Social Sciences, Business Technology and Management (SBTM-NOV-2016)

Seoul, South Korea

November 17-18, 2016

Akademika Nusa Internasional
Association of Social Sciences and Humanities
www.anissh.com

BOOK oF FULL PAPER PROCEEDINGS

ANISSH

Akademika Nusa Internasional Association for Social Sciences & Humanities

Full Paper Proceeding Book

2nd International conference on Social Sciences, Business, Technology and Management (SBTM)

Seoul, South Korea
November 17-18, 2016
ISBN: 978-602-6427-39-7

Head Office:

JI. Pasirlayung Selatan VIII No. D69,

Bandung 40192, West Java Indonesia

Contact (Whatsapp): +62-812-2430-0811

Email:info@anissh.com

URL: www.anissh.com

Proceedings of the International Conference on International Conference on Social Sciences, Business, Technology and Management (SBTM)

Disclaimer

Authors have ensured sincerely that all the information given in this book is accurate, true, comprehensive, and correct right from the time it has been brought in writing. However, the publishers, the editors, and the authors are not to be held responsible for any kind of omission or error that might appear later on, or for any injury, damage, loss, or financial concerns that might arise as consequences of using the book. The views of the contributors stated might serve a different perspective than that of the ANI.

2nd International conference on Social Sciences, Business, Technology and Management (SBTM)

Venue: Western CO-OP residence 77-2 euljiro 5(o)-ga Jung-gu seoul

Theme: Provision of unified communication platform for researchers in a wide area of topics from all fields related to Social Sciences, Business, Economics and Management Studies

SCIENTIFIC COMMITTEE

Assoc. Prof. Doc Edgar R. Eslit
St. Michael's College/ English Dept., CAS, Philippines

Mr. Mohd Azhar Bin Abdul Rahman
Urban Development Authority of Malaysia (UDA), Malaysia

Assistant Professor Jitender Grover
University, Sadopur, Ambala (Haryana), India

Assist. Prof. Doc Surendra Kansara
Symbiosis Institute of Operations Management, India

Associate Professor Melinda V. Abichuela
Catanduanes State University/College of Business and Accountancy/Virac, Catandu-
anes, Philippines

Mr. Bright Lumor MENSAH
Jilin University, School of International and Public Affairs (SIPA), China

Assoc. Prof. Doc Sharifah Hayaati Syed Ismail
University of Malaya.Kuala Lumpur, Malaysia

Dr. Lakshmikanth
Srishti International, India

Dr. Fararishah binti Abdul Khalid
Universiti Teknikal Malaysia Melaka, Malaysia
Head of department Odupitan Kolade Mattias
Oshodi/Isolo Local Government, Nigeria

ORGANIZING COMMITTEE

Dr. Sukri Plautturi
Conference Chair
Email: conference.chair@anissh.com

Santi Rahmawati
Conference Supervisor
Email: santi.rahmawati@anissh.com

Desintha Dwi Asrini
Conference Supervisor
Email: sintha.dwi@anissh.com

CONFERENCE TRACKS

- Social and Community Studies
- Arts
- Humanities
- Civic and Political Studies
- Cultural & Global Studies
- Enviromental Srudies
- Organizational Studies
- Educational and Communication Studies
- Economics, Finance & Accounting
- Business and Management Studies

Table of Contents

CONFERENCE CHAIR MESSAGE

Dr. Sukri Palutturi

International Conference of Akademika Nusa Internasional Association of Social Sciences and Huminities} is a platform that thrives to support the worldwide scholarly community to analyze the role played by the multidisciplinary innovations for the betterment of human societies. It also encourages academicians, practitioners, scientists, and scholars from various disciplines to come together and share their ideas about how they can make all the disciplines interact in an innovative way and to sort out the way to minimize the effect of challenges faced by the society. All the research work presented in this conference is truly exceptional, promising, and effective. These researches are designed to target the challenges that are faced by various sub-domains of the social sciences and applied sciences.

I would like to thank our honorable scientific and review committee for giving their precious time to the review process covering the papers presented in this conference. I am also highly obliged to the participants for being a part of our efforts to promote knowledge sharing and learning. We as scholars make an integral part of the leading educated class of the society that is responsible for benefitting the society with their knowledge. Let's get over all sorts of discrimination and take a look at the wider picture. Let's work together for the welfare of humanity for making the world a harmonious place to live and making it flourish in every aspect. Stay blessed.

Thank you.

Dr. Sukri Palutturi
Conference Chair
Email: conference.chair@anissh.com

International conference on Social Sciences, Business, Technology and Management (SBTM)
Full Paper Proceeding ANISSH-2016, Vol. 2- Issue. 2

ISBN: 978-602-6427-39-7

Do Tax Burden Matter in Income Distribution: A Quantile Regression Approach

Yi-Chung Hsu and Yu-Chuan Liu
National Taichung University of Science and Technology, Taiwan
National Taxation Bureau of the Central Area, Taiwan
hsuyichung@yahoo.com.tw

Abstract. The objective of the study is to explain the seeming paradox of countries with a high tax burden and a continually concentrated distribution of income by using 120 countries from 1984 to 2012. Our main contribution is to examine the income distribution determinants throughout the conditional distribution of income across nations. By means of quantile regression model we analyze the distributional impact of tax burden on the Gini index. Quantile regression approach can analyze the effects across quantiles in the conditional distribution. In addition, this paper consider GDP per capita, openness, education, female labor force participation rate, unemployment rate, population density, subsidies and others. Our results for the significant determinants support some findings in the literature, but also provide new conclusions. In many cases, quantile regression estimates are quite different from those from OLS regressions. Tax burden, GDP per capita and female labor force participation rate has a significant impact for low quantiles of the distribution of income. Our results suggest that some current tax policies may be reconsidered, especially among the least Gini index nations.

Keywords— Tax Burden, Income Distribution, Quantile Regression

INTRODUCTION

Income distribution remains one of the most debated economic issues in developing countries. Although poverty has declined fast and steadily during the last decade, inequality has not changed much. Quite often it is concluded that the stagnation of income distribution is due to inappropriate policies that should be replaced by direct redistributive measures. Given that one of the ways the state can affect income distribution is through the tax system, there is permanent discussion on the distributional effects of taxes. This discussion heats up whenever the government proposes some tax amendment.

Toward the end of the 19th century the German political theorist Adoph Wagner devised his law of expanding state activity, also known as Wagner's law. This law stated that the size of public sector in the economy grows as per capita income rises. Although this "law" was somewhat controversial, the data show that there is a tendency for government expenditures as a share of GDP to be larger for rich than for poor countries.

Similarly, recent economic experience of a number of major developing economies has raised the concern that the price of high per capita income growth may be an accompany worsening inequality in the relative distribution of income. One would expect to find the tax burden of most low income countries to be lighter than the tax burden of wealthy countries, and at the same time that the distribution of income to be more equitable in higher than in lower income countries.

One would thus expect to find the tax burden of most low income countries to be lighter than the tax burden of wealthy countries, and at the same time that the distribution of income to be more equitable in higher than in lower income countries. It is thus striking to find that in Brazil, one of the maor emerging countries, the tax burden is similar to that of many advanced industrial countries, its income distribution is among the most concentrated in the world. It is the purpose of this article to throw some light on this seeming paradox.

As an alternative to OLS regression, this study uses quantile regression to presents an overview of tax burden and income inequality. The remainder of this study is organized as follows. Section 2 proposes our methodology. Section 3 provides a brief model. Section 4 presents the empirical results, and Section 5 concludes.

METHODOLOGY

Quantile regression (hereafter, QR) is based on the minimization of weighted absolute deviations to estimate conditional quantile (percentile) functions (Koenker and Bassett 1978; Koenker and Hallock 2001; Zietz et al. 2008). For the median (quantile=0.5), symmetric weights are used, and for all other quantiles (e.g., 0.1, 0.2, …, 0.9) asymmetric weights are employed. In contrast, classical OLS regression estimates conditional mean functions. Unlike OLS, quantile regression is not limited to explaining the mean of the dependent variable. It can be employed to explain the determinants of the dependent variable at any point of the distribution of the dependent variable.

Quantile regression generalizes the concept of an unconditional quantile to a quantile that is conditioned on one or more covariates. Least squares minimizes the sum of the squared residuals,

$$\min_{\{b_j\}_{j=0}^{k}} \sum_i \left(y_i - \sum_{j=0}^{k} b_j x_{j,i}\right)^2,$$

where y_i is the dependent variable at observation i,x_(j,i) the jth regressor variable at observation i, and b_j an estimate of the model's jth regression coefficient. By contrast, quantile regression minimizes a weighted sum of the absolute deviations,

$$\min_{\{b_j\}_{j=0}^{k}} \sum_i \left|y_i - \sum_{j=0}^{k} b_j x_{j,i}\right| h_i$$

where the weight h_i is defined as

h_i=2q

if the residual for the ith observation is strictly positive or as

h_i=2-2q

if the residual for the ith observation is negative or zero. The variable q ($0<q<1$) is the quantile to be estimated or predicted.

The standard errors of the coefficient estimates are estimated using bootstrapping as suggested by Gould (1992, 1997). They are significantly less sensitive to heteroscedasticity than the standard error estimates based on the method suggested by Rogers (1993).

Quantile regression analyzes the similarity or dissimilarity of regression coefficients at different points of the distribution of the dependent variable, which is tax burden in our case.

THE MODEL

In order to analyze the empirical relationship between income inequality and tax burden for 120 countries, we use unbalance panel data during 1984 to 2012. However, since some countries do not present data for all considered variables we need to discard some data. Table 1 provides the definition of variables and expected impact.

Since tax burden could have heterogeneity in the potential effects, we use a structural quantile regression (QR) method, where income distribution for each country is the dependent variable of tax burden and other control variables. QR estimation is fully described in Koenker (2005).

Quantile regression approach offers a more complete characterization of the stochastic relationship among variables and provide a more robust, and consequently more efficient, estimates in some non-Gaussian settings. In the case analyzed in this paper, this class of estimator is suitable, since it is important to analyze the behavior of tax burden in each quantile of the conditional income inequality distribution.

QR is not only concerned with the income distribution effect on the average individual, but allows one to estimate the marginal effect of a given tax burden on individuals at different points in the conditional achievement distribution.

To study the determinants of income distribution, we use ten variables: tax burden (TB), economic development (GDP), openness (OPEN), female labor force participation rate (FEMALE), unemployment rate (UN), population density (DEN), population growth rate (POPG), government subsidized (SUB), degree of urbanization (URBAN), and one dummy variable (DUMMY). Formally, the estimated equation takes the following form

$$\mathrm{GINI}_{it} = \alpha + \beta_1 TB_{it} + \beta_2 GDP_{it} + \beta_3 FEMAIL_{it} + \beta_4 OPEN_{it} + \beta_5 DEN_{it} + \beta_6 POPG_{it} + \beta_7 SUB_{it} + \beta_8 URBAN_{it} + \beta_9 UN_{it} + \beta_{10} DUMMY_{it} + \varepsilon_{it}$$

Tax burden and economic development are standard determinants that are used in almost every study devoted to the causes of income distribution. The other variables in Eq. (1) have also been used quite frequently in some studies.

Table 1 The definition of variables and expected impact

Variable Name(Code)	Variable definition	Expected impact	Source of data
Explained variables			
Gini coefficient(GINI)	Gini coefficient is between 0 and 1, the Gini coefficient is smaller, more average annual income distribution, higher the Gini coefficient, income distribution more unequal.		WDI
Variables			
Tax burden(TB)	Tax revenue as percentage of GDP	−	WDI
Economic development(GDP)	GDP per capita	+	
OPEN(OPEN)	The sum of exports and imports of goods and services measured as a share of	?	
Level of education(EDU)	School enrollment, tertiary (% gross)	?	
Female labor force participation rate (FEMALE)	Labor force, female (% of total labor force)	?	
Unemployment rate (UN)	Unemployment, total (% of total labor force)	+	
Variable Name(Code)	Variable definition	Expected impact	Source of data
explanatory variables			
Population density (DEN)	Midyear population divided by land area in square kilometers	+	WDI
Population growth rate (POPG)	Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage	+	
Government-subsidized (SUB)	Subsidies and other transfers (% of expense)	−	
Degree of urbanization(URBAN)	Urban population (% of total)	+	
Other Variables			
Dummy variable (DUMMY)	Developing country=1 Non-developing countries=0		World economic outlook, April 2015 (International Monetary Fund)

EMPIRICAL RESULTS

All of the results are presented in Table 2. The first column provides the OLS regression results, and the next nine columns provide the QR results for quantiles 10 to 90. First, the OLS slope estimate of the tax burden is

significantly negative at the 1% level. This result indicates that as higher tax burden by government, the more even the income distribution. Secondly, greater GDP per capita, female labor force participation rate, population growth rate, urban population and unemployment rate affect income distribution significantly. A higher level of education and population density seems more to lower GINI index. More openness in countries, other things being equal, are also associated with lower GINI index. A greater government subsidized leads to lower GINI index. However, OLS estimates provide a baseline of mean effects, and we compare these to estimates for separate quantiles in the conditional distribution of income.

Table 2 Coefficient estimates, OLS and by Quantile

		Quantile								
	OLS	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Constant	0.135***	0.077	0.034	0.023	0.114	0.178*	0.284***	0.370***	0.459***	0.591***
	(0.003)	(0.204)	(0.633)	(0.703)	(0.214)	(0.078)	(0.006)	(0.000)	(0.003)	(0.000)
Dependent variable										
TB	-0.202***	-0.388***	-0.395***	-0.371***	-0.354**	-0.254**	-0.1331	-0.097	-0.030	-0.029
	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.020)	(0.2328)	(0.308)	(0.756)	(0.789)
Control variables										
GDP	0.020**	0.027***	0.022*	0.030**	0.024*	0.007	-0.007	-0.006	-0.016	-0.022
	(0.042)	(0.006)	(0.059)	(0.012)	(0.061)	(0.584)	(0.616)	(0.720)	(0.493)	(0.288)
FEMAIL	0.223***	0.213***	0.269***	0.295***	0.318***	0.309***	0.299***	0.131	0.015	-0.149
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.008)	(0.383)	(0.916)	(0.590)
OPEN	-0.051***	-0.038*	-0.068***	-0.082***	-0.091***	-0.071**	-0.073**	-0.066***	-0.068***	-0.036
	(0.001)	(0.084)	(0.004)	(0.000)	(0.000)	(0.017)	(0.021)	(0.004)	(0.000)	(0.123)
DEN	-0.013**	0.006	0.002	0.002	0.003	0.001	-0.010	-0.023*	-0.033***	-0.052***
	(0.042)	(0.363)	(0.695)	(0.767)	(0.656)	(0.889)	(0.446)	(0.072)	(0.006)	(0.000)

Note：*p*-values appear in parentheses. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels.

By contrast, the quantile-varying estimates of the GINI variable derived by the Quantile regression, reveal considerable variation in size, significance and even in sign. In particular, by using the 10% level of significance as a criterion, while the TB variable is associated with an insignificant coefficient at the higher quantiles, from 0.6 to 0.9, it becomes a significantly negative coefficient at lower quantiles levels from 0.1 to 0.5. This shows that higher tax burden is relatively efficient in decreasing income inequality in countries which already have a more equitable income distribution. Therefore, for countries with lower GINI index, an increase in tax burden has impact in improving the distribution of the income. On the other hand, for the countries with upper GINI index, an increase in tax burden decreases income inequality less effectively.

Subsequently, Figure 1 depicts the QR estimates and the OLS estimates. Apparently, as moving up the GINI index quantiles levels, the QR estimates varies widely. Moreover, a comparison of the QR estimates with the

traditional OLS estimates indicates that the OLS estimates underestimate the tax burden effects at the higher quantile levels and obtain the wrong conclusion at the lower quantiles.

Figure 1 QR estimates with 95% confidence intervals versus OLS estimate

The coefficients for the real GDP per capita, GDP, show a different result: higher real GDP per capita has a much higher impact in lower GINI index than in higher GINI index. This shows that economic development is relatively inefficient in decreasing income inequality in countries which already have a more equitable income distribution. Our results indicate that there is strong evidence that the effect of real GDP per capita is not constant, but varies among the various quantiles. In addition, it is important to note that the effect of female labor force participation rate, FEMAIL, is nearly always positive, causing higher GINI index; i.e., higher FEMAIL is correlated with higher GINI index. However, the effect of FEMAIL is not consistently significant. OLS estimates suggest FEMAIL matters quite a bit in increasing GINI, but quantile regression result do not uniformly confirm that. Specifically, FEMAIL substantially heighten GINI index, but only within quantiles levels from 0.1 to 0.6.

Greater population density, DEN, lowers GINI index, but not consistently throughout the conditional distribution. This effect appears significant in OLS, but not throughout the quantiles presented. The effect of population density is insignificant in the lowermost quantile, suggesting that within the lower GINI index countries, increasing the size of DEN does not reduce the GINI index.

CONCLUSION

Numerous factors have been considered to assess the causes of income distribution. In this article, we use 566 observations data set of 120 countries in income distribution and tax burden from 1984 to 2012. This study produces some interesting results. The results of estimates of the effects of tax burden on income inequality, presents evidence that in order to reduce income inequality, the government would have to emphasize in its fiscal policy which benefit more countries with low income inequality. In addition, the results showed the relative inefficiency of economic development in reducing the income inequality for countries at the top of the GINI index, where income is less equitable, vis-à-vis countries at the bottom of the conditional income inequality distribution, where income is more equitable.

The quantile results provide some valuable insights to the different relationships that the explanatory variables have with GINI index. For example, some variables such as real GDP per capita, population density and female labor force participation rate have a greater impact across different quantile level. Other variables have a relatively constant effect on GINI index across different income distribution. These include population growth, subsidies and other transfers rate, urban and unemployment rate.

These results add to the body of research explaining how these factors affect the distribution of income. The implication of these findings is that one important means for improving the income distribution of some countries is to drastically change not only tax structure, but also demographic structure.

References

Baer, W., & Galvão, A. F. (2008). Tax burden, government expenditures and income distribution in Brazil. *The Quarterly Review of Economics and Finance*, *48*(2), 345-358.

Bahmani-Oskooee, M., & Gelan, A. (2011). Kuznets inverted-U hypothesis revisited: a time-series approach using US data. *Applied Economics Letters*, *15*(9), 677-681

Budría, S., & Pereira, P. T. (2011). Educational qualifications and wage inequality: evidence for Europe. *Revista de economía aplicada*, *19*(56), 5-34

Breau, S. (2015). Rising inequality in Canada: A regional perspective. *Applied Geography*, *61*, 58-69.

Chakrabarti, A. (2000). Does trade cause inequality?. *Journal of Economic Development*, *25*(2), 1-22.

Chen, A. (2002). Urbanization and disparities in China: challenges of growth and development. *China Economic Review*, *13*(4), 407-411.

Engel, E. M., Galetovic, A., & Raddatz, C. E. (1999). Taxes and income distribution in Chile: some unpleasant redistributive arithmetic. *Journal of Development Economics*, *59*(1), 155-192.

Fahad, I., & Rehmat, A. (2013). Impact Of Macroeconomic Policies On Poverty Alleviation In Pakistan. *Romanian Economic and Business Review*, *8*(4), 48.

Gustafsson, B., & Johansson, M. (2003). Steps toward equality: how and why income inequality in urban Sweden changed during the period 1925–1958. *European Review of Economic History*, *7*(2), 191-211.

Hoeller, P., Joumard, I., & Koske, I. (2014). Reducing income inequality while boosting economic growth: Can it be done? Evidence from OECD countries. *The Singapore Economic Review*, *59*(01), 1450001.

Huber, E., & Stephens, J. D. (2014). Income inequality and redistribution in post-industrial democracies: demographic, economic and political determinants. *Socio-Economic Review*, *12*(2), 245-267.

Karunaratne, H. D. (2000). Age as a factor determining income inequality in Sri Lanka. *The Developing Economies*, *38*(2), 211-242.

Kanseitkizi, K. A., Viktorovna, K. T., Mintaevich, M. B., & Baigozhaevich, Z. E. (2012). Income tax on individuals in the Republic of Kazakhstan:" Fairness and efficiency" compromise. *African Journal of Business Management*, *6*(27), 8178.

Koenker, R., & Bassett Jr, G. (1978). Regression quantiles. *Econometrica: journal of the Econometric Society*, 33-50.

Koenker, R. and K. F. Hallock. 2001. Quantile Regression. *Journal of Economic Perspectives*, *15*, 143-156

Kozuharov, S., Petkovski, V., & Ristovska, N. (2015). The impact of taxes measured by GINI index in Macedonia. *UTMS Journal of Economics*, *6*(1), 41.

Nieswiadomy, M., Slottje, D. J., & Hayes, K. (1991). The impact of unionization, right-to-work laws, and female labor force participation on earnings inequality across states. *Journal of Labor Research*, *12*(2), 185-195.

Odedokun, M. O., & Round, J. I. (2004). Determinants of income inequality and its effects on economic growth: evidence from African countries. *African Development Review*, *16*(2), 287-327.

Zietz, J., Zietz, E. N., & Sirmans, G. S. (2008). Determinants of house prices: a quantile regression approach. *The Journal of Real Estate Finance and Economics*, *37*(4), 317-333.

International conference on Social Sciences, Business, Technology and Management (SBTM)
Full Paper Proceeding ANISSH-2016, Vol. 2- Issue. 2

ISBN: 978-602-6427-39-7

Environmental Tax and Economic Growth: New Evidence

Yu-Chia Chien and Bin-Ru Lin
National Taichung University of Science & Technology, Taiwan
lincecum5531@gmail.com

Abstract. The aim of this study is to re-examine the relationship between environment taxes and economic growth, using different measures of environment taxes with GDP as well as net savings. A panel of 22 European countries is used from 1995 to 2014 and the quantile regression approach is applied. Our analysis shows that environment tax decrease economic growth at the top of conditional GDP. This explicitly allows higher-development countries to have a different environmental tax than lower-development countries. The quantile results also provide some valuable insights to the different relationships that the explanatory variables have with economic growth such as population. Some other variables such as net national saving and education expenditure have a significant effect on GDP but there is no clear pattern of the effect across different GDP.

Keywords— Environmental Tax, Economic Growth, Net National Savings

INTRODUCTION

Over the recent past, European Union member states in particular and other countries in general have set voluntary targets for the reduction in pollution and emission of greenhouse gases, which have facilitated the sometimes controversial use of environmental taxes across the world, especially in the EU. As a result of recent concerns relating to the harmful effects of global warming, policy makers have become increasingly interested in the use of environmental taxation as a means of combating the problem, in order to meet targets set at the 1997 Kyoto protocol to reduce greenhouse gases.

Also, during the 1990s, beginning with the Scandinavian countries, there has been a number of attempts to introduce Environmental Tax Reform (ETR) in EU member states. This has involved shifting the burden of taxation away from factors of production to pollution and the users of natural resources, summarized as a move from economic "goods" to environmental "bads". Again, one of the main ways in which EU governments have attempted to do this is through the use of energy taxes, in order to encourage a reduction in carbon emissions.

To determine whether the existing level of economic growth affects how the various causes of economic growth come into play, we use quantile regression. This technique enables us to investigate whether the relationship between economic growth and the explanatory variables differs throughout the distribution of the dependent variable. Thus, as an alternative to OLS regression, this study uses quantile regression to presents an overview of economic growth and environmental tax. The remainder of this study is organized as follows. Section 2 proposes our methodology and model. Section 3 presents the empirical results, and Section 4 concludes.

METHODOLOGY AND MODELS

Quantile regression (hereafter, QR) is based on the minimization of weighted absolute deviations to estimate conditional quantile (percentile) functions (Koenker and Bassett 1978; Koenker and Hallock 2001; Zietz et al. 2008). For the median (quantile=0.5), symmetric weights are used, and for all other quantiles (e.g., 0.1, 0.2,…, 0.9) asymmetric weights are employed. In contrast, classical OLS regression estimates conditional mean functions. Unlike OLS, quantile regression is not limited to explaining the mean of the dependent variable. It can be employed to explain the determinants of the dependent variable at any point of the distribution of the dependent variable.

Quantile regression generalizes the concept of an unconditional quantile to a quantile that is conditioned on one or more covariates. Least squares minimizes the sum of the squared residuals,

$$\min_{\{b_j\}_{j=0}^{k}} \sum_i \left(y_i - \sum_{j=0}^{k} b_j x_{j,i}\right)^2,$$

where y_i is the dependent variable at observation i,x_(j,i) the jth regressor variable at observation i, and b_j an estimate of the model's jth regression coefficient. By contrast, quantile regression minimizes a weighted sum of the absolute deviations,

$$\min_{\{b_j\}_{j=0}^{k}} \sum_i |y_i - \sum_{j=0}^{k} b_j x_{j,i}| h_i,$$

,
where the weight h_i is defined as
h_i=2q
if the residual for the ith observation is strictly positive or as
h_i=2-2q
if the residual for the ith observation is negative or zero. The variable q (0<q<1) is the quantile to be estimated or predicted.

The standard errors of the coefficient estimates are estimated using bootstrapping as suggested by Gould (1992, 1997). They are significantly less sensitive to heteroscedasticity than the standard error estimates based on the method suggested by Rogers (1993). Quantile regression analyzes the similarity or dissimilarity of regression coefficients at different points of the distribution of the dependent variable, which is economic growth in our case.

In this paper we attempt to explain the empirical relationship between economic growth and environmental tax, we use balance panel data during 1995 to 2014. However, since some countries do not present data for all considered variables we need to discard some data. Table 1 provides the definition of variables and expected impact.

To study the relationship between economic growth and environmental tax, we use four variables: environmental tax (ENV), total population (POP), net national saving (SAV) and education expenditure (EDU). Formally, the estimated equation takes the following form:

$$\mathrm{LGDP}_{it} = \alpha + \beta_1 ENV_{it} + \beta_2 POP_{it} + \beta_3 SAV_{it} + \beta_4 EDU_{it} + \varepsilon_{it} \qquad (1)$$

Environmental tax and total population are standard determinants that are used in almost every study devoted to the causes of economic growth. The other variables in Eq. (1) have also been used quite frequently in some studies.

Table 1 The definition of variables and expected impact

Variable Name(Code)	Variable definition	Expected impact	Source of data
Explained variables			
LGDP	natural logarithm of GDP per capital(constant 2011 US$)		WDI
Explanatory variables			
ENV	Total environmental taxes(Percentage of GDP)	?	EUROSTAT
POP	natural logarithm of total population	+	WDI
SAV	net national saving(% of GNI)	+	WDI
EDU	education expenditure (% of GNI)	+	WDI

EMPIRICAL RESULTS AND DISCUSSION

All of the results are presented in Table 2. The first column provides the OLS regression results, and the next nine columns provide the QR results for quantiles 10 to 90. First, the OLS slope estimate of the environmental tax is insignificantly at the 1% level. This result indicates that higher environmental tax by government has no effect on economic growth. Secondly, greater population does not affect economic growth insignificantly. Third, a higher level of net national saving is associated with higher economic growth. Finally, the greater education expenditure leads to higher economic growth. However, OLS estimates provide a baseline of mean effects, and we compare these to estimates for separate quantiles in the conditional distribution of economic growth rate.

Table 2 Descriptive Statistics

Variables	Mean	Median	S.D.	Min	Max
LGDP	10.322	10.514	0.666	8.225	11.608
ENV	2.675	2.560	0.686	1.040	5.300
POP	15.988	15.976	1.475	12.822	18.229
SAV	6.883	6.846	5.161	-7.155	21.744
EDU	4.944	4.810	1.127	2.220	8.285

By contrast, the quantile-varying estimates of the LGDP variable derived by the Quantile regression, reveal considerable variation in size, significance and even in sign. In particular, by using the 10% level of significance as a criterion, while the ENV variable is associated with an insignificant coefficient at the lower/median quantiles, from 0.1 to 0.6, it becomes a significantly negative coefficient at higher quantiles levels from 0.7 to 0.9. This shows that higher environmental tax is relatively efficient in decreasing economic growth in countries which already have a higher economic development. Therefore, for countries with higher LGDP, a decrease in environmental tax has impact in improving the economic growth. On the other hand, for the countries with lower LGDP, a decrease in environmental tax burden increases economic development less effectively.

Greater population, POP, has no effect on LGDP, but not consistently throughout the conditional distribution. This effect appears insignificant in OLS, but not throughout the quantiles presented. The effect of population is significant in the median and uppermost quantile, suggesting that within the higher LGDP countries, increasing the size of POP does improve the economic growth.

Table 2 Coefficient estimates, OLS and by Quantile

		Quantile								
	OLS	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
C	8.804***	7.962***	6.637***	6.725***	7.134***	7.500***	8.006***	8.660***	11.071***	12.856***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ENV	-0.0672	-0.0065	-0.0841	-0.0878	-0.0572	-0.0353	-0.0236	-0.0724**	-0.0574*	-0.0671***
	(0.1392)	(0.9219)	(0.2302)	(0.2037)	(0.1844)	(0.3107)	(0.3983)	(0.0116)	(0.0503)	(0.0029)
POP	0.0119	-0.0576	0.1022**	0.1219***	0.1147***	0.1041***	0.0856***	0.0594***	-0.0513	-0.1280***
	(0.5392)	(0.2431)	(0.0456)	(0.0002)	(0.0000)	(0.0000)	(0.0000)	(0.0045)	(0.1157)	(0.0000)
SAV	0.0585***	0.0736***	0.0400***	0.0404***	0.0422***	0.0436***	0.0449***	0.0513***	0.0451***	0.0228***
	(0.0000)	(0.0000)	(0.0030)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0086)
EDU	0.2226***	0.4053***	0.3439***	0.2972***	0.2451***	0.2100***	0.1730***	0.1653***	0.0733**	0.0268***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0365)	(0.2266)
R-squared	0.319	Pseudo R-squared			0.253					
Adjusted R-squared	0.313	Adjusted R-squared			0.246					

Note：*p*-values appear in parentheses. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels.

CONCLUSION

In this article, a panel of 22 European countries is used from 1995 to 2014 and the quantile regression approach is applied. Our analysis shows that environment tax decrease economic growth at the top of conditional GDP. This explicitly allows higher-development countries to have a different environmental tax than lower-development

countries. The quantile results also provide some valuable insights to the different relationships that the explanatory variables have with economic growth such as population. Some other variables such as net national saving and education expenditure have a significant effect on GDP but there is no clear pattern of the effect across different GDP.

The quantile results provide some valuable insights to the different relationships that the explanatory variables have with LGDP. For example, some variables such as environmental tax and population have a greater impact across different quantile level. Other variables have a relatively constant effect on LGDP across different income distribution. These include net national saving and education expenditure. These results add to the body of research explaining how these factors affect the economic growth. The implication of these findings is that one important means for improving economic development of some countries.

References

Abdullah, S., & Morley, B. (2014). Environmental taxes and economic growth: Evidence from panel causality tests. *Energy Economics*, *42*, 27-33.

Grdinić, M., Klun, M., & Kotnik, Z. (2015). Environmental Taxation: New Evidence for Energy Taxes. *International Public Administration Review*, *13*(3-4).

Konopczyński, M. (2013). How taxes and spending on education influence economic growth in Poland. *Contemporary Economics*, *8*(3), 329-348.

Koenker, R., & Bassett Jr, G. (1978). Regression quantiles. *Econometrica: journal of the Econometric Society*, 33-50.

Koenker, R. and K.F. Hallock (2001). "Quantile Regression", Journal of Economic Perspectives, vol. 15(4), 143-156.

Zietz, J., Zietz, E. N., & Sirmans, G. S. (2008). Determinants of house prices: a quantile regression approach. *The Journal of Real Estate Finance and Economics*, *37*(4), 317-333.

Gould, W. (1997). Maximum-likelihood estimation using the ml command. *Stata Technical Bulletin*, *6*(34).

Gould, W. (1993). Quantile regression with bootstrapped standard errors. *Stata Technical Bulletin*, *2*(9).

Rogers, W. H. 1993. Regression standard errors in clustered samples. *Stata Technical Bulletin 13*, 19–23.

Siddiqui, M. S. (2015). Environmental taxes and international spillovers: The case of a small open economy. *Energy Economics*, *48*, 70-80.

Meng, S., Siriwardana, M., & McNeill, J. (2013). The environmental and economic impact of the carbon tax in Australia. *Environmental and Resource Economics*, *54*(3), 313-332.

Macek, R. (2014). The Impact of Taxation on Economic Growth: Case Study of OECD Countries. *Review of Economic Perspectives*, *14*(4), 309-328.

Sethy, S.K., Sahoo, H., 2015, Investigating The Relationship Between Population And Economic Growth: An Analytical Study Of India, Indian Journal Of Economics & Business, Vol. 14, No. 2, (2015) 269-288

Mercan, M., & Sezer, S. (2014). The effect of education expenditure on economic growth: The case of Turkey. *Procedia-Social and Behavioral Sciences*, *109*, 925-930.

ISBN: 978-602-6427-39-7

Determinants of the Effective Tax Rate in Taiwan

Hui-Fen Chen and Yi-Chung Hsu
Local Tax Bureau of Taichung City Government, Taiwan
National Taichung University of Science & Technology, Taiwan
chen.huifen0118@gmail.com

Abstract. This study examines the determinants of the effective tax rate (ETR) for listed companies in Taiwan. We use a panel of 1,062 companies over the period 2005-2014, and we apply the quantile regression for panel data. This study produces some interesting results. First, family business and financial leverage (LEV) are often used to determine the performance of a company since they are expected to have a significant effect on the ETR. While previous studies bear this out, it is interesting to see how companies in different ETR value these variables. This is shown by the significant difference between the coefficients at the lower and the higher quantiles. Second, other variables have a relatively constant effect on ETR across different ETR level. These include the ratio of earnings before income tax to total assets (ROA), family CEO (FCEO), the ratio of outside board member (OUT), operational risk (RISK), firm size and cash flows from operating activities (CFO).

Keywords— Effective Tax Rate, Family Business, Financial Leverage

INTRODUCTION

The business income tax is the tax collected by the government from a business enterprise based on its annual taxable income and the statutory tax rate schedule. Theoretically, the business income tax rate is determined by the need of government expenditures, for example, a country providing its citizens with a better social welfare system would have a higher tax rate. However, in an attempt to encourage the development of certain industries or investment activities, the government often stipulates various laws of tax incentives, thus creating a difference between the nominal business income tax and the effective tax rate of business enterprises.

Furthermore, tax incentives also cause acute differences in the effective tax rate among companies from different industries of of/with different sizes, violating the principle of tax equity. The study of the Citizens for Tax Justice presented by McIntyre and Wilhelm (1985) loudly criticized large companies for having unreasonably low effective tax rates. That study was generally regarded as the major catalyst that fostered the 1986 tax reform in the United States. Thereafter, many US scholars used the effective tax rate to evaluate the performance of the Tax Reform Act of 1986 on corporate tax burdens and tax fairness (e.g. Hagan and Larkins, 1992; Kern and Morris, 1992; Omer, Molloy and Ziebart, 1993; Gupta and Newberry, 1997). Hence, effective tax rate studies are important both in academics and in public policy debate; they are useful not only in the fairness surveillance of a nation's taxation system and the need for reform, but also useful in evaluating the success of tax reforms.

Since there are numerous factors causing differences between the effective tax rate and the nominal tax rate, a number of finance and accounting scholars have attempted to discover the factors deciding the effective tax rate. Studies of this nature could further clarify the various factors leading to tax differences, as well as make a valuable reference for taxation policies. The studies on Taiwan's effective tax rate are still in the incipient stage. Domestic studies, such as Chou et al. (1989) and Lin and Yang (1994), generally examined the relation of effective tax rate and company size in a univariate framework and overlooked the effects of corporate characteristics on the effective tax rate. Hence, prior studies potentially created correlated omitted variables problems, leading to biased and inconsistent parameter estimations.

As an alternative to OLS regression, this study uses quantile regression to presents an overview of tax burden and income inequality. The remainder of this study is organized as follows. Section 2 proposes our methodology. Section 3 provides a brief model. Section 4 presents the empirical results, and Section 5 concludes.

METHODOLOGY

Quantile regression (hereafter, QR) is based on the minimization of weighted absolute deviations to estimate conditional quantile (percentile) functions (Koenker and Bassett 1978; Koenker and Hallock 2001; Zietz et al. 2008). For the median (quantile=0.5), symmetric weights are used, and for all other quantiles (e.g., 0.1, 0.2, …, 0.9) asymmetric weights are employed. In contrast, classical OLS regression estimates conditional mean functions. Unlike OLS, quantile regression is not limited to explaining the mean of the dependent variable. It can be employed to explain the determinants of the dependent variable at any point of the distribution of the dependent variable.

Quantile regression generalizes the concept of an unconditional quantile to a quantile that is conditioned on one or more covariates. Least squares minimizes the sum of the squared residuals,

$$\min_{\{b_j\}_{j=0}^{k}} \sum_i \left(y_i - \sum_{j=0}^{k} b_j x_{j,i}\right)^2,$$

where y_i is the dependent variable at observation i,x_(j,i) the jth regressor variable at observation i, and b_j an estimate of the model's jth regression coefficient. By contrast, quantile regression minimizes a weighted sum of the absolute deviations,

$$\min_{\{b_j\}_{j=0}^{k}} \sum_i \left|y_i - \sum_{j=0}^{k} b_j x_{j,i}\right| h_i,$$

where the weight h_i is defined as
h_i=2q
if the residual for the ith observation is strictly positive or as
h_i=2-2q
if the residual for the ith observation is negative or zero. The variable q (0<q<1) is the quantile to be estimated or predicted.

The standard errors of the coefficient estimates are estimated using bootstrapping as suggested by Gould (1992, 1997). They are significantly less sensitive to heteroscedasticity than the standard error estimates based on the method suggested by Rogers (1993).

Quantile regression analyzes the similarity or dissimilarity of regression coefficients at different points of the distribution of the dependent variable, which is effective tax rate in our case.

THE MODEL

In order to analyze the factor influencing corporate effective tax rates in Taiwan, we use balance panel data from the listed corporations during 1984 to 2012. However, since some countries do not present data for all considered variables we need to discard some data. Table 1 provides the definition of variables and expected impact.

Quantile regression approach offers a more complete characterization of the stochastic relationship among variables and provide a more robust, and consequently more efficient, estimates in some non-Gaussian settings. In the case analyzed in this paper, this class of estimator is suitable, since it is important to analyze the behavior of tax planning in each quantile of the conditional ETR distribution.

To study the determinants of effective tax rate, we estimate the following model:

$$\mathrm{ETR}_{it} = \beta_0 + \beta_1 FB_{it} + \beta_2 LEV_{it} + \beta_3 ROA_{it} + \beta_4 FCEO_{it} + \beta_5 OUT_{it} + \beta_6 RISK_{it} + \beta_7 SIZE_{it} + \beta_8 CFO_{it} + \epsilon_{it}$$

The effective tax rate, ETR, is a common measure of corporate tax aggressiveness in prior literature (e.g. Gupta and Newberry, 1997; Hanlon and Slemrod, 2009; Wilson, 2009; Chen et al., 2010; Chan et al., 2013). The ETR can be used to evaluate the distribution effect of the tax system in the economy, thus providing an indicator for determining the presence of capital allocation distortion. Therefore, ETR is a widely used parameter of tax policy makers and academic researchers. Following Wu et al. (2013), we define ETR as the ratio of the current portion of tax expense to adjusted taxable income.

The explanatory variable, FB, is a dummy variable used to test the effect of family business on ETR. LEV denotes a firm's capital structure, which is measured as total debt divided by total assets. SIZE is measured as the natural logarithm of the total assets. While larger firms have more resources for tax planning and are better able to reduce their tax burdens (Shevlin and Porter, 1992; Dyreng et al., 2008). ROA denotes earnings before income tax divided by book value of total assets. FCEO is a dummy variable. OUT is the ratio of outside board member. RISK denotes the standard derivation of firm profitability. CFO is cash flow right over voting rights.

EMPIRICAL RESULTS

Table 1 demonstrates the descriptive statistics of the dependent variable and the explanatory ones. All of the results are presented in Table 2. The first column provides the OLS regression results, and the next nine columns provide the QR results for quantiles 10 to 90. First, the OLS slope estimate of the ROA, FCEO, OUT and SIZE are significantly positive at the 1% level. This result indicates that the ROA, FCEO, OUT and SIZE have influence on

ETR. Secondly, RISK and CFO have negative influence on ETR in OLS regression. Third, we found no significant relationship among FB, LEV and ETR.

Table 1 The definition of variables

Variable Name(Code)	definition
Explained variables	
Effective Tax Rate(ETR)	Total income tax burden (% of earnings before income tax)
Explanatory variables	
Return on Assets (ROA)	Earnings before income tax/ book value of total assets
Family Business (FB)	If the company is family firm is 1, and 0 otherwise
Family CEO (FCEO)	If the ultimate control shareholder family serve as President or CEO is 1, and 0 otherwise
Financial Leverage (LEV)	Total debt(% of total assets)
The Ratio of Outside Board Member (OUT)	Outside directors(% of board committee)
Operations risk (RISK)	Standard derivation of firm profitability(firm profitability=earnings before income tax/book value of total assets)
Firm Size (SIZE)	Natural logarithm of total assets
Cash Flows rights (CFO)	Cash flow rights over voting rights

By contrast, the quantile-varying estimates of the ETR variable derived by the Quantile regression, reveal considerable variation in size, significance and even in sign. In particular, by using the 10% level of significance as a criterion, while the FB variable is associated with an insignificant coefficient at the lower and median quantiles, 0.1, 0.5 and 0.6, it becomes a significantly negative coefficient at lower quantiles levels from 0.2 to 0.4, but positive coefficient at higher quantiles levels from 0.7 to 0.9. This shows that family business is relatively efficient in making tax planning in company with higher effective tax rate.

For the firm characteristics, greater SIZE increases ETR, but not consistently throughout the conditional distribution. The effect seems bimodal, with less positive and more insignificant effects in the tails among the most and least ETR. The effect of CFO is insignificant in the lowermost quantile, suggesting that within the less ETR companies, increasing the CFO does not change tax planning.

For the board characteristics, the effect of OUT is nearly always positive, causing higher ETR; i.e., OUT is correlated with more ETR. However, the effect of OUT is not consistently significant. OLS estimates suggest OUT matters quite a bit in increasing ETR, but quantile regression results do not uniformly confirm that.

Table 2 Descriptive Statistics

Variables	Mean	Median	S.D.	Min	Max
ETR	14.321	13.770	14.643	0	99.100
FB	0.612	1	0.487	0	1
LEV	41.858	42.150	18.017	0.580	99.130
ROA	4.043	4.500	10.066	-110.820	95.780
FCEO	0.468	0	0.499	0	1
OUT	0.396	0.400	0.213	0	1
RISK	1.14E-06	1.61E-06	5.35E-05	-0.003	0.000
SIZE	15.230	15.043	1.459	9.795	21.624
CFO	24.365	20.290	17.898	0.010	100.000

Table 3 Coefficient estimates, OLS and by Quantile

		Quantile								
	OLS	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Constant	0.357	-0.039	-3.584***	-8.608***	-11.374***	-9.162***	-3.714*	5.543**	12.704***	29.800***
	(0.839)	(0.923)	(0.000)	(0.000)	(0.000)	(0.000)	(0.095)	(0.011)	(0.000)	(0.000)
Dependent variable										
FB	0.056	-0.004	-0265**	-0.600**	-0.565*	-0.287	0.081	0.543*	0.819**	1.173***
	(0.844)	(0.946)	(0.037)	(0.013)	(0.073)	(0.392)	(0.794)	(0.081)	(0.018)	(0.008)
LEV	0.007	-0.000	-0.013***	-0.022***	-0.007	0.018**	0.039***	0.076***	0.087***	0.083***
	(0.380)	(0.909)	(0.000)	(0.000)	(0.401)	(0.039)	(0.001)	(0.000)	(0.000)	(0.000)
ROA	0.337***	0.005**	0.225***	0.430***	0.532***	0.571***	0.552***	0.474***	0.290***	-0.245***
	(0.000)	(0.069)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FCEO	0.817***	0.003	0.336***	0.663***	1.062***	1.400***	1.217***	1.174***	1.013***	0.278
	(0.003)	(0.958)	(0.004)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.524)
OUT	1.848***	0.005	1.006***	2.799***	3.085***	2.208***	1.969**	0.833	0.844	0.148
	(0.006)	(0.972)	(0.000)	(0.000)	(0.000)	(0.005)	(0.014)	(0.268)	(0.304)	(0.894)
RISK	-7605.079***	-181.373	-9179.712*	-27566.29***	-35694.91***	-41989.15***	-32129.29***	-17542.64***	-870.429	12570.25***
	(0.005)	(0.462)	(0.089)	(0.000)	(0.000)	(0.000)	(0.003)	(0.007)	(0.478)	(0.000)
SIZE	0.739***	0.003	0.309***	0.780***	1.107***	1.110***	0.917***	0.475***	0.275*	-0.210
	(0.000)	(0.907)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.084)	(0.294)
CFO	-6.87E-08***	5.78E-09	2.86E-09	-3.71E-08***	-5.47E-08***	-7.87E-08***	-8.36E-08***	-6.89E-08***	-6.18E-08***	-3.24E-08***
	(0.000)	(0.681)	(0.649)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Note : *p*-values appear in parentheses. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 level

CONCLUSION

Numerous factors have been considered to assess the causes of effective tax rate. We use a panel of 1,062 companies over the period 2005-2014, and we apply the quantile regression for panel data. This study produces some interesting results. First, family business and financial leverage (LEV) are often used to determine the performance of a company since they are expected to have a significant effect on the ETR. While previous studies bear this out, it is interesting to see how companies in different ETR value these variables. This is shown by the significant difference between the coefficients at the lower and the higher quantiles. Second, other variables have a relatively constant effect on ETR across different ETR level. These include the ratio of earnings before income tax to total assets (ROA), family CEO (FCEO), the ratio of outside board member (OUT), operational risk (RISK), firm size and cash flows from operating activities (CFO).

These results add to the body of research explaining how these factors affect the effective tax rate. The implication of these findings is that one important means for improving the tax planning of companies.

References

Chen, S., Chen, X., Cheng, Q., & Shevlin, T. (2010). Are family firms more tax aggressive than non-family firms?. *Journal of Financial Economics*, *95*(1), 41-61.

Chan, M. K. (2013). A dynamic model of welfare reform. *Econometrica*, *81*(3), 941-1001.

Dopuch, N., & Gupta, M. (1997). Estimation of benchmark performance standards: An application to public school expenditures. *Journal of Accounting and Economics*, *23*(2), 141-161.

Okulski, R. R., & Heshmati, A. (2010). Time Series Analysis of Global Airline Passengers Transportation Industry. *Technology management, economics and policy program, TEMEP discussion paper*, (2010), 65.

Koenker, R., & Bassett Jr, G. (1978). Regression quantiles. *Econometrica: journal of the Econometric Society*, 33-50.

Koenker, R. and K.F. Hallock(2001). Quantile Regression. *Journal of Economic Perspectives*, vol. 15(4):143-156.

Lefgren, L., McIntyre, F., & Sims, D. P. (2015). Beyond Education and Fairness: A Labor Market Taxation Model for the Great Gatsby Curve. *Economic Inquiry*, *53*(2), 962-978.

Matsunaga, S., Shevlin, T., & Shores, D. (1992). Disqualifying dispositions of incentive stock options: Tax benefits versus financial reporting costs. *Journal of Accounting Research*, 37-68.

McIntyre, R. S., & Tipps, D. C. (1985). Exploding the Investment-Incentive Myth. *Challenge*, *28*(2), 47-52.

Pfähler, W. (1990). Redistributive effect of income taxation: decomposing tax base and tax rates effects. *Bulletin of Economic Research*, *42*(2), 121-129.

Rogers, W. H.(1993). Regresson standard errors in clustered samples. Stata Technical Bulletin 13:19-23.

Foerster, S. R., & Porter, D. C. (1992). The disappearing size effect: evidence from dual class shares. *Quarterly Journal of Business and Economics*, 80-91.

Slemrod, J. (2009). Lessons for tax policy in the Great Recession. *National Tax Journal*, 387-397.

Loretz, S. (2007). Determinants of bilateral effective tax rates: empirical evidence from OECD countries. *Fiscal Studies*, *28*(2), 227-249.

Vozikis, G. S., Mark Weaver, K., & Gibson, B. (2009). Family Business Succession: Emphasis On The Family Not The Business. *Indian Journal of Economics & Business*.

Wu, C. W., & Tsaur, T. W. (2013). Tobin tax effects under currency substitution: real exchange rate dynamics and stability. *Academia Economic Papers*, *41*(4), 559.

Wilson, R. J. (2009). An examination of corporate tax shelter participants. *The Accounting Review*, *84*(3), 969-999.

Gould, W. (1997). Maximum-likelihood estimation using the ml command. *Stata Technical Bulletin*, *6*(34).

Gould, W. (1993). Quantile regression with bootstrapped standard errors. *Stata Technical Bulletin*, *2*(9).

Zietz, J., Zietz, E. N., & Sirmans, G. S. (2008). Determinants of house prices: a quantile regression approach. *The Journal of Real Estate Finance and Economics*, *37*(4), 317-333.

International conference on Social Sciences, Business, Technology and Management (SBTM)
Full Paper Proceeding ANISSH-2016, Vol. 2- Issue. 2

ISBN: 978-602-6427-39-7

The Impact of Corporate Governance and Effective Tax Rate on their R&D Investment Decisions

Jui-Ping Chu and Yi-Chung Hsu
Local Tax Bureau of Taichung City Government, Taiwan
National Taichung University of Science & Technology, Taiwan
chyu0151@gmail.com

Abstract. Investments in R&D can influence a firm's ability to develop new products and to create and adopt innovative technologies that may enhance productivity. However, due to uncertainty regarding the outcome, investments in R&D may lead to an agency problem between the owners and the managers of a firm. This paper studies whether corporate governance and effective tax rate would affect the R&D investment decisions. Our empirical analysis is based on listed company in Taiwan from 2005 to 2014 by using quantile regression. The results of estimates of the effects of corporate governance on R&D investment, presents evidence that in order to increase R&D investment, the company would have to emphasize in its corporate governance, such as cash flow rights, deviation, family business, the ratio of outside board member and firm size. In addition, in our study, quantile regression estimates are quite different from those from OLS regressions. Among the higher R&D investment companies, higher effective tax rate and greater total accruals do appear to reduce R&D investment. Our results suggest that some current R&D investment decision may be reconsidered, especially among the higher R&D investment companies.

Keywords— Corporate Governance, Effective Tax Rate, Quantile Regression

INTRODUCTION

Investments in research and development (R&D) are essential to advance innovation. However, R&D spending has certain characteristics that make it different from other investments: it is time-consuming and often fails to meet objectives. R&D returns are uncertain and highly skewed (Scherer, 1998; Scherer and Harhoff, 2000). Making R&D investments therefore requires a risk-taking attitude and a long-term horizon. This explains why R&D investments may lead to an agency problem between owners and managers of a firm: the manager undertaking the R&D decisions often has better information about the likelihood of success and the nature of given R&D activity than does an external owner, and this creates an instance of asymmetric information (Akerlof, 1970; Leland and Pyle, 1977; Myers and Majluf, 1984; Thakor, 1990).

In addition, because managers are usually primarily interested in short-term performance, they may fear the costs associated with R&D and favor projects with short-term payoffs over uncertain projects with long-term payoffs. This can lead to a moral hazard situation (Campbell and Marino, 1994; Hirshleifer and Thakor, 1992; Narayanan, 1985). As a result of asymmetric information and moral hazard, an underinvestment problem may occur with R&D. Specifically, the firm may invest less in R&D than it should to stay competitive. Yet, problems of moral hazard may also lead to overinvestment: managers may invest the firm's free cash flow in their "pet projects" rather than paying out the funds to shareholders (Jensen, 1986; Vogt, 1994). Either way, the investment strategy is not value maximizing from a firm's perspective.

From an agency theory perspective, family-and lone founder-owned firms are different from other businesses (Chrisman et al., 2004, 2007). In particular, the owners are in a strong position to monitor the management of the firm. As owners, families and lone founders usually own large blocks of stock, which is why they have a strong incentive to ensure effective monitoring (Fama, 1980; Maug, 1998). Moreover, they often exhibit a thorough understanding of the business and its underlying processes, which reduces the information asymmetries between the owners and managers of the firm (Miller and Le Breton-Miller, 2005; Ward, 2004). In some cases, the managers of the firm are owner-managers or belong to the business-owning family. A stronger alignment of a firm's ownership and management suggests lower agency costs (Jensen and Meckling, 1976) and more efficient R&D spending. For family firms, however, this view has been challenged from several perspectives.

It has been argued that family firms are characterized by conflicts originating from, e.g., sibling rivalries, identity conflicts and different goals of individual family members with regard to the development of the firm (Dyer, 1994; Eddleston and Kellermanns, 2007; Schulze et al., 2001, 2003). Another stream of literature argues that families as owners may primarily seek private control-oriented benefits and preferentially seek high dividends over firm growth (Chandler, 1990; Claessens et al., 2002; Johnson et al., 2000; Morck and Yeung, 2003). Their comprehensive understanding of the business and their entrenchment in the firm puts them in a strong position to pursue their private goals. These two lines of arguments cast doubt on families being strong monitors and suggest less efficient R&D spending in family firms relative to lone founder or other firms. In summary, it is an open question whether family

firms exhibit high or low levels of R&D spending and R&D productivity and how they as a group compare against lone founder or other firms.

This paper contributes to the discussion about the link between corporate governance, effective tax rate and R&D investment. As an alternative to OLS regression, this study uses quantile regression to presents an overview of tax burden and income inequality. The remainder of this study is organized as follows. Section 2 proposes our empirical method. Section 3 provides a brief model. Section 4 presents the empirical results, and Section 5 concludes.

EMPIRICAL METHOD

Constant-coefficient regression models have been applied extensively in statistics, while various random-coefficient models have also emerged as viable competitors in particular fields of application. One variant of the latter class of models, although perhaps not immediately recognizable as such, is the Quantile regression (hereafter, QR). Quantile regression is based on the minimization of weighted absolute deviations to estimate conditional quantile (percentile) functions (Koenker and Bassett 1978; Koenker and Hallock 2001; Zietz et al. 2008). For the median (quantile=0.5), symmetric weights are used, and for all other quantiles (e.g., 0.1, 0.2, …, 0.9) asymmetric weights are employed. In contrast, classical OLS regression estimates conditional mean functions. Unlike OLS, quantile regression is not limited to explaining the mean of the dependent variable. It can be employed to explain the determinants of the dependent variable at any point of the distribution of the dependent variable.

Quantile regression generalizes the concept of an unconditional quantile to a quantile that is conditioned on one or more covariates. Least squares minimizes the sum of the squared residuals,

$$\min_{\{b_j\}_{j=0}^{k}} \sum_i \left(y_i - \sum_{j=0}^{k} b_j x_{j,i}\right)^2,$$

where y_i is the dependent variable at observation i,x_(j,i) the jth regressor variable at observation i, and b_j an estimate of the model's jth regression coefficient. By contrast, quantile regression minimizes a weighted sum of the absolute deviations,

$$\min_{\{b_j\}_{j=0}^{k}} \sum_i \left|y_i - \sum_{j=0}^{k} b_j x_{j,i}\right| h_i$$

where the weight h_i is defined as
h_i=2q
if the residual for the ith observation is strictly positive or as
h_i=2-2q
if the residual for the ith observation is negative or zero. The variable q ($0<q<1$) is the quantile to be estimated or predicted.

The standard errors of the coefficient estimates are estimated using bootstrapping as suggested by Gould (1992, 1997). They are significantly less sensitive to heteroscedasticity than the standard error estimates based on the method suggested by Rogers (1993). Quantile regression analyzes the similarity or dissimilarity of regression coefficients at different points of the distribution of the dependent variable, which is R&D investment in our case.

THE MODEL

In order to analyze the empirical relationship between corporate governance, effective tax rate and R&D investment, we use balance panel data during 2005 to 2014. However, since some countries do not present data for all considered variables we need to discard some data. Table 1 provides the definition of variables and expected impact.

Since R&D investment could have heterogeneity in the potential effects, we use a structural quantile regression (QR) method, where R&D investment for each company is the dependent variable of effective tax rate and other control variables. QR estimation is fully described in Koenker (2005).

Quantile regression approach offers a more complete characterization of the stochastic relationship among variables and provide a more robust, and consequently more efficient, estimates in some non-Gaussian settings. In the case analyzed in this paper, this class of estimator is suitable, since it is important to analyze the behavior of tax burden in each quantile of the conditional R&D investment distribution. QR is not only concerned with the R&D investment effect on the average individual, but allows one to estimate the marginal effect of a given effective tax rate on individuals at different points in the conditional achievement distribution.

To study the determinants of R&D investment, the estimated equation takes the following form:

$$R\&D_{it} = \alpha + \beta_1 ETR_{it} + \beta_2 ROA_{it} + \beta_3 DIV_{it} + \beta_4 GRO_{it} + \beta_5 RISK + \beta_6 PRF_{it} + \beta_7 FB_{it} + \beta_8 OUT_{it} + \varepsilon_{it} \quad (1)$$

R&D investment (R&D) and effective tax rate (ETR) are standard determinants that are used in almost every study devoted to the causes of income distribution. Following Wu et al. (2013), we define ETR as the ratio of the current portion of tax expense to adjusted taxable income. The other variables in Eq. (1) have also been used quite frequently in some studies. FB is a dummy variable used to test the effect of family business on ETR. LEV denotes a firm's capital structure, which is measured as total debt divided by total assets. SIZE is measured as the natural logarithm of the total assets. While larger firms have more resources for tax planning and are better able to reduce their tax burdens (Shevlin and Porter, 1992; Dyreng et al., 2008). ROA denotes earnings before income tax divided by book value of total assets. FCEO is a dummy variable. OUT is the ratio of outside board member. RISK denotes the

Table 1 The definition of variables and expected impact

Variable Name(Code)	**Variable definition**	**Expected impact**	**Source of data**
R&D Investments(RD)	Research development expense(% of total sales)		TEJ
Effective tax rate(ETR)	total income tax burden(% of earnings before income tax)	−	TEJ
Family firms(FB)	If the company is family firm, and 0 otherwise.	+	
Return on assets(ROA)	Earnings before income tax (% of total assets)	−	
Enterprise growth rate(GRO)	(Net operating income for the year/Net operating income last year)-1	+	
Outside directors (OUT)	Outside directors (% of board committee)	+	
Operations risk(RISK)	standard derivation of 5 years firm profitability(firm profitability= earnings before income tax/book value of total assets)	−	
Dividend payout rate(DIV)	Cash dividends for ordinary shares & cash dividends for special shares (% earning after income tax)	+	
Firm profitability(PRF)	Pre-tax profit before depreciation (% book value of total assets)	−	

standard derivation of firm profitability. CF is cash flow right over voting rights.

EMPIRICAL RESULTS

All of the results are presented in Table 3. The first column provides the OLS regression results, and the next nine columns provide the QR results for quantiles 10 to 90. First, the OLS slope estimate of the effective tax rate is insignificantly negative at the 1% level. This result indicates that the higher effective tax rate by government do not influence on R&D investment. Secondly, the greater firm profitability, the more R&D investment. The family firms, return on assets, operation risk, dividend payout ratio, Enterprise growth rate and outside directors do not affect R&D investment significantly. However, OLS estimates provide a baseline of mean effects, and we compare these to estimates for separate quantiles in the conditional distribution of R&D investment.

Table 2 Summary statistics

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**
RD	6.514	98.859	0.000	8890.76
ETR	14.738	14.765	0.000	99.100
ROA	4.237	9.928	-110.820	49.400
DIV	0.535	4.127	-26.861	344.736
GRO	12.624	313.651	-99.800	27896.370
RISK	1.69E-06	5.12E-05	-0.003	0.000

PRF	9.312	10.369	-107.620	71.560
FB	0.589	0.492	0.000	1.000
OUT	0.417	0.2077	0.000	1.000

By contrast, the quantile-varying estimates of the R&D investment derived by the Quantile regression, reveal considerable variation in size, significance and even in sign. In particular, by using the 10% level of significance as a criterion, while the ETR variable is associated with a significant coefficient at the all quantiles, from 0.1 to 0.9, it becomes a significantly negative coefficient at higher quantiles levels from 0.1 to 0.9. This shows that higher effective tax rate is relatively efficient in decreasing R&D investment in companies.

The coefficients for the return on assets, ROA, show a different result: lower ROA has a much higher impact in lower R&D investment than in higher R&D investment. This shows that return on assets is relatively efficient in decreasing R&D investment in companies which already have a less R&D investment. Our results indicate that there is strong evidence that the effect of ROA is not constant, but varies among the various quantiles. In addition, it is important to note that the effect of enterprise growth rate, GRO, is nearly always positive, causing higher R&D investment; i.e., higher GRO is correlated with higher R&D investment. However, the effect of GRO is not consistently significant. OLS estimates suggest GRO do not matter quite a bit in increasing R&D investment, but quantile regression result do not uniformly confirm that. Specifically, GRO substantially heighten R&D investment, but only within quantiles levels from 0.3 to 0.9.

Table3 Results of OLS and Quantile

	OLS		**Quantile**								
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
C	10.135	***	0.134***	0.433***	0.837***	1.369***	2.038***	2.992***	4.178***	6.470***	12.907***
	(0.003)		(0.027)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ETR	-0.122		-0.003**	-0.007***	-0.010***	-0.014***	-0.021***	-0.032***	-0.043***	-0.058***	-0.107***
	(0.108)		(0.033)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.006		-0.034**	-0.044***	-0.038***	-0.032***	-0.025**	-0.014	-0.005	0.047	-0.017
	(0.985)		(0.000)	(0.000)	(0.000)	(0.001)	(0.049)	(0.473)	(0.877)	(0.118)	(0.834)
DIV	0.016		0.021	0.021*	0.024***	0.022***	0.021***	0.020***	0.018***	0.012***	0.018
	(0.951)		(0.121)	(0.098)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.769)
GRO	0.001		0.000	0.000	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.851)		(0.978)	(0.992)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
RISK	-19366.8		-4796.4	-15201.790	-20301.670	-20078.700	-19823.150*	-24132.890	-29758.2	-62245.96*	-63429.42*
	(0.390)		(0.866)	(0.102)	(0.000)	(0.000)	(0.000)	(0.000)	(0.106)	(0.000)	(0.000)
PRF	-0.486	*	0.035***	0.046***	0.038***	0.027***	0.016	-0.002	-0.023	-0.098***	-0.194***
	(0.093)		(0.000)	(0.000)	(0.000)	(0.001)	(0.152)	(0.928)	(0.290)	(0.000)	(0.005)
FB	1.563		-0.146***	-0.311***	-0.501***	-0.768***	-0.942***	-1.179***	-1.434***	-2.166***	-3.168***
	(0.480)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
OUT	4.372		0.396***	0.991***	1.761***	2.478***	2.993***	3.762***	4.800***	7.376***	9.925***
	(0.406)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-square		0.00401		Pseudo R-squared		0.027382					
Adjusted R-squared		0.003058		Adjusted R-squared		0.026452					

Note：*p*-values appear in parentheses. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels

CONCLUSION

Investments in R&D can influence a firm's ability to develop new products and to create and adopt innovative technologies that may enhance productivity. However, due to uncertainty regarding the outcome, investments in R&D may lead to an agency problem between the owners and the managers of a firm. This paper studies whether corporate governance and effective tax rate would affect the R&D investment decisions. Our empirical analysis is based on listed company in Taiwan from 2005 to 2014 by using quantile regression.

The results of estimates of the effects of corporate governance on R&D investment, presents evidence that in order to increase R&D investment, the company would have to emphasize in its corporate governance, such as cash flow rights, deviation, family business, the ratio of outside board member and firm size. In addition, in our study, quantile regression estimates are quite different from those from OLS regressions. Among the higher R&D investment companies, higher effective tax rate and greater total accruals do appear to reduce R&D investment. Our results suggest that some current R&D investment decision may be reconsidered, especially among the higher R&D investment companies.

These results add to the body of research explaining how these factors affect the R&D investment. The implication of these findings is that one important means for improving the R&D investment of some companies is to drastically change not only board characteristics, but also corporate governance structure.

References

Scherer, F. M., & Harhoff, D. (2000). Technology policy for a world of skew-distributed outcomes. *Research Policy*, *29*(4), 559-566.

Scherer**,** F. M. (Reviewer)(1998); "Industrial organization in the European Union: Structure, strategy, and the competitive mechanism"*Journal of Economic Literature*, *36*(1), 265-266

Akerlof, G. A.;(1970) "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism" *Quarterly Journal of Economics*, 84 (3), 488-500

Brealey, R., Leland, H. E., & Pyle, D. H. (1977). Informational asymmetries, financial structure, and financial intermediation. *The journal of Finance*, *32*(2), 371-387.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), 187-221.

Brennan, M. J., & Thakor, A. V. (1990). Shareholder preferences and dividend policy. *The Journal of Finance*, *45*(4), 993-1018.

Campbell, T. S., & Marino, A. M. (1994). Myopic investment decisions and competitive labor markets. *International Economic Review*, 855-875.

Hirshleifer, D., & Thakor, A. V. (1994). Managerial performance, boards of directors and takeover bidding. *Journal of Corporate Finance*, *1*(1), 63-90.

Narayanan, M. P. (1985). Observability and the payback criterion. *Journal of Business*, 309-323.

Jensen, M. C. (1986). Agency cost of free cash flow, corporate finance, and takeovers. *Corporate Finance, and Takeovers. American Economic Review*, *76*(2).

Vogt, S. C. (1994). The cash flow/investment relationship: evidence from US manufacturing firms. *Financial management*, 3-20.

Sharma, P., Chua, J. H., & Chrisman, J. J. (2000). Perceptions about the extent of succession planning in Canadian family firms. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration*, *17*(3), 233-244.

Fama, E. F. (1980). Agency Problems and the Theory of the Firm. *The journal of political economy*, 288-307.

Maug, E. (1998). Large shareholders as monitors: is there a trade-off between liquidity and control?. *The Journal of Finance*, *53*(1), 65-98.

Miller, D., Le Breton-Miller, I., Lester, R. H., & Cannella, A. A. (2007). Are family firms really superior performers?. *Journal of corporate finance*, *13*(5), 829-858.

Ward, M. P. (2004). Some reflections on the 1968–93 SNA revision. *Review of Income and Wealth*, *50*(2), 299-313.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, *3*(4), 305-360.

Matsunaga, S., Shevlin, T., & Shores, D. (1992). Disqualifying dispositions of incentive stock options: Tax benefits versus financial reporting costs. *Journal of Accounting Research*, 37-68.

Kellermanns, F. W., Eddleston, K. A., Sarathy, R., & Murphy, F. (2012). Innovativeness in family firms: A family influence perspective. *Small Business Economics*, *38*(1), 85-101.

Schulze, W. S., Lubatkin, M. H., & Dino, R. N. (2002). Altruism, agency, and the competitiveness of family firms. *Managerial and decision economics*, *23*(4-5), 247-259.

Chandler, A. D. (1990). Integration and Diversification as Business Strategies--An Historical Analysis. *Business and Economic History*, 65-73.

Claessens, S., Djankov, S., Fan, J. P., & Lang, L. H. (2002). Disentangling the incentive and entrenchment effects of large shareholdings. *The Journal of Finance*, *57*(6), 2741-2771.

Johnson, S. A., & Tian, Y. S. (2000). The value and incentive effects of nontraditional executive stock option plans. *Journal of Financial Economics*, *57*(1), 3-34.

Morck, R., & Yeung, B. (2005). Dividend taxation and corporate governance. *The Journal of Economic Perspectives*, *19*(3), 163-180.

Koenker**,** R. W.; Bassett, G., (1978)"Regression Quantiles"*Econometrica*, *46*(1), 33-50

Koenker, R. and K.F. Hallock (2001). "Quantile Regression", *Journal of Economic Perspectives*, vol. 15(4), 143-156.

Zietz, J., Zietz, E. N., & Sirmans, G. S. (2008). Determinants of house prices: a quantile regression approach. *The Journal of Real Estate Finance and Economics*, *37*(4), 317-333.

Gould, W. (1993). Quantile regression with bootstrapped standard errors. *Stata Technical Bulletin*, *2*(9).

Gould, W. (1997). Maximum-likelihood estimation using the ml command. *Stata Technical Bulletin*, *6*(34).

International conference on Social Sciences, Business, Technology and Management (SBTM)
Full Paper Proceeding ANISSH-2016, Vol. 2- Issue. 2

ISBN: 978-602-6427-39-7

The Relationship Between Facebook Engagement and Team Identification: An Investigation for Sport Fans

Metin Argan
Anadolu University, Turkey
margan@anadolu.edu.tr

Abstract. Social media-especially Facebook- have a great effect in terms of fans' relationship. The aim of this study is to investigate the relationship between Facebook engagement and team identification for soccer fans. The sample consists of 470 soccer fans in a city of Central Anatolia, Turkey. The scales of Facebook engagement and team identification were subjected to reliability, validity, confirmatory factor analysis (CFA) procedures. The results of EFA and CFA indicated the satisfactory fit values about validity and reliability. The main result of the study indicates that there are a significant relationship ($p < 0.01$) between Facebook engagement and team identification. The study has significant implications as to how well sport team managers design social media strategies.

Keywords— Facebook, Facebook Engagement, Sport Marketing, Team Identification, Turkey

INTRODUCTION

Team managers that are aware of this involvement of the fans into the social media have begun to take conscious steps for using Facebook in more effective ways and to develop strategies in this regard. Engagement subject has attracted attention as one of the today's most popular concepts and practices. It is trying to use social media tools effectively to keep the fans in a continuous relationship with the club.

The subject of Facebook engagement can be used for both loyalties of the fans, profitability and reinforcement of the team identification. Keeping fans constantly connected with the team through social media can contribute to the development of awareness and level of advocacy. Social media that has become a medium that can be measured, especially Facebook, has come to be used in an effective and efficient manner in the development of advocacy. For this reason, it has been seen that people who associate more their self with the team or whose team identification is more advanced share more things about their team on social media. Therefore, it is likely to mention the existence of a relationship between Facebook engagement and team or fan identification.

Although there are conducted researches on Facebook, the purpose of Facebook usage among fans and on similar issues in the literature, the number of conducted researches examining the relationship between Facebook attachment and team identification is extremely limited. Thus, the purpose of this research is to examine this relationship

LITERATURE REVIEW

Fan identification is one of the subjects studied in different sports branches such as basketball, football, and baseball (Wann, Dimmock, & Grove, 2003). Fan identification is defined as establishing a psychological connection of a fan for a team (Wann et al., 2001). According to this definition, a fan perceives the team as an extension of his/her personality. Trail, Anderson, and Fink (2000) defined identification as "an orientation of the self in regard to other objects including a person or group that results in feelings or sentiments of close attachment" (p. 165-166). Branscombe and Wang (1992) define a fan's identification as a level of special concern or attachment for a special team.

Researchers reveal that fan identification is an important indicator from emotional, cognitive and behavioral aspects in many sports branches. (e.g. Kim, 2013; Wann & Branscomb, 1993; Wann & Dolan, 1994; Wann, Tucker, & Schrader, 1996). For instance, fan identification has a positive effect on fans' perception of the sponsors of the team they support. Fans with the high level of dedication have more awareness on their team's sponsors, fed more positive feelings towards them, and are more likely the purchasers of the products of the sponsors (Dalakas, & Phillips Melancon, 2012; Gwinner and Swanson, 2003). The level of fan allegiance gives a clue about an individual's persistance and resistence for a team. Allegiance situation of a fan for the team is evaluated with team identity, fan loyalty, psychological commitment and connection, team attachment and relationship quality (Yoshida et al., 2014). And also, in the literature it is considered that geographical location socialization agents, perceived similarity with the team, and team success are the reasons for team identification (Theodorakis, Wann & Weaver, 2012).

Engagement is one of the concepts examined widely in different disciplines. The concept "engage" in the sport marketing literature is often used (Yoshida et al., 2014). Marketing scholars view customer engagement as 'the level of a customer's physical, cognitive and emotional presence in their relationship with a service organization'

(Patterson et al, 2006; cited in Chan et al., 2014, p. 83). Bowden (2009) conceptualized the customer engagement concept as a psychological process by examining it from cognitive and emotional aspects. Fan engagement can be considered as an interaction and experience (Chan et al., 2014). The subject of fan engagement can also be considered from the perspective of relationship marketing in sports marketing literature (Pronschinske, Groza, & Walker, 2012). When taking the subject with this approach, interactions between a sports team and fans and shared experiences with bringing the realities of matches to the social media will be considered in this context.

Malhotra, Malhotra and Sea (2013) refer to the eight ways used as tools to establish brand engagement on Facebook of increasing the number of likes. These are: express yourself through photos, be topical, share the validation, don't hesitate to be in your face, educate the fans, humanize the brand, humor is the best social medicine, and ask to be "liked". When you take these eight ways, it is possible to see that these are widely used by the fans about their own team.

Sports teams present themselves on Facebook and fans respond this presentation. Involvement of fans to Facebook pages can also be considered as a clue about fan identifications. Traditionally, the concept of customer engagement is seen as transactional and non-transactional in sports marketing literature (Yoshida et al., 2014). Eventually, both transactional and non-transactional fan engagement elements can direct social media operations in today's world.

Researchers have examined also the relationship between team identification and fan aggression (Wann et al., 1999), sport team performance (Wann & Dolan, 1994), fan loyalty (Kim, 2013), and sponsorship outcomes (Gwinner & Swanson, 2003). However, research that bas examined the relationship Facebook Engagement and Fan Identification are limited. Given its likely influence on fandom, sport marketing researchers would benefit from increased understanding of how fans' Facebook usage characteristics are related to fan identification.

Bernthal et al. (2015) indicates that there is a positive relationship between engagement variables and spectatorship. The research also found a positive relationship with attendance at and viewership of top-level tournaments.Loyal fans do not only deal with the tasks that serve their own interests, but also are concerned with the tasks for the benefit of the team they are in favor (Yoshida et al., 2015). In this sense, Facebook engagement can be considered as a key variable in creating or developing fan identification. Facebook engagement influences not only more repeat interaction, but also the behavioral component of identification (support, greater participating frequency, etc.).

Yosida et al. (2014) have predicted that there is a significant relationship between management cooperation with fan engagement dimensions, pro-social behavior, and performance tolerance. As a result of the research, it is found that fan identification is the leader of all three dimensions of fan engagement. Based on the above-noted issues and the results obtained in this study; we anticipate that in this study there is a significant relation between team identification and Facebook attachment. The model based on this anticipation is as follows.

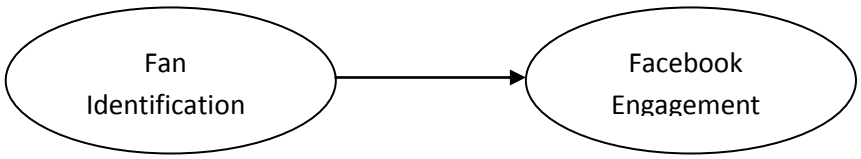

Figure 1. Conceptual model

METHODOLOGY

The questionnaire of this study contained two scales and, demographic and fandom characteristics. The following two scales were included in the model analysis: fan identification and Facebook engagement (Table 1). The scales were measured using a 5-point Likert scale ranging from 1 (never) to 5 (very frequently). Participants responded to seven-items related to their fan identification behaviors. The items in the fan identification engagement scale were adopted from Moyer (2012), Theodorakis et al. (2010) and Wann and Branscombe (1993) to determine identification about the favorite team of the participants. The second scales titled as Facebook engagement comprised seven-items. The seven-items related to Facebook engagement were adopted from Moyer (2012).

The data were collected using nonprobability convenience sampling, where participants who fit the eligibility requirements (18 years and bigger fans in a university) were asked to fill in a self-completion questionnaire. A total of 627 valid questionnaires were sent and 523 were completed in the one week time frame. Data cleaning based on missing values and blank questionnaires narrowed the total to 470, which were used in the analysis (74% final response rate). Participant demographics indicated that 50.4 percent of the respondents were female, and that the majority of the respondents (55.7%) were between the ages of 20-22. Large majority of participants (80.8%) was

faculty students. $170 $ or below. More than 40 % was at $170 $ or below. In terms of fandom status, 41.9 % of them were fan of Galatasaray, about 26% of the participants were Fenerbahce fans, and 20% of them were Besiktas fans.

RESULTS

Measurement and Structural Models

To determine the measurement of the model a confirmatory factor analysis (CFA) was performed (see Table 2). At the level of fan identification scale, ratio of X^2 to degrees of freedom (X^2=7.99; df= 5; p > 0.05) was 1.598, indicating smaller than the cutoff point of 3. Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Incremental Fit Index (IFI) and comparative fit index (CFI) values over 0.90 were considered to represent an adequate fit; a root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) under 0.05 indicated a good fit and a RMSEA between 0.05 and 0.08, a reasonable fit, between 0.08 and 0.1 satisfactory fit (Bollen & Long, 1993; Thompson, 2004). The following fit indices were considered satisfactory: RMSEA (0.038) < .05, SRMR (0.007) < 0.05, CFI (1.00) > 0.95, GFI (0.99) > 0.95 (Browne & Cudeck, 1993), AGFI (0.98) > 0.5, NFI (1.00) > 0.95, NNFI (1.00) > 0.90; IFI (1.00) > 0.95.

Table 1. Facebook engagement and fan identification

	Std. Loads	*t value*	*M*	*SD*
Facebook Engagement (F-ENG)			2.93	1.18
Follow updates	.91	25.61	2.98	1.33
Read stories	.93	26.56	2.76	1.33
Watch videos	.93	26.27	3.10	1.37
View photos	.86	23.58	3.10	1.35
Answer questions/polls or quizzes	.74	19.00	2.70	1.35
Fan Identification (F-IDE)			3.54	1.06
How important to you is it that your favorite team win?	.86	22.95	4.02	1.04
How strongly do your friends see you as a fan of your favorite team?	.93	26.43	3.39	1.26
During the season, how often do you your favorite team via any of the following media: television, on the radio, internet etc.?	.89	24.35	3.50	1.23
How important is being a fan of favorite team to you?	.90	24.99	3.69	1.21
How often do you display your favorite team name or insignia at your place of work, where you live, or on your clothing?	.83	22.07	3.06	1.34
CR: 0.94, 0.96; respectively. AVE: 0.77, 0.78; respectively. Reliabilities (Alphas): 0.93, 0.92; respectively.				

Similarly, CFA results presented a very good fit to the data, in terms of fan identification scale: X^2 /df =2.61 (x2= 13.09, df= 5, p < 0.05), CFI = 1.00, NFI = 1.00, NNFI = 0.99, IFI = 1.00 =0.95, GFI = 0.99, AGFI = 0.97, SRMR = 0.009 and RMSEA = 0.059 (Hu & Bentler, 1999).

Following the confirmation of the measurement model, the conceptual model was evaluated by SEM including the test of path estimates (see Figure 1). The SEM results revealed a good structural fit within the model (X^2/df = 2.48 [X^2 = 84.60, df = 34, p < 0.05], RMSEA and SRMR < 0.08 and 0.05 respectively, CFI, IFI, NFI, NNFI, GFI > 0.95; AGFI > 0.90). Moreover, result from the SEM analysis showed that fan identification were very strong predictor of Facebook engagement (Std. β = 0.86; t = 20.59)

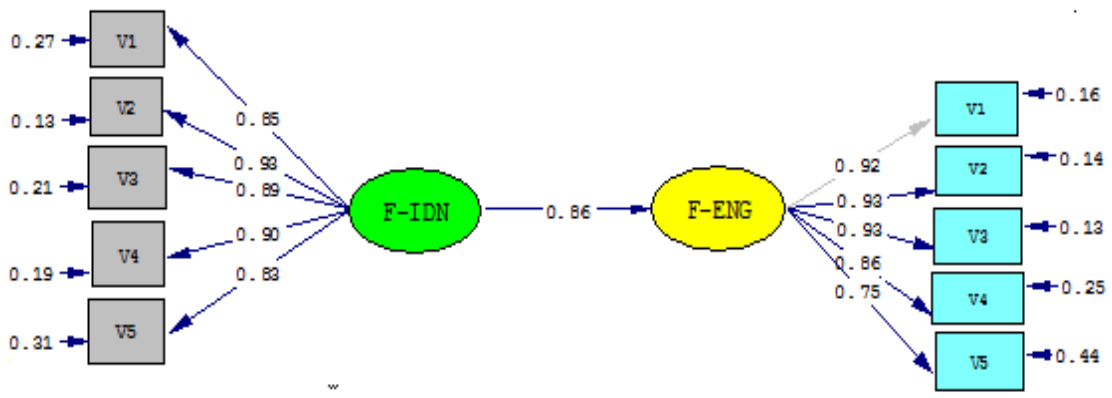

Figure 2. Relationship between fan identification (F-IDN) and Facebook engagement (F-ENG)

DISCUSSION AND CONCLUSION

The purpose of this study was to investigate relationship between fan identification and Facebook engagement. The CFA results show that dimensions about fan identification and Facebook engagement can be conceptualized and measure as unidimensional constructs, separately. The results from the SEM analyses showed that the relationship between fan identification and Facebook engagement was strong. This finding is somewhat consistent with previous research (Yosida et al., 2014), showing associations between fan engagement and sub-dimensions of Facebook engagement, management cooperation, prosocial behavior and performance tolerance. Therefore, consistent with previous suggestions appearing in the sports marketing literature, we conceptualize fan identifications as an antecedent of engagement, loyalty and purchase. Additionally, the originality in this study is that the significant relationship between two variables revealed by researcher.

The findings provide several important insights into the relationship between identification and engagement. The results not only highlight the structure and nature of meaningful relationship, but they also represent the first attempt to test the role of a strong fan identification as an indicator of engagement or transaction. Moreover, the benefit for spot team management is that Facebook engagement is a very cheap way of reaching a potentially very large fan groups and the enormous amount of information about fan database.

Overall, the study results show that the fans who have strong grade have an exceptional role in terms of communicating with external audiences of sport clubs. The findings of this study highlighted that Facebook transactions regarding sport teams emerged. Moreover, our finding regarding relationship between fan identification and social media engagement means that fans as sport team promoters should be encouraged to be form new loyal fans. As a result, this study has significant implications as to how well sport team managers design social media strategies.

REFERENCES

Bernthal, M. J., Koesters, T., Ballouli, K., & Brown, M. T. (2015). Motivations and Fan Engagement Related to Professional Bass Fishing Spectatorship. *Sport Marketing Quarterly*, *24*(1), 6.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. *Sage focus editions*, *154*, 136-136.

Bowden, J. L. H. (2009). The process of customer engagement: A conceptual framework. *Journal of Marketing Theory and Practice*, *17*(1), 63-74.

Branscombe, N. R., & Wann, D. L. (1992). Physiological arousal and reactions to outgroup members during competitions that implicate an important social identity. *Aggressive behavior*, *18*(2), 85-93.

Chan, T. K., Zheng, X., Cheung, C. M., Lee, M. K., & Lee, Z. W. (2014). Antecedents and consequences of customer engagement in online brand communities. *Journal of Marketing Analytics*, *2*(2), 81-97.

Dalakas, V., & Phillips Melancon, J. (2012). Fan identification, Schadenfreude toward hated rivals, and the mediating effects of Importance of Winning Index (IWIN). *Journal of Services Marketing*, *26*(1), 51-59.

Gwinner, K., & Swanson, S. R. (2003). A model of fan identification: Antecedents and sponsorship outcomes. *Journal of services marketing*, *17*(3), 275-294.

Kim, B. (2013). *A study of the relationship between corporate social responsibility, corporate reputation, fan identification, and fan loyalty of Korean sport industry* (unpublished doctoral thesis). United States Sports Academy, Daphne, Alabama.

Malhotra, A., Malhotra, C. K., & See, A. (2013). How to create brand engagement on Facebook. *MIT Sloan Management Review*, *54*(2), 18.

Moyer, C. (2012). *Relationship of Facebook Usage to Team Identification (Master thesis)*, Marquette University, Milwaukee, Wisconsin.

Patterson, P., Yu, T., & De Ruyter, K. (2006, December). Understanding customer engagement in services. In *Advancing theory, maintaining relevance, proceedings of ANZMAC 2006 conference, Brisbane* (pp. 4-6).

Pronschinske, M., Groza, M. D., & Walker, M. (2012). Attracting Facebook'fans': the importance of authenticity and engagement as a social networking strategy for professional sport teams. *Sport Marketing Quarterly*, *21*(4), 221.

Theodorakis, N., Wann, D., Sarmento, P., & de Carvalho, M. (2010). Translation and initial validation of the Portuguese version of the Sport Spectator Identification Scale. *North American Journal of Psychology*, *12*(1), 67-80.

Theodorakis, N. D., Wann, D. L., & Weaver, S. (2012). An antecedent model of team identification in the context of professional soccer. *Sport Marketing Quarterly*, *21*(2), 80.

Thompson, B. (2004). *Exploratory and confirmatory factor analysis: Understanding concepts and applications*. American Psychological Association.

Trail, G. T., Anderson, D. F., & Fink, J. S. (2000). A theoretical model of sport spectator consumption behavior. *International Journal of Sport Management*, *1*(3), 154-180.

Wann, D. L., & Branscombe, N. R. (1993). Sports fans: Measuring degree of identification with their team. *International Journal of Sport Psychology*.

Wann, D. L., & Dolan, T. J. (1994). Influence of spectators' identification on evaluation of the past, present, and future performance of a sports team. *Perceptual and Motor Skills*.

Wann, D. L., Melnick, M. J., Russell, G. W., & Pease, D. G. (2001). *Sport fans: The psychology and social impact of spectators*. Routledge.

Wann, D. L., Peterson, R. R., Cothran, C., & Dykes, M. (1999). Sport fan aggression and anonymity: The importance of team identification. *Social Behavior and Personality: An International Journal*, *27*(6), 597-602.

Wann, D. L., Tucker, K. B., & Schrader, M. P. (1996). An exploratory examination of the factors influencing the origination, continuation, and cessation of identification with sports teams. *Perceptual and motor skills*, *82*(3), 995-1001.

Wann, D. L., Dimmock, J. A., & Grove, J. R. (2003). Generalizing the Team Identification-Psychological Health Model to a Different Sport and Culture: The Case of Australian Rules Football. *Group Dynamics: Theory, Research, and Practice*, *7*(4), 289.

Yoshida, M., Gordon, B., Heere, B., & James, J. D. (2015). Fan community identification: an empirical examination of its outcomes in Japanese professional sport. *Sport Marketing Quarterly*, *24*(2), 105.

Yoshida, M., Gordon, B., Nakazawa, M., & Biscaia, R. (2014). Conceptualization and measurement of fan engagement: Empirical evidence from a professional sport context. *Journal of Sport Management*, *28*(4), 399-417.

Vision

Our vision is to establish sustainable research and academic hub for future generations.

Seoul, South Korea

International Conference on Social Sciences, Business, Technology and Management

SBTM-2016

Organized By:

Akademika Nusa Internasional
Association of Social Sciences and Humanities