出國報告

（出國類別：出席國際研討會並發表論文）

出席 The SIBR 2015 Osaka Conference on Interdisciplinary Business & Economics Research 國際研討會心得報告

服務機關：國立高雄應用科技大學財富與稅務管理系

姓名職稱：姚名鴻副教授

派赴國家：日本

出國期間：104 年 6 月 30 日至 104 年 7 月 6 日

會議期間：104 年 7 月 2 日至 104 年 7 月 3 日

報告日期：104 年 7 月 10 日

摘要：

　　本次出國目的在參加 2015 年The SIBR 2015 Osaka Conference on Interdisciplinary Business & Economics Research國際研討會，由 Society of Interdisciplinary Business Research (SIBR) 組織和泰國的 Nakhon Ratchasima Rajabhat University 共同主辦，會議地點在日本大阪的 Ark Hotel，會議時間為 2015年 7 月 2-3 日，總計2天。

　　報告人的行程為台灣時間 6 月 30 日下午由高雄小港國際機場出發，搭乘華航 CI0176 班機出境，於日本當地時間晚上抵達關西國際機場，隨即安排機場附近旅店住宿。7 月 1 日上午搭乘大眾運輸工具，前往開會地點，瞭解住宿地點與研討會地點的交通往返時間。7 月 2 日上午完成註冊與報到手續，並領取大會議程及論文摘要集等會議資料，隨即進行非正式招待會及 2 天的議程。報告人於本次研討會口頭發表一篇論文，於 7 月 3 日下午的第 2 個時段（3 點到 5 點）進行，題目是 The Impact of Public Debt on Taiwan's Economic Growth。論文共同作者為國立中正大學經濟學系朱琇妍助理教授。報告人原訂於會議結束隔天 7 月 3 日返國，但適逢暑假，無法順利候補機位。因此，於 7 月 6 日上午搭乘華航 CI0167 班機，於台灣時間下午返抵國門。

報告人所發表的論文主要利用台灣 1976 至 2013 年的時間序列資料，以自我迴歸分配落後模型（Autoregressive Distributed Lag Model, ARDL）估計我國在樣本期間政府未償還債務餘額占 GDP 比重與經濟成長率的長期關係。相較於傳統的共整合方法，ARDL 實證方法的優點有三：一、可同時處理整合階次不同的時間序列變數；二、只須估計單一方程式，估計結果簡單、容易解釋；三、允許模型中不同變數有不同的落後期數。實證結果發現此二變數有長期共整合關係，而且政府未償還債務餘額占 GDP 比重對經濟成長有顯著負向影響。2008 年美國的金融海嘯波及全球，世界各國競相推出減稅，並以舉債方式融通公共支出的「凱因斯思維」政策，以期刺激景氣，早日走出衰退的陰霾。短期或可奏效，但根據本研究的結果，長期而言，政府過多的舉債，實會排擠民間投資，不利於長期經濟成長。政府應以最近希臘的債務危機為鑑，致力縮減財政赤字，避免政府債務進一步攀升。

　　發表後，主持人及與會者建議可進一步分析政府債務是透過何管道影響經濟成長，例如民間儲蓄或勞動供給等因素。此外，雖然研究領域或有不同，但報告人仍能與各領域的時間序列研究人員進行討論與廣泛交換意見，對後續研究規劃及研究方向獲益良多。

目　　次

壹、 目的

本次出國目的在參加 2015 年 The SIBR 2015 Osaka Conference on Interdisciplinary Business & Economics Research 國際研討會，由 Society of Interdisciplinary Business Research (SIBR) 組織和泰國的 Nakhon Ratchasima Rajabhat University 共同主辦，會議地點在日本大阪的 Ark Hotel，會議時間為 2015 年 7 月 2-3 日，總計 2 天。

本次研討會共收錄 243 篇論文，出席會議人士眾多。由於主辦單位和地緣關係，出席的學者多為東亞的日本、韓國和香港，東南亞的泰國、印尼和馬來西亞，以及美國、澳大利亞和台灣學者。本次研討會論文主題為「*Interdisciplinary Knowledge Advancement: Past Experience and Future Agenda*」，主要是討論跨領域研究的進展，包含過去的經驗及未來的議題。此外，還有其他相關議題，包括教育與勞動經濟學、企業倫理與法律、公共行政、應用計量經濟學、公司治理、會計與金融、環境經濟學、經濟成長和消費者行為等。

報告人的研究領域為公共經濟學，屬於政治學與經濟學的跨領域學科。期望藉由出席此研討會進而和其它國家的學者切磋最新的計量經濟學實證方法，交流研究心得，並分享實證分析過程和解釋估計結果的心得，將國際晚近之研究議題及方法論帶回國內，已達成學術交流的目的。

貳、 過程

　　報告人的行程為台灣時間 6 月 30 日下午由高雄小港國際機場出發，搭乘華航 CI0176 班機出境，於日本當地時間晚上抵達關西國際機場，隨即安排機場附近旅店住宿。7 月 1 日上午搭乘大眾運輸工具，前往開會地點，暸解住宿地點與研討會地點的交通往返時間。7 月 2 日上午完成註冊與報到手續，並領取大會議程及論文摘要集等會議資料，隨即進行非正式招待會及 2 天的議程。

　　7 月 2 日上午 9 點整開始第一個時段的論文發表，分四個場地同時進行。10 點 30 分由研討會主辦單位泰國的 Nakhon Ratchasima Rajabhat University 校長 Dr. Wichean Foypikul 發表簡單的開幕詞及歡迎茶會。7 月 2 日及 7 月 3 日中午皆在飯店舉行午宴。兩日的會議共分 4 個場地同時進行 8 個時段的口頭報告，以及一個場次的壁報發表。由議程的安排可看出主辦單位的精心規劃，內容緊湊充實，使參與會議的人員得到最多的訊息及充分交流的機會。

　　報告人於本次研討會口頭發表一篇論文，於 7 月 3 日下午的第 2 個時段（3 點到 5 點）進行，題目是 The Impact of Public Debt on Taiwan's Economic Growth。論文共同作者為國立中正大學經濟學系朱琇妍助理教授。

　　報告人原訂於會議結束隔天 7 月 3 日返國，但適逢暑假，無法

順利候補機位。因此，於 7 月 6 日上午搭乘華航 CI0167 班機，於台灣時間下午返抵國門。

參、 心得及建議事項

報告人所發表的論文主要利用台灣 1976 至 2013 年的時間序列資料，以自我迴歸分配落後模型（Autoregressive Distributed Lag Model, ARDL）估計我國在樣本期間政府未償還債務餘額占 GDP 比重與經濟成長率的長期關係。相較於傳統的共整合方法，ARDL 實證方法的優點有三：一、可同時處理整合階次不同的時間序列變數；二、只須估計單一方程式，估計結果簡單、容易解釋；三、允許模型中不同變數有不同的落後期數。實證結果發現此二變數有長期共整合關係，而且政府未償還債務餘額占 GDP 比重對經濟成長有顯著負向影響。2008 年美國的金融海嘯波及全球，世界各國競相推出減稅，並以舉債方式融通公共支出的「凱因斯思維」政策，以期刺激景氣，早日走出衰退的陰霾。短期或可奏效，但根據本研究的結果，長期而言，政府過多的舉債，實會排擠民間投資，不利於長期經濟成長。政府應以最近希臘的債務危機為鑑，致力縮減財政赤字，避免政府債務進一步攀升。

發表後，主持人及與會者建議可進一步分析政府債務是透過何管

道影響經濟成長，例如民間儲蓄或勞動供給等因素。此外，雖然研究領域或有不同，但報告人仍能與各領域的時間序列研究人員進行討論與廣泛交換意見，對後續研究規劃及研究方向獲益良多。最重要的是與國際學者們的意見交流，可瞭解目前國際上時間序列研究方法應用最新知識及應用領域。報告人認為參加此種國際性研討會有助於提高學術視野，因此期望國內專家學者能多加前往參會，以便提高國內時間序列研究在國際上之知名度，對於個人之研究可吸收最新研究方法，將有極豐富的啟發及研究助益。

國際學術交流對於相關領域的從業人員是必要的活動，其中，又以國際型學術研討會最為重要。因為國際性研討會提供一個平台，可以讓學術人員、出版社及業界人士，充分交流。報告人本次出席 2015 年 The SIBR 2015 Osaka Conference on Interdisciplinary Business & Economics Research 國際研討會，成果豐碩。除與印尼、韓國、日本、泰國及其他國家與會之專家學者交換研究心得外，也吸取很多寶貴經驗與想法。建議國內專家學者多能在參與多國舉辦之國際研討會後，貢獻經驗，提供國內的國際研討會籌備參考。有感於研究不能閉門造車，應多與各國之研究學者專家交流，才能以獲裨益，使國內有志從事時間序列及財政政策研究之年輕後輩，除學校課程與參與研討會外，能進一步在研討會中學習理論基礎及實務之機會。

肆、 附錄

一、 研討會議程

SIBR

SIBR-RDINRRU Conference on Interdisciplinary Business & Economics Research
July 2-3, 2015, Osaka

Nakhon Ratchasima Rajabhat University

PROGRAM (Finalized Version)

	DAY 1 (July 2, 2015)	DAY 2 (July 3, 2015)
Registration 8:30-16:00 (Days 1-2)		
	9:00-10:30 Sessions **A1, B1, D1, Poster**	9:00-10:15 Sessions **A2, B2, C2, D2**
	10:30-10:50 **Opening Address*** & Tea reception	10:15-10:35 Tea break
	10:50-11:50 Sessions **E1, F1, G1, H1**	10:35-11:50 Sessions **E2, F2, G2, H2**
	11:50-12:40 Lunch (Restaurant on 2/F)	11:50-12:40 Lunch (Restaurant on 2/F)
	12:40-14:40 Sessions **J1, K1, L1, M1**	12:40-14:40 Sessions **J2, K2, L2, M2**
	14:40-15:00 Tea break	14:40-15:00 Tea break
	15:00-17:00 Sessions **N1, P1, Q1, R1**	15:00-17:00 Sessions **N2, P2, Q2, R2**

* Opening Address by: Associate Professor Dr. Wichean Foypikul, President of Nakhon Ratchasima Rajabhat University, Thailand (venue: Kujyaku, 2/F).

二、 報告人發表之論文

The Impact of Public Debt on Taiwan's Economic Growth

Ming-Hung Yao*
Department of Wealth and Taxation Management, National Kaohsiung University of Applied Sciences, 80778 Taiwan
E-mail: mhyao@kuas.edu.tw

Shiou-Yen Chu
Department of Economics, National Chung Cheng University, 62102 Taiwan
E-mail: ecdsyc@ccu.edu.tw

(Corresponding Author indicated by an asterisk *)

ABSTRACT

This paper investigates the relationship between Taiwan's economic growth and public debt in the period of 1976-2013. The ARDL (autoregressive distributed lag) approach is used to deal with the series of different orders of integration. The results show that there is a long-run equilibrium relationship between Taiwan's economic growth rate and public debt-to-GDP ratio. Higher public debt reduces Taiwan's economic growth in the long run. From a policy perspective, our results support the argument that the government should reduce public debt to sustain long-run economic growth.

Keywords: public debt, economic growth, ARDL cointegration method

1. INTRODUCTION

Since the most recent financial crisis, many countries are still seeking solutions for economic recovery. Although the Ricardian equivalence theorem suggests that all means of financing government spending have no real effects on output and interest rates, whether a government should pursue an economic stimulus by conducting aggressive fiscal policies through debt issuance is under debate.

An essential element of the debate is the relationship between public debt and economic growth. A positive relationship between GDP growth and public debt-to-GDP ratio indicates that either expansionary government spending financed by debt can promote economic growth or better economic performance can expand government's repayment ability and the issuance of debt. A negative relationship, on the other hand, displays caution on government borrowing. Many studies (Reinhart and Rogoff 2010; Checherita-Westphal and Rother 2012; Panizza and Presbitero 2013, 2014; Spilioti and Vamvoukas 2015) find inversely linear or nonlinear relationships between economic growth and government debt when the public debt-to-GDP ratio

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exceeds a certain level. Other studies (Herndon, Ash and Pollin 2013; Egert 2015) provide neutral explanations for their relationships.

This paper aims to examine the short-run dynamics and long-run relationship between Taiwan's public debt and economic growth by using the autoregressive distributed lag (ARDL) approach. This approach was proposed by Pesaran et al. (2001). The advantage of employing this approach to cointegration is that a null hypothesis of no cointegration can be tested when variables have different orders of integration. We apply this methodology to Taiwanese data during 1976-2014 since the ADF tests show that Taiwan's public debt to GDP ratio is an $I(1)$ series and its economic growth rate is an $I(0)$ series. Our estimation results show that a long run relationship exists between Taiwan's public debt-to-GDP ratios and growth rates. Higher public debt has a significantly negative effect on Taiwan's economic performance.

The remainder of the paper is organized as follows. Section 2 discusses related literatures. Section 3 presents the methodology and results. Section 4 concludes.

2. LITERATURE REVIEW

Numerous studies have examined the relationship between public debt and economic growth across countries. For example, Checherita-Westphal and Rother (2012) analyze the economic consequences of public debt on growth for 12 euro area countries. They conduct a variety of estimation techniques, such as panel data models with fixed effects, including debt in quadratic function form and in linear form, as well as instrumental variable models. They find a non-linear relationship between public debt and growth. After a threshold of about 90-100% debt-to-GDP ratio, high public debt generally leads to lower economic growth.

Panizza and Presbitero (2013) survey related theoretical and empirical studies regarding the relationships between public debt and economic growth. Their findings suggest that cross-country heterogeneity be considered in estimation. Whether high debt results in low economic growth is inconclusive. Panizza and Presbitero (2014) employ an instrumental variable approach to investigate the causal effect between public debt and economic growth. They conclude that public debt does not have a causal link on economic growth in advanced economies. Spilioti and Vamvoukas (2015) estimate Greek data from 1970 to 2010, including population growth rate, trade growth rate, savings, short-term interest rate, unemployment rate, exports, and etc. Their results show that debt-to-GDP ratios higher than 110% harm economic growth.

Reinhart and Rogoff (2010) empirically document that high debt-to-GDP ratios (over 90%) substantially reduce growth for advanced and emerging economies. Yet, Herndon, Ash and Pollin (2013) replicate Reinhart and Rogoff's (2010) paper and conclude that countries with a debt-to-GDP ratio over 90% still have an average economic growth rate of 2.2%. Their sample set includes 20 advanced economies over 1946-2009. An additional 30 percentage point increase in the public debt-to-GDP ratios from 90% to over 120% reduces average GDP growth rates but not to a substantial extent. Egert (2015) extends Reinhart and Rogoff's (2010) data sets to test whether a negative nonlinear relationship between debt and growth occurs

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during 1946 and 2009. They find that the negative nonlinear correlation appears at low debt-to-GDP ratio and the thresholds of debt-to-GDP ratio are sensitive to different selections of countries and time periods.

3. METHODOLOGY

We follow Bal and Rath (2014) and Morley (2006) by applying an ARDL model to Taiwanese annual data from 1976 to 2014. The data of GDP growth rates and public debt-to-GDP ratios are obtained from the AREMOS database. *GDPGR* and *PDGDP* denote the GDP growth rate and the public debt-to-GDP ratio, respectively. Figure 1 depicts the GDP growth rates and public debt-to-GDP ratios. Table 1 summarizes the descriptive statistics of these two variables. The average of Taiwan's GDP growth rates during 1976-2014 was about 6.66% and the average public debt-to-GDP ratio was about 13.95%. The public debt-to-GDP ratio reached 34.23% in 2014. Table 2 shows that the GDP growth rate and the debt-to-GDP ratio are negatively correlated.
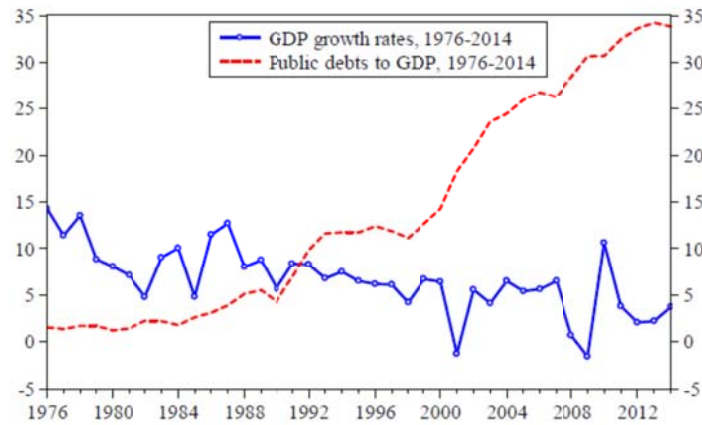
Figure 1 Taiwan's GDP Growth Rates and Public debt-to-GDP ratios during 1976-2014

Table 1 Descriptive statistics

Variables	Mean	Max.	Min.	S.D.	Skewness	Kurtosis	J.B. test	Obs.
GDPGR	6.66	14.28	-1.57	3.59	-0.11	3.16	0.12	39
PDGDP	13.95	34.23	1.21	11.56	0.48	1.75	4.03	39

Note: The sample period is from 1976 to 2014.

Table 2 Correlation coefficients of variables

Variables	GDPGR	PDGDP
GDPGR	1.00	-
PDGDP	-0.64	1.00

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A complete ARDL approach to cointegration involves four steps. First, identify the order of integration of each variable. Second, select the lag order of the ARDL model and compute the Wald statistics to see whether a long run relationship exists among variables. Third, estimate the long run coefficient. Fourth, estimate the short-run dynamics parameters. We apply four unit root tests: the augmented Dickey and Fuller (1979, 1981; ADF), Phillips and Perron (1988; PP), Elliot, Rothenberg, and Stock's (1996) Dickey–Fuller GLS detrended (DF-GLS), and Kwiatkowski, Phillips, Schmidt, and Shin (1992; KPSS) to verify the stationarity of each time series. Table 3 shows that GDP growth rate is a $I(0)$ series and the public debt-to-GDP ratio is a $I(1)$ series at the 5% significance level.

Table 3 Results of unit root test

Variables	ADF	DF-GLS	PP	KPSS
Levels				
GDPGR	-5.23**(1)	-4.64**(1)	-6.68**(4)	0.05(2)
PDGDP	-2.41(1)	-1.81(1)	-2.27(1)	0.20**(4)
First order differences				
GDPGR	-8.09**(1)	-7.76**(1)	-23.44**(16)	0.07(4)
PDGDP	-4.13**(0)	-4.24**(0)	-4.07**(3)	0.11(0)

Notes: The numbers in parentheses indicate the selected lag order. The regressions include an intercept and trend. The superscript ** indicates significance at the 5% level. The null hypothesis for all tests except for the KPSS test is that a variable has a unit root. The null hypothesis for the KPSS test is that a variable is stationary.

In the second step, we estimate equation (1) to test the null hypothesis: $\delta_1 = \delta_2 = 0$ against the null hypothesis: $\delta_1, \delta_2 \neq 0$. According to the interpretation of lower bound and upper bound critical values stated in Pesaran et al. (2001), a computed F-statistic less than the lower bound value fails to reject the hypothesis. A computed F-statistic exceeding the upper bound value indicates that a long-run relationship exists between variables. No conclusions can be drawn if a computed F-statistic is between the lower and upper bound values. Based on the AIC and SC criteria, the optimal lag orders for *GDPGR* and *PDGDP* are 2 and 1, respectively. The results in Table 4 show that the calculated F-statistic in our ARDL (2, 1) model is greater than the critical value at the 5% significance level. Hence, we conclude there exists a long-run relationship between public debt and economic growth.

$$\Delta GDPGR_t = \eta + \delta_1 \cdot GDPGR_{t-1} + \delta_2 \cdot PDGDP_{t-1} + \sum_{i=1}^{q_1} \lambda_i \cdot \Delta GDPGR_{t-i}$$
$$+ \sum_{j=1}^{q_2} \gamma_j \cdot \Delta PDGDP_{t-j} + \varepsilon_t \tag{1}$$

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Table 4 Bound F-test results

F-statistic value	Lag length	5% bound critical values	
		$I(0)$	$I(1)$
5.983	$q_1 = 2; \; q_2 = 1$	4.94	5.73

Note: Critical values are cited from Pesaran et al. (2001)

In the third step, we proceed to estimate the long-run coefficients estimation from equation (2). The results in Table 5 indicate that public debt-to-GDP ratio has a significantly negative impact on Taiwan's economic growth. It implies that higher public debt reduces Taiwan's economic growth in the long run.

$$GDPGR_t = \theta + \sum_{i=1}^{q_1} \alpha_i \cdot GDPGR_{t-i} + \sum_{j=1}^{q_2} \beta_j \cdot PDGDP_{t-j} + \varepsilon_t \qquad (2)$$

Table 5 Estimation of long run effect

Varible	Coefficient	t-test statistics
PDGDP	-0.191***	-3.06
Constant	9.566***	4.04

Note: Dependent variable GDPGR. The superscript *** indicates significance at the 1% level.

In the final step, we estimate an error correction model (ECM) in equation (3) to examine the short-run dynamics of variables.

$$\Delta GDPGR_t = \mu + \vartheta \cdot ECT_{t-1} + \sum_{i=1}^{q_1} \lambda_i \cdot \Delta GDPGR_{t-i} + \sum_{j=1}^{q_2} \gamma_j \cdot \Delta PDGDP_{t-j} + \varepsilon_t. \; (3)$$

where ECT_{t-1} represents the lagged error correction term from the cointegration model. Table 6 presents the results. A stable long-run relationship among the variables is verified since the error correction term with a value of -0.996 is significant (Banerjee et al. 1998). A significantly negative lagged error correction term implies that the dependent variable $\Delta GDPGR$ will converge to its long-run equilibrium level. In our model, a significant error correction term running from public debt to the growth rate of GDP is indicative of long-run causality. However, its lagged differenced terms are insignificant, providing little evidence of any short-run causality.

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Table 6 Results of error correction representation

Varibles	Coefficients	t-test statistics
$\Delta GDPGR_{t-1}$	-0.016	-0.07
$\Delta GDPGR_{t-2}$	-0.208	-1.40
$\Delta PDGDP_{t-1}$	0.164	0.40
ECM_{t-1}	-0.996***	-3.51
R-squared	0.581	
Adjusted R-squared	0.527	
Prob (F-statictics)	0.000	
$\chi^2_{(\text{Auto})}(2)$	1.006 (0.60)	
$\chi^2_{(\text{Norm})}(1)$	3.536 (0.17)	
$\chi^2_{(\text{Het})}(4)$	3.177 (0.53)	

Note: Dependent variable $\Delta GDPGR$. The superscript *** indicates significance at the 1% level.

We also apply the cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests to check the stability of the regression coefficients. In figures 2 and 3, the plots of CUSUM and CUSUMSQ stay within the 5% critical bounds, suggesting the stability of the parameters and the overall model. A *LM* test is used for examining the serial correlation of the residuals. Table 7 indicates that the null hypothesis of no serial correlation cannot be rejected at the 5% significance level.
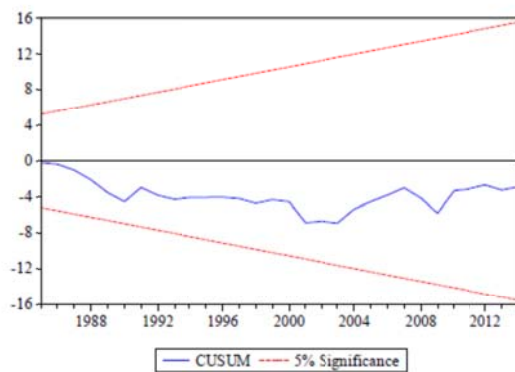
Figures 2 CUSUM test
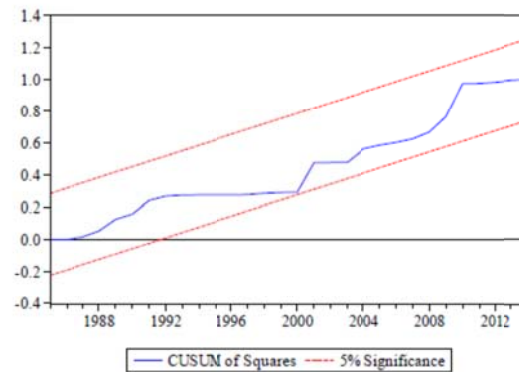
Figures 3 CUSUM SQ test

Table 7 Residual autocorrelation test

Model	LM(1)	LM(2)	LM(4)
$ARDL$ (2, 1)	0.115 [0.735]	1.015 [0.60]	1.152 [0.886]

Note: Numbers in brackets represent p-values.

6

4. CONCLUSION

The recent economic turmoil brings not only attention to the regulation of the financial and credit markets, but also to government actions with respect to fiscal sustainability. Whether a government should conduct expansionary policies to restore confidence or launch aggressive debt reduction for economic recovery has not been empirically decided.

In this paper, we use the ARDL approach to examine the impact of Taiwan's public debt on its economic growth during 1976 to 2014. The implementation of an ARDL approach appears to be a methodological addition to existing debt literature in the Taiwanese context. Our results show that a long-run equilibrium relationship exists between Taiwan's economic growth and debt-to-GDP ratio. Moreover, higher public debt will reduce Taiwan's economic growth in the long run. From a policy perspective, our results support the argument for debt reduction to support long-run economic growth.
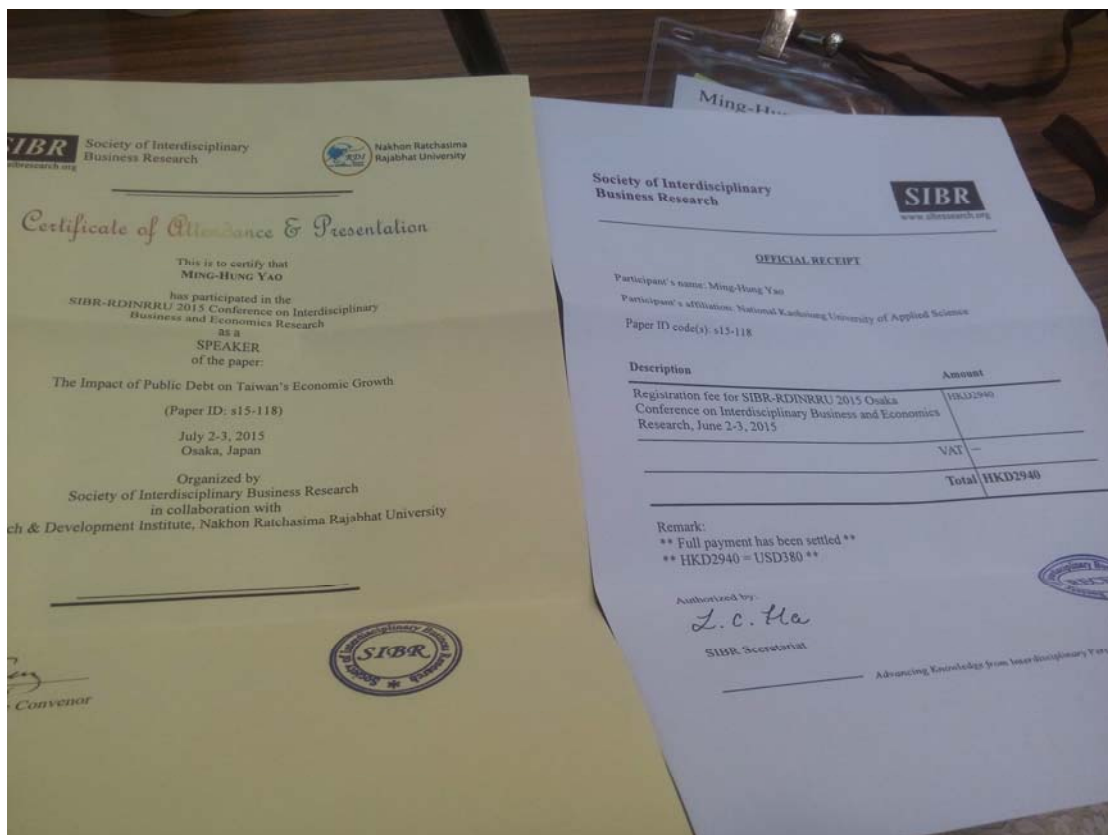
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三、 會議出席暨發表證書

四、 活動照片