Do Administrative Fines Affect Market Concentration?
An Empirical Analysis of Taiwan

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Abstract

This study examines the impact of administrative fines, as a result of rulings by the Taiwan Fair Trade Commission, on the market concentration of industrial sectors in Taiwan. The administrative fines levied on cartels, violations of merger notifications, vertical restraints, and unfair competition are considered. By estimating a panel data fixed effect model using a dataset of 4,203 industrial sectors between 2006 and 2014, it is evident that the imposition of fines on cartel conduct have significantly reduced market concentration. Both direct and indirect deterrence effects of the fines have been found. Moreover, the introduction of a leniency program and an increase in the maximum amount for anticompetitive behavior have resulted in a stronger impact in terms of reducing market concentration.

1. Introduction

In contrast to academic research, competition agencies must make ruling decisions on each antitrust case with time and resource constraints. How to achieve a fair verdict on each case to insure a procompetitive economic environment has therefore become one of the policy objectives for all competition agencies in the world. Among others, conducting ex-post evaluation on competition law enforcement has been promoted by the competition committee of the Organization for Economic Co-operation and Development (OECD). Ex-post evaluation is an examination to assess a competition agency's law enforcement decisions on the market after the ruling decision has been made. In 2016, the competition committee of the OECD published a reference guideline that reviews empirical evidence of the OECD member countries on assessments of competition law enforcements[1].

Over the past decade, a sizable body of ex-post evaluation studies has been conducted to assess the impacts of competition agencies' decisions on markets, firms, and consumers in order to improve the effectiveness of their internal case investigation and decision ruling process. After reviewing the ex-post evaluation studies on competition law enforcements documented in the OECD 2016 guideline, it appears that the mainstream studies focused on horizontal merger controls, and empirical evidence had been revealed in a variety of markets including videogame[2], retail book[3], hospital[4], retail food chains[5], and parking garages[6] etc. Some other studies focused on the conducts of abuse of dominance, cartels

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[1] OECD, *Reference Guide of Ex-Post Evaluation of Competition Agencies' Enforcement Decisions*, Competition Committee, OECD (2016).

[2] *See* Luca Aguzzoni, Elema Argentesi, Paolo Buccirossi, Lorenzo Ciari, Tomaso Duso, Massimo Tognoni & Cristina Vitale, "A Retrospective Merger Analysis in the U.K. Videogame Market," *10 Journal of Competition Law and Economics*, 933-958 (2014).

[3] *See* Luca Aguzzoni, Elema Argentesi, Lorenzo Ciari, Tomaso Duso & Massimo Tognoni, "Ex Post Merger Evaluation in the U.K. Retail Market for Books," *64 Journal of Industrial Economics*, 170-200 (2016).

[4] *See* Jeffrey Alexander, Michael Halpern & Shoou-Yih Lee, "The Short-Term Effects of Merger on Hospital Operations," *30 Health Service Research*, 827-847 (1996).

[5] *See* Orley Ashenfelter, David Ashmore, Jonathan Baker, Suzanne Gleason & Daniel Hosken, "Empirical Methods in Merger Analysis: Econometric Analysis of Pricing in FTC vs. Staples," *13 International Journal of Economics and Business*, 265-279 (2006).

[6] *See* Philippe Choné & Laurent Linnemer, "A Treatment Effect Method for Merger Analysis with an Application to Parking Prices in Paris," *60 Journal of Industrial Economics*, 631-656 (2012).

or concerted actions, and vertical restraints. For instance, Kai et al.[7] evaluated the impacts of the competition commission's decision on road-surfacing cartels in Swiss. The authors found that the detection of cartel conduct can reduce price in the short-term.

The fair trade act in Taiwan has been put into action in 1992. However, it is of a little surprise that there are only two studies so far that provided evaluation on the impacts of the enforcement actions ruling by the Taiwan Fair Trade Commission (TFTC). The first article was written by Lo and Gee[8] in 2001. The authors demonstrated the relationship between competition policy enforcements and macroeconomic performance. The authors concluded that TFTC's competition enforcements improved the amount of foreign direct investment. After fifteen years later, Hu et al.[9] used an event study method to evaluate the impact of three horizontal merger decisions made by the TFTC on the merging firms' stock market prices. A statistically insignificant impact on stock market price was found after those merger decisions made by the TFTC. Given the limited available ex-post studies conducted in Taiwan, it is necessary to provide more and updated evidence to assess TFTC's ruling decisions on the economy. This type of analysis can help to shed some light on the evaluation of the ruling decisions made by TFTC and to evaluate the effectiveness of recent amendments in Taiwan fair trade acts.

This paper evaluates the impacts on market concentration resulted from the anticompetition and unfair competition fines ruling by the TFTC. The specific objectives of this study are to provide answers for the following questions related to competition law enforcement. (1) Do the administrative fines affect the market concentration of the industrial sectors? (2) Is there an indirect deterrence effect of the administrative fines on the market concentration of the sector[10]? (3) Does the introduction of the leniency program

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[7] *See* Kai Hüschelrath, Nina Leheyda & Patrick Beschorner, "Assessing the Effects of a Road-Surfacing Cartel in Switzerland," *6 Journal of Competition Law and Economics*, 335-374 (2010).

[8] *See* Changfa Lo & Gee San, "A Decade of Fair Trade Law Legislation and Its Enforcement in the Republic of China," *International and Comparative Competition Law and Policies*, International Competition Law Series 3, Kluwer Law International (2001).

[9] Wei-Min Hu, Chia-Wen Chen & Kuang-Ta Lo, "Ex-Post Evaluations of Merger Decisions Involving Event Studies," *24(4) Taiwan Fair Trade Quarterly*, 1-30 (2016) (in Chinese).

[10] Yannis Katsoulacos, Evgenia Motchenkova & David Ulph have outlined a theoretical framework to distinguish the direct and indirect deterrence effect of anti-cartel interventions on firm performance. *See* Yannis Katsoulacos, Evgenia Motchenkova & David Ulph, "Measuring the Effectiveness of Anti-Cartel Interventions: A Conceptual Framework," *TILEC Discussion Paper 2016-001* (2016).

and the increased maximum amount of fines in antitrust conduct affect the market concentration? (4) Which type of administrative fine affects market concentration more? Self-initiated or reported cases?

To achieve the research objectives, I construct a unique industrial sector level balanced panel dataset to quantify the effects of the anticompetition and unfair competition fines ruling by the TFTC on market concentration of the industrial sectors. The Herfindahl-Hirschman index (HHI) is used as a proxy to capture market concentration of the industrial sectors. In this study, I include all of the fines for the anticompetition and unfair competition conduct. Moreover, the anticompetition cases are further categorized into cartels, violations of merger notifications, and vertical restraints. By estimating a panel data fixed effect model using a dataset of 4,203 industrial sectors from 2006 to 2014, it is evident that TFTC's anticompetition fines significantly reduced market concentration of the industrial sectors. Moreover, the effects are more pronounced for fines in cartels. In addition, the effect is statistically stronger after the introduction of the leniency program and the increase in the maximum amount of fines for antitrust conduct in the amendment of Taiwan fair trade act in 2011.

Several unique features that may set this paper apart from the existing studies. First, this paper contributes to the limited empirical evidence related to the evaluation of TFTC's law enforcement. In contrast to Lo and Gee, and Hu et al., this paper provides a more comprehensive analysis of TFTC's enforcements by including all the fines in anticompetition and unfair competition conducted ruling by TFTC. In so doing, the differential impacts of the fines on market concentration by types of illegal conducts can be analyzed. Second, the increase in the maximum amount of fines and the leniency program were introduced in the fair trade law amendments in recent years. By collecting a dataset that covers the years before and after the amendment, I provide an empirical assessment of the effectiveness of the amendment. To the best of my knowledge, this study is among the first economic study that addresses this issue. Third, theoretical studies in antitrust have stated that the optimal fines should take not only the damage of the illegal

behavior but also the indirect deterrence effect into account[11]. However, not much quantitative evidence of the deterrence effect has been found so far. This study provides supporting evidence of the deterrence effect resulted from the fines in cartel conducts using a case study of Taiwan as an illustration.

The remainder of this paper is organized as follows. I first introduce the datasets and the empirical strategies. The following section presents the results of the empirical analyses. In the final section, I conclude this paper by summarizing the primary findings and presenting research limitations of this study.

2. Data

A balanced panel dataset was constructed. The primary dataset contains 467 sectors in the industry, commerce and service industries from 2006 to 2014 (9 years in total). The final sample contains 4,203 sectors. For each sector in each year, two variables are defined: the Herfindahl-Hirschman Index (HHI) and the total number of firms in each sector. In addition to the economic performance of the industrial sectors, I collect information of the anticompetition and unfair competition fines ruling by the TFTC from 2006 to 2014 and all of the monetary terms are deflated to the 2006 level. For each sector in each year, I calculate all of the fines for antitrust cases and then categorize them into different conducts including abuse of dominance, cartels, and violations of merger notifications. In addition, the fines for unfair competition conduct are calculated. Moreover, I categorize the total fines of antitrust and unfair competition conduct into reported and self-initiated cases. The administrative files are then merged into the sector level dataset based on the sector-specific codes provided by the Ministry of Economic Affairs in Taiwan[12].

The definition and sample statistics of the variables specified in the industrial sector level dataset are presented in Table 1. The sample mean of the HHI variable in the full sample is 1,156, and it ranges from 1,090 to 1,278. The value of the total fines in each

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[11] For example, William M. Landes applied the model proposed by Garry Becker to the case of antitrust. *See* William M. Landes, "Optimal Sanctions for Antitrust Violations," *50 University of Chicago Law Review*, 652-656 (1983).

[12] Agricultural sectors were excluded due to a lack of the four-digit codes.

sector is NT$ 57.89 million, on average. In contrast to the HHI value, the amount of fines varies across years, and ranges from NT$ 1.52 million to NT$ 375.42 million. When it comes to the different types of fines, it appears that fines for antitrust activities hold a lion's share of the total fines, accounting for NT$ 55.68 million, on average. In contrast, the amount of fines for unfair trade practices only accounts for 4% of the total fines (2.11/57.89 = 0.04). Among all the antitrust fines, it is observed that almost all of the fines come from a penalty for cartel conduct (NT$ 55.38 million in total, on average). When I break down all the fines in antitrust and unfair competition activities into self-initiated and reported cases, it appears that the average amount of fines in self-initiated cases is NT$ 46.34 million, accounting for approximately 80% of the total fines.

Table 1. Sample distributions of fines and market concentration over time

Year		All	2006	2007	2008	2009	2010	2011	2012	2013	2014
Number of industries		4,203	467	467	467	467	467	467	467	467	467
Variable	Definition	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Market concentration											
HHI value	Herfindahl-Hirschman index (0-10,000).	1,156	1,090	1,121	1,169	1,205	1,278	1,114	1,122	1,140	1,160
TFTC's administrative fines (in NT$ 1 million)											
Fines_all	Fines in all cases.	57.89	24.94	6.36	3.56	75.53	1.52	6.85	4.37	22.42	375.42
Fines_antitrust	Fines in antitrust cases.	55.68	22.05	3.42	0.61	73.23	0.69	4.16	2.69	19.42	374.83
Fines_antitrust_merger	Fines in violation of merger notifications cases.	0.17	0.08	0.18	0.61	0.06	0.13	0.00	0.01	0.06	0.39
Fines_antitrust_cartel	Fines in cartels cases.	55.38	21.92	2.93	0.00	73.16	0.55	4.05	2.63	19.33	373.88
Fines_antitrust_vertical	Fines in vertical restraints cases.	0.10	0.02	0.00	0.00	0.00	0.04	0.39	0.40	0.01	0.00
Fines_unfair competition	Fines in unfair trade practices cases.	2.11	2.88	2.94	2.94	2.30	0.79	2.30	1.28	2.99	0.59
Fines_reported	Fines in reported cases.	11.54	10.86	3.74	2.28	75.05	0.76	1.77	0.79	3.24	5.37
Fines_self-initiated	Fines in self-initiated cases.	46.34	14.08	2.62	1.28	0.48	0.76	5.08	3.58	19.18	370.05

3. Empirical Strategy

The empirical analysis aims to quantify the effects of administrative fines on market concentration of the industrial sectors. This part of analysis relies on a balanced panel dataset of 4,203 industrial sectors in total, collected from 2006 to 2014. I estimate a panel data model for the HHI equation, and the emphasis is on the relationship between fines and HHI. In contrast to the standard linear regression model that relies on the Ordinary Least Squares (OLS) estimator, the panel data model can further control for the time-invariant individual characteristics. It has been documented that OLS method will result in inconsistent estimation results in a panel dataset since it fails to control for the individual heterogeneity[13].

There are two types of panel data models: the fixed effect and the random effect model. Compared to the random effect model that deals with the autoregression bias, the fixed effect model focuses on the cross-sectional heterogeneity of the sample. Therefore, the fixed effect model can be used to cope with endogeneity bias. Since market concentration and the fines may be correlated due to some unobserved common factors, the panel data fixed effect model was estimated to cope with potential endogeneity bias in this study[14]. The market concentration equation to be estimated is specified as:

(1) $HHI_{jt} = \alpha + \gamma * F_{jt} + \beta' z_{jt} + u_j + \varepsilon_{jt}$

where HHI_{jt} is the Herfindahl-Hirschman Index for sector j in year t. The variable F_{jt} indicates the amount of fines imposed on sector j in year t, and z are explanatory variables that are associated with HHI. u_j is the fixed effect for sector j and ε_{jt} is the random error. α, γ, β are parameters to be estimated. The parameter γ thus captures the effects of the amount of fines on HHI.

The administrative fines may not only have a direct effect on market concentration in

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[13] A detailed description of the endogeneity bias can be found in Jeffrey Woodridge's econometric textbook. *See* Jeffrey Woodridge, *Econometric Analysis of Cross Section and Panel Data*, 2nd ed., The MIT Press (2009).

[14] Endogeneity can result in inconsistent estimation results. A detailed description of the endogeneity bias can be found in Jeffrey Woodridge's econometric textbook, *supra* note 13.

the same year when the fines are imposed, but may also generate an indirect deterrence effect that have an impact on market concentration in the following years. To empirically test the deterrence effect is a challenging task, and there is no clear approach on this issue. In this paper, we follow the approach used in Feinberg and Park[15] who argued that the deterrence effect can be empirically specified as the effect of the fines in the previous year on the current economic outcome. To test the possibility of the deterrence effect, I include the fines in the previous year ($F_{j,t-1}$) into equation (1) and estimate the following equation.

$$(2) \quad HHI_{jt} = \alpha + \gamma_1 * F_{jt} + \gamma_2 * F_{j,t-1} + \beta' z_{jt} + u_j + \varepsilon_{jt}$$

In equation (2), the direct effect and the indirect deterrence effect of the fines on the HHI variable can be disentangled by the parameters γ_1 and γ_2, respectively. The panel data fixed effect method is used to estimating equation (2).

4. Results and Discussions

In this section, I present the estimation results of the econometric models in Tables 2, 3 and 4. I discuss the results presented in each table based on the research questions I try to answer.

4.1   Do the fines rulings by the TFTC affect market concentration?

The first question to be addressed is to see whether the fines ruling by the TFTC affects the market concentration of the industrial sectors. I estimate the HHI equation using the sector level dataset consisting of 4,203 industrial sectors from 2006 to 2014 and the estimation results are presented in Table 2. Three models of different specifications in variables are estimated using the panel data fixed effect model and the explanatory variables include the amount of fines, number of firms in each industrial sector in each year, and sector and year dummies. In model A of Table 2, I use the total amount of fines for all types of illegal conduct rulings by the TFTC from 2006 to 2014 (the variable

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[15] *See* Robert M. Feinberg & Minsoo Park, "Deterrence Effects of Korean Antitrust Enforcement on Producer Prices and Profit Margins," *11(4) Journal of Competition Law and Economics*, 917-933 (2015).

Fines_all). In model B of Table 2, I break down the total amount of fines into antitrust (the variable *Fines_antitrust*) and unfair trade practices (the variable *Fines_unfair competition*). In model C of Table 2, I further break down antitrust fines into the violations of notification of mergers (the variable *Fines_antitrust_merger*), cartels (the variable *Fines_antitrust_catrel*) and vertical restraints (the variable *Fines_antitrust_vertical*) because it is evident that antitrust fines account for a significant proportion of the total fines (see Table 1).

Table 2. Estimation results of the HHI equations using the panel data fixed effect model

Model	(A)		(B)		(C)	
Variables	Coefficient	S.E	Coefficient	S.E	Coefficient	S.E
Fines_all	-0.0106 **	0.0058				
Fines_antitrust			-0.0107 **	0.0058		
Fines_antitrust_merger					1.3123	3.7103
Fines_antitrust_cartel					-0.0106 **	0.0058
Fines_antitrust_vertical					-0.9164	1.6232
Fines_unfair competition			1.1057	1.3694	1.1203	1.3699
Number of firms per sector	-0.4429	1.2066	-0.4132	1.2072	-0.4336	1.2080
Number of industrial sectors	467		467		467	
Number of years	9		9		9	
Control for years	Yes		Yes		Yes	
Control for industrial sectors	Yes		Yes		Yes	
Sample (# of sectors)	4,203		4,203		4,203	

Note: Standard errors are clustered in industrial sectors. ** denotes $p < 0.05$. All of the monetary terms are deflated to the 2006 level.

With respect to the estimation results in model A of Table 2, it is evident that the total amount of fine is negatively associated with market concentration. More specifically, the results indicate that every one million NT$ increase in total fines decreases the HHI value

by 0.0106 units. The estimation results of model B of Table 2 further indicate that only fines on antitrust conduct are statistically and negatively associated with the HHI value. In contrast, an insignificant effect is found for fines on unfair trade practices. When the antitrust fines are further divided into violations of merger notifications, cartels, and vertical restraints, the estimation results in model C of Table 2 show that only fines on cartel conduct are significantly associated with the HHI value. In contrast, fines on violations of merger notifications and vertical restraints are statistically insignificant.

4.2   Is there deterrence effect of the fines on market concentration?

In addition to the direct effects, it is possible that the fines ruling by the competition authorities may generate an indirect deterrence effect on market concentration. To test this hypothesis, I include not only the fines in the current year but also the fines in the previous year as the explanatory variables in the HHI equation. Similar to the specification of the HHI equation reported in Table 2, three models using different categories of fines are estimated and the results are presented in Table 3. The results presented in Table 3 echo the findings shown in Table 2, which indicate the significance of fines for cartel conduct on HHI. However, the results show that fines in previous years are not significantly associated with the HHI in the current year (see column C of Table 3). By further comparing the results presented in Table 2 and Table 3, it is evident that the magnitude of the direct effects of fines for cartel conduct on HHI slightly decreases from -0.0106 to -0.0100 after controlling for the potential deterrence effect.

4.3   The introduction of the leniency program and the increase in the maximum amount of fines for antitrust conduct

The Taiwan Fair Trade Act has been amended seven times since 1992, and the latest two amendments took place in 2015. In the fifth amendment in 2011, the leniency program was introduced. In addition, the maximum amount of fines for serious violations of abuse of dominance and cartel conduct were increased up to 10 percent of the total sales income in the previous accounting year of the enterprise. In the sixth amendment in February 2015,

circumstantial evidence was allowed to be considered in case investigations of concerning actions. In addition, the amount of fines increased 100% for violations of the abuse of dominance and cartel conduct. The administrative punishment prescription periods were also extended from 3 to 5 years. In the final amendment of the Taiwan Fair Trade Act in June of 2015, the antitrust fund was established, which provides an income source for *rewards for reporting illegal conducts* program (details of recent amendments in the fair trade act in Taiwan can be found in OECD 2015) [16].

In this section, I empirically test whether the introduction of the leniency program and an increase in the maximum amount of fines for antitrust conduct can strengthen the direct and indirect deterrence effects of the fines on market concentration. I estimate a HHI equation using the sector level dataset between 2011 and 2014. For this part of analysis, the total sample contains 1,401 sectors, and the estimation results are presented in column D of Table 3. The results show that fines on cartel conduct in the current and previous years are both significant and negatively associated with HHI. Interestingly, the magnitudes of the direct and indirect effects are more pronounced when they are compared with the results using the full sample (see column C of Table 3). The magnitude of the direct effect of the fines on HHI increases from -0.010 to -0.019 after the amendments of Taiwan Fair Trade Act in 2011. A similar result is found for the magnitude of the indirect deterrence effect, which increases from -0.098 to -0.135. This result may provide supportive evidence that the introduction of the leniency program and doubling the amount of the maximum fine for antirust conduct can result in stronger direct and indirect deterrence effects.

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[16] OECD, *Annual Report of Competition Policy Development in Chinese Taipei*, Competition Committee, OECD (2015).

Table 3. Estimation results of the HHI equations including fines from the current and previous year

Model	(A)		(B)		(C)		(D)	
Variable	Coefficient	S.E	Coefficient	S.E	Coefficient	S.E	Coefficient	S.E
Fines_all	-0.010 *	0.006						
Fines_all_lag	-0.078	0.086						
Fines_antitrust			-0.009 *	0.006				
Fines_antitrust_lag			-0.099	0.087				
Fines_antitrust_merger					1.405	3.798	3.314	6.019
Fines_antitrust_merger_lag					0.470	3.980	-2.154	22.265
Fines_antitrust_cartel					-0.010 *	0.006	-0.019 **	0.006
Fines_antitrust_cartel_lag					-0.098	0.088	-0.135 **	0.042
Fines_antitrust_vertical					10.872	16.640	18.723	12.138
Fines_antitrust_vertical_lag					-2.279	16.469	3.977	10.149
Fines_unfair competition			0.767	1.494	1.005	1.507	1.253	1.921
ines_unfair competition_lag			2.044	1.431	2.027	1.432	0.017	1.469
Numbers of firms per industry	-0.422	1.264	-0.335	1.267	-0.360	1.268	-1.407	2.645
Number of industrial sectors	467		467		467		467	
Number of years	8		8		8		3	
Control for years & sectors	Yes		Yes		Yes		Yes	
Sample (# of industrial sectors)	3,736		3,736		3,736		1,401	

Note: All of the monetary terms are deflated to 2006 level. Variable's name ends with "_lag" is the fines from the previous year. For example, "Fines_all_lag" is the total fines from the previous year. To include the lag variables, data in 2006 were excluded. Standard errors are clustered in industrial sectors.
   ** denotes p < 0.05; * denotes p < 0.1.

4.4 Which affects market concentration more? self-initiated vs. reported cases

Table 4 reports the estimation results when the total fines were divided into fines on self-initiated and reported cases. The estimation results in Table 4 suggest that fines on self-initiated cases have a statistically significant effect on HHI. More specifically, every 1 million NT$ increase in self-initiated cases decreases the HHI value by 0.01 unit, other things being equal. In contrast, the effect of fines in reported cases on HHI is statistically insignificant.

Table 4. Estimation of the HHI equations (reported vs. self-initiated cases)

Variable	Coefficient	S.E
Fines_reported	-0.061	0.096
Fines_self-initiated	-0.010 *	0.006
Number of firms per sector	-0.422	1.264
Number of industrial sectors	467	
Number of years	9	
Control for years	Yes	
Control for industrial sectors	Yes	
Sample (# of sectors)	4,203	

Note: All of the monetary terms are deflated to the 2006 level. Standard errors are clustered in industrial sectors. * denotes $p < 0.1$.

4.5 Implications on competition law enforcement in Taiwan

In this section, I provide rationales to explain the empirical findings with the competition law enforcements in Taiwan. Firstly, the results show that the fines ruling by the TFTC could reduce market concentration in the industrial sectors but the magnitude of the effect is subtle. This may reflect the fact that market concentration is determined by many other factors in addition to competition law enforcement efforts. For instance, market structures are likely correlated with macroeconomic environment. Another

noticeable finding is the significance of the direct and indirect deterrence effects of the fines on cartel cases, and the magnitudes of the direct and indirect deterrence effects are more pronounced after 2011. These results may provide empirical evidence to support the introduction of the leniency program and the increase in the maximum amount of antitrust fines in the amendments of the Taiwan fair trade act in 2011. These amendments increase not only the direct effect, but also the deterrence effect, of the fines on market concentration.

Empirical findings also reveal that the fines in self-initiated cases affect market concentration more aggressively than the ones in reported cases. Since the dataset only contains fines from 2006 to 2014, the analysis is silent about the "*awards for reporting illegal conduct*" program introduced in the 2015 amendment of the fair trade act in Taiwan. If the data become available, it would be interesting to investigate the efficacy of this program.

5. Conclusion

Compared to enormous ex-post evaluation studies conducted in Western jurisdiction, little evidence has been provided in Asia. There are only two papers that evaluated TFTC's ruling decisions. This paper fulfills this knowledge gap by providing an ex-post study to evaluate the effects of TFTC's antitrust and unfair competition fines on industrial sectors. By estimating a panel data fixed effect model, it is evident that the fines, especially those on cartel conduct, significantly reduce market concentration. Moreover, the magnitudes of the direct and indirect deterrence effects are more pronounced after the introduction of the leniency program and the increase in the maximum amount of fines on antitrust conduct. Some interesting policy implications can be inferred. First, the negative relationship between the fines and market concentration may provide supportive evidence for TFTC's law enforcement efforts. Since one of the policy objectives of TFTC is to insure a procompetitive economic environment, the reduction on market concentration corresponding to the administrative fines may indicate that TFTC's law enforcements are aggressive, especially on illegal cartels. Moreover, the significant effect of the indirect

deterrence effect on market concentration may reflect the fact that the fines are not only used to punish illegal activities, but also to generate deterrence for illegal activities in the future. Furthermore, the leniency program and the increase in maximum amount of fines on antitrust activities seem working well because a stronger effect on market concentration is found after this law amendment.

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行政罰鍰會影響市場集中度嗎？
來自臺灣的實證分析

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摘要

　　本文評估臺灣公平交易委員會之行政罰鍰是否會影響臺灣產業的市場集中度。本文所使用的行政罰鍰包含聯合行為、違反結合事前申報、垂直交易限制以及不公平競爭的案例。實證分析方法上，本文建構一個由 2006 年至 2014 年包含 4,203 個產業別的追蹤資料，並估計追蹤樣本固定效果模型。實證結果發現，公平交易委員會的行政罰鍰能有效減少產業集中度，其中又以對聯合行為的罰鍰統計效果最為顯著。甚而，本文實證分析結果亦顯示公平交易委員會的行政罰鍰不但具有懲罰違法行為的直接效果，其亦具備了威嚇效果。在政策改革方面，本文研究結果發現在公平交易法修法增列寬恕政策以及提高行政罰鍰上限後，行政罰鍰所具備的直接以及間接的威嚇效果較未修法前更為顯著，此一研究結果提供了公平交易委員會修法成效之評估。

關鍵詞：市場集中度、追蹤樣本固定效果模型、行政罰鍰、寬恕政策、公平交易委員會