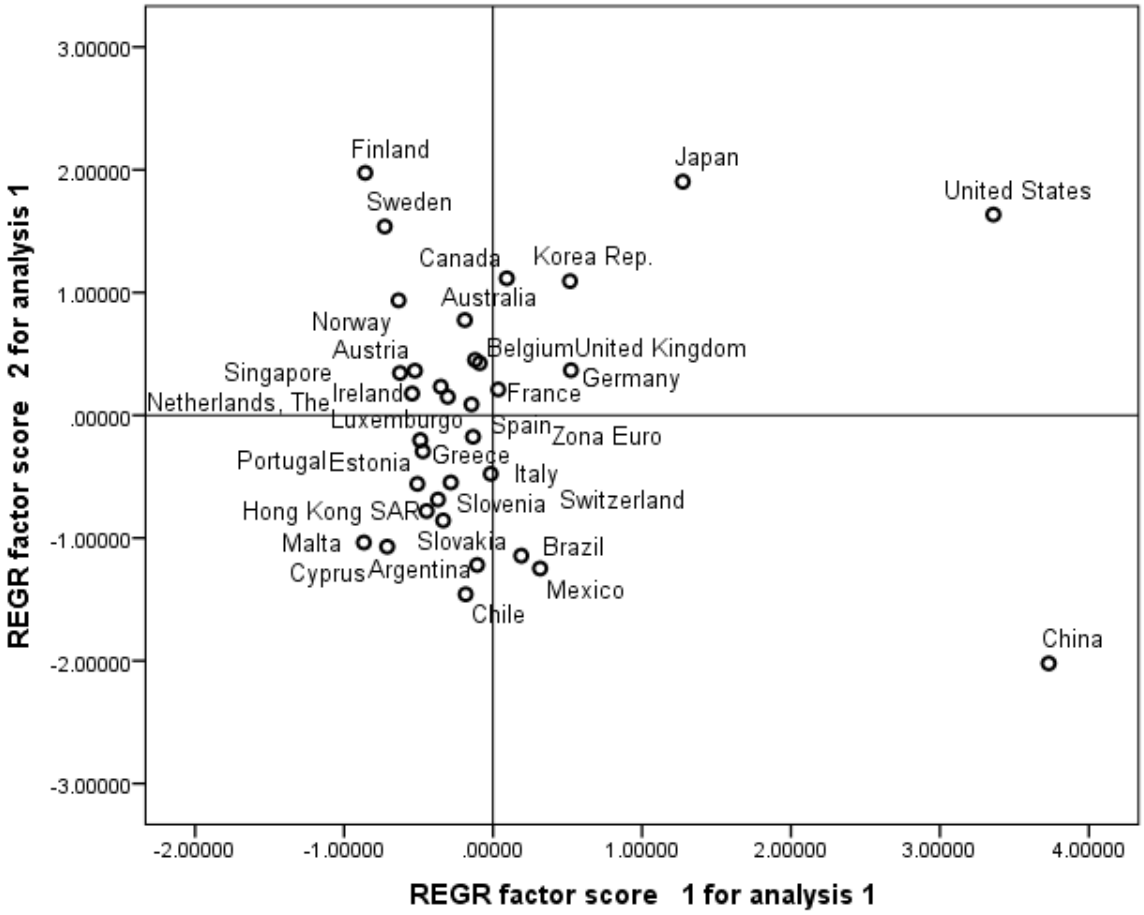
This table shows the variance explained by each factor. Source: Author based on the results of the Analysis Factorial of Correspondences.

Chord to the positioning of indicators within the multidimensional space of the X-axis represents the degree of current development in technology and innovation of each economy. This process groups the variable exports of products of high technology to current prices, patent applications of residents and non residents, articles in scientific and technological publications, and trademark applications of residents and non residents. Because the scores are positive (in the rotated components matrix) among the right, most countries will be better positioned. The best placed countries in respect of this axis are China, The United States, Japan, Germany, France, Korea, Switzerland, Mexico, Brazil and Australia while the worst positioned are Cyprus, Finland, Slovakia, Sweden, Portugal, and Estonia.

The Y axis represents the level of global investment in R & D. This is due to variables such as spending on R & D as percentage of the GDP, researchers dedicated to R & D (a million people), and the top educational levels as percentage of the education are incorporated in this sub-dimension. As in factors of the X-axis, the further up economies are located the better located they will be, such as is the case of Finland, Japan,

The United States, Sweden, Canada, Korea, Norway, Australia, United Kingdom, Ireland, Germany, France, Belgium, Singapore, Luxembourg, and Spain, in this order. In contrast, Chile, Argentina, Mexico, Cyprus, Brazil, Slovakia and Malta are located further down (see Figure 2).

Figure 2: scores plot factors 1 and 2

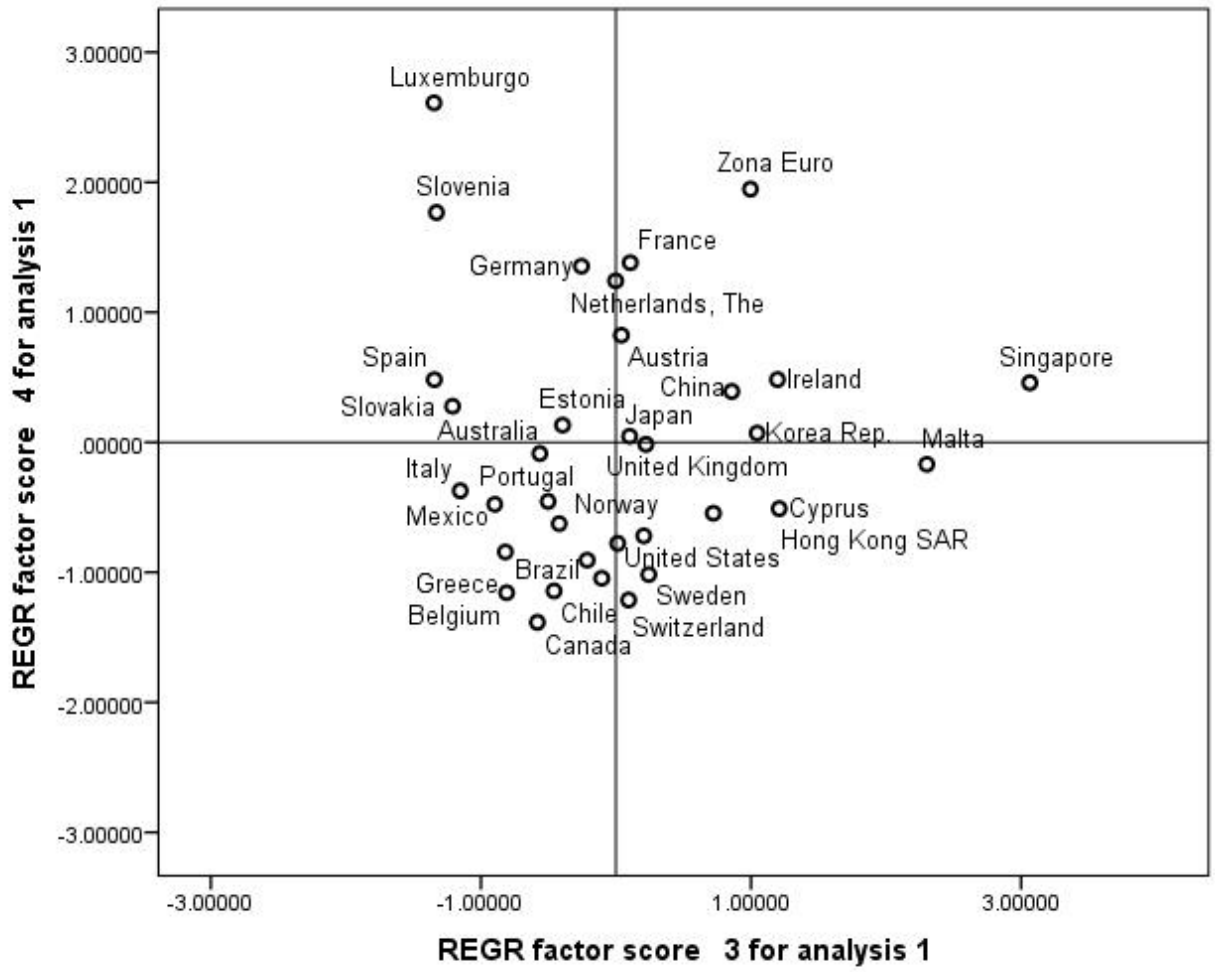


Source: Authors' calculations based on the results of Factorial Analysis of Correspondences.

Figure 3 represents in the X-axis (Component 3) showing the percentage positioning of investment and development in technology and innovation. It contemplates the exports of high-technology products like the percentage of manufacture exports and the number of researchers as a percentage of the population. The complementary indicators of technological development are located on the Y-axis (Component 4). These are royalty payments for copyright and licenses and technical specialists in innovation and development.

Because component 3 has negative and positive values, the best placed countries with respect to the X-axis will be those that tend to zero, such as Japan, United Kingdom, United States, Netherlands, Austria, Sweden, and France. The top-ranked countries respect of the Y-axis will be those who are located at the top of this axis, such as Luxembourg, the Euro-zone, Slovenia, France, Germany, Netherlands, Austria, Singapore, Ireland, China, and Spain (see Figure 3).

Figure 3: Scores Plot Factors 3 and 4



Source: Authors' calculations based on the results of the Factorial Analysis of Correspondences.

The competitiveness index obtained accounts for the position of each country analyzed to combine the results for each of the dimensions. The index reveals the countries that have better ranking or are more competitive in innovation and technology. The economy with the highest index of competitiveness is the United States followed in descending order by China, Japan, Korea, Germany, Singapore, France, the Euro-zone, Canada and United Kingdom. The minor indexes find Chile, Slovakia, Cyprus, Greece, Argentina, Sweden, Estonia, Portugal, Malta, Hong Kong, and Mexico with the sample mean of 2.6 (Table 4).

CONCLUDING COMMENTS

We examine the hypothesis: competitiveness of countries on innovation and technology is determined by high technology development and innovation, global investment in innovation and development, percentage positioning of investment and development in technology and innovation, and the complementary indicators of technological development. The results show high technology development and innovation and global investment in innovation and development have greater weight in determining the innovation and technology competitiveness. The aim of this work is to measure the impact of different variables that affect innovation and technology, as well as the real economy. The overall goal of this research was accomplish.

Table 4: Competitiveness Index Dimension of Technology

País Dimensión	INNOVACIÓN Y TECNOLOGÍA	País Dimensión	INNOVACIÓN Y TECNOLOGÍA
United States	9.01	Spain	2.39
China	7.36	Norway	2.38
Japan	6.40	Brazil	1.95
Germany	4.32	Italy	1.95
Singapore	3.69	Mexico	1.91
France	3.62	Portugal	1.71
Zona Euro	3.60	Estonia	1.62
Canada	3.30	Switzerland	1.51
United Kingdom	3.23	Argentina	1.45
Finland	3.10	Greece	1.41
Australia	3.02	Slovakia	1.35
Netherlands, The	2.98	Chile	0.97
Ireland	2.91		
Sweden	2.87	SUM	88.0
Luxemburgo	2.84	MEDIA	2.65142829
Austria	2.71	AVARAGE	3.0
Belgium	2.43		

Source: Authors' calculations based on the results of the Factorial Analysis of Correspondences.

By integrating the results of components one and two that explain the degree of development in technology and innovation (X-axis) and the investment in research and development (Y-axis), it is observed that the top-ranked countries are located in the first quadrant, i.e., The United States, Japan, Korea, Germany, France, and United Kingdom. Whereas the countries worse placed are Cyprus, Malta, Argentina, and Chile.

The United States is best placed in terms of development in technology and innovation and in investment in research and development. China, according to the results of the study, has a high degree of development in technology and innovation but a low degree of investment in research and development
Among the best positioned economies in an international context, according to the index of competitiveness of innovation and technology, are the United States followed (consecutively) by China, Japan, Korea, Germany, Singapore, France, and the Euro-zone.

Mexico appears at position number 13 in terms of competitiveness in innovation and technology with 1.91 points, which places it below the average (2.93). It is important to point out that indicators which place Mexico at a lower level are the number of researchers in R & D, articles in scientific and technological publications, and patent applications of residents, where Mexico shows a value far below of the average.

Developed countries seek to support links between the development of educational and scientific systems with the ability to innovate in the real sector of their economies. This is still not on the agenda of many developing countries such as Mexico. This study identified elements that can lead to strategies aimed at the promotion of innovation and technological development, emphasizing strategies directed to the formation of researcher-driven innovation and technology, promotion of publications and creation of magazines related to science and technology; strategies that link the academic and business sectors, as well as the use of patents generated in order to boost competitiveness and development in Mexico.

Among some limitations on this paper are the number of units of analysis. Future research could be done grouping countries by continent or GDP. Another limitation of the study is the time frame because the data is limited to the year 2012.

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THE TAXATION EFFECTS OF TOURISM UNDER AVIATION DEREGULATION IN A SMALL OPEN ECONOMY

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ABATRACT

In the past four years, Chinese tourists' consumption in Taiwan has contributed to the Taiwanese economy. However, there is a limited literature documenting the actual tax effects under the aviation deregulation. Based on the models established by Leontief (1966) and Miyazawa (2002) and by adding the effective tax rate, which is employed by the Japan National Tourism Organization (2010), the present study measures the indirect tax, the personal income tax, and the corporate income tax resulting from the change in the transport policy. This allows us to get better understanding the tax effects of the change in a transport policy. The empirical results show that the total tax revenue of the aviation deregulation generated for US$1,047.3164 million, equivalent to the total tax revenue of 1.78% in 2011 in a small open economy. The indirect tax revenue, the personal income tax revenue and the corporate income tax revenue accounted for 0.76%, 0.81%, 0.21%, respectively. As for the industrial sector, the tax revenue from the service-related industry is US$939.7126 million, which accounts for up to 89.73% of the total tax revenue under the aviation deregulation.

KEYWORDS: Aviation Deregulation; Effective Tax Rate, Tax Revenue Effect

JEL: H29, R28, R38

INTRODUCTION

The economic development of most Asian countries has long depended on trade. The manufacturing sector has been the focus of government's economic policies. With increasing gross domestic product, the magnitude of the government spending and the accumulated fiscal deficit also rise continually. The financial crisis in 2008 shattered the global economy. (Lane and Milesi, 2008; Apergis and Tsoumas, 2009; Farhi and Tirole, 2009; Hume and Sentance, 2009; Warnock and Warnock, 2009; Hall, 2010; Woodford, 2010; Campello, Graham and Harvey, 2010; McCauley and Scatigna, 2011) Subsequently, Taiwan's exports declined significantly. Even though the Taiwanese government attempted to maintain its economic growth by increasing public investments and by implementing an expansionary monetary policy, its economic downturn continues in Taiwan, and the expected fiscal revenue could not be achieved. However, the development of the international tourism industry could bring a lot of foreign exchange reserves. The tourism industry is a pollution-free green one with little concerning of the external costs. Therefore, the Taiwan's government attempts to increase international tourists to solve the financial predicament. On December 15, 2008, both China and Taiwan permitted the direct entry of their travelers.

Before this, China and Taiwan had not provided a direct transport mode for their travelers or commodities. Their travelers and commodities had to be transported using transitional modes from other regions or countries. In 2010, the designated direct air routes increased to 31 and the flights between China and Taiwan

had also expanded to 370 flights per week. In June 2011, Taiwan authority further relaxed its restrictions by allowing Chinese people to visit freely and individually, In July 2012, the designated direct air routes further increased to 41 and expanded weekly flights to 558. On December 15, 2012, it has further increased 9 direct air routes and increased weekly flights to 616 in response to the New Year's holiday. With the aviation deregulation and the increase of direct air routes, the amount of Chinese tourists visiting Taiwan increased rapidly from 329,204 in 2008 to 972,123 in 2009, 1,630,735 in 2010, 1,784,185 in 2011, and 2,235,636 in 2012. The government hoped that the consumption of foreign tourists would boost economic growth and increase national income.

In the past four years, Chinese tourists' consumption in Taiwan has contributed to the Taiwanese economy. There is a little literature documenting the role of the actual tax effects under the aviation deregulation. Based on the models established by Leontief (1966) and Miyazawa (2002) and by adding the effective tax rate, which is employed by the Japan National Tourism Organization (2010), the present study measures the indirect tax revenues, the personal income tax revenues, and the corporate income tax revenues resulting from the change in the transportation policy. This might allow us to get better understanding the tax effects of the change in the transportation policy. The remainder of this paper is organized as follows: Section 2 reviews previous studies. Section 3 describes the methodology. Empirical results are presented in Section 4. The final section concludes with a brief summary

LITERATURE REVIEW

Some previous studies focused on the supply-demand analysis of change in the aviation market to examine the effect of the aviation deregulation. Aviation Deregulation (Dargay, 1993; Witt and Witt, 1995; Karlaftis et al., 1996; Cline et al., 1998; Abed et al., 2001; Goh and Law, 2002; Lai and Lu, 2005). Others investigated the effect of aviation deregulation in terms of cost (Waters, 1970; Gillen et al. 1988, 1990; Dresner and Tretheway, 1992; Robinson, 1994; Barrett, 2000; Youdi et al., 2003; Hummels, 2007). However, prior studies have mixed results in identifying a relationship between deregulation and airline industry cost of capital. Allen et al. (1990): Deregulation of U.S. Airline Industry might have lowered the systematic risk because pricing freedom and route flexibility improved airline management reaction to various economic conditions. Reduced systematic risk offers lower cost of equity capital for the industry as a whole as well as for individual carriers. In addition, some studies had evaluated the compelling economic effects of aviation deregulation (Shaw, 1982; Wilson, 1986; Thornicroft, 1989; Barrett, 1992; Doganis, 1994; Button, 1996; John, 1997; Gillen and Lall, 2002; Schipper et al., 2003; Oum et al., 2003, 2004; Ida and Tamura, 2005; Schipper et al., 2007).

Schipper et al. (2003) documented how the presence of external costs has affected the welfare effect of the liberalization of airline markets..The economic evaluation of this policy change has generally shown favorable outcomes in terms of consumer welfare. These welfare effects may be termed market internal effects, as they reflect the welfare consequences of transactions that take place in the market. Thornicroft (1989) suggested that the Airline Deregulation Act of 1978 has had a significant impact on the airline industry and its labor market. Schipper et al. (2007) estimated the welfare effects for various types of post-deregulation entry. Quiggin (1997) concluded that the representative passenger has probably experienced a small reduction in the cost of air travel since deregulation. In economic analyses of tourism, the impact of the tourism consumption on the economy has been explored by using the perspective of trade and income multipliers to demonstrate the importance of the tourism industry (Johnson and Thomas, 1990; Fletcher and Archer, 1991). Although the development of the tourism provides economic benefits, it also results in the volatility in commodity prices and wages, subsequently having an impact on employment (Copeland, 1991; Janaki and Wiktor, 2000).

Regarding the research methodologies which were applied to the tourism economy, Lee(1996) used the input-output model to estimate the effects of tourism consumption on a country's income, employment,

added value, indirect tax, and imports. A perspective from employment and tax was adopted to demonstrate that the tourism industry had a superior contribution to the economy compared to other industries. In some previous studies, the input-output model was employed to measure the economies of scale and added value generated by the tourism industry (Henry and Deane, 1997; Kweka et al., 2003). There are regional characteristics in the tourism industry. In an economic analysis of a regional tourism industry, Frechtling and Horvath (1999) employed the regional input-output model to investigate the increases in employment and labor income created by tourism expenditures. An analysis of the multiplier effects of 37 industries indicated that the tourism sector yielded a higher labor income. Zaman et al. (2010) employed the input-output model to analyze the effects that tourism has on the regional economy. Zaman et al. (2010) documented that the direct and disseminated effects of tourism consumption are crucial impacts on country's economies of scale.

The computable general equilibrium models (CGE) have been employed by numerous studies to investigate issues in the tourism industry, and the emphasis was placed on the changes in tourism demands to analyze the extent of their effect on the economy (Adams and Parmenter, 1995; Zhou et al, 1997; Dwyer et al., 2000, 2003). As environmental protection issues attract increasing international attention, the tourism industry is no longer only valued by developed countries. Instead, an increasing number of emerging developing countries have gradually acknowledged its role on the economy. Sustainable management of the tourism industry has become an emphasized consensus. Previous studies have recommended that tourism-related industries use taxes to develop tourism (Brida and Pereyra, 2008; Pasquale, 2011). Pasquale(2011) introduced a taxation mechanism to explore the internalized external costs of the tourism industry to pursue sustainability of the local economy.

In the present study, we employ the industry-related spillover model to measure the tax effects of the change in the transportation policy and examine whether the change in transportation policy achieved the objective of improving the government's fiscal budget. Through the empirical results, we attempt to uncover whether the tourism could play an important role in the future economic development, which has long been neglected by the government.

Data Source and Model Developmemt

The data of this study were compiled by the Tourism Bureau of the Executive Yuan in Taiwan. The means of the Chinese tourists' expenditures in Taiwan between 2008 and 2012 was primarily in the retail sector (50.67%), followed by accommodation services (29.15%), catering services (6.68%), land transport (6.38%), and others (7.12%). The annual amounts of Chinese tourists visiting Taiwan are shown in Figure 1. The amount of the average daily spending was US$213.1 in 2008, US$232.11 in 2009, US$246.23 in 2010, US$236.48 in 2011, and US$237.01 in 2012.The average travel-day was five.

The trip intentions of Chinese people visiting Taiwan were for business, tourism, family visits, conferences, and study. Table 1 presents the percentage of the various trip-intension visitors following the change in the transport policy. The tourism-oriented accounted for the majority of Chinese visitors, in which the tourism-oriented accounted for more than 70% in 2010, 2011, and 2012. Increases in the pattern of visitors resulted from the change to the transport policy.

Figure 1: Amounts of Chinese People Visiting Taiwan around the Periods of Aviation Deregulation

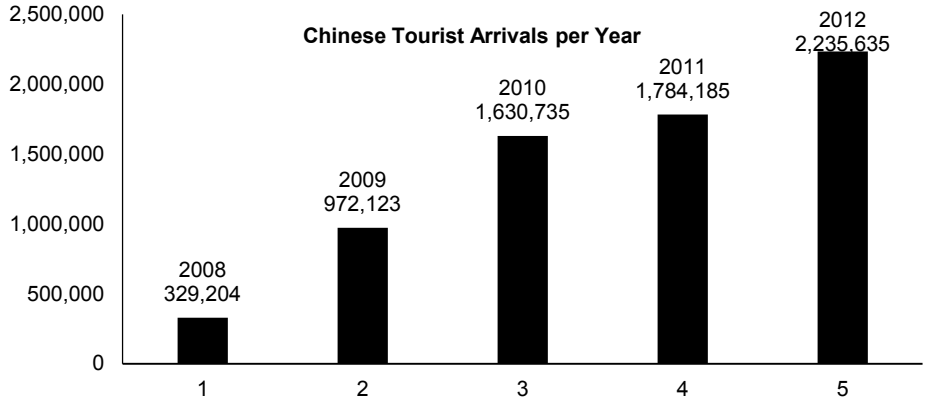

Table 1: Trip-Intension Visitors after the Change in Transport Policy

Year	Total (Persons)	Business	Tourism	Family Visiting	Conference	Study	Others	Unstated
2012	2,235,636	1.93%	78.33%	2.32%	0.14%	0.15%	0.15%	1.62%
2011	1,784,185	7.03%	72.35%	6.67%	1.26%	0.51%	6.67%	5.50%
2010	1,630,735	5.49%	75.31%	6.38%	2.01%	0.51%	6.62%	3.68%
2009	972,123	7.17%	55.46%	7.34%	2.36%	0.41%	11.3%	15.96%
2008	329,204	11.12%	28.79%	17.33%	4.06%	0.37%	20.33%	18%

Note: (1)The data is compiled by the National Immigration Agency in Taiwan.(2) The amount for year 2008 is covered before the aviation deregulation.

Model Development

Following Miyazawa (2002) and adding the effective tax rate(JNTO, 2010), the tax revenue model could be formulated as follows:
The indirect tax revenue could be measured from equation (1)

$$\mathrm{TAX}^{\mathrm{i}} = \left\{(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}} + \mathrm{B}^*\left[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}}\right] + \mathrm{B}^*[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_2^{\mathrm{d}}]\right\} * (\mathrm{w}_{\mathrm{j}}^{\mathrm{G}}) * (\mathrm{t}_{\mathrm{i}}^{\mathrm{e}}) \qquad (1)$$

where I is the identity matrix; $\bar{\mathrm{M}}$ represents the diagonal matrix of import coefficient (n×n); F^{d} deducted import from the aggregate expenditures is the matrix of Taiwanese final consumption and investment; $[\mathrm{I} - (\mathrm{I} - \bar{\mathrm{M}})\mathrm{A}]^{-1}$ is the Leontief inverse matrix; A is the input coefficient matrix (n×n). Let $[\mathrm{I} - (\mathrm{I} - \bar{\mathrm{M}})\mathrm{A}]^{-1}$ be B^*; the indirect effective tax rate $(\mathrm{t}_{\mathrm{i}}^{\mathrm{e}})$ is measured as the indirect tax revenue divided by GDP; $\mathrm{w}_{\mathrm{j}}^{\mathrm{G}}$ denotes the rate of gross induced added value.

The personal income tax revenue ($\mathrm{TAX}^{\mathrm{pi}}$) could be estimated by equation (2)

$$\mathrm{TAX}^{\mathrm{pi}} = \left\{(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}} + \mathrm{B}^*\left[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}}\right] + \mathrm{B}^*[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_2^{\mathrm{d}}]\right\} * (\mathrm{w}_{\mathrm{j}}^{\mathrm{L}}) * (\mathrm{t}_{\mathrm{pi}}^{\mathrm{e}}) \qquad (2)$$

where the effective tax rate of personal income $(\mathrm{t}_{\mathrm{pi}}^{\mathrm{e}})$ is measured by the ratio of individual direct tax revenue to the income of employment; $(\mathrm{w}_{\mathrm{j}}^{\mathrm{L}})$ is the rate of Induced Income of Employment. The corporate income tax could be measured by equation (3)

$$\mathrm{TAX}^{\mathrm{ci}} = \left\{(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}} + \mathrm{B}^*\left[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}}\right] + \mathrm{B}^*\left[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_2^{\mathrm{d}}\right]\right\} * (\mathrm{r}_{\mathrm{ce}}) * (\mathrm{t}_{\mathrm{ci}}^{\mathrm{e}}) \qquad (3)$$

where the effective tax rate of the corporate income(t_{ci}^{e}) is computed by the corporate income tax revenue divided by the corporate earnings; r_{ce} is the corporate earnings ratio. In the present study, we measure the indirect tax revenue (TAX^{i}), the personal income tax revenue(TAX^{pi}) and the corporate income tax revenue(TAX^{ci}) by employing equations (1), (2) and (3), respectively.

EMPIRICAL RESULTS

The present study first measure the tax revenue from the tourism of Chinese tourists under the aviation deregulation. The taxes consist of the indirect tax revenue, the personal income tax revenue and the corporate income tax revenue in seven sectors. Table 2 presents the tax effects under the aviation deregulation. The tax revenue was only US$42.555 million before the aviation deregulation in 2008. Right after the aviation deregulation, due to the substantial increase of Chinese travelers, it has also led to an increase in tax revenue from US$149.47 million in 2009 to US$353.53 million in 2012. Comparing those before and after aviation deregulation, the tax revenues in 2012 are 8.3 times of those in 2008. The total tax revenue after the aviation deregulation is US$1,047.32 million, which is equivalent to 1.78% of Taiwan's total tax revenue in 2011.

Table 2: Taxation on Tourism of Aviation Deregulation

Year	Indirect Tax	Personal Income Tax	Corporate Income Tax	Total
2008	1,804.9	1,940.1	510.47	4,255.5
(1)2009	6339.5	6,814.6	1,793	14,947
(2)2010	11,120	11,953	3,145	26,218
(3)2011	11,966	12,863	3,384.4	28,214
(4)2012	14,994	16,118	4,240.8	35,353
(5)=(1)+(2)+(3)+(4)	44,420	47,749	12,563	104,732

Note: (1) The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation

The personal income tax revenue of US$477.49 million is the biggest, accounting for 45.59%, followed by the indirect tax revenue (42.41%) and the corporate income tax revenue (12%). Based on the input-output table compiled by Taiwan authority, we classified the 165 sectors into seven major sectors, as shown in Table 3. The Chinese tourists spend most of the expenditures on shopping, followed by accommodation and catering, which all belong to service-related industries. As to the tax effects, the tax revenues from the service-related industry is US$939.71 million, accounting for 89.73 percent of the total tax revenue, the second one of tax revenues is from the light industry, which is only 3.7% of the total tax revenue. This exhibits that the largest one of tourism tax effect is from the service-related industry under the aviation deregulation.

Table 3: Tax Revenues of Industries under Aviation Deregulation

Sector	**2008**	**(1) 2009**	**(2) 2010**	**(3) 2011**	**(4) 2012**	**(5)= (1)+(2)+(3)+(4)**	**Percentage**
Agriculture and Food Processing	84.1	295.39	518.14	557.59	698.67	2,069.8	1.98%
Light Industry	157.49	553.17	970.29	1,044.2	1,308.3	3,876	3.7%
Chemical	50.47	177.27	310.94	334.61	419.28	1,242.1	1.19%
Iron and Non-Ferrous	21.88	76.86	134.82	145.08	181.8	538.56	0.51%
Machinery	41.06	144.21	252.94	272.2	341.08	1,010.4	0.96%
Infrastructure	82.22	288.79	506.55	545.12	683.05	2,023.5	1.93%
Service-related	3,818.3	13,411	23,524	25,315	31,721	93,971	89.73%
Total	4,255.5	14,947	26,218	28,214	35,353	104,732	100%

Note: (1)The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation.

As shown in Table 4, the tax revenue of US$397.71 million was generated in the service-related industry, accounting for 89.54% of the total tax revenue of US$444.2 million. It was followed by those in the light industry and the infrastructure sector, which accounts for only 3.6%, 2.34% of the indirect tax revenues, respectively.

Table 4: Indirect Tax Revenues of Aviation Deregulation

Sector	2008	(1) 2009	(2) 2010	(3) 2011	(4) 2012	(5)= (1)+(2)+(3)+(4)	Percentage
Agriculture and Food Processing	30.14	105.86	185.69	199.83	250.39	741.77	1.67%
Light Industry	65.05	228.48	400.77	431.29	540.41	1,600.95	3.60%
Chemical	25.24	88.66	155.51	167.35	209.69	621.21	1.40%
Iron and Non-Ferrous	8.61	30.25	53.07	57.11	71.56	211.99	0.48%
Machinery	17.53	61.56	107.98	116.20	145.61	431.35	0.97%
Infrastructure	42.31	148.6	260.65	280.50	351.47	1,041.22	2.34%
Service-related	1,615.99	5,676.06	9,956.1	10,714.10	13,425.08	39,771	89.54%
Total	1,804.9	6,339.5	11,120	11,966.37	14,994.21	44,420	100%

Note: (1)The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation.

In Table 5, the personal income tax ((US$ 427.57 million) in the service-related sector is still the most, accounting for 89.55% of total personal income tax (US$477.49million). Those in the light industry and the agriculture and food processing sector are only 4.29% and 1.77%, respectively.

Table 5: Personal Income Tax under Aviation Deregulation

Sector	2008	(1) 2009	(2) 2010	(3) 2011	(4) 2012	(5) =(1)+(2)+(3)+(4)	Percentage
Agriculture and Food Processing	34.37	120.72	211.74	227.87	285.52	845.85	1.77%
Light Industry	83.19	292.19	512.51	551.54	691.09	2,047.3	4.29%
Chemical	20.67	72.59	127.32	137.02	171.69	508.62	1.07%
Iron and Non-Ferrous	10.69	37.56	65.88	70.90	88.84	263.18	0.55%
Machinery	19.86	69.75	122.34	131.66	164.97	488.72	1.02%
Infrastructure	34.04	119.56	209.72	225.69	282.79	837.76	1.75%
Service-related	1,737.3	6,102.2	10,704	11,518	14,433	42,757	89.55%
Total	1,940.1	6,814.6	11,953	12,863	16,118	47,749	100%

Note: (1)The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation.

As for the corporate income tax in Table 6, the highest proportion of them is from the service-related, up to 91.08% (US$114.43 million). The tax revenue of the agriculture and food processing sector came to the second place, accounted for 3.84% (US$ 4.8216 million). In contrast, the corporate income tax is smaller than the indirect tax and the personal income tax under the aviation deregulation, respectively. Table 7 shows the tax revenues obtained from various sectors. The consumption patterns of Chinese tourists have a tendency for shopping activities. It could be reflected in the tax effect of the retail sector, which generated US$359.45million in tax revenues, accounting for 53.42% of the total tax revenue from tourism-related industries. The tax revenues in the retail sector is followed by that for the accommodation and catering sectors, which generated tax revenues of US$142.77 million and US$45.982 million, accounting for 22.08% and 6.83% of the total tax revenue from tourism-related industries. Besides, the financial intermediaries sector yielded US$44.186 million in tax revenues, accounting for approximately 6.55% of the total tax revenue from the tourism-related industries. The tax revenue in the tourism-related industries in 2011 accounts for 1.10% of Taiwan's total tax revenue, accounting for 61.73% of those under the aviation deregulation. In addition to the amount of tourists, these tax effects were significantly influenced by the extent of economic spillover effect, which is related to tourists' consumption patterns. The inducement

dependency ratio of the final domestic production shown in Table 8 suggests the different tax effects in the various tourism-related sectors.

Table 6: Corporate Income Tax under Aviation Deregulation

Sector	2008	(1) 2009	(2) 2010	(3) 2011	(4) 2012	(5)= (1)+(2)+(3)+(4)	Percentage
Agriculture and Food Processing	19.59	68.81	120.70	129.89	162.76	482.16	3.84%
Light Industry	9.25	32.5	57.00	61.34	76.86	227.7	1.81%
Chemical	4.56	16.02	28.11	30.25	37.9	112.28	0.89%
Iron and Non-Ferrous	2.58	9.05	15.87	17.08	21.40	63.4	0.5%
Machinery	3.67	12.9	22.62	24.34	30.5	90.36	0.72%
Infrastructure	5.87	20.63	36.18	38.94	48.79	144.54	1.15%
Service-related	464.94	1,633.1	2,864.5	3,082.6	3,862.6	11,443	91.08%
Total	510.47	1,793	3,145	3,384.4	4,240.8	12,563	100.00%

Note: (1)The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation.

Table 7: Tax Revenues from Tourism-Related Industries

sector	2008	(1)2009	(2)2010	(3)2011	(4)2012	(5)=(!)+(2)+(3)+(4)
Retail	1,403.4	4,929.7	8,646.7	9,305.1	11,660	3594.5
Other Land Transportation	144.82	508.71	892.29	960.23	1,203.2	3,564.4
Air Transportation	5.03	17.66	30.98	33.34	41.77	123.75
Accommodation	580.08	2,037.6	3,574	3,846.1	4,819.3	14,277
Catering	179.53	630.62	1,106.13	1,190.4	1,491.5	4598.2
Telecommunication	65.33	229.48	402.51	433.16	542.76	1,607.9
Financial Intermediate	172.07	604.42	1,060.2	1,140.9	1,429.6	4,418.6
Insurance	56.11	197.09	345.7	372.02	466.15	1,381
Arts, Entertainment and Leisure	20.53	72.10	126.46	136.09	170.52	505.17
Total	2,626.9	9,227.3	16,184.9	17,417	21,824	64,654

Note: (1)The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation.

The inducement dependency ratio of the final domestic production indicates the extent to which various industries' production levels depend on the ultimate demand sectors. Table 7 shows that the tax effects from the retail and the accommodation sectors are larger. The retail sector is a domestic-demand-dependent industry, which means it relies on domestic consumption. The production inducement dependency ratio for the retail industry was 80.56%. By contrast, the accommodation sector is an output-dependent industry, which means it relies on foreign tourists' consumption.

Table 8: Domestic Production Inducement Dependency Ratios in the Tourism-Related Industries

Sector	Domestic Private Consumption	Government Consumption	Gross Capital Formation	Change in Inventory	Export
Retail	80.56%	1.03%	9.09%	0.09%	9.23%
Other Land Transportation	42.32%	3.06%	15.16%	-0.20%	39.66%
Air Transportation	50.82%	1.24%	1.07%	0.01%	46.86%
Accommodation	28.06%	0.78%	2.09%	0.01%	69.06%
Catering	82.34%	3.10%	2.08%	0%	12.47%
Telecommunication	67.64%	8.05%	6.89%	0.02%	17.40%
Financial Intermediate	61.17%	5.68%	7.39%	0.03%	25.73%
Insurance	73.91%	4.45%	3.21%	0.02%	18.42%
Arts, Entertainment and Leisure	79.2%	6.69%	1.53%	0%	12.58%

Note: The inducement dependency ratio of the final domestic production is measured as $\frac{v_i \sum_j b_{ij} f_j^d}{v_i X_i} = \frac{\sum_j b_{ij} f_j^d}{X_i}$

The domestic production inducement dependency ratio of the accommodation sector was 69.06%. The

influx of Chinese tourists increased the demand for hotels. In addition, Chinese tourists are strongly inclined to shopping. Consequently, the induced employment income and the gross added value of these industries were increased. The level of induced employment income and gross added value determines the amount of tax revenue.

CONCLUDING COMMENTS

The world financial crisis in 2008 has exposed Taiwan's economic growth strategy with stretched and the governments have eventually decided to lift the aviation regulation between Taiwan and China in the end of 2008. After they reached an aviation agreement between China and Taiwan, the travelers do not need to convert the flights. The aviation deregulation could reduce the transportation costs of the goods. Travelers could also save time and costs. It would drive the increase in the number of visitors and promote its economic growth. It might improve the fiscal deficit accumulated in recent years in Taiwan. In the present study, we aim to investigate tax effects under the aviation deregulation. Based on the models established by Leontief (1966) and Miyazawa (2002) and by adding the effective tax rate, which is employed by the Japan National Tourism Organization (2010), we estimate the indirect tax revenues, the personal income tax revenues, and the corporate income tax revenues resulting from the change in the transportation policy. The data of this study were compiled by the Tourism Bureau of the Executive Yuan in Taiwan.

Our results show that the total tax revenue under the aviation deregulation generated US$ 1,047.32 million, equivalent to the total tax revenue of 1.78% in 2011in Taiwan. The indirect tax revenue, the personal income tax revenue and the corporate income tax revenue accounted for 0.76%, 0.81%, 0.21%, respectively. As for the industrial sector, the tax revenue from the service-related industry is US$939.71 million, which accounts for up to 89.73% of the total tax revenue after aviation deregulation. The aviation deregulation brings a great impact of industries, especially tourism-related industries. The tax revenues from the retail industry are US$359.45 million, which is the largest one. Taiwan never had a long period of economic recession like the current financial crisis. It has relived a small part (billion) of the fiscal deficit at the beginning under the aviation deregulation.

However, it has created the tax revenues of billions of US dollars only within four years. It might be meaningful for the budget of the small open economy later. In the present study, we investigate the taxation effects of tourism under aviation deregulation. Although aviation deregulation generated substantial taxation effects in a short period because of Chinese tourists visiting Taiwan, various tourist facilities cannot meet the demands of Chinese tourists, and price competition among travel agencies in Taiwan and China has resulted in a poor quality of tourism. Therefore, tourist facilities and tourism quality urgently require improvement. Although this study examined the taxation effects produced by aviation deregulation, aviation deregulation is not the only consideration for an economic perspective regarding transport policy changes. Liberalization and globalization have engendered economic prosperity in the region and also led to regional non-economic conflicts. Cross-strait aviation deregulation requires additional consideration and planning from numerous aspects. In other words, in addition to economic factors, political, social, cultural, and environmental issues must be considered to encourage sustainable transportation.

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THE ANALYSIS OF COMPANY LIQUIDITY A USING CASH CONVERSION CYCLE APPLICATION: EVIDENCE FROM TAIWAN

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ABSTRACT

It is important to determine whether firms realize assets within a short period to settle liabilities when the debts are due. Most common indicators used to measure liquidity are the current and quick ratios. However, the cash conversion cycle period (CCC) may be a better approach. This study chooses two Taiwan companies in food industries: a listed company (Uni-President) and a delisted company (Tsin Tsin) to compare performance based on liquidity indicators. We examine financial data of the two companies from 1996 to 2005 (Tsin Tsin was delisted in 2006), to calculate their current ratio, quick ratio and cash conversion cycles. The research results show that CCC indicators better reflect the company's actual short-term debt-paying ability and liquidity.

JEL: G33, G34

KEYWORDS: Liquidity, Working Capital, Current Ratio, Cash Conversion Cycle

INTRODUCTION

Many people are familiar with the 5-major ratio analysis for financial ratios (Liu and Hsue, 2012; Hsieh, 2013). The first of these ratios is the liquidity ratio, which is commonly used to measure a company's short-term liquidity. Such application is also known as the liquidity and the length of period for converting a company's assets into cash or settling its liabilities when debts are due (Tsao, 2013, 22). A company's liquidity is also related to creditors, investors, securities analysts and accounting auditors. Creditors usually demand that the borrowing company maintain a certain level of liquidity. Investors and securities analysts are concerned about the company's ability to acquire cash, and whether or not has sufficient cash to handle the requirement for daily operations. Suppliers care about the company's ability to pay cash to purchase necessary goods. In addition, for external auditors, the evaluation of a company's liquidity is important.

It is important that a company is able to realize assets within a short period to settle their liabilities when the debts are due. If an enterprise is not able to pay off these debts within a short period, it may form bad debts and encounter the risk of bankruptcy. Generally, the most common indicators of measuring liquidity are the current and quick ratios (also known as "acid-test ratio"). However, different industries may have sizeable difference in these two ratios. Moreover, it is difficult to determine practical liquidity by directly using the ratio pitch, as well as hard to tell the good or bad according to the ratio descriptions (Cagle et al., 2013). Richards and Laughlin (1980) firstly pointed out that Cash Conversion Cycle (hereafter referred to as CCC) is a better approach than the current and quick ratios to evaluate corporate liquidity. It not only measures the outflow and inflow period of working capital, but also considers sales revenue (sales volume). Thus, it correctly evaluates whether a company's working capital management policy is appropriate without the scale influence. A better working capital management policy shall strive for the reduction of CCC (Liu and Hsue, 2012).

This study uses practical cases of Taiwan listed companies to show the advantage of CCC relative to the current and quick ratio, to provide general creditors, investors, securities analysts and accounting auditors with deeper understanding of company's liquidity. Following this introduction, the second section is the literature review. The third section is data and methodology, followed by the fourth section results. It compares the performance of liquidity indicators by focusing on Uni-President and a delisted company (Tsin Tsin). The last section is the concluding comments.

LITERATURE REVIEW

In terms of liquidity examinations, some authors stress the relationship between current assets and financing costs, such as Hoshi et al. (1991), John (1993). Other authors stress the optimal level of current assets or other determinants, such as Schilling (1996), James and Doug (1998), Kim et al. (1998), Chen and Chen (2002), Yang, Ku, and Huang (2007). The the correlation between current assets and company's profitability, is examined by authors including Jose et al. (1996), Shin and Soenen (1988) and or the correlation between financial ratios and corporate governance, such as Yu and Wang (2011), Lin et al. (2012).

However, Cagle et al. (2013) noted that only using traditional current ratio and quick ratio to measure a company's liquidity and short-term liquidity may be misleading. Thus, they suggested the CCC is a useful auxiliary approach to evaluate a company's liquidity and profitability. However, this measure is usually neglected in accounting-related textbooks in U.S., and in Taiwan. Therefore, this study follows the approach of Cagle et al. (2013). We choose a company with normal operation and a company that was delisted due to financial risk and bad operations. We compare the performance of these aforesaid liquidity indicators.

DATA AND METHODOLOGY

This study examines Tsin Tsin Corporation, a well-known company in the food industry currently delisted. We also examine Uni-President Enterprises Corporation, a listed company with excellent operations currently. We use annual financial data of last decade (1996~2005) before Tsin Tsin's delisting to calculate the current ratio, quick ratio and CCC for these two companies. The detailed equations are as follows:

$$\text{Current Ratio} = \text{Current Assets} \div \text{Current Liabilities} \quad (1)$$

$$\text{Quick Ratio} = (\text{Current Assets} - \text{Inventory} - \text{Prepaid Expenses}) \div \text{Current Liabilities} \quad (2)$$

$$\text{Cash Conversion Cycle (CCC)} = \text{Inventory Conversion Period} + \text{Average Collection Period} - \text{Payable Deferral Period} \quad (3)$$

$$\text{Inventory Conversion Period } (C_1) = \text{Average Inventory} \div (\text{Cost of Goods Sold}/365) \quad (4)$$

$$\text{Average Collection Period } (C_2) = \text{Average Accounts Receivable} \div (\text{Net Sales}/365) \quad (5)$$

$$\text{Payable Deferral Period } (C_3) = \text{Average Accounts Payable} \div (\text{Cost of Goods Sold}/365) \quad (6)$$

Ratios (1) and (2), measure the relative sizes between current assets and current liabilities. Among the above, current assets indicate assets that can be converted into cash in a short period (within one year). Current assets include cash and cash equivalents, short-term investments, accounts and notes receivable, other accounts receivable, inventory, prepaid expenses and prepayments, and other current assets. Current liabilities are debts that need to be settled in a short period (within one year), including short-term borrowings, commercial paper payable, accounts and notes payable, expenses payable, advance receipts, other accounts payable, income tax payable, current portion of long-term liabilities and other current liabilities. Inventory needs to be sold before converting into accounts receivable. Whether inventory is able to be sold cannot be controlled by the company. Prepaid expenses and prepayments (such as prepaid rent or insurance premium) belong to the company's current assets, but mostly will not be converted into cash

in the future; therefore, their ranking of liquidity is relatively low. The quick ratio deducts these items, including inventory, prepaid expenses and prepayments, from the current assets, to obtain quick assets, and then calculate the relative number between quick assets and current liabilities.

The main advantage of the current ratio and quick ratio is that it is easy to calculate, and covers the effects of all current assets and liabilities. However, it is unable to control for liquidity that is changing with time, and it is difficult to tell whether higher values of these two ratios are good or bad. For example, higher current ratios and quick ratios, in general, are considered good. But the ratios are too high to have efficiency in asset usage. On the contrary, low current and quick ratios seem to be bad. But, such low ratios are probably the result of effective working capital application (Cagle et al., 2013).

Equations 3 - 6 are described as follows:

1. Inventory Conversion Period (C_1) measures the average time needed to turn a company's inventory into sales revenue. Generally speaking, the shorter the C_1 period is, the better the company's liquidity. If product handling time from inventory to sales is too long, it will reflect on the day number of CCC. That is, such a company has a bad liquidity. On the other hand, the current ratio is a static equation, which contains inventory and accounts receivable into current assets. Thus, it is difficult to see such liquidity level by using the current ratio only.

2. Average Collection Period (C_2) measures the time needed to convert a company's accounts receivable into cash. After products are sold, if the handling time of converting accounts receivable into cash is too long, it will reflect in a higher CCC. That is, such a company has a bad liquidity. On the contrary, it is difficult to see such liquidity level by using the current ratio (and quick ratio) only.

3. Payable Deferral Period (C_3) measures the time a company defers the payment of accounts payable (without paying interest). Longer deferral implies a benefit to working capital. But the reduction of current ratio (and quick ratio) caused by deferred accounts payable may instead cause concern about the company's liquidity instead.

Cash Conversion Cycle (CCC) is the summarization of these three periods, which indicates the operating cycle for cash inflow and outflow of a company from purchasing raw materials, settling cash expense resulting from production costs, to selling the products, creating accounts receivable and converting accounts receivable into cash. In theory, smaller CCC values implies better working capital management. If a company has an excellent working capital management, then its CCC value may even be negative.

RESULTS

Tsin Tsin Corporation was founded in 1984 with capital of NT$ 600,000. Mr. Wang, Chien-lang was its president. It initiated from a MSG factory at Dehua Street, Taipei City originally named Pacific Chemical Industry Co., Ltd. In 1956, it increased capital by NT$ 3.5 million and merged with Tunghai Chemical Industry Co., Ltd. In 1959, it increased capital by NT$ 5 million, and began epoch-making innovated manufacturing method of MSG. It also changed names to Tsin Tsin MSG Co., Ltd. In 1964, it increased capital by NT$ 30 million and launched its stocks in the public market. In 1966, it increased capital by NT$ 16 million. It expanded its exporting business and developed the canned foods market. It built a canned foods factory in Changhua, integrated two factories in Taipei to implement a consistent operation producing MSG, and then renamed it to Tsin Tsin Food Industrial Corporation.

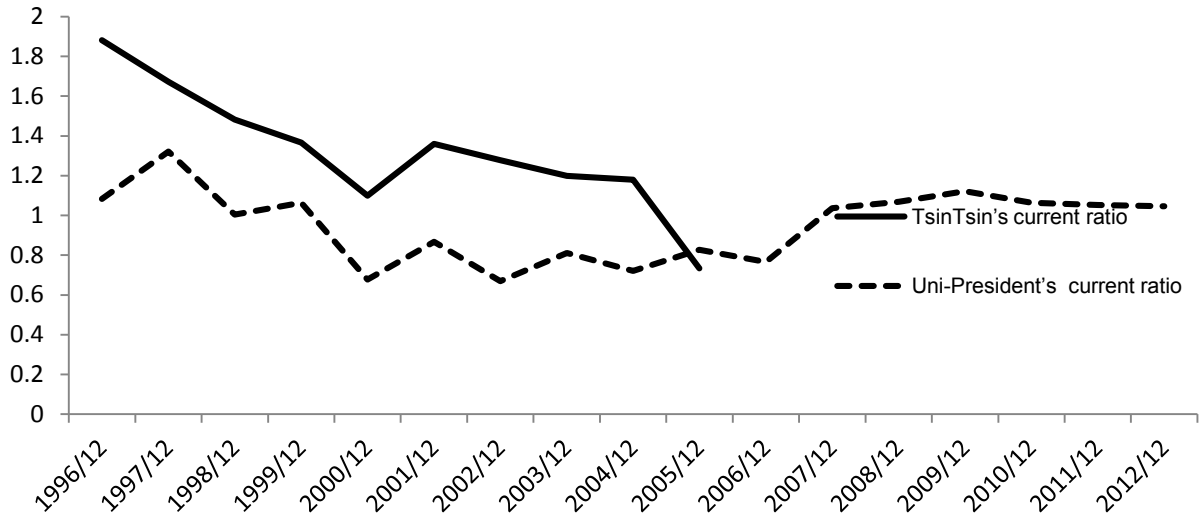
In 1977, it increased a capital by NT$ 200 million and expanded its Changhua factory. It replaced semi-automatic juice production equipment with fully automatic equipment and added an automatic retort pouch packing machine system. In 1978, it increased a capital by NT$ 150 million and continuously expanded its production equipment. It added production equipment for ice and dairy products, freezing equipment and cold storage. In 1995, Changhua's first factory obtained the GMP certificate for its asparagus juice product. Tsin Tsin was once listed as the top three foods factories together with Wei Chuan and Ve Wong in Taiwan.

It occupied the top rank of stocks in food industry. During its peak, annual production was more than 100 million cans, and the number of employees exceeded 1400. In 1998, it reinvested in Hsieh Tsin construction Co., Ltd., and engaged in the construction of operation of leisure facilities. In 2005, it developed dairy products launching Green Mountain Ranch Milk Yogurt. However, due to the loss in reinvestment, in 2005, president Wang, Chien-lang and his younger brother Wang, Chien-hua have been accused of arranging many false trades of real estate during 1997 to 2004 to embezzle about NT$ 800 million from their family businesses, Tsin Tsin and Union Leather & Printing. Their checks were even bounced on July 22nd, 2005. In June 2006, Tsin Tsin was delisted (Chen, 2005, Pang, 2011, Yan, 2005).

Uni-President Corporation was established in 1967. Mr. Wu Hsiu-Chi was the first president of Uni-President, and Mr. Kao, Chin-Yen, the first general manager. They formally led Uni-President Corporation to build a flour mill and fodder factory at Yongkang Village, Tainan County. In 1969, it increased a capital by NT$ 16 million and built foods factory to launch the production of Uni-President instant noodles. In 1974, it invested in Ton Yi Industrial Corp., and increased capital to NT$ 256 million. GM Mr. Kao, Chin-Yen was awarded the 4th Top 10 Entrepreneurs in Taiwan. In 1975, it established the dairy product department, and Uni-President awarded as the First Top 10 Companies in R.O.C. In 1978, it established HQ factory at Chongli to produce bread, cake and desert. In 1979, it signed a contract with Southland Corporation to introduce the operating techniques of 7-ELEVEN, then opened 14 Uni-President Convenience Stores at the same time island-wide. In 1987, it became a listed company. In 1996, it was awarded by *Common Wealth Magazine* as the Most Admired Companies in Taiwan. In 2012, it was awarded 2nd place of "2012 The most attractive company for the new generation-Top 100" by *Cheers Magazine*, "The benchmarking companies of digital service in 2012" by *Business Next* Magazine, and "2012 Most Admired Companies in Taiwan" by *Common Wealth* Magazine. Currently, Mr. Kao, Chin-Yen is its chairman, Mr. Alex C. Lo is its president, and its capital is NT$ 51.542 billion.

In the following, we use data from Taiwan Economic Journal Database to compare the results of the equations 1 - 6 for the financial statements between Uni-President and Tsin Tsin within 10 years (1996-2005) before Tsin Tsin was delisted (June 2006). First, the data shows that during the period 1996-2005, Tsin Tsin's average current ratio is 1.32, which is higher than 0.90 of the excellent Uni-President. Similarly, during this period, Tsin Tsin's quick ratios are roughly higher than Uni-President's (both average quick ratios are 0.97 and 0.58, respectively, refer to Figures 1 and Figure 2).

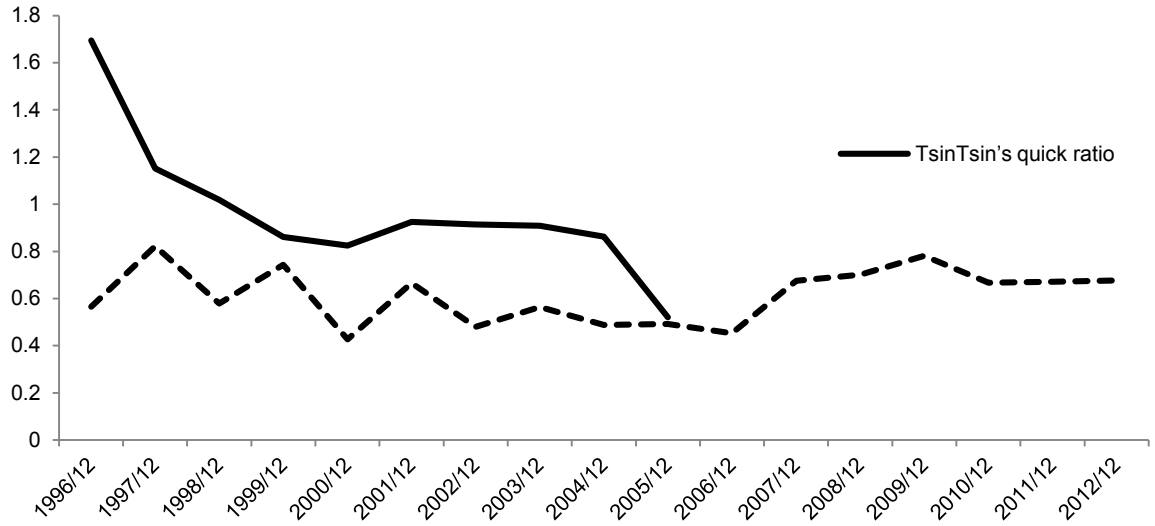
Figure 1: The Comparison of Current Ratios between Tsin Tsin and Uni-president



This figure shows the comparison of current ratios between Tsin Tsin and Uni-presiden Tsin Tsin's current ratio is higher than Uni-President's.

Tsin Tsin's liquidity is better than Uni-President's. However, during the same period, Uni-President's cash conversion cycle (CCC) is only 43.8 days, but 107 days for Tsin Tsin as shown in Figure 3. Based on CCC indicators, Uni-President's liquidity is significantly better than Tsin Tsin's. Further, Uni-President's Inventory Conversion Period (C_1) is 27 days shorter than Tsin Tsin's. Uni-President's Average Collection Period (C_2) is 71 days shorter than Tsin Tsin's. But Uni-President's Payable Deferral Period (C_3) is 23 days, 35 days shorter than Tsin Tsin's 58 days. This may be caused by Uni-President's management policy of accounts receivable. In the same industry, Wei Chuan's C_3 is 54 days, and Ve Wong is 37 days, thus further examination is warranted.

Figure 2: The Comparison of Quick Ratios between Tsin Tsin and Uni-President



This figure shows a comparison of quick ratios between two companies. Tsin Tsin's quick ratio is higher than Uni President's.

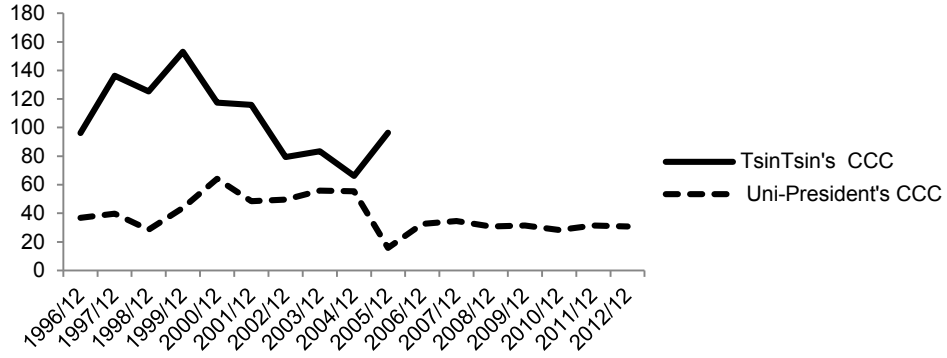
In summary, CCC indicators show that Uni-President's liquidity is significantly better than that of Tsin Tsin, but the indicators of current ratio and quick ratio show that Tsin Tsin's liquidity is better than Uni-President's. Based on delisting for Tsin Tsin in 2006 due to its financial issues, the CCC indicators can better reflect actual short-term debt-paying ability and liquidity. In addition, the data show that during 2006-2012, Uni-President's CCC value continuously decreased to an average of 31 days, which is mainly due to the quick decrease of Average Collection Period (C2) with an average decrease of 10 days. Thus, we can tell that Uni-President has more effective accounts receivable management. However, some items including current liabilities, such as interest, wage and tax are not considered in CCC. These issues may cause significant effect on its liquidity. On the contrary, the current ratio considers all current liabilities. Therefore, it is better to observe both current ratio and CCC to evaluate a company's liquidity.

CONCLUDING COMMENTS

We use Taiwan Economic Journal Database to compare Uni-President's and Tsin Tsin's financial statements for the 10 years from 1996-2005, before Tsin Tsin delisting in June 2006. We examine the current ratio, quick ratio and Cash Conversion Cycle. The data shows that during this period, Tsin Tsin's average current ratio is 1.32, which is higher than 0.90 of Uni-President. Tsin Tsin's quick ratios are higher than Uni-President's. Tsin Tsin's liquidity is better than Uni-President's. However, during the same period, Uni-President's cash conversion cycle (CCC) is only 43.8 days, but 107 days for Tsin Tsin. Thus, CCC indicators show Uni-President's liquidity is significantly better than Tsin Tsin's. Since Tsin Tsin was delisted in 2006 due to financial issues, we conclude CCC indicators better reflect short-term solvency and liquidity.

However, the CCC approach also has limitations. Current liabilities, such as interest, wage and tax are not considered in CCC. These issues may cause significant effect on liquidity. Since the current ratio indicators consider all current liabilities, it is advised that related parties observe both current ratio and CCC to evaluate liquidity. Investors, creditors, suppliers and accounting auditors need to understand a company's working capital management, thus it is important to enhance their understanding of CCC indicators, which will improve their ability to understand a company's liquidity.

Figure 3: The Comparison of CCC between Tsin Tsin and Uni-President



This figure shows the comparison of CCC between the two companies. Tsin Tsin's CCC is longer than Uni-President's.

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