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THE INITIAL RETURNS OF PROFIT-EXEMPTED IPOS IN TAIWAN

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ABSTRACT

This study investigates a unique sample of firms exempted from the profitability requirement of conducting initial public offerings (IPOs) in Taiwan. From 2005–2018, 67.31% of profit-exempted IPO firms were concentrated in the chemical and bio-pharmaceutical industry. The underpricing of profit-exempted IPO firms was 5.06% lower than those of other IPO companies. Additionally, the initial returns of profit-exempted IPO companies during the hot market were 18.82% higher than those of other IPO companies. In opposition to the signaling hypothesis, high-tech firms that are exempted from the profitability requirement may issue IPOs in the hot issue market and deliver optimistic messages about their future operations to mislead investors. Profit-exempted IPO companies obtain higher proceeds from IPOs by misleading investors about the true value of their firms. Therefore, this study suggests that firms exempted from the profitability requirement of conducting IPOs more closely follow the market timing hypothesis.

JEL: G30, G32

KEYWORDS: Hot Issue, Market Timing, IPOs, Profit-Exempted, Underpricing

INTRODUCTION

Taiwan passed the Act for the Development of Biotech and Pharmaceutical Industry in 2007. In an attempt to replicate the semiconductor industry's success in the 1980s, the regulator of Taiwan exempts new biotechnology drug development firms from the profitability requirement of conducting initial public offerings (IPOs). Subsequently, biotech and pharmaceutical stocks have created a boom of IPOs in Taiwan and have attracted considerable interest from investors. This situation is consistent with the argument made by Ritter (1984) and Helwege and Liang (2004), when IPOs are concentrated on specific industries that had accounted for most of the issuance in the hot market. Their short-term abnormal returns of IPOs are significantly higher than those of other firms during the same period. This suggests that IPO returns are related to underwriters catering to market demand.

The following case is an example of firms in Taiwan taking the opportunity to issue IPOs during the hot market. In August 2020, ASLAN-KY (6497), whose net equity value per share was less than 5 New Taiwan Dollars (NTD), was delisted from Taiwan's capital market after less than three years, creating a shock for the market. In an interview with Business Week before the IPO, Carl Firth, CEO and former Chairman of ASLAN-KY (6497), stated, "Taiwan's retail investors have shown great interest in biotech stocks. Therefore, ASLAN chose to list in Taiwan to raise funds after studying the Taiwan over-the-counter (OTC) market and the U.S. Nasdaq market" (Cai, 2016).

Welch (1989) shows that high-quality issuers used the low offer price of IPOs to distinguish themselves from low-quality issuers, which affected their subsequent issuance and increased their capital. However, Demers and Joos (2007) suggest that high-tech start-ups, unlike other firms, have negative cash flows and large accumulated losses. They increasingly rely on intangible assets and equity financing and often post

significant accounting losses due to R&D failures. For profit-exempted high-tech firms, equity financing is extremely important for them. If the issuer uses the hot market to raise the earnings of their IPOs, there should be an incentive to send positive messages to reduce IPO price disagreement with investors and increase earnings. Zörgiebel (2016) finds that technology stocks with negative earnings give investors have overly optimistic expectations through marketing methods, creating market demand and increasing IPO gains. Regarding IPOs in the technology industry in Taiwan. Lu, Kao, and Chen (2012) also find substantial R&D expenditure and reveal that the greater the growth expectation, the more effective it is to reduce the underpricing of IPO issuance. In addition, Dittmar and Thakor (2007) and Boulton and Campbell (2016) suggest that lower underpricing of IPO would be observed. If issuers chose to set the underwriting period to a time when they and shareholders were in the least disagreement about firm value.

Therefore, due to the unique features of high-tech firms, this study examines a special sample set of firms exempted from the profitability requirement of conducting IPOs in Taiwan. The findings indicate that such firms are highly dependent on equity financing when they have negative cash flow, which gives the insiders an advantage over informed outsiders. Firms may declare optimistic prospects of their future operations in an attempt to mislead investors into misjudging their true value, thereby reducing IPO price disagreement and obtaining lower underpricing of IPOs. In addition, we find that firms exempted from the profitability requirement of conducting IPOs may issue in the hot market. They used market optimism to mislead investors into misestimating their true value, as the initial returns of their IPOs were higher than those of other firms during the hot-market period.

This paper has the following three contributions. First, this is the first study that focuses on the underpricing of IPOs for Taiwan's profit-exempted companies. Second, the results show that profit-exempted eligibility companies demonstrate behavior that is consistent with the market timing theory. Issuers will aggressively convey optimistic expectations to reduce IPO price divergence, i.e., lower first-day initial returns. Additionally, the profit-exempted eligibility companies may take the opportunity of hot market issuance to cause investors to misestimate the true value of their company to obtain IPO earnings. Third, the results of this paper can be used as a reference for regulatory agencies to manage profit-exempted IPO companies. This paper is organized as follows. Section 2 reviews the relevant literature and proposes the hypotheses. Section 3 describes the data and research methodology. Section 4 discusses the empirical results, and Section 5 is the conclusion of this paper.

LITERATURE REVIEW AND HYPOTHESIS

Exemption from the Profitability Requirement of IPOs in Taiwan

For the development of advanced technology firms that can raise funds through listing. The profit requirements exemption of IPO firms were approved by the Taiwan Stock Exchange (TWSE) for certain specialty industries in 1992 and the Taipei Exchange (TPEx) in 2008. In other words, IPO firms that meet specific conditions can be exempted from the profitability requirement. The profit-exempted rules are made by the TWSE Corporation's Securities Listing Review Guidelines and the Republic of China Securities OTC Trading Center Securities Dealer Business Office Review Guidelines. The Exemption from the Profitability Requirement before Conducting IPOs was approved by the Industrial Development Bureau, Ministry of Economic Affairs and the Council of Agriculture of the Executive Yuan, the Ministry of Culture, respectively.

In 2017, the exemption from the profitability requirement of IPOs was approved by the Ministry of Economic Affairs (MEA). The MEA convenes with the experts and holds a meeting to evaluate and vote for the permissions according to different industry types. The obtained certificate can be applied for IPOs within one year.

Initial Returns of IPOs

The dot-com bubble in 2000 provided a comparison of the difference in the IPOs between high-tech stocks issued by firms with negative cash flows and IPOs issued by firms in general. Aggarwal, Bhagat, and Rangan (2009) investigated IPOs in the U.S. from 1986–2001 and found that the market-to-book ratio of firms with more negative earnings was higher than that of firms with low negative earnings. They suggest that large accumulated losses are a proxy for growth opportunities for internet firms, as investors have optimistic expectations for the future growth potential of companies with large accumulated losses. In addition to electronic technology stocks, Guo, Lev, and Zhou (2005) examine the offering price of IPOs for biotechnology stocks. They find that it is entirely different from discounted cash flows but relies on the ratio of R&D expenditures to expenses. Overall, the more R&D expenditures, the greater accumulated losses, which indicates greater growth strength of intangible assets of the firm. Moreover, Zörgiebel (2016) use a sample of U.S. IPOs from 1994–2013. He finds that technology stocks with negative earnings, venture capital and underwriters may use marketing methods to give investors excessively optimistic expectations, creating market demand and increasing their IPO revenue. Neill, Pourciau, and Schaefer (1995); Friedlan (1994); and DuCharme, Malatesta, and Sefcik (2001) also suggest that IPO issuers will use information asymmetry to mislead investors about future growth expectations to affect the underwriting price of IPOs, thereby increasing their IPO proceeds. In terms of Taiwanese technology stock IPOs, Lu, Kao, and Chen (2012) find that the higher the proportion of corporate R&D expenditures, the lower the underpricing of IPOs.

Rock (1986) suggests that the underpricing of IPOs must be increased to enable uninformed investors to earn a risk-adjusted return due to high uncertainty. However, considering that IPOs of high-tech stocks with negative earnings are the main source of capital increases and that firm valuation focuses on expectations of high future growth. The managers of high-tech IPOs may proactively mislead investors by exaggerating their future growth potential, convincing them that their future growth uncertainty is low and thus reducing IPO price disagreement to increase their IPO gains. Therefore, lower initial returns of IPOs can be observed. Boulton and Campbell (2016); Dittmar and Thakor (2007); and Heaton (2002) suggest that when the disagreement between issuing firms and investors is low, the manager will issue equity to maximize the proceeds of IPOs, which decreases the underpricing of IPOs.

For the initial returns of IPOs, the unique high-tech firms that are exempted from the profitability requirement of conducting IPOs in Taiwan. It provides a good sample source for the analysis of the difference between high-tech firms with negative cash flows and firms in general. These firms not only have unstable cash flows but also may continue to lose money after the issuance. As it is not easy to conduct debt financing, external equity financing is an important source of financing, so obtaining funds during the IPO stage has a significant impact on a company's future operations. Therefore, to increase their IPO revenue, issuers have incentives to proactively convey optimistic messages to convince investors that their future growth uncertainty is quite low and reduce the offering price disagreement with investors.

Hypothesis 1: The initial returns of firms that are exempted from the profitability requirement of IPOs are lower than other IPO firms.

IPO Issuances under Hot Market

Banerjee, Güçbilmez, and Pawlina (2016) propose a theoretical approach that models the dynamics of going public within an IPO wave. They suggest that the early leaders of IPOs receive high valuation and high initial returns, attracting more followers to enter the IPO market and forming a clustering phenomenon. Derrien (2005) suggest that investor sentiment affects value judgment when IPOs are issued during the hot market, and rising market demand leads to rising investor sentiment, causing IPOs to be overpriced with high initial returns. Ljungqvist, Nanda, and Singh (2006) reveal that during the dot-com IPO boom from

1999–2000, underwriters would attempt to sell stocks to maximize their own profits at the expense of irrational investors. Therefore, the high initial returns of IPOs are the result of limiting the stock supply and attempting to maintain the market price.

Furthermore, it is widely assumed that high-tech firms have more fluctuating cash flows and find it difficult to obtain favorable terms with respect to interest conditions and repayment obligations. Therefore, it is imperative that they choose listed equity financing to raise funds. In addition, high-tech firms with negative earnings are significantly different from firms in general in terms of intangible assets, patents, R&D expenses, and accumulated losses (Joos and Zhdanov, 2008). Considering the differences in financial characteristics, the evaluation model used for the prediction of high-tech IPO results should not be the same as that for firms in general. Therefore, the comparison of IPOs in high-tech industries should be analyzed independently (Demers and Joos, 2007).

Moreover, the information gap between the high-tech firms exempted from the profitability requirement of conducting IPOs and investors is quite large. If it is true that high-tech firms proactively send optimistic signals in an attempt to increase the gains of IPOs, there are incentives for them to issue in the hot market to attract investors. In addition, equity financing is more important for high-tech firms than other firms. Therefore, they use issuance in the hot market to mislead investors to misestimate the value of their investments and the initial returns of their IPOs would be higher than those of firms in general.

Hypothesis 2: The initial returns of firms that exempted from the profitability requirement of IPOs in the hot market are higher than other IPO firms.

DATA AND METHODOLOGY

Data Source

This paper examines 738 IPO cases between 2005 and 2018 in Taiwan. Fifty-two of them were eligible for profit exemption, and 35 of these were concentrated in the chemical and bio-pharmaceutical industry, accounting for 67.31% of the total sample. Variables in this paper related to issuance price, listing date, the issue success rate of IPOs, issuance amount, listing category, and lead underwriter were obtained from the official announcements of the TWSE and the underwriting announcements of the Taiwan Securities Association. Financial information such as first-day initial returns of IPOs, market-weighted index, industry category, total assets, market-to-book ratio, and long-term liabilities was retrieved from the Taiwan Economic Journal (TEJ). The information on venture capital was obtained from the public disclosure statement of each firm's IPO. This study started with the first listing exempted from the profitability requirement in Taiwan.

Definition of Variables

The definitions of independent variables and dependent variables in this study are listed below.

Exemption from the Profitability Requirement before Conducting IPOs (FREE): The main observation variable in this study is profit-exempted firms. Therefore, for firms with exemption from the profitability requirement before conducting IPOs, *FREE* = 1; for firms that are not qualified, *FREE* = 0.

IPO initial returns (UP): The definition of IPO initial return follows that of Chang, Chiang, Qian, and Ritter (2017). They computed the percentage change between the closing price on the first date that does not hit the limit price and the offering price of the IPO. In addition, we also deducted the corresponding market return from the initial return to obtain the risk-adjusted initial return of IPOs.

$$UP = \frac{(P_C - P_S)}{P_S} - \frac{(I_C - I_S)}{I_S} \quad (1)$$

Pc is the closing price on the first non-hit day after the issuance. *Ps* is the IPO issue price. *Ic* is the closing price of the market-weighted index on the first non-hit day after the issuance. Finally, *Is* is the closing price of the market-weighted index on the day before the issuance.

Market-to-book value ratio (MB): This paper uses the market value at the end of the IPO year divided by the book value of shareholders' equity as a proxy for future growth potential.

Listed or OTC (EXC): If IPOs are listed OTC, *EXC* = 1; otherwise, *EXC* = 0.

Venture capital holdings (VC): If there are venture capital holdings at the time of the IPO, *VC* = 1; otherwise, *VC*=0.

High-tech industry (TECH): If IPOs belong to high-tech industries classified by the Ministry of Science and Technology, R.O.C, *TECH* = 1; for the rest, *TECH* = 0.

The percentage of issue success rate (OVERSUB): The percentage of issue success rate is the total number of shares subscribed by IPOs divided by the total number of shares subscribed by investors.

Underwriter's reputation (UNDEWR): This paper uses the market share of the underwriter in the year of the IPO as a proxy variable for the underwriter's reputation.

Leverage ratio (LEV): This paper defines the leverage ratio as the ratio of long-term liabilities to total assets in the fiscal year before the IPO.

Thirty-day Market Index Return before the IPO filing date (PRIOP30): I_F is the market-weighted stock price index on the IPO application date, while I_{F30} is the market-weighted index thirty days before the IPO application.

$$PRIOP30 = \frac{(I_F - I_{F30})}{I_{F30}} \quad (2)$$

Firm idiosyncratic risk (RMSE): Regression analysis of daily returns and market-weighted index returns within one year after IPOs is used to obtain the standard deviation of the residuals as a proxy variable for the firm idiosyncratic risk.

Timing of IPOs (HOT, COLD): If the initial return of IPOs and the moving average of the IPOs' monthly issuance volume is higher than 75% of all sample values, it is regarded as a hot issuance, and *HOT* = 1; the rest *HOT* = 0. Conversely, if it is lower than 25% of all sample values, it is regarded as a cold issuance, and *COLD* = 1; the rest *COLD* = 0.

Company Size (lnASSET): This paper uses the natural logarithm of total assets in the fiscal year before the issuance of IPOs as a proxy variable for company size.

Fundraising scale (PROSEED): In this paper, we calculated the fundraising scale as the natural logarithm of the total funds raised by the IPO.

Research Methodology

For Hypothesis 1, we estimated the following ordinary least squares (OLS) regression model:

$$UP_i = \alpha_0 + \alpha_1 FREE_i + \alpha_2 EXC_i + \alpha_3 OVERSUB_i + \alpha_4 VC_i + \alpha_5 TECH_i + \alpha_6 UNDEWR_i + \alpha_7 LEV_i + \alpha_8 PRIOR30_i + \alpha_9 RMSE_i + \alpha_{10} HOT_i + \alpha_{11} COLD_i + \alpha_{12} InASSET_i + \alpha_{13} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i \quad (3)$$

The dependent variable is *UP*, and the main explanatory variable is *FREE. EXC, OVERSUB, VC, TECH, UNDEWR, LEV, PRIOP30, RMSE, HOT, COLD, LnASSET*, and *PROSEED* are control variables. γ is a vector of year fixed effect, and δ is a vector of industry fixed effect. The standard error is a heteroscedasticity-consistent standard error.

The control variables included follow Lu and Chen (2017). If Hypothesis 1 is supported, firms exempted from the profitability requirement of IPOs would tend to proactively and positively convey high future growth signals to reduce the offering price disagreement with investors. It suggests that *UP* of profit-exempted firms would lower than other IPO firms. The coefficient α_1 for *FREE* should be negative.

For Hypothesis 2, we estimated the following OLS regression model:

$$UP_i = \alpha_0 + \alpha_1 FREE_i + \alpha_2 (FREE_i \times HOT_i) + \alpha_3 EXC_i + \alpha_4 OVERSUB_i + \alpha_5 VC_i + \alpha_6 TECH_i + \alpha_7 UNDEWR_i + \alpha_8 LEV_i + \alpha_9 PRIOR30_i + \alpha_{10} RMSE_i + \alpha_{11} HOT_i + \alpha_{12} COLD_i + \alpha_{13} InASSET_i + \alpha_{14} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i \quad (4)$$

The dependent variable is *UP*, and the main explanatory variable is the interaction term of *FREE* and *HOT*. *EXC, OVERSUB, VC, TECH, UNDEWR, LEV, PRIOP30, RMSE, HOT, COLD, LnASSET*, and *PROSEED* are control variables. γ is a vector of year fixed effect, and δ is a vector of industry fixed effect. The standard error is a heteroscedasticity-consistent standard error.

If Hypothesis 2 is supported, firms exempted from the profitability requirement would issue IPOs in the hot market to cause investors to misestimate the true value of firms. Therefore, the initial returns of IPOs issued by these firms during the hot market would be higher than other IPO firms. The coefficient α_2 of the interaction term between *FREE* and the control variable of *HOT* should be positive.

Table 1: Industry Annual Distribution of Observations Companies

Years	Number of IPOs	Number of Profit-exempted Firms	Profit-exempted Percentage	Profit-exempted Firms in Chemical and Bio-pharmaceutical Industry	Profit-exempted Firms in Chemical and Bio-pharmaceutical Industry Percentage
2005	62	2	3.85%	1	1.92%
2006	43	1	1.92%	1	1.92%
2007	52	1	1.92%	1	1.92%
2008	36	0	0.00%	0	0.00%
2009	39	1	1.92%	0	0.00%
2010	45	3	5.77%	1	1.92%
2011	82	3	5.77%	3	5.77%
2012	61	9	17.31%	6	11.54%
2013	58	8	15.38%	6	11.54%
2014	50	5	9.62%	3	5.77%
2015	54	7	13.46%	4	7.69%
2016	57	3	5.77%	3	5.77%
2017	39	4	7.69%	3	5.77%
2018	60	5	9.62%	3	5.77%
Total	738	52	100.00%	35	67.31%

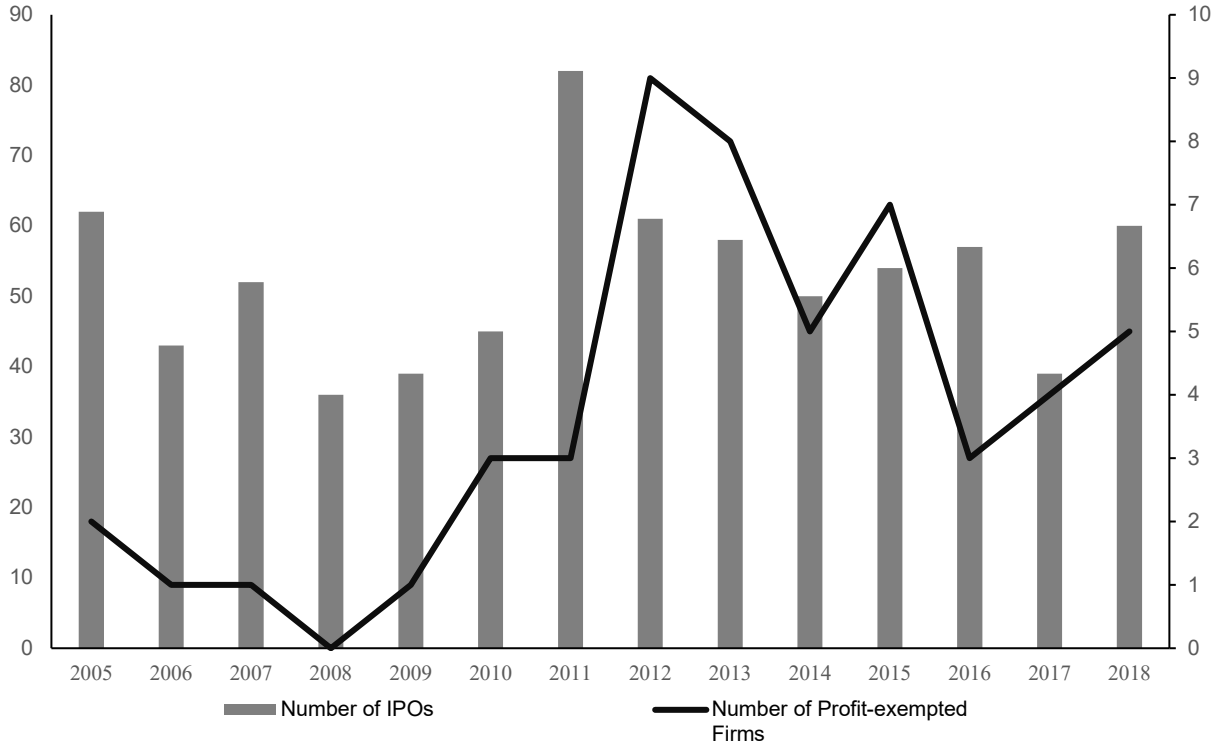
This table shows the total number of IPO and profit-exempted firms between 2005 and 2018 by year, respectively. Profit-exempted percentage is the percentage value of the annual the number of profit-exempted firms over the total number of profit-exempted firms. Profit-exempted firms in chemical and bio-pharmaceutical industry percentage is the percentage value of the annual the number of profit-exempted firms in chemical and bio-pharmaceutical industry over the total number of profit-exempted firms.

Sampling Distribution

Table 1 shows the sample distribution of IPO firms and profit-exempted firms by year. A total of 52 firms were exempted from the profitability requirement of IPOs, of which, 35 were concentrated in the chemical and bio-pharmaceutical industry, accounting for 67.31% of the total sample.

From 2012–2015, the number of profit-exempt firms was 29, which equals 55.77% of the total number of profit-exempted firms. Subsequently, there was a decline in these firms from 2016–2018, with only 12 profit-exempted firms, which equals 23.08% of all profit-exempted firms. The above distribution suggests that firms exempted from the profitability requirement of IPOs are concentrated in the same set of industries and in certain years. It is consistent with the argument made by Ritter (1984) and Helwege and Liang (2004) that IPOs are concentrated in the same industries during both hot and cold markets.

Figure 1: Annual Distribution of Sample Companies



This figure shows the sample distribution of the number of total IPO firms and profit-exempted firms by year, respectively. The left axis is the number of total IPOs while the right axis is the number of profit-exempted firms.

Descriptive Statistics

Table 2 presents the results of summary statistics. The mean, standard deviation, 25th percentile, median, and 75th percentile of all variables are reported in Table 2. The results show that 7.1% of IPOs were *FREE* firms. The mean value of *UP* was 37.6%, and the median was 26.1%, indicating that the average initial returns of IPOs were affected by a small number of stocks that obtained highly positive initial returns. Overall, 64.23% of IPOs is listed on the OTC, which is in line with the threshold for listing requirement on the OTC, which is relatively lower than the TWSE. Thereby, the number of IPOs is higher than that of listed companies in the TWSE. The average ratio of *VC* was 47.97%. The average ratio of *TECH* was 58.7%, which is in line with Taiwan's IPOs firms being mainly in the electronics industry. The average value of *OVERSUB* was 4.84%, and the median was 2.04%. The subscription ratio was the reciprocal of the issue success rate. The subscription ratio is the total number of shares subscribed by investors divided by the total number of shares subscribed by IPOs. Hence, the average subscription ratio is computed from 1/0.0484 = 20.66, and the median subscription ratio is computed from 1/0.0204 = 49.02. The average leverage ratio (*LEV*) of long-term liabilities to total assets was 6.09%. The mean value of *PRIOP30* was 0.22%. The average value of *RMSE* was 0.038. The *HOT* ratio was 1.76%, and the *COLD* ratio was 4.20%. The average of *lnASSET* of individual companies in the fiscal year before IPOs was 14.42. For *PROSEED*, the mean of the natural logarithm was 19.36.

Table 2: Summary Statistics

Variables	N	Mean	S.D.	Percentile		
				25	Median	75
FREE	738	0.071	0.256	0.000	0.000	0.000
UP	738	0.376	0.508	0.091	0.261	0.491
MB	738	2.704	2.194	1.486	2.118	3.225
EXC	738	0.642	0.480	0.000	1.000	1.000
VC	738	0.480	0.500	0.000	0.000	1.000
TECH	738	0.587	0.493	0.000	1.000	1.000
OVERSUB (%)	738	4.839	11.805	1.070	2.040	4.048
UNDEWR	738	0.066	0.050	0.024	0.042	0.112
LEV	738	0.061	0.093	0.000	0.019	0.095
PRIOP30	738	0.002	0.054	-0.029	0.007	0.036
RMSE	738	0.038	0.028	0.025	0.032	0.042
HOT	738	0.018	0.132	0.000	0.000	0.000
COLD	738	0.042	0.201	0.000	0.000	0.000
LnASSET	738	14.424	1.097	13.697	14.253	14.926
PROSEED	738	19.364	1.009	18.625	19.272	20.005

The table above presented the variables of Mean, Standard deviation, Median, Percentile and Skewness Coefficient. Including of Exemption from the Profitability Requirement before Conducting IPOs (Free), IPO initial returns (UP), Market-to-book value ratio (MB), Listed or OTC (EXC), Venture capital holdings (VC), High-tech industry (TECH), The percentage of issue success rate (OVERSUB), Underwriter's reputation (UNDEWR), Financial leverage (LEV), Thirty-days Market Index Return before the IPO filing date (PRIOP30), Firm idiosyncratic risk (RMSE), Timing of IPOs (HOT, COLD), Company Size (lnASSET), Fundraising scale (PROSEED).

RESULTS

Exemption from the Profitability Requirement of IPOs and Initial Returns

Table 3 demonstrates the regression results of the relation between the exemption from the profitability requirement of IPOs and initial returns of IPOs. We first controlled the IPO characteristics and year fixed effect in models (1) and (3). Then, we controlled the industry and other firm characteristics in models (2) and (4). For all models used in Table 3, the coefficients of FREE was negative and significant at the 10% level at least. Specifically, in model (4) of Table 3, after all variables and fixed effects were controlled, the results indicate a negative relationship between FREE and UP of IPOs, with a coefficient of −0.0506 and a t-value of −1.67. The coefficient was significant at the 10% level, which supports Hypothesis 1. The results indicated that the firms exempted from the profitability requirement of IPOs had underpricing that was 5.06% lower than that of other IPO companies.

Previous studies have highlighted that due to high uncertainty, the underpricing of high-tech stocks must be increased to attract uninformed investors (Rock, 1986). However, the results of this study indicate that high-tech stocks of firms exempted from the profitability requirement of conducting IPOs are overpriced, which is consistent with previous studies by Aggarwal, Bhagat and Rangan (2009) and Zörgiebel (2016). This suggests that high-tech firms exempted from the profitability requirement of conducting IPOs with negative cash flows have a higher tendency to proactively convey high future growth signals than other

IPO firms. As investors are convinced that their future uncertainty is low and the IPO price disagreement is reduced to increase IPO proceeds, the underpricing of IPOs is lower than that of other IPO firms. In other words, the valuation of high-tech firms exempted from the profitability requirement of conducting IPOs is higher than that of firms in general. This study suggests the initial returns of IPOs issued by firms exempted from the profitability requirement in Taiwan are significantly lower than those of other IPO firms.

For the control variables, in model (4), OVERSUB was negatively correlated with UP of IPOs with a coefficient of −0.0024 and was significant at the 1% level, indicating that a lower issue success rate (higher subscription ratio) led to higher initial returns of IPOs. The findings are consistent with those of past studies (Rock, 1986; Beatty and Ritter, 1986). PRIOP30 was positive and significantly correlated with UP of IPOs. This suggests that there is a lead–lag relationship between issuance under a hot-market period and initial returns of IPOs. It shows that liquid market returns before IPO pricing positively affected initial returns of IPOs (Lowry and Schwert, 2004). RMSE was significantly positively correlated with the UP of IPOs, which supported previous findings that asset risk premium is positively correlated with the stand-alone risk. When uncertainty increased in a firm, the degree of information asymmetry became higher, and it would need to increase its returns to attract investors to subscribe (Goyal and Santa-Clara, 2003).

In terms of firm size, previous studies have concluded that firm size has a positive correlation with the initial returns of IPOs. It is argued that the larger the total assets of the firm, the higher the discount on IPOs. Issuers attempt to create excessive demand by suppressing the underwriting price of IPOs, which results in a diversification effect on equity. It reduces the monitoring of the firm by major shareholders, eventually separating the ownership and control of the firm (Field and Sheehan, 2004). Hanley (1993) and Hanley and Wilhelm (1995) find that underwriters play an important role in the equity allocation and price adjustment of IPOs. Generally speaking, the larger the amount of capital raised, the lower the initial returns of IPOs. The results of this paper are consistent with previous literature: the larger the amount of capital raised, the lower the initial returns of IPOs.

Table 3: Exemption from the Profitability Requirement before Conducting IPOs and Initial Returns

	(1)	**(2)**	**(3)**	**(4)**
Intercept	-0.2235*** (-12.98)	-0.1297 (-1.041)	-0.2472*** (-5.205)	-0.1357 (-0.984)
FREE	-0.0687** (-2.474)	-0.0546** (-1.965)	-0.0581* (-1.904)	-0.0506* (-1.669)
EXC	-0.0115 (-1.162)	-0.0107 (-0.789)	-0.0086 (-0.832)	-0.0111 (-0.780)
OVERSUB	-0.0023*** (-3.336)	-0.0023*** (-3.325)	-0.0024*** (-3.474)	-0.0024*** (-3.445)
TECH	-0.0122 (-1.167)	-0.0069 (-0.631)	0.0088 (0.474)	0.0112 (0.591)
UNDEWR	0.1002 (1.039)	0.1283 (1.347)	0.0948 (0.947)	0.1045 (1.071)
PRIOP30	0.3944*** (4.434)	0.3971*** (4.468)	0.3767*** (4.218)	0.3780*** (4.231)
RMSE	17.0620*** (69.00)	17.0700*** (63.75)	17.1393*** (62.09)	17.1157*** (59.86)
HOT	-0.0386 (-1.124)	-0.0386 (-1.143)	-0.0472 (-1.639)	-0.0507* (-1.768)
COLD	-0.0332 (-1.412)	-0.0361 (-1.520)	-0.0193 (-0.858)	-0.0211 (-0.933)
VC		-0.0136 (-1.312)		-0.0069 (-0.647)
LEV		-0.0325 (-0.695)		-0.0655 (-1.339)
LnASSET		0.0131** (2.099)		0.0093 (1.298)
PROSEED		-0.0145** (-2.188)		-0.0118* (-1.670)
INDUSTRY	NO	NO	YES	YES
Year FE	YES	YES	YES	YES
Observations	738	738	738	738
Adjusted R2	0.9294	0.9297	0.9316	0.9315

The table above conducts a multivariate analysis of profit-exempted eligibility (FREE) and initial returns for IPOs (UP) ,estimates the initial return of IPOs using ordinary least squares regression (OLS) with the main observation variable being the exemption from profit conditions (FREE). $UP_i = \alpha_0 + \alpha_1 FREE_i + \alpha_2 EXC_i + \alpha_3 OVERSUB_i + \alpha_4 VC_i + \alpha_5 TECH_i + \alpha_6 UNDEWR_i + \alpha_7 LEV_i + \alpha_8 PRIOR30_i + \alpha_9 RMSE_i + \alpha_{10} HOT_i + \alpha_{11} COLD_i + \alpha_{12} InASSET_i + \alpha_{13} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i$ *(3). The control variables: If IPOs are listed for the OTC, set EXC = 1; otherwise, set EXC = 0. If IPOs belong to the high-tech industry, let TECH = 1, and the rest, TECH = 0. PRIOP30 is thirty-days Market Index Return before the IPO filing date. RMSE is firm idiosyncratic risk. If there are venture capital holdings at the time of the IPO, let VC=1; otherwise, no venture capital holdings, let VC=0. OVERSUB, the issue success rate. UNDEWR, Underwriters reputation. LEV, financial leverage. Hot issuance, set HOT = 1; the rest HOT = 0. Cold issuance, set COLD = 1; the rest COLD = 0. MB is Market-to-book value ratio. LnASSET, Asset size, the natural logarithm of the total assets of IPOs in the previous fiscal year. PROSEED, the scale of funds raised by IPOs, the natural logarithm of the total funds raised by IPO. Year and Industry fixed effects are included. Year and Industry fixed effects are included. t-value is reported in parentheses, and the standard error is adjusted by heteroscedasticity. *, **, and *** refer to the 10%, 5%, and 1% significance level, respectively.*

Exemption from the Profitability Requirement of IPOs and Issuance under a Hot Market

Table 4: Exemption from the Profitability Requirement before Conducting IPOs and Issuance under Hot Market

	(1)	(2)	(3)	(4)
Intercept	-0.2237*** (-12.98)	-0.1417 (-1.141)	-0.2481*** (-5.200)	-0.1493 (-1.085)
FREE	-0.0728*** (-2.587)	-0.0590** (-2.091)	-0.0619** (-2.005)	-0.0545* (-1.773)
FREE×HOT	0.1927*** (4.706)	0.1917*** (4.414)	0.1974*** (5.126)	0.1882*** (4.701)
EXC	-0.0109 (-1.098)	-0.0093 (-0.685)	-0.0078 (-0.752)	-0.0095 (-0.670)
OVERSUB	-0.0022*** (-3.323)	-0.0023*** (-3.314)	-0.0024*** (-3.467)	-0.0024*** (-3.437)
TECH	-0.0121 (-1.157)	-0.0067 (-0.615)	0.0090 (0.4812)	0.0113 (0.601)
UNDEWR	0.0974 (1.010)	0.1237 (1.300)	0.0924 (0.950)	0.1003 (1.027)
PRIOP30	0.3930*** (4.414)	0.3954*** (4.444)	0.3748*** (4.194)	0.3757*** (4.203)
RMSE	17.0724*** (68.73)	17.0823*** (63.47)	17.1508*** (61.89)	17.1287*** (59.66)
HOT	-0.0528 (-1.608)	-0.0526 (-1.595)	-0.0619** (-2.325)	-0.6453** (-2.400)
COLD	-0.0331 (-1.406)	-0.0359 (-1.514)	-0.0191 (-0.850)	-0.0209 (-0.923)
VC		-0.0139 (-1.342)		-0.0073 (-0.677)
LEV		-0.0303 (-0.644)		-0.0629 (-1.285)
LnASSET		0.0132** (2.123)		0.0093 (1.303)
PROSEED		-0.0140** (-2.115)		-0.0111 (-1.589)
INDUSTRY	NO	NO	YES	YES
Year FE	YES	YES	YES	YES
Observations	738	738	738	738
Adjusted R2	0.9295	0.9298	0.9317	0.9316

The table above conducts a multivariate analysis of profit-exempted eligibility (FREE) and initial returns for IPOs (UP), estimates the initial return of IPOs using ordinary least squares regression (OLS) with the main observation variable being the exemption from profit conditions (FREE) interaction with the Hot Market (HOT) issue (FREE×HOT). $UP_i = \alpha_0 + \alpha_1 FREE_i + \alpha_2(FREE_i \times HOT_i) + \alpha_3 EXC_i + \alpha_4 OVERSUB_i + \alpha_5 VC_i + \alpha_6 TECH_i + \alpha_7 UNDEWR_i + \alpha_8 LEV_i + \alpha_9 PRIOR30_i + \alpha_{10} RMSE_i + \alpha_{11} HOT_i + \alpha_{12} COLD_i + \alpha_{13} InASSET_i + \alpha_{14} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i$ (4). *The control variables: If IPOs are listed for the OTC, set EXC = 1; otherwise, set EXC = 0. If IPOs belong to the high-tech industry, let TECH = 1, and the rest, TECH = 0. PRIOP30 is thirty-days Market Index Return before the IPO filing date. RMSE is firm idiosyncratic risk. If there are venture capital holdings at the time of the IPO, let VC=1; otherwise, no venture capital holdings, let VC=0. OVERSUB, the issue success rate. UNDEWR, Underwriters reputation. LEV, financial leverage. Hot issuance, set HOT = 1; the rest HOT = 0. Cold issuance season, set COLD = 1; the rest COLD = 0. MB is Market-to-book value ratio. LnASSET, Asset size, the natural logarithm of the total assets of IPOs in the previous fiscal year. PROSEED, the scale of funds raised by IPOs, the natural logarithm of the total funds raised by IPO. Year and Industry fixed effects are included. t-value is reported in parentheses, and the standard error is adjusted by heteroscedasticity. *, **, and *** refer to the 10%, 5%, and 1% significance level, respectively.*

Table 4 shows the empirical regression results on the relations between the exemption from the profitability requirement of IPOs and the issuance under a hot market. As with Table 3, we estimated different models to control for different control variables and fixed effects. For all models controlled in Table 4, there was a positive relationship between the interaction term of FREE×HOT and initial returns of IPOs with a 1% significance level. Specially, after all variables and fixed effects were controlled, model (4) of Table 4 showed that the coefficient of the interaction term, FREE×HOT, was 0.1882 and that it was significant at a 1% level, which supports Hypothesis 2.

This study suggests that IPOs issued in a hot market by firms exempted from the profitability requirement had significantly higher initial returns. These results are consistent with those of previous studies conducted by Allen and Faulhaber (1989); Ljungqvist, Nanda, and Singh (2006); and Stambaugh, Yu, and Yuan (2012). They indicate that high-tech firms exempted from the profitability requirement of conducting IPOs with negative cash flows may take advantage of issuance in a hot market to cause investors to misestimate the true value of their investments. Therefore, the initial returns of IPOs would be significantly higher than those of other IPO firms. In terms of the economic significance, this study finds that the average UP of IPOs issued by profit-exempted firms in the hot market was significantly higher than that by other IPO firms in general by approximately 18.82%. Driven by the clustering of IPOs issued by firms exempted from the profitability requirement in the hot market, the overall average UP of IPOs are higher than those of other IPO firms.

Additional Test: Exemption from the Profitability Requirement of IPOs and Market-to-book Ratio

So far, we have examined how the profit-exempted requirement of IPO affects the underpricing of IPOs and how the joint effect of profit-exempted requirement of IPO and hot issue market affects the initial returns of IPOs. Next, we determined whether the exemption from the profitability requirement of IPOs increases the company's valuation and reduces the underpricing issuance by affecting investors' optimistic expectations.

Aggarwal, Bhagat, and Rangan (2009); Guo, Lev, and Zhou (2005); and Zörgiebel (2016) find that the MB of IPOs of high-tech stocks with higher negative earnings is greater than that of high-tech stocks with lower negative earnings. They indicate that accumulated losses for intangible asset investments represented future growth potential and has a significant impact on investors' IPO valuation. If it is true that firms exempted from the profitability requirement before conducting IPOs have high growth potential in the future. Their corporations' value should be evaluated higher than that of other IPO firms; in other words, they should have a higher MB.

Moreover, Zörgiebel (2016) point out that technology stocks with negative earnings may create market demand through marketing tools, giving investors overly optimistic expectations, thereby increasing IPO proceeds. Lu, Kao, and Chen (2012) also indicate that the higher the ratio of R&D expenses of a technology company, the more attractive the growth potential to investors, and the better the effect of reducing Taiwan IPO underpricing. De Bondt and Thaler (1987); Daniel, Hirshleifer, and Subrahmanyam (1998, 2001); and Lakonishok, Shleifer, and Vishny (1994) find that high market-to-book ratios are associated with the overreaction of investors' perceptions of company performance, leading to investors' misjudgment of enterprise value. Therefore, if investors have high growth expectations for profit-exempted firms with negative cash flow, higher market-to-book value ratios and lower IPO underpricing would be observed concurrently.

Based on the above discussion, in this subsection, we conducted the following OLS regression model to analyze the relation between MB and firms exempted from the profitability requirement of conducting IPOs.

$$MB_i = \alpha_0 + \alpha_1 UP_i + \alpha_2 FREE_i + \alpha_3 (FREE_i \times UP_i) + \alpha_4 EXC_i + \alpha_6 VC_i + \alpha_7 TECH_i + \alpha_8 LEV_i + \alpha_9 HOT_i + \alpha_{10} COLD_i + \alpha_{11} InASSET_i + \alpha_{12} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i \quad (5)$$

The dependent variable is *MB* at the end of the IPO year. The main explanatory variables are *FREE* and the interaction term of *FREE* and *UP* of IPOs. *EXC, OVERSUB, VC, TECH, UNDEWR, LEV, PRIOP30, RMSE, HOT, COLD, LnASSET*, and *PROSEED* are control variables. γ is a vector of year fixed effect, and δ is a vector of industry fixed effect. The standard error is a heteroscedasticity-consistent standard error.

If the predictions are consistent with previous discussions, the firms that are exempted from the profitability requirement of IPOs should have high growth potential in the future. Hence, their market-to-book value ratio should be evaluated higher than other IPO firms. We should observe the coefficient α1 for exemption from the profitability requirement of conducting IPOs is positive. In particular, if investors have high growth expectations for profit-exempted firms and lower initial returns of IPO are associated with the reduced price disagreement between investors and underwriters. We should observe that firms exempted from the profitability requirement of IPOs have lower initial returns of IPOs and higher market-to-book ratios, suggesting that the coefficient α3 should be negative.

Table 5 presents the regression results of the exemption from the profitability requirement of IPOs and the market-to-book ratio at the end of the IPO year. In models (1) and (2) of Table 5, we included all control variables but only controlled for year fixed effect. In models (3) and (4), we additionally controlled for industry fixed effects. In model (3) of Table 5, after all variables and fixed effects were controlled, the regression results suggested that firms exempted from the profitability requirement of conducting IPOs and MB were positively correlated; moreover, the MB ratio of firms exempted from the profitability requirement of conducting IPOs was 1.13 times higher than those of other IPO firms.

In model (4) of Table 5, we added an interaction term between FREE and UP to further examine the joint effect of profit-exempted firms and initial return of IPO on market-to-book ratios. The coefficient of interaction term FREE×UP was −0.6748 and was significant at a 5% level. That is also consistent with the expectation that if investors have high growth expectations for profit-exempted firms, higher market-to-book value ratios and lower IPO underpricing would be observed concurrently.

Table 5: Exemption from the Profitability Requirement before Conducting IPOs and Market-to-book Ratio

	(1)	(2)	(3)	(4)
Intercept	-16.1234***	-16.0710***	-15.2038**	-15.1515***
	(-8.038)	(-8.068)	(-6.887)	(-6.905)
UP	0.6732***	0.8920***	0.6575***	0.8729***
	(3.376)	(5.592)	(3.212)	(5.483)
FREE	1.3692***	1.7055***	1.1396**	1.4737***
	(2.588)	(2.843)	(2.491)	(2.780)
UP×FREE		-0.6955***		-0.6748**
		(-2.601)		(-2.480)
EXC	0.6941***	0.6774***	0.5663***	0.5518***
	(4.179)	(4.120)	(3.299)	(3.240)
VC	-0.0069	-0.0203	-0.0037	-0.0161
	(-0.088)	(-0.188)	(-0.031)	(-0.136)
TECH	0.0416	0.0187	0.0393	0.0103
	(0.409)	(0.186)	(0.272)	(0.072)
LEV	-0.2927	-0.3745	-0.0708	0.1336
	(-0.402)	(-0.516)	(-0.095)	(0.180)
HOT	-0.3214	-0.3153	-0.4148	-0.4070
	(-1.111)	(-1.033)	(-1.313)	(-1.240)
COLD	-0.1646	-0.1553	-0.2181	-0.2080
	(-0.628)	(-0.599)	(-0.833)	(-0.801)
LnASSET	-0.8071***	-0.7896***	-0.8422***	-0.8245***
	(-7.159)	(-7.209)	(-7.543)	(-7.608)
PROSEED	1.5174***	1.4987	1.5054***	1.4871***
	(11.090)	(11.210)	(10.150)	(10.250)
INDUSTRY	NO	NO	YES	YES
Year FE	YES	YES	YES	YES
Observations	738	738	738	738
Adjusted R2	0.4435	0.4477	0.4394	0.4436

The table above conducts a multivariate analysis of Market-to-book value ratio (MB) and profit-exempted eligibility (FREE), estimates the Market-to-book value ratio (MB) using ordinary least squares regression (OLS) with the main observation variable being the exemption from profit conditions (FREE) and Exemption from Profit Condition Eligibility (FREE) interaction IPOs initial return (UP). $MB_i = \alpha_0 + \alpha_1 UP_i + \alpha_2 FREE_i + \alpha_3(FREE_i \times UP_i) + \alpha_4 EXC_i + \alpha_5 VC_i + \alpha_6 TECH_i + \alpha_7 LEV_i + \alpha_8 HOT_i + \alpha_9 COLD_i + \alpha_{10} InASSET_i + \alpha_{11} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i$ *(5). The control variables: If IPOs are listed for the OTC, set EXC = 1; otherwise, set EXC = 0. If IPOs belong to the high-tech industry, let TECH = 1, and the rest, TECH = 0. PRIOP30 is thirty-days Market Index Return before the IPO filing date. RMSE is firm idiosyncratic risk. If there are venture capital holdings at the time of the IPO, let VC=1; otherwise, no venture capital holdings, let VC=0. OVERSUB, the issue success rate. UNDEWR, Underwriters reputation. LEV, financial leverage. Hot issuance season, set HOT = 1; the rest HOT = 0. Cold issuance season, set COLD = 1; the rest COLD = 0. MB is Market-to-book value ratio. LnASSET, Asset size, the natural logarithm of the total assets of IPOs in the previous fiscal year. PROSEED, the scale of funds raised by IPOs, the natural logarithm of the total funds raised by IPO. Year and Industry fixed effects are included. t-value is reported in parentheses, and the standard error is adjusted by heteroscedasticity. *, **, and *** refer to the 10%, 5%, and 1% significance level, respectively.*

CONCLUDING COMMENTS

This study studied Taiwan's unique profit-exempted IPO conditions to distinguish whether profit-exempted IPO firms conform to signal theory or market timing through observation of their initial returns. Since the insiders of the firms have more information than outside investors, they attempt to convey information to participants during the process of IPOs. However, the outcome of issuers' messages and IPOs depend on when or how issuers choose to express their faith about the firm. The market timing hypothesis states that issuers set the underwriting period at the time when the disagreement between issuers and investors on firm value is at its lowest. If the issuers indeed time the market to issue equities when disagreement on firm value is minimal, we should observe higher firm valuations and lower underpricing of IPOs. Alternatively, the signaling hypothesis expects issuers to use higher discounts on IPOs to convey their firm quality to investors. Under this assumption, higher underpricing of IPOs should be observed.

This study used a cross-sectional OLS regression model to examine 738 IPO cases between 2005 and 2018 in Taiwan. Fifty-two of them were eligible for profit-exemption, of which 35 were concentrated in the chemical and bio-pharmaceutical industry, accounting for 67.31% of the total sample. This report find that the underpricing of profit-exempted IPO firms is 5.06% lower than that of other IPO companies. The initial returns of profit-exempted IPO companies during the hot market are 18.82% higher than those of other IPO companies. It is deduced that, consistent with the market timing hypothesis, firms exempted from the profitability requirement of conducting IPOs exploited opportunism to mislead investors in an attempt to achieve higher proceeds. This caused lower first-day market returns (lower discount levels) to be observed. This view differed from the traditional signaling hypothesis (e.g., Welch, 1989), in which issuers using signaling strategies would have higher initial returns (discount level) of IPOs. In addition, there is a clustering phenomenon of IPOs issued by firms exempted from the profitability requirement in the hot-market periods. They take advantage of the high market sentiment to obtain high initial returns of IPOs, making the average initial returns of IPOs of such firms higher than that of other IPO firms. This clearly showed that issuers take advantage of issuance under a hot-market period to cause investors to misestimate firm value to obtain the proceed of IPOs. It shows that managers of profit-exempted high-tech IPO companies tried to use information asymmetry and optimistic messages to mislead investors, which may affect the fundraising of IPOs and may be harmful to shareholders' interests as a whole. The findings of this study can provide a reference for government agencies to consider the post-listing management of high-tech companies exempt from profit conditions.

In terms of research restrictions, Taiwan's unique profit-free IPO conditions only existed after 2005. In the future, this article will provide a basis for discussion on the IPO value of negative-earnings high-tech companies, which can include dialogue about equity allocation, agency conflict, and irrational behavior.

REFERENCES

Aggarwal, R., S. Bhagat and S. Rangan (2009) "The Impact of Fundamentals on IPO Valuation," *Financial Management,* vol. 38(2, Summer), p. 253-284.

Allen, F. and G. R. Faulhaber (1989) "Signalling by Underpricing in the IPO Market," *Journal of Financial Economics,* vol. 23(2, August), p. 303-323.

Banerjee, S., U. Güçbilmez and G. Pawlina (2016) "Leaders and Followers in Hot IPO Markets," *Journal of Corporate Finance,* vol.37(April), p. 309-334.

Beatty, R. P. and J. R. Ritter (1986) "Investment Banking, Reputation, and the Underpricing of Initial Public Offerings," *Journal of Financial Economics,* vol. 15(1-2, January/February), p. 213-232.

Boulton, T. J. and T. C. Campbell (2016) "Managerial Confidence and Initial Public Offerings," *Journal of Corporate Finance,* vol.37(April), p. 375-392.

Cai, L. X. (2016) "Why does the Best Biotech Company in Asia "Love Taiwan"?" *Business Week R.O.C*, 1498.

Chang, C., Y. M. Chiang., Y. Qian and J. R. Ritter (2017) "Pre-market Trading and IPO Pricing," *The Review of Financial Studies,* vol.30(3, March), p.835-865.

Daniel, K. D., D. Hirshleifer and A. Subrahmanyam (2001)"Overconfidence, Arbitrage, and Equilibrium Asset Pricing," *The Journal of Finance,* vol. 56(3, June), p. 921-965.

Daniel, K., D. Hirshleifer and A. Subrahmanyam (1998) "Investor Psychology and Security Market Under- and Overreactions," *The Journal of Finance*, vol.53(6, December), p. 1839-1885.

De Bondt, W. F. and R. H. Thaler (1987) "Further Evidence on Investor Overreaction and Stock Market Seasonality," *The Journal of Finance*, vol.*42*(3, July), p. 557-581.

Demers, E. and P. Joos (2007) "IPO Failure Risk," *Journal of Accounting Research,* vol.45(2, May), p.333-371.

Derrien, F. (2005) "IPO Pricing in "Hot" Market Conditions: Who Leaves Money on the Table?" *The Journal of Finance,* vol. 60(1, February), p. 487-521.

Dittmar, A. and A. Thakor (2007) "Why Do Firms Issue Equity?" *The Journal of Finance,* vol.62(1, February), p. 1-54.

DuCharme, L. L., P. H. Malatesta and S. E. Sefick (2001) "Earnings Management: IPO Valuation and Subsequent Performance," *Journal of Accounting, Auditing & Finance,* vol. 1*6*(4), p. 369-396.

Field, L. C. and D. Sheehan (2004) "IPO Underpricing and Outside Blockholdings," *Journal of Corporate Finance,* vol.10(2, March), p. 263-280.

Friedlan, J. M. (1994) "Accounting Choices of Issuers of Initial Public Offerings," *Contemporary Accounting Research,* vol. 11(1, Summer/Fall), p. 1-31.

Goyal, A. and P. Santa-Clara (2003) "Idiosyncratic Risk Matters!" *The Journal of Finance, vol.58*(3, June), p. 975-1007.

Guo, R. J., B. Lev and N. Zhou (2005) "The Valuation of Biotech IPOs," *Journal of Accounting, Auditing & Finance, vol. 20*(4, October), p. 423-459.

Hanley, K. M. (1993) "The Underpricing of Initial Public Offerings and the Partial Adjustment Phenomenon," *Journal of Financial Economics,* vol. 34(2, October), p. 231-250.

Hanley, K. W. and W. J. Wilhelm Jr (1995) "Evidence on the Strategic Allocation of Initial Public Offerings," *Journal of Financial Economics,* vol.37(2, February), p. 239-257.

Heaton, J. B. (2002) "Managerial Optimism and Corporate Finance, *Financial Management ,* vol.31(2, Summer), p. 33-45.

Helwege, J. and N. Liang (2004) "Initial Public Offerings in Hot and Cold Markets," *Journal of Financial and Quantitative Analysis,* vol.39(3), p.541-569.

Joos, P. and A. Zhdanov (2008) "Earnings and Equity Valuation in the Biotech Industry: Theory and Evidence," *Financial Management, vol.37*(3, Autumn), p. 431-460.

Lakonishok, J., A. Shleifer and R. W. Vishny (1994) "Contrarian Investment, Extrapolation, and Risk," *The Journal of Finance,* vol.49(5, December), p.1541-1578.

Ljungqvist, A., V. Nanda and R. Singh (2006) "Hot Markets, Investor Sentiment, and IPO Pricing," *The Journal of Business,* vol.79(4, July), p. 1667-1702.

Lowry, M. and G. W. Schwert (2004) "Is the IPO Pricing Process Efficient?" *Journal of Financial Economics,* vol.71(1, January), p. 3-26.

Lu, C. S. and A. Chen. (2017) "Explaining the Short- and Long-Run Performance of IPOs by Managerial Overconfidence," *Journal of Management and Business Research,* vol.34(1), p.31-54.

Lu, C. S., L. Kao and A. Chen (2012) "The effects of R&D, Venture Capital, and Technology on the Underpricing of IPOs in Taiwan," *Review of Quantitative Finance and Accounting,* vol. 39, p. 423-445.

Neill, J. D., S. G. Pourciau and T. F. Schaefer (1995) "Accounting Method Choice and IPO Valuation," *Accounting Horizons,* vol. 9(3, September), p. 68-80.

Ritter, J. R. (1984) "The "Hot Issue" Market of 1980," *The Journal of Business,* vol. 57(2, April), p. 215-240.

Rock, K. (1986) "Why New Issues are Underpriced", *Journal of Financial Economics,* vol.15(1-2, January/February), p. 187-212.

Stambaugh, R. F., J. Yu and Y. Yuana (2012) "The Short of it: Investor Sentiment and Anomalies," *Journal of Financial Economics,* vol.104(2, May), p. 288-302.

Welch, I. (1989) "Seasoned Offerings, Imitation Costs, and the Underpricing of Initial Public Offerings," *The Journal of Finance,* vol.44(2, June), p. 421-449.

Zörgiebel, S. (2016) "Valuation of IPOs with Negative Earnings," *Available at SSRN: https://ssrn.com/abstract=2698281,* 57 pages.

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IMPACT OF CANADIAN SOX ON DETERMINANTS OF EQUITY ISSUANCE COSTS FOR BOUGHT DEALS AND MARKETED UNDERWRITTEN OFFERS

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ABSTRACT

This manuscript explores the effect of Canadian SOX (CSOX) on determinants of equity issuance costs (underwriting fees and offer price discount) for Canadian bought deals and marketed underwritten equity offers. CSOX is a crucial piece of legislation equivalent to the U.S. Sarbanes-Oxley Act. Bought deals and marketed underwritten offers are two methods of choice for issuing common stock by exchange-traded companies. Are the determinants of underwriting fees and price discount for both underwriting methods the same before and after the passage of Canadian law? From eleven expected determinants of underwriting fees, findings show gross offer proceeds is the only determinant significant in the pre-and post-CSOX periods for both bought deals and marketed underwritten offers. The determinant associated with stock return volatility is significant during the pre- and post-CSOX periods for bought deals only. On the other hand, from fourteen expected determinants of offer price discount, volatility of stock returns and stock spread are the only common determinant for the pre- and post-CSOX periods for bought deals only. In general, the results reveal the Canadian legislation had a different effect on determinants of issuance costs for both underwriting methods.

JEL: G24, G32

KEYWORDS: Underwriting Fees, Price Discount, Bought Deals, Marketed Underwritten Offers, Canadian SOX, Sarbanes Oxley, Seasoned Equity Offerings

INTRODUCTION

The purpose of this study is to provide evidence on whether expected determinants of underwriting fees and price discount are the same before and after the passage of Canadian SOX (CSOX) for seasoned equity offerings of bought deals and marketed underwritten offers, respectively. CSOX is legislation equivalent to the U.S. Sarbanes-Oxley Act (USSOX). After the passage of USSOX in 2002, many countries passed similar legislation, including Canada, which became effective in 2005 (Rubalcava, 2012). The main goal of both laws is to protect investors against corporate wrongdoing through rules and provisions for improving corporate governance for publicly listed companies and the quality of financial information. Seasoned equity offerings (SEO) are company shares of common stock sold to investors after an initial public offering. Underwritten fees (also called gross spread) and price discount (also called underpricing) are major issuance costs for public companies that sell shares in the stock market. These costs are not trivial for issuing companies. For example, underwriting fees of Canadian issuers are around five percent of gross offering revenues paid to the investment bank, which helps sell the shares to investors (Rubalcava, 2018). By comparison, the underwriting fees for U.S. firms are in the range of 3 to 8 percent (Butler, Grullon, and Weston 2005). On the other hand, the price discount on issued shares offered to selected investors is on average around 3 to 5 percent of the market share price for Canadian firms (Rubalcava, 2020). For U.S. firms is around 2.4 percent (Autore, 2011), and for global offers around 4.6 percent (Bortolotti, Megginson, and Smart, 2008). Bought deals and marketed underwritten offers are alternative methods of choice of stock offers by company issuers.

This manuscript extends the work of Rubalcava (2018) on the impact of Canadian SOX on underwriting fees for Canadian firms listed on the Toronto Stock Exchange. Also, it extends the work of Rubalcava (2020) on the impact of CSOX on price discount of Canadian equity offers. However, unlike those studies, this study goes further by finding out whether determinants of underwriting fees (and offer price discount) are the same before and after the Canadian SOX for Canadian bought deals and marketed underwritten offers, respectively. Specifically, the main contribution is to corroborate whether the significant determinants in the period before CSOX (1999-2005) are also significant afterwards (2006-2011). These two periods include similar number of years and enough data to get reliable comparative results. The post-CSOX period also incorporates as determinants the years of the financial crisis (2007-2009), a period that significantly affected financial markets worldwide. Did these years have an impact on equity issuance costs? (Note: The term significant refers to *statistically* significant.) The determinants are from research studies, which account for offer and firm size, stock and market volatility, systematic risk, liquidity, underwriting reputation, intended use of funds and others.

Findings show gross offer proceeds (*LnGProceeds*) – a proxy for offer economies of scale- is the only significant determinant of underwriting fees for bought deals and marketed underwritten offers for both the pre- and post-CSOX periods. Stock return volatility (*RetVol*) is a significant determinant for the pre-and post-CSOX periods for bought deals only. On the other hand, the year 2007 is significant determinant for marketed underwritten offers (higher fees), and for bought deals, the year 2009 was significant determinant (lower fees). On determinants of offer price discount, stock return volatility and stock spread are the only significant determinant for the pre- and post-CSOX periods for bought deals only. On the other hand, I did not find consistent determinants for the pre- and post-CSOX periods for offer price discount of marketed underwritten offers. Also, none of the financial crisis years had an effect on price discount. Overall, the results show that most significant (nonsignificant) determinants in the pre-CSOX period are not significant (significant) after the post-CSOX period. This implies the Canadian SOX had a different effect on determinants of issuance costs for each underwriting method. The paper is organized as follows. Next section includes the literature review. Followed by the section of data and methodology. Next section reports and discusses the results. Last section shows the summary and conclusion.

LITERATURE REVIEW

This section examines the main features of bought deals and marketed underwritten offers. Then follows a review of relevant research on underwriting fees and price discount for seasoned equity offerings. Finally, it closes with research questions**.** Bought deals and marketed underwritten offers are two methods of choice for seasoned equity offerings by issuing companies. Both methods are mainly underwritten by an investment bank or bank syndicate, which markets the issue among potential investors (typically institutional investors, such as mutual funds, pension funds, hedge funds, and insurance companies). Usually, the investment bank commits to buying the shares from the issuing company and selling them to investors. Investment banks also help to comply with government and stock exchange rules. They charge an underwriting fee to the issuing company for these services, typically a percent of gross offer revenue.

A quick review of distinguishing features of Canadian bought deals and marketed underwritten offers from Pandes (2010) and Gunay and Ursel (2015) is as follows. Bought deals are equity offers immediately at or shortly after the announcement date. On the other hand, marketed underwritten offers are issued several days after the offer announcement. This allows investment banks the opportunity to promote the offering to potential investors through *roadshows*. These are presentations about the characteristics of the issue, its intended use of funds and other relevant information. The interest shown by investors provides valuable information about the offer demand, offer size and price. Marketed underwritten offers also include a *market-out* clause, meaning that if market conditions are unfavorable for the stock offer, the investment bank can cancel it. Bought deals do not have a *market-out* class and *roadshow,* which makes bought deals

seemingly riskier. However, investment banks mitigate the risk because they previously certify bought deals (Pandes, 2010), unlike marketed underwritten offers, which are not.

Research on underwriting fees and price discount of seasoned equity offerings is extensive. Eckbo, Masulis and Norli (2007) and Papaioannou and Karagozoglu (2017) provide an excellent review on these issuance costs. Evidence on whether bought deals or marketed underwritten offers incur low underwritten fees is overwhelming in favor of the former. These studies include Bortolotti, Megginson, and Smart (2008), Gao and Ritter (2010), Calomiris and Tsoutsoura (2010), Pandes (2010), Karpavicius and Suchard (2012), Koerniadi et al. (2015), and Rubalcava (2018, for Canadian non-cross-listed offers). On the other hand, studies finding no difference in fees are Denis (1993), Sherman (1999), and Rubalcava (2018, for Canadian cross-listed offers). Those studies control for a different set of determinants.

The determinants of underwritten fees for Canadian firms examined here are from the above studies and others. These determinants account for economies of scale (Smith, 1977; Altinkilic and Hansen, 2000), distribution risk (Butler, Grullon, and Weston (2005), firm size (Hansen and Torregrosa, 1992), systematic risk (Bhagat, Marr, and Thompson, 1985), stock volatility (Bae and Levy, 1990; Hansen and Torregrosa, 1992; Altinkilic and Hansen, 2003), underwriter reputation and prestige (Chemmanur and Fulghieri, 1994; Calomiris and Tsoutsoura, 2010; Jeon and Ligon, 2011; Fermando et al., 2015), stock liquidity (Butler, Grullon, and Weston, 2005), and intended use of funds (Rubalcava, 2018).

Another essential issuance cost for seasoned equity offerings is the share price discount or underpricing. Price discount usually occurs when the price offered to investors (typically institutional investors) is below the market price (i.e., closing share price before the issue date). An exciting review of why underpricing of stock offers occurs is by Papaioannou and Karagozoglu (2017). Research evidence on whether bought deals or marketed underwritten offers incur low underpricing is inconclusive. Studies reporting little underpricing for bought deals compared to marketed underwritten offers are Bortolotti, Megginson, and Smart (2008) and Gustafson (2018). In contrast, Autore (2011) finds bought deals incur higher underpricing. On the other hand, in a more recent study Rubalcava (2020) did not find a significant difference in underpricing between bought deals and marketed underwritten offers for Canadian cross-listed and non-cross-listed firms. All these studies also control for expected determinants.

Similar to underwriting fees, this study includes determinants of price discount for Canadian stock offers from relevant research studies. Specifically, the determinants of price discount considered here account for return volatility (Bae and Levy, 1990; Corwin, 2003; Altinkilic and Hansen, 2003; Kim and Shin, 2004; Pandes, 2010; Autore, 2011; Huang and Zhang, 2011; Kim and Masulis, 2012), gross offer revenues (Bhagat, Marr, and Thompson, 1985; Mola and Loughran, 2004), offer size (Corwin, 2003; Altinkilic and Hansen, 2003; Autore, 2011; Huang and Zhang, 2011; Kim and Masulis, 2012), firm size (Corwin, 2003; Huang and Zhang, 2011), pre-offer share price (Altinkilic and Hansen, 2003), share price run-up (Corwin, 2003; Pandes, 2010; Rubalcava, 2020), underwriter prestige (Safieddine and Wilhelm, 1996; Kim and Shin, 2004; Mola and Loughran, 2004; Kim, Palia and Saunders, 2010; Kim and Masulis, 2012), market volatility (Bhagat, Marr, and Thompson, 1985), information asymmetry (Corwin, 2003), inclusion of overallotment option (Lee, Lochhead, and Ritter, 1996), and intended use of offer proceeds (Rubalcava, 2016).-Major determinants included here, and their relation with underwriting fees and price discount are from previous research. This study includes limited number of determinants because of data availability. However, unlike most studies, this research distinguishes stock offers by underwriting method (bought deal, marketed underwritten offer). Thus, whether similar relation holds for each underwriting method for the pre- and post-CSOX periods is a topic worth exploring further. (The methodology section examines in detail the expected determinants included here.)

The purpose of this study is to answer the following research question. Are the determinants of equity issuance costs -underwriting fees and stock price discount - for Canadian bought deals (and marketed

underwritten offers) the same before and after Canadian SOX? Specifically, what are the determinants of each equity issuance cost for bought deals (and marketed underwritten offers), that are significant before and after the Canadian SOX? Findings will reveal the effect of CSOX on determinants of issuance costs for bought deals and marketed underwritten offers by Canadian firms.

DATA AND METHODOLOGY

The sample data for the analysis of determinants of underwritten fees and price discount includes 656 stock offers of Canadian firms listed on the Toronto Stock Exchange and not listed in other countries. The overall sample period is from 1999 to 2011 (pre-CSOX period: 1999-2005; post-CSOX period: 2006-2011). For comparative purposes, the overall sample includes similar subsample periods (pre-CSOX: 7 years, and post-CSOX: 6 years) with enough observations on each period to get reliable results. Due to data constraints, it covers up to the year 2011. The sample for both issuance costs -underwriting fees and offer price discount- is the same and its distribution is as follows: Bought deals are 120 and 450 for the pre- and post-CSOX periods, respectively. On the other hand, marketed underwritten offers are 55 and 31 for the pre- and post-CSOX periods, respectively. The source of data for bought deals and marketed underwritten offers is *FP Advisor* (https://fpadvisor.financialpost.com) and cross-checked on the System for Electronic Documents Analysis and Retrieval *(SEDAR* Canada). The data include underwriting fees of equity offerings, underwriting type (bought deal, marketed underwritten offer), lead underwriter(s), offer announcement and issue dates, offer price, offer size, gross proceeds, overallotment option, and intended use of equity offer. The Canadian Financial Markets Research Centre (*CFMRC*) is the source of market data. They include daily stock prices, bid-ask quotes, trading volumes, S&P/TSX value-weighted index, and monthly number of shares outstanding. Statistics Canada is the source for the Canadian monthly T-bill rate (a proxy for risk-free rate). The sample does not include data with errors or missing values.

Determinants of Underwriting Fees for Bought Deals and Marketed Underwritten Offers

The cross-sectional model showing the relation of underwriting fees on expected determinants is as follows:

$$Fees_i = a_0 + (a_1 + \delta_{LnGProceeds} DumPer2) LnGProceeds_i + (a_2 + \delta_{Price} DumPer2) Price_i + (a_3 + \delta_{LnME} DumPer2) LnME_i + (a_4 + \delta_{Beta} DumPer2) Beta_i + (a_5 + \delta_{RetVol}\, DumPer2) RetVol_i + \ldots + a_t DYearFinCrisis_{2007} + \cdots + a_{t+n} DYearFinCrisis_{2009} + \varepsilon_i \quad (1)$$

Equation (1) shows the effect on underwriting fees (*Fees*) of expected determinants, simultaneously for the pre-CSOX period (1999-2005) and post-CSOX period (2006-2011). The model applies for bought deals and marketed underwritten offers, respectively. The determinants are from relevant research studies from the literature review section. Because of data constraints, it includes proxies from selected determinants from those studies. Determinants identifiers and descriptions are as follows. *Fees* is the underwriting fee (also called gross spread or investment banking fee). The subscript *i* stands for stock offer for issuer *i*. *Fees* is a percent of gross offer revenues paid by the issuing company to the investment bank (or syndicate), which helps in marketing the equity issue to investors. *DumPer2* is a dummy variable that equals one for the post-CSOX period and zero for the pre-CSOX period (*DumPer1*). Coefficient estimates a_0, $a_1 \ldots a_{t+n}$ show the extent on *Fees* of each determinant. The indicator variable *DumPer2* interacts with expected determinants to capture the differential effect of each determinant on *Fees* for the pre-and post-CSOX periods, respectively.

LnGProceeds is the natural log of gross revenues and measures economies of scale (Smith, 1977). A negative relation between fees and gross proceeds is expected because the higher gross proceeds, the higher the monetary value earned by investment banks. Therefore, they will be able to afford charging lower fees. *Price* is the share price two days before the offer date. It measures issue distribution risk (Butler, Grullon, and Weston (2005). A negative relation between fees and price is expected because offers with low prices

are more difficult to sell than those with higher prices. *LnME* is the natural log of issuer's market equity and proxies for firm size (Hansen and Torregrosa, 1992). The expectation is of a negative relation between fees and firm size because larger firms are already consolidated and better known among investors than smaller firms. Therefore, investment banks will charge lower fees for larger firms because of the lower risk in placing the offer in the market than for smaller firms. *Beta* is the systematic risk of the issuer (Bhagat, Marr, and Thompson, 1985). *Beta* is the coefficient of the Canadian market risk premium estimated from an asset pricing model between daily excess returns of a Canadian issuer and the Canadian market risk premium to get the abnormal return around the announcement date of the equity offer. The expectation is of a positive relation between fees and *Beta* because offers with a higher beta are riskier (i.e., more sensitive to market variations) than those with lower beta. *RetVol* is the standard deviation of stock returns annualized daily for three months before the offer date. It proxies for stock volatility (Bae and Levy, 1990). Because of higher volatility the higher investment bank's risk, therefore, the higher fees.

LeadUnderwriter is the incremental number of stock offerings an investment bank acts as lead underwriter from the previous year. It measures underwriter reputation. The relation between underwriting fees and investment bank reputations is not clear, according to Calomiris and Tsoutsoura (2010). For example, studies showing higher underwriter reputation with lower underwriting fees are Pandes (2010), Jeon and Ligon (2011), and Fernando et al. (2015). On the other hand, Chemmanur and Fulghieri (1994) argue reputable underwriters charge higher fees because of their superior certification. The empirical results section will shed light on the effect of this determinant on *Fees*. *VolTO* is volume turnover, which is equal to the ratio of daily annualized share trading volume divided by the total number of outstanding shares. It measures stock liquidity (Butler, Grullon and Weston, 2005). A negative relation between fees and the ratio is expected because shares with higher liquidity are easier to sell by investment banks.

Dum0 to *Dum 4* are dummy variables that classify the intended use of the equity offer as follows: *Dum0 (*unknown), *Dum1* (working capital), *Dun2* (capital investment), *Dum3* (general corporate) and *Dum4* (debt reduction). The expected relation between underwriting fees and the intended use is unknown. $DYearFinCrisis_{\tau}$ is a dummy variable for each year of the financial crisis period (2007-2009). The coefficient estimates of the financial crisis dummy variables show these years' effect on underwriting fees. The expected relation between underwriting fees and these dummy years is unknown. ε_i is the error term and assumed to be independently and normally distributed; i.e., $\varepsilon_i \sim N(0,\sigma^2)$

Determinants of Price Discount for Bought Deals and Marketed Underwritten Offers

The cross-sectional model showing the relation of price discount on expected determinants is as follows.

$$\begin{aligned} PrDisc_i = \; & a_0 + (a_1 + \psi_{RetVol} DumPer2) RetVol_i \;\; \varepsilon_i i + (a_2 + \psi_{RelGProc} DumPer2) RelGProc_i \\ & + \left(a_3 + \;\; \psi_{RelOffer} DumPer2\right) RelOffer_i + (a_4 + \psi_{LnME} DumPer2) LnME_i \\ & + (a_5 + \psi_{Price}\, DumPer2) Price_i + \qquad \ldots + a_t DYearFinCrisis_{2007} + \cdots \\ & + a_{t+n} DYearFinCrisis_{2009} + \;\; \varepsilon_i \end{aligned} \tag{2}$$

Equation (2) includes the effect on price discount of expected determinant simultaneously for the pre- and post-CSOX periods, respectively. The determinants are from the literature review section on offer price discount. For conciseness, this section mention only the oldest bibliographic reference(s) for a specific determinant. The explanation of variables in equation (2) is as follows. $PrDisc_i$ is the offer price discount of issuer *i* in percent and equals the difference between its closing market price in the previous day and offer price next day, divided by the closing market price in previous day. The lower offer price serves as compensation to investors (mostly institutional investors) who showed interest and provided information about the potential demand of the stock offering before the issue date. This measure is for marketed underwritten offers only. Bought deals use a different price discount as in Narayanan, Rangan, and Rangan

(2004). Here, to calculate the offer price discount is by buying the stock at the offer price and selling it at (usually higher) closing price on the *offer day.* That is because, in bought deals, the stock offer is around the announcement date, which usually a price drop occur immediately afterwards, consistent with Myers and Majluf's (2004) adverse selection theory. (Under this theory, when a company announces a stock offering, investors assume an overvaluation of the stock, so they assess its value downwards, resulting in unfavorable market reaction.) Thus, this adapted measure of price discount is net of the information effect by the offer announcement. *DumPer2* is a dummy variable that equals one for the post-CSOX period and zero for the pre-CSOX period (*DumPer1*). Coefficient estimates a_0, $a_1 \ldots a_{t+n}$ show the portion effect on *PrDisc* of each determinant. The indicator variable *DumPer2* interacts with expected determinants to capture the differential effect of each determinant on *PrDisc* for the pre-and post-CSOX periods, respectively. *RetVol* is the standard deviation of daily annualized stock returns three months before the offer date. Proxy for return volatility (Corwin, 2003; Altinkilic and Hansen, 2003). The expectation is of a positive relation between return volatility and price discount because of share price uncertainty.

RelGProceeds is the offer gross revenue divided by the firm's market capitalization before the offer date. Mola and Loughran (2004) find a positive relation between the offer price discount and gross offer revenues because higher revenues suggest more liquidity unpredictability. However, Bhagat, Marr, and Thompson (1985) find a negative relation between issuing costs and offering proceeds because of economies of scale. The empirical results section explores which of these results will hold in our study. *Reloffer* is the ratio of offer size to total number of shares outstanding before the offer date. It measures price pressure (Corwin, 2003; Altinkilic and Hansen, 2003). These studies argue larger offers expect to show higher price discount because of higher price pressure before the shares offer date. *LnME* is the natural log of market equity of issuing company. Proxies for firm size (Corwin, 2003). Evidence exists that larger firms show lower discount because they involve less information asymmetry than smaller firms. Thus, the expectation is of a negative relation between firm size and offer price discount.

Price is the share price 2 days before the offer date (Altinkilic and Hansen, 2003). Low-priced stocks reflect more value doubt and placement risk than high-priced stock; therefore, expecting higher price discount for the former. *Runup* is the price run-up or cumulative abnormal return 25 days before the offer date. The abnormal return is from a regression between daily excess return of a Canadian issuer and the Canadian market risk premium around the equity offer date (Corwin, 2003). Price run-up may occur because the actual pre-offer value overestimates the fair value; therefore, these offers expect a higher price discount. *LeadUnderwriter* is the incremental number of stock offerings an investment bank acts as a lead underwriter from the previous year. It proxies for underwriter reputation or prestige (Safieddine and Wilhelm, 1996). Reputable underwriters certify the fair value of the offer, so investors need lower price discount. *DumOAO* is a dummy variable equal to one if the offer has an overallotment option and zero otherwise. An offer with an overallotment option suggests underpricing of the offer (Lee, Lochhead and Ritter, 1996); thus, the expectation is of a positive relation between price discount and *DumOAO.*

StdTSX is the standard deviation of daily annualized returns on the Canadian stock index (S&P/TSX) during three months before the offer date. It is a proxy for market unpredictability (Bhagat, Marr and Thompson, 1985); therefore, the higher the market unpredictability, the higher price discount. *Spread* is the bid-ask spread of the stock divided by the spread midpoint. It proxies for information asymmetry between issuers and investors (Corwin, 2003). The higher the spread, the higher the price discount as compensation for the offer information asymmetry. *Dum0* to *Dum4* are dummy variables that classify the intended use of the equity offer as described before. Similarly, *DYearFinCrisis* is a dummy variable for each financial crisis period year (2007-2009). And, ε_i is the error term assumed to be independently and normally distributed; i.e., $\varepsilon_i \sim N(0, \sigma^2)$

RESULTS AND DISCUSSION

Descriptive Statistics for Underwriting Fees of Bought Deals and Marketed Underwritten Offers

Table 1 shows the mean (median) underwriting fees of seasoned equity offerings (SEO) for bought deals and marketed underwritten offers for Canadian firms listed on the Toronto Stock Exchange. It includes number of SEO in brackets for the pre- and post-CSOX periods and the p-value of the difference in mean (median) fees. The mean (median) underwriting fees range between 4.75% (5.00%) and 4.82% (5.00%) for bought deals. It shows the mean and median underwriting fees of bought deals are not statistically different between pre- and post-CSOX periods, as displayed by their nonsignificant p-values (0.3318 and 0.1468, respectively). Interestingly, the number of bought deals increases significantly during the post-CSOX period (120 to 450). The mean (median) range of underwriting fees for marketed underwritten offers is between 5.16% (5.00%) and 5.32% (5.00%). Similar to the findings for bought deals, no significant difference in mean and median underwriting fees between pre- and post- CSOX periods exist for marketed underwritten offers (p-values are 0.3889 and 0.5086, respectively). Table also shows the number of marketed underwritten offers decreased significantly after CSOX. Overall, the results reveal CSOX did not show a significant impact on underwriting fees.

Table 1: Mean (Median) Underwriting Fees for Bought Deals and Marketed Underwritten Offers

	Bought Deals			**Marketed Underwritten Offers**		
	Pre-CSOX	**Post-CSOX**	**P-value Diff. Mean (Median)**	**Pre-CSOX**	**Post-CSOX**	**P-value Diff. Mean (Median)**
No. of SEO	[120]	[450]		[55]	[31]	
Mean	4.75%	4.82%	0.3318	5.16%	5.32%	0.3889
(Median)	(5.00%)	(5.00%)	(0.1468)	(5.00%)	(5.00%)	(0.5086)

This table shows the mean (median) underwriting fees for bought deals and marketed underwritten offers of Canadian firm listed on the Toronto Stock Exchange, during the pre- and post-CSOX periods, respectively. Number of stock offers is in brackets. Two-tailed t-test is used to test for the difference in means and Wilcoxon/Mann-Whitney test for the difference in medians.

Determinants of Underwriting Fees for Bought and Marketed Underwritten Offers: Pre- vs Post-CSOX Period

This section presents regressions results of underwriting fees (*Fees*) on expected determinants for bought deals and marketed underwritten offers for the pre- and post-CSOX periods from equation (1). The coefficient estimates reported in Regressions 1 to 4 consider the effect of dummy *DumPer2* (i.e., *post-CSOX period- DumPostCSOX)* or *DumPer1 (i.e., pre-CSOX period -DumPreCSOX)* on *Fees* for each determinant. This section does not show the coefficients of these interacting dummies to save space. Table 2 presents only coefficient estimates showing net effects on *Fees* for the pre- and post-CSOX periods, respectively. In the table, asterisks ***, ** and * stand for significance at one, five and ten percent levels, respectively. (Note: This and following sections define statistical significance of coefficient estimates as follows: highly significant (***), significant (**), and slightly significant (*)).

For illustrative purposes, the section presents the effect of *DumPer2* for *LnGProceeds* (natural log of gross proceeds) on bought deals. The procedure of getting coefficient estimates is as follows. In Regression 1, the coefficient estimate (-0.4674) of *LnGProceeds* for the pre-CSOX period is a_1 in equation (1) where the interactive dummy *DumPer2* is *DumPostCSOX.* Since equation (1) calculates simultaneously the effect on *Fees* for the pre- and post-CSOX periods, the coefficient estimate (-0.1108) of *LnGProceeds* in Regression 2 is the sum of coefficients a_1 and interactive dummy $\delta_{LnGProceeds}$*DumPer2* or $\delta_{LnGProceeds}$*DumPostCSOX (i.e.,* -0.4674 plus 0.3566, unreported) from Regression 1.

Alternatively, in Regression 2, the coefficient estimate (-0.1108) of *LnGProceeds* for the post-CSOX period is $a_1$in Regression 2, where the interactive dummy is *DumPer1 (or DumPreCSOX).* Thus, the coefficient estimate (-0.4674) of *LnGProceeds* in Regression 1 for the pre-CSOX period is the sum of coefficients a_1 and interactive dummy $\delta_{LnGProceeds}$ **DumPer1* or $\delta_{LnGProceeds}$ **DumPreCSOX (i.e.,* -0.1108 minus 0.3566, unreported) from Regression 2. (The sections of empirical results does not report coefficients of these interacting dummies to save space.) In other words, the coefficient estimates a_1 in Regressions 1 and 2 report directly the net effect of *LnGProceeds* on *Fees* for bought deals for the pre- and post-CSOX periods, respectively. (Notice that coefficient estimates of Regressions 1 and 2 are from equation 1, which includes 570 stock offers, including the pre- and post-CSOX periods; therefore, they have the same adjusted R square value of 0.503).

A similar procedure follows for marketed underwritten offers for the pre- and post-CSOX periods, respectively. Regression 1 to 4 show that *LnGProceeds* is the only significant determinant during the pre- and post-CSOX periods for bought deals and marketed underwritten offers, respectively. In addition, the negative coefficient signs of *LnGrossProceeds* show underwriting fees decrease with gross-proceeds (standing for economies of scale), which is consistent with similar findings from previous studies. Interestingly, the coefficient estimate of *LnGrossProceeds* for bought deals is less negative during the post-CSOX period (-0.1108) and for marketed underwritten offers is more negative (-0.5868).

Other significant determinants during the pre- and post-CSOX periods are *Beta* and *RetVol for* bought deals only. For example, the coefficient of *Beta* for the post-CSOX period is positive and highly significant (0.1248); this says that *Fees* increase with systematic stock risk as in Bhagat, Marr, and Thompson (1985). However, the pre-CSOX period is negative and significant (-0.1969), which shows that *Fees* increase with lower systematic risk, which is counterintuitive. On the other hand, the coefficient estimate of *RetVol* is positive and highly significant for pre-CSOX period (1.1830) and positive and highly significant for post-CSOX period (0.7204). This says that *Fees* increase with stock return volatility (slightly less for the post-CSOX period), consistent with prior research studies The coefficient estimate of *Price* is negative and slightly significant for the pre-CSOX period for bought deals (-0.0111 in Regression 1). This says that high-priced stocks represent low distribution risk and, therefore, lower fees. Coefficient estimate of *LnME* is negative and significant for the post-CSOX period for bought deals (-0.2156), and negative and significant in the pre-CSOX period (-0.2968) for marketed underwritten offers (Regression 3). Results show *Fees* decrease with firm size, which supports previous studies. This is because offers of larger, more known firms are easier to sell than those of smaller, less known firms. The coefficient estimate of *LeadUnderwriter* is positive and highly significant in the pre-CSOX period for bought deals (0.0374 in Regression 1). Finding positive relation between *Fees* and *LeadUnderwriter* supports the underwriting certification hypothesis of Chemmanur and Fulghieri (1994). And the coefficient estimate of share turnover (*VolTO)* is negative and significant (-0.0521) for bought deals in the post-CSOX period only (Regression 2). This supports Buttler, Grullon and Weston (2005), who argue that more liquid stocks are easier to place in the market -involving less distribution risk by investment banks- than those less liquid.

The coefficients of dummy variables *Dum1* (working capital), *Dum2* (capital investment), and *Dum3* (general corporate) are positive and significant in the post-CSOX period for bought deals (Regression 2). This says *Fees* increase if the intended use of funds is working capital, capital investment, and general corporate. On the other hand, the coefficient estimates of dummies *Dum1* to *Dum4* for marketed underwritten offers are all negative (Regression 4). These results show underwriting fees decrease if the intended use of funds is working capital, capital investment, general corporate and debt reduction, contrary to the findings for bought deals. A possible explanation of the difference in signed coefficients, is that for marketed underwritten offers, underwriters have more time to assess issuers' intention use of funds, which they may find more credible compared with those for bought deals, which they may not. This is because in bought deals, the time from the offer announcement to the issue date is significantly shorter (i.e., less time to evaluate issuers' intended use of funds). Therefore, underwriters are likely to charge higher fees for

bought deals and lower fees for marketed underwritten offers. The effect of financial crisis years (2007-2009) on *Fees* is as follows. For bought deals, the coefficient is negative and significant for 2009 (-0.1410, p-value of 0.0494 -unreported). On the other hand, it is positive and highly significant for 2007 (0.9098, p-value of 0.0071 -unreported) for marketed underwritten offers. Thus, results show the years of the financial crisis had different effects on *Fees* for bought deals and marketed underwritten offers.

Table 2: Regressions of *Fees* on Expected Determinants for Bought Deals and Marketed Underwritten Offers: Pre- and Post-CSOX Periods

	Bought Deals		**Marketed Underwritten Offers**	
Variables	**Pre-CSOX 1**	**Post-CSOX 2**	**Pre-CSOX 3**	**Post-CSOX 4**
Constant	1.1983***	1.0478**	1.7672***	1.0672***
lnGProceeds	-0.4674***	-0.1108***	-0.4046***	-0.5868***
Price	-0.0111*	-0.0047	-0.0068	-0.0139
LnME	0.0364	-0.2156**	-0.2968**	0.2395
Beta	-0.1969**	0.1248***	0.1457	-0.3348
RetVol	1.1830***	0.7204***	0.0205	1.5532
LeadUnderwriter	0.0374***	0.0029	0.0028	-0.0121
VolTO	0.0512	-0.0521**	0.0727	-0.0438
Dum1	0.0359	0.0530***	0.0455	-0.7154**
Dum2	-0.0020	0.0375***	0.0519*	-0.6790**
Dum3	0.0043	0.0275*	0.0029	-0.6738**
Dum4	-0.0355*	0.0191	0.0240	-0.6469*
DYearFinCrisis	--	Yes	--	Yes
R^2	0.526	0.526	0.758	0.758
R^2 Adj.	0.503	0.503	0.657	0.657
No. of SEO	570	570	86	86

This table reports coefficient estimates from regressions of underwriting fees (Fees) of Canadian bought deals and marketed underwritten offers on expected determinants, for the pre- and post-CSOX periods, respectively. Regression model is $Fees = a_0 + (a_1 + \delta_{LnGProceeds}DumPer2)LnGProceeds_i + (a_2 + \delta_{Price}DumPer2)Price_i + (a_3 + \delta_{Beta}DumPer2)Beta_i + (a_4 + \delta_{RetVol}DumPer2)RetVol_i + \ldots + a_tDYearFinCrisis_{\tau=2007} + \ldots + a_{t+n}DYearFinCrisis_{\tau=2009} + \varepsilon_i$. *The coefficient estimates for the Constant, RetVol, Dum1 to Dum4 are multiplied by* 10^{-1}. *VolTO is multiplied by* 10^2. *The section Determinants of Underwriting Fees for Bought Deals and Marketed Underwritten Offers defines Fees and expected determinants. The asterisks ***, ** and * stand for significance at the 1, 5 and 10 percent levels.*

In summary, *LnGProceeds* (a proxy for economies of scale) is the only common and significant determinant for the pre- and post-CSOX periods for bought deals and marketed underwritten offers. *RetVol* (proxy for return volatility) is the common determinant in pre- and post-CSOX periods for bought deals only. On the other hand, no other common determinants exist in pre-and post-CSOX periods for bought deals and marketed underwritten offers. Overall, results reveal CSOX had a different effect on determinants of underwriting fees of stock offers.

Descriptive Statistics for Offer Price Discount of Bought Deals and Marketed Underwritten Offers

Table 3 reports the mean (median) offer price discount for bought deals and marketed underwritten offers for Canadian issuers. It includes number of seasoned equity offers (SEO) in brackets for the pre- and post-CSOX periods and p-value of the difference in mean (median) fees. It shows the mean (median) price discount for bought deals range between 3.84% (2.96%) and 4.00% (3.34%). Table also shows the difference in mean and median offer price discount of bought deals is not statistical different between pre- and post-CSOX periods (p-value of 0.7505 and 0.7667, respectively). The mean (median) range of offer price discount for marketed underwritten offers is between 3.63% (1.84%) and 5.85% (4.53%). It shows the median price discount of marketed underwritten offers is higher for the post- than in the pre-CSOX period at a 0.05 significance level. However, the p-value of the difference in means between pre- and post-CSOX periods shows no statistical significance (p-value of 0.1592). In sum, CSOX did not significantly affect price discount for bought deals and marketed underwritten offers.

Table 3: Mean (Median) Offer Price Discount for Bought Deals and Marketed Underwritten Offers

	Bought Deals			Marketed Underwritten Offers		
	Pre-CSOX	**Post-CSOX**	**P-value Diff. Mean (Median)**	**Pre-CSOX**	**Post-CSOX**	**P-value Diff. Mean (Median)**
No. of SEO	[120]	[450]		[55]	[31]	
Mean	4.00%	3.84%	0.7505	3.63%	5.85%	0.1592
(Median)	(3.34%)	(2.96%)	(0.7667)	(1.84%)	(4.53%)	(0.0196)**

*This table shows the mean (median) offer price discount for bought deals and marketed underwritten offers of Canadian firms listed on the Toronto Stock Exchange, during the pre- and post-CSOX periods, respectively. Number of stock offers is in brackets. The asterisks ** stands for significance at the 5 percent level. Two-tailed t-test is used to test for the difference in means and Wilcoxon/Mann-Whitney test for the difference in medians.*

Determinants of Offer Price Discount for Bought and Marketed Underwritten Offers: Pre- vs Post-CSOX Period

This section reports regressions results of offer price discount (underpricing) on expected determinants for bought deals and marketed underwritten offers for the pre- and post-CSOX periods from equation (2). Coefficient estimates shown in Regressions 1 to 4 consider the effect of the interactive dummy *DumPer2* (i.e., *DumPostCSOX* for post-CSOX period) or *DumPer1* (i.e., *DumPreCSOX* for pre-CSOX period*)* on *price discount (PrDisc)* for each determinant. The section does not show coefficients of these interacting dummies to save space. Table 4 presents only coefficient estimates showing the net effect on *PrDisc* for the pre- and post-CSOX periods, respectively (similar to the section of Determinants of Underwriting Fees examined previously). As an illustration, this section presents the effect of *DumPer2* and *DumPer1* for determinant *RetVol* of bought deals. The procedure to get coefficient estimates is as follows. In Regression 1, the coefficient estimate (1.1782) of *RetVol* for the pre-CSOX period is $a_1$in equation (2), where the interactive dummy *DumPer2* is *DumPostCSOX. S*ince equation (2) calculates simultaneously the effects on *PrDisc* for pre- and post-CSOX periods, the coefficient estimate (0.2856) of *RetVol* in Regression 2, is the sum of coefficients a_1 and ψ_{RetVol} of *DumPostCSOX* (i.e., 1.1782 minus 0.8926, unreported) from Regression 1. To put it differently, in Regression 2, the coefficient estimate (0.2856) of *RetVol* for the post-CSOX period is $a_1$in Regression 2, where the interactive dummy is *DumPer1 (i.e., DumPreCSOX).* Thus, the coefficient estimate (1.1782) of *RetVol* in Regression 1 is the sum of coefficients a_1 and $\psi_{RetVol}$of *DumPreCSOX* (i.e., 0.2856 plus 0.8926, unreported) from Regression 2. To put it simply, coefficient estimates a_1 in Regressions 1 and 2 show directly the net effect of *RetVol* on *PrDisc* for bought deals for the pre-CSOX and post-CSOX periods, respectively.

A similar procedure follows for marketed underwritten offers. From Regressions 1 to 4, the significant coefficients of *RetVol* are for bought deals only. None of the coefficients of *RetVol* are significant for marketed underwritten offers (Regressions 3 and 4). The positive coefficient signs of *RetVol* say the offer price discount increases with stock return volatility (meaning price unpredictability), which is consistent with similar findings from previous studies (e.g., Corwin, 2003; Kim and Masulis, 2012). This subsection starts examining another determinant (*Spread*) that is significant in both the pre- and post-CSOX periods. Then, it continues with other determinants that are significant in only one period (i.e., pre-CSOX or post-CSOX). The coefficient estimate of *Spread* for bought is positive and slightly significant in the pre-CSOX period (1.0732, Regression 1) and positive and significant in the post-CSOX period (0.9486, in Regression 2). However, the coefficient estimate of *Spread* for marketed underwritten offers is positive and significant (2.1276) in the pre-CSOX period only (Regression 3). Since *Spread* is a proxy for information asymmetry (between company and investors), the expectation is a positive relation between *PrDisc* and *Spread* as in Corwin (2003). The coefficient estimate of *RelGProceeds* is negative and significant (-2.4532) for the post-CSOX period for bought deals (Regression 2), consistent with economies of scale by Bhagat, Marr, and Thompson (1985). However, the coefficient for same determinant is positive and slightly significant (1.7157, in Regression 3), supporting Mola and Loghran (2004). They argue a positive relation is more likely because sizeable gross proceeds suggest more liquidity unpredictability, and therefore, a higher price

discount. The coefficient estimate of *RelOffer* for bought deals is positive and highly significant (2.4242) in the post-CSOX period (Regression 2). This finding supports the price pressure hypothesis of Corwin, 2003) and Altinkilic and Hansen (2003). The coefficient of *Price* is negative and significant (-0.1064) for bought deals in the pre-CSOX period only (Regression 1).

Table 4: Regressions of Offer Price Discount on Expected Determinants for Bought Deals and Marketed Underwritten Offers: Pre- and Post-CSOX Periods

	Bought Deals		**Marketed Underwritten Offers**	
Variables	**Pre-CSOX 1**	**Post-CSOX 2**	**Pre-CSOX 3**	**Post-CSOX 4**
Constant	-2.4875*	-0.8140	-0.8289	4.0825
RetVol	1.1782***	0.2856**	-0.1331	-0.6423
RelGProceeds	-0.2004	-2.4532**	1.7157*	1.5505
RelOffer	0.1845	2.4242***	-0.5885	-2.4307
LnME	1.4937**	0.4063	0.3773	-2.5929
Price	-0.1064**	-0.0297	-0.0470	-0.1818
Runup	0.3100	0.0644	0.9915*	-0.7305
LeadUnderWriter	-0.1405	-0.0401	-0.4174**	-0.0194
DumOAO	2.1222	1.3560***	-2.3416	-1.9496
StdTSX	-2.2004	0.7448	-4.3938*	18.8252***
Spread	1.0732**	0.9486***	2.1276**	0.8161
Dum1	-0.1982	0.02060	8.8245**	5.0199
Dum2	-0.1419	0.0935	8.9711**	5.4775
Dum3	-0.3310*	0.0846	0.7876	5.4313
Dum4	-0.2149	0.0419	0.5793	5.4909
DYearFinCrisis	--	Yes	--	Yes
R^2	0.204	0.204	0.546	0.546
R^2 Adj.	0.156	0.156	0.285	0.285
No. of SEO	570	570	86	86

This table reports coefficient estimates from regressions of offer price discount (PrDisc) of Canadian bought deals and marketed underwritten offers on expected determinants, for the pre – and post-CSOX periods, respectively. The regression model is $PrDisc_i = a_0 + (a_1 + \psi_{RetVol}DumPer2)RetVol_i + (a_2 + \psi_{RetGProc}DumPer2)RelGProc_i + (a_3 + \psi_{RelOffer}DumPer2)RelOffer_i + (a_4 + \psi_{LnMe}DumPer2)LnME_i + \ldots + a_tDYearFinCrisis_{\tau=2007} + \ldots + a_{t+n}DYearFinCrisis_{\tau=2009} + \varepsilon_i$. *The section Determinants of Price Discount for Bought Deals and Marketed Underwritten Offers defines PrDisc and expected determinants. The coefficient estimates for the Constant, RelGPrceeds, Reloffer, Runup, and Dum1 to Dum 4 are multiplied by* 10^{-1}. *Coefficient estimates for RetVol, RelGProceeds, Reloffer, StdTSX, and Spread are multiplied by* 10^{-2}. *The asterisks ***, ** and * stand for significance at the 1, 5 and 10 percent levels.*

This says that high-priced stocks reflect less value unpredictability and lower price discount (Altinkilic and Hansen, 2003). The coefficient estimate of *Runup* is positive and slightly significant (0.9915) in the pre-CSOX period for marketed underwritten offers (Regression 3). This is in line with Corwin (2003), who asserts pre-offer price run-up suggests stock overvaluation, which is in line with a positive relation with price discount. On the other hand, the coefficient of *LeadUnderwriter* is negative and significant (-0.4174) for marketed underwritten offers during the pre-CSOX period. The negative coefficient supports the underwriter certification argument by Safieddine and Wilhelm (1996). In other words, the price discount is decreasing with increasing reputation of the underwriting investment bank. Finally, the coefficient estimate of *DumOAO* is positive and highly significant (1.3560) for bought deals in the post-CSOX period (Regression 2), as in Lee, Lochhead and Ritter (1996). A coefficient estimate with no consistency in sign is for *StdTSX* (a proxy for market uncertainty) of marketed underwritten offers. Its coefficient estimate is -4.3938 (unexpected sign) in pre-CSOX period (Regression 3) and 18.8252 (expected sign) in post-CSOX period (Regression 4). The expectation is that offer price discount increases with market volatility, which only holds for the post-CSOX period. On the other hand, the coefficient estimates for *Dum1* (working capital) (8.8245) and *Dum2* (capital investment) (8.9711) are positive and significant for marketed underwritten offers in the pre-CSOX period only (Regression 3). This shows the offer price discount increases with working capital and capital investment as the intended use of funds. The coefficient of *Dum3* for bought deals is negative and slightly significant (-0.3310) in the pre-CSOX period (Regression 1). This means the offer price discount decreases if the purpose of funds is general corporate. The coefficient

estimates (unreported) of dummy variables that account for financial crisis years (2007-2009) were not significant. This reveals that none of these years had an impact on price discount for seasoned equity offerings of bought deals and marketed underwritten offers.

To sum up this section, *RetVol* (stock return volatility) and *Spread* (a proxy for information asymmetry) are the only significant determinants of offer price discount for the pre and post-CSOX periods, but only for bought deals. On the other hand, the determinants with coefficient estimates consistent with expected signs from previous research studies are *RelGProceeds*, *RelOffer*, *Price*, *Runup*, *LeadUnderwriter* but not consistency in significance across offer types and CSOX periods. Unexpectedly, *StdTSX* (stock market volatility) shows a coefficient estimate with an alternating sign for marketed underwritten offers in the pre- and post-CSOX periods. Overall, these results show that, except for *RetVol* and *Spread*, no consistent determinant of offer price discount exists for the pre – and post-CSOX periods for either bought deals or marketed underwritten offers.

SUMMARY AND CONCLUSION

Research evidence on determinants of equity issuance costs of public stock offerings such as underwriting fees and offer price discount is extensive. This manuscript aims to find out whether the determinants of underwriting fees and price discount for Canadian equity offerings changed after the passage of Canadian SOX. This is an essential piece of legislation equivalent to U.S. Sarbanes-Oxley passed in 2002. The Canadian law became effective in 2005. Both laws have had a significant impact on the corporate governance of publicly traded companies. They have improved transparency, quality of financial information, including proper disclosure of equity offerings. Their main objective is to protect investors against corporate wrongdoing and result in more efficient capital markets. The research question of this study is, did the Canadian legislation have a significant effect on determinants of equity issuance costs of Canadian stock offers? Specifically, were determinants that are significant in the pre-CSOX period also significant after CSOX? This paper tries to answer this question by examining determinants of underwriting fees (and offer price discount) of Canadian bought deals and marketed underwritten offers. These are two typical methods of choice that Canadian companies can choose when issuing stocks. The sample includes 656 seasoned equity offers of companies listed on the Toronto Stock Exchange.

From eleven different determinants of underwriting fees, findings show gross offer proceeds (*LnGProcceds*) is the only significant determinant in the pre- and post-CSOX periods for both bought deals and marketed underwritten offers. Stock return volatility (*RetVol*) is significant during the pre- and post-CSOX periods for bought deals only. On determinants of offer price discount, from fourteen different determinants, stock return volatility (*RetVol*) and *Spread* are the only significant determinants for the pre- and post-CSOX periods for bought deals only. Marketed underwritten offers do not show consistent determinants for the pre- and post-CSOX periods. In general, findings reveal that a significant determinant in one period does not ensure the same determinant will be significant in a different period. This is mainly if the period is after the passage of a crucial law such as the Canadian SOX. Due to data constraints, this study did not consider many determinants used in previous research. It uses the most common across various studies. Nevertheless, the analysis is robust because it uses the exact determinants of underwriting fees (and price discount) for bought deals and marketed underwritten offers for the pre and post-CSOX periods. Whether missing determinants not included in this study could have been consistently significant for the pre – and post-CSOX periods are subject to further empirical evidence

REFERENCES

Altinkiliç, O. and R. S. Hansen (2000) “Are there economies of scale in underwriting fees? Evidence of rising external financing costs,” *Review of Financial Studies*, vol. 13(1), p. 191-218.

Altinkilic, O. and R. S. Hansen (2003) "Discounting and underpricing in seasoned equity offers," *Journal of Financial Economics*, vol. 69, p. 285-323.

Autore, D. M. (2011) "Does Rule 10b-21 increase SEO discounting?" *Journal of Financial Intermediation*, vol. 20, p. 231-247.

Bae, S. C. and H. Levy (1990) "The valuation of firm commitment underwriting contracts for seasoned new equity issues: Theory and evidence," *Financial Management*, vol. 19(2), p. 48-50.

Bhagat, S., Marr, M. W., and G. R. Thompson (1985) "The rule 415 experiment: Equity markets," *Journal of Finance*, vol. 40(5), p. 1385-1401.

Bortolotti, B., Megginson, W., and S. B. Smart (2008) "The Rise of Accelerated Seasoned Equity Underwritings," *Journal of Applied Corporate Finance*, vol. 20(3), p. 35-57.

Butler, A. W., Grullon, G., and J. P. Weston (2005) "Stock market liquidity and the cost of issuing equity," *Journal of Financial and Quantitative Analysis*, vol. 40(2), p. 331-348.

Calomiris, C. W. and M. Tsoutsoura (2010) "Underwriting Costs of Seasoned Equity Offerings: Cross-Sectional Determinants, Technological Change, and Pricing Benefits, 1980-2008," from https://www0.gsb.columbia.edu/faculty/ccalomiris/research.html.

Chemmanur, T. J. and P. Fulghieri (1994) "Investment bank reputation, information production, and financial intermediation," *The Journal of Finance*, vol. 49(1), p. 57-79.

Corwin, S. (2003) "The Determinants of Underpricing for Seasoned Equity Offers," *The Journal of Finance*, vol. 58(5), p. 2249-2279.

Denis, D. J. (1993) The costs of equity issues since rule 415: A closer look," *The Journal of Financial Research*, vol. 56(1), p. 77-88.

Eckbo, B. E., Masulis, R.W., and O. Norly (2007) "Security Offerings" In B. E. Eckbo (Ed.), Handbook of Corporate Finance: Empirical Corporate Finance. (p. 233-373) Elsevier/North-Holland Handbook of Finance Series.

Fernando, C. S., Gatchev, V. A. May, A. D., and W. L. Megginson (2015) "Prestige without purpose? Reputation, differentiation, and pricing in U.S. equity underwriting," *Journal of Corporate Finance*, vol. 32, p. 41-63.

Gao, X. and J. R. Ritter (2010) "The marketing of seasoned equity offerings," *Journal of Financial Economics*, vol. 97, p. 33-52.

Gunay, E. and N. Ursel (2015) "Underwriter competition in accelerated seasoned equity offerings: Evidence from Canada," *Journal of International Financial Markets, Institutions and Money*, vol. 34 (1), p. 94-110.

Gustafson, M. T. (2018) "Price Pressure and Overnight Seasoned Equity Offerings," *Journal of Financial and Quantitative Analysis,* vol. 53(2), p. 837-866.

Hansen, R. S. and P. Torregrosa (1992) "Underwriter compensation and corporate monitoring", *The Journal of Finance*, vol. 47(4), p.1537-1555.

Huang, R. and D. Zhang (2011) "Managing underwriters and the marketing of seasoned equity offerings," *Journal of Financial Quantitative Analysis*, vol. 46(1), p. 141-170.

Jeon, J. Q. and J. A. Ligon (2011) "The role of co-managers in reducing flotation cost: Evidence from seasoned equity offerings," *Journal of Banking and Finance*, vol. 35(5), p. 1041-1056.

Karpavicius, S. and J. A., Suchard (2012) "Institutional ownership and the rise of shelf offerings in U.S. equity raisings", *https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1566730*.

Kim, K.A. and H. Shin. (2004) "The puzzling increase in the underpricing of seasoned equity offerings," *The Financial Review*, vol.39 (3), p. 343-365.

Kim, D., Palia, K. and A. Saunders (2010) "Are initial returns and underwriting spreads in equity issues complements or substitutes?" *Financial Management*, vol. 39 (4), p. 1403-1423.

Kim, S. T. and R. W. Masulis (2012) "Order imbalances around seasoned equity offerings," *Unpublished Manuscript*, from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1932401.

Koerniadi, H., Krishnamurti, C., Lau, S. T., Tourani-Rad, A., and T. Yang (2015) "The role of internal and external certification mechanism in seasoned equity offerings," *Journal of Multinational Financial Management*, vol. 30, p.110-127.

Lee, I., Lochhead, S., and J. Ritter (1996) "The costs of raising capital," *The Journal of Financial Research*, vol. 49(1), p. 59-74.

Mola, S. and T. Loughran (2004) "Discounting and clustering in seasoned equity offering prices," *Journal of Financial and Quantitative Analysis*, vol. 39(1), p. 1-23.

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

Narayanan, R.P., Rangan, K.P., and N. K. Rangan (2004) "The role of syndicate structure in bank underwriting," *Journal of Financial Economics*, vol. 72 (3), p. 555-580.

Pandes, J. A. (2010) "Bought Deals: The Value of Underwriter Certification in Seasoned Equity Offerings," *Journal of Banking & Finance*, vol. 34, p. 1576-1589.

Papaioannou, G. J. and A. K. Karagozoglu (2017), "Theories of New Issue Pricing," Chapter 9, p. 135-143, Underwriting Services and the New Issues Market, Academic Press (Elsevier), United Kingdom.

Rubalcava, A. (2012) "The Sarbanes-Oxley: Research Potential of Similar Regulations in Other Countries," *Journal of Business & Financial Affairs,* vol. 1(3), p. 1.

Rubalcava, A. (2016) "Underpricing of Seasoned Equity Offerings by Canadian Cross-Listed Firms in the Pre- and Post-Sarbanes-Oxley Periods," *The International Journal of Business and Finance Research*, vol. 10(1), p. 27-37.

Rubalcava, A. (2018) "Investment banking fees on seasoned equity offerings: Evidence from Canadian issuer after the passage of Canadian SOX," *Journal of International Finance Studies*, vol. 18(1), p. 39-58.

Rubalcava, A. (2020) "The effects of Canadian SOX on the price discount of Canadian equity offerings," *The International Journal of Business and Finance Research*, vol. 14(1), p. 71-84.

Safieddine, A. and W. Wilhelm (1996) "An empirical investigation of short-selling activity prior to seasoned equity offerings," *Journal of Finance*, vol. 51 (2), p. 729-749.

Sherman, A. E. (1999) "Underwriter certification and the effect of shelf registration on due diligence," *Financial Management*, vol. 28(1), p. 5-19.

Smith, C. W. (1977) "Alternative methods for raising capital: Rights versus underwritten offerings," *Journal of Financial Economics*, vol. 5(3), p. 273-307.

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EVIDENCE ON RELATIONSHIPS BETWEEN OIL, GOLD, AND THE CHINA STOCK MARKET

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ABSTRACT

Many studies exist on the relationship between capital markets, oil prices, and the gold price that provide many meaningful results. But the impact of oil and gold prices on the China market is rarely considered. We use variables such as the return of oil price, return of gold price, volatility index of Chicago Board Options Exchange, and exchange rate to explore their relationship with the Shanghai Securities Composite Index. Our results show the Shanghai Securities Composite Index is affected by these international factors. In addition, we calculated the threshold value for the threshold effect of oil price on the Shanghai Securities Composite Index but using the similar method, there is no threshold effect of gold price on the Shanghai Securities Composite Index.

JEL: G00, G10

KEYWORDS: Oil Price, Chinese Market, Threshold Effect

INTRODUCTION

A number of scholars have used various techniques to explore the relationship between multivariate factors and stock returns, including the return of oil price, return of gold price, Volatility Index (VIX), and exchange rate (Sadorsky, 1999, Gokmenoglu and Fazlollahi, 2015, Jain and Biswal, 2016, Singhal et al., 2019). This paper focuses on international factors that impact the Chinese stock market. The motivations and contributions of this paper are twofold: firstly, most of the extant literature on the Chinese stock market uses the Chinese oil market, the Chinese gold market, and the exchange rate market. However, Chinese oil and gold prices are not exactly equal to international oil and gold prices. One of the questions of this paper is whether international factors affect the Chinese stock market (Cong et al., 2008, Luo and Qin, 2017). Secondly, empirical research methods used on this topic use mostly linear models. Since oil prices experienced a panic increase due to the 2008 economic crisis during our study period, the linear model may be inaccurate. Therefore, in this paper, we try to use a nonlinear threshold model to test the relationship between these factors and SSEC (Gokmenoglu and Fazlollahi, 2015, Singhal et al., 2019).

The main objective of this study is to investigate whether there exists a relationship between the gold price, oil price, VIX, and the exchange rate (CNY/USD), on the Shanghai Securities Composite Index (SSEC). Second, we investigate the length of time that the above factors will affect the returns of the SSEC and their significance. Finally, we examine the threshold effect of oil prices on SSEC. The impact between the stock market and the exchange rate market is not direct but through the linkage reaction of the oil market. Therefore, we expect the impact will change over time. According to a study of the Mexican market by Singhal et al (2019), the reaction times of oil, gold and the exchange rate to the stock market are variable. Moreover, by adjusting for these factors lagging 1, 2, and 3 periods respectively, they concluded that the price of oil negatively impacts the exchange rate, however, the price of gold has an insignificant impact on the exchange rate. In this study, first, we find that the return of oil price has a weakening significant as time goes, possibly resulting from a momentum effect. Second, the return of gold price is significant with

SSEC in the current period and at two lags periods. We suspect this effect may be due to a reversal effect of overreaction. VIX is significant as usual, which is consistent with historical experience. The significance of the exchange rate to SSEC return is relatively weak. Finally, we find that there is a threshold effect of oil price returns on the return of SSEC. Moreover, when we use data from the post-2008 economic crisis, we can illustrate that high oil prices do not produce a significant positive effect on the stock market. We find the oil price works positively for the stock market when it is between 50.06 and 83.06. The rest of the paper is organized as follows: Section 2 is the literature review; Section 3 presents the data and methodology and Section 4 is the empirical result. Section 5 provides some concluding comments.

LITERATURE REVIEW

Crude oil is an important resource for industry and provides the basis for whether industrial producers can provide consumers with stable products. Drastic changes in oil prices can expose producers and consumers to market risks. Past research has found that oil prices have a correlation with the stock market. Sadorsky (1999) analyzes movements in oil price and how they explain the relationship with movements in stock returns. Another, the oil market also provides the opportunity to hedge, as well as hedging opportunities for the stock market, Arouri et al. (2011), provide evidence that the Gulf Cooperation Council (GCC) provides the best hedging ratio with the oil market in these markets, ranging from a low of 0.0782 (Saudi Arabia) to 0.4289 (Oman). However, other studies have shown that different countries and types of markets react to oil price to different degrees, which can be broken down into aspects such as emerging markets versus developed markets. For example, Hammoudeh et al. (2011) examined the South Korea market, which was an emerging market at the time. They find that the country's rapid industrialization led to an increase of more than 300% in energy consumption in its industrial sector. Their research points out that corporate profits will drop when oil prices experience an adverse shock and investors will sell their holdings. From this, we think that the China stock market, as an emerging market, will also be affected by the oil price. In addition, Degiannakis et al. (2018) found that correlation between the stock market and oil price is roughly the same in countries that are oil-importing or oil-exporting. But the correlation between the two markets is more likely to be affected by some unpredictable sudden changes in the demand side, such as the Asian crisis, the real estate boom, the global economic crisis, and the rapid growth of the Chinese economic market.

In 2020, China's crude oil consumption reached 736 million tons, of which 542 million tons were imported accounting for 73.64% of the overall. This suggests that China's capital market will be shocked by changing international oil prices. However, China's domestic oil price is affected by the mark-up, which does not truly reflect its relationship with the capital market. Cong et al. (2008) conducted an evidence-based study of the Chinese market through a multivariate autoregressive approach (VAR model). They found the shock of oil price is limited for the composite class, such as the Shanghai and Shenzhen stock. However, the manufacturing index and some oil-related companies show a more significant statistical effect on changes in oil price. Some studies have different views. For instance, Luo and Qin (2017) use the VAR model to produce evidence that oil price shocks have a positive effect on the China stock market. They argue that higher oil prices are a sign of increased aggregate demand and represent a boom. At the same time, they apply the oil volatility index (OVX) and find the OVX has a negative impact on the China stock market. From past research, we have found that oil prices have an impact on the stock market, but the positive or negative impact is not consistent. Results may be driven y the selection of the data period or the research method.

In financial markets, many financial assets may have inconsistent positive and negative returns. As a result, some studies use asymmetric models for estimation. Escobari and Sharma (2020) use a variety of nonlinear models. They find that stock price shocks to crude oil is asymmetric. Because oil is a highly demanded energy commodity, when the economy is in a recession and encounters an increase in oil price, the financial

market reacts relatively quickly. Their research shows this reaction will be immediately reflected in consumers and the stock market. Other studies use threshold regression to identify mutation points. The threshold regression model (TR) describes a simple form of nonlinear regression with the special feature of using ordinary regression practices to identify mutation points for segmented regression (Hansen, 1999). In our study, we find a threshold effect of oil price changes on the return of the SSEC index, which is consistent with the model proposed by Barberis et al. (1998).

We know that precious metals are another important investment instrument in financial markets because of their good returns and low volatility and correlation properties. Metals are unlike the stock market, which can diversify away from increasing market risks. Batten et al. (2010) document the sensitivity of precious metal volatility to macroeconomic factors. Overall results suggest that precious metals cannot be considered a a single asset class and, in particular, that the volatility of gold can be explained empirically by monetary variables. Traditionally, gold has been used as a hedge against inflation and will show its usefulness in times of economic crisis. Gold creates a hedge to diversify increasing risks in the market, thanks to the different volatility and the low return correlation with equities that it offers at the sector and market level. It is an ideal asset class for portfolio diversification (Arouri and Nguyen, 2010, Daskalaki and Skiadopoulos, 2011). Some studies argue that gold should predominate in the optimal portfolio (Arouri and Nguyen, 2010, Hammoudeh et al., 2011, Baur, 2012). Therefore, investors can adjust their investment strategies to the stock market according to changes in the gold price, thereby affecting stock market prices. Zhang et al. (2021) used the DCC-GARCH model to investigate whether there would be a transmission of gold to the stock market due to hedging. They found the optimal hedging ratio of spot gold to the stock market was at 0.0952, but the spot gold to oil is the highest hedge ratio of 0.2271. They concluded that gold is a good hedge instrument against stock market risks.

Gokmenoglu and Fazlollahi (2015) used the ARDL model for the gold price, oil price, gold price volatility (GVZ), and oil price volatility (OVX) on the S&P500 stock market price index (GSPC). They found that all variables have an impact on the stock price index, but the gold price has more impact on the stock market. Jain and Biswal (2016) used the DCC-GARCH model to study the relationship between oil price, gold price, exchange rates, and the Indian stock market over the same period. They argue that crude oil price is a key determinant of future economic growth and is of great significance. Their results show that gold price, exchange rates, and the stock market have a short-term negative correlation. This means that investors may transfer their assets from high-risk assets to low-risk or stable-risk assets when macroeconomic risks increase. Arouri et al. (2015) studied the relationship between gold and other precious metal markets and the China stock market and found the price of gold had a significant volatility crossover effect on the Chinese stock market in 2004-2011. Their research shows that including gold in China's stock investment portfolio can effectively improve risk-adjusted performance.

Since oil and gold are settled in U.S. dollars, there may be a correlation between exchange rates and capital markets. Gavin (1989) argued that since monetary policy affects the foreign exchange market, the interest rate dominates the change with the exchange rate, which affects the price volatility of the stock market. In terms of spillover effects, Jebran and Iqbal (2016) indicated there are spillover effects in the stock market and the foreign exchange of some Asian countries. They found asymmetric volatility spillovers in the two markets, especially in China, where there is a two-way asymmetric volatility spillover between the foreign exchange market and the stock market. In other studies, they found that the oil price, gold price, and exchange rate are correlated. For example, Kumar et al. (2021) found that energy price has a significant impact on the Indian market. In theory, exchange rates, interest rates, and the securities market will have a certain degree of dependence on funds due to the relationship between the economic boom. Due to the Indian government's control measures on oil imports, the increase in oil price has a significant impact on the gas market. The impact of gold prices on the oil and gas markets is also significant. The exchange rate is not significant. Therefore, this article attempts to verify whether the same relationship exists on the Shanghai Securities Composite Index.

Most studies examine only the movements between oil price, gold price, and stock price indices of each country through models such as GARCH and ARDL (Gokmenoglu and Fazlollahi, 2015, Singhal et al., 2019). But, Sarwar (2012) analyzes the impact of VIX on the BRIC countries' stock markets. Because of the time difference, the opening time of the US stock market is displayed at different times in China, Indian and Russian markets and managers can adjust their investment strategies in time. Their research results show that VIX is not only a fear index for American investors, but also a fear index for investors in Brazil, China, and India. So, we consider the volatility index (VIX) in our paper. The VIX is the trading code of the Chicago Board Options Exchange market volatility index. It is commonly used to measure the implied volatility of S&P 500 index options. The VIX is a price-weighted index of a series of S&P 500 index options. It is often referred to as the " Panic Index" or "Panic Indicator". It is a measure to understand the market's expectations of future market volatility. We included VIX to test the impact of the three variables of oil price, gold price, and VIX on the securities market.

DATA AND METHODOLOGY

From past research, we understand that oil price, gold price, or VIX all have an impact on the securities market. However, the Chinese securities market has only gradually grown in the last thirty years. Coupled with the particularity of Chinese economic regulation, this article discusses whether the phenomena that exist in various international markets will also appear in the Chinese market. In this paper, we study the relationship between oil price returns, gold price returns, VIX, and the exchange rate to the return of Shanghai Securities Composite Index (SSEC). Data on the gold price, oil price, and VIX come from the FRED economic database. The SSEC and CNY/USD are provided by the Wind database. CNY/USD adopts the middle price. All data use daily observations. Our data period is from 1991/01/02 to 2020/12/30. We use the natural logarithm format for all variables. The returns of these variables are calculated using the following formula:

$$r_t = ln(X_t)/ln(X_{t-1})$$

X represents the variables used in this article. Cong et al. (2008) find the impact of international oil is significant in the China stock market. Among the various international oil price series, the best known are the prices of OPEC, Brent, and WTI. Most studies on oil price use WTI. In order to avoid differences caused by data, this article follows the use of Oil_WTI. Gold is an important investment commodity in the international financial market. However, since China is a net importer of gold, its domestic market usually has a premium to the international gold price. As a result, we use the closing price of the London bullion market at 15:00 in US dollars instead, and in this paper, we use $Gold\_1500$ instead. Chen and Yang (2019) find the VIX has a significant impact on most investments, and is very stable and sensitive, so we use the Chicago Board Options Exchange's VIX as our reference variable and replace it with Vix in this paper. Oil and gold price are quoted in U.S. dollars in the international market, and the exchange rate also affects the flow of funds. This article takes the exchange rate into consideration and represents it as US_CNY. The Shanghai Stock Exchange (SSE) develops the Shanghai Stock Exchange Composite Index (SSEC) is one of the two major exchanges in China. It has the significance of a weather vane for the China stock market. So, we use SSEC as the object for the test. The methodology is divided into two parts: "impact on the Return of the SSEC with GARCH Model" and "impact on the Return of the SSEC with Threshold Model".

Impact on the Return of the SSEC with GARCH Model First

We estimate the relationship between the SSEC index and the gold price, the oil price, the VIX, and the exchange rate. For this, we use three different time conditions for the model to be inferred. We observe the results of the current period, lagged one period and lagged two periods, Equation 1 and 2 show the formulas:

$$R\_SS_t = \beta_0 + \beta_1 Oil\_WTI\_r_t + \beta_2 Gold\_1500\_r_t + \beta_3 Vix_t + \beta_4 US\_CNY_t + \varepsilon_t \quad (1)$$

$$R\_SS_t = \beta_0 + \beta_1 Oil\_WTI\_r_{t-1} + \beta_2 Gold\_1500\_r_{t-1} + \beta_3 Vix_{t-1} + \beta_4 US\_CNY_{t-1} + \varepsilon_t \quad (2)$$

In these models, R_SS is the daily SSEC index return. R_SS_t state the daily return of the SSEC index at the end of day t. $Gold\_1500\_r_t$ represents the price return at the 15:00 in the London bullion market. $Oil\_WTI\_r_t$ is the return representing the price of oil at the end of day t. The Vix_t is the VIX at the end of day t. And US_CNY_t is the Dollar against the CNY (mid-price) at the end of day t. All variables in Equation 2 are the value lagged one period. Singhal et al. (2019) argued that if the relationship between variables is established in a long-term observation process when using the long-term error estimation equation, the error correction term in the error correction model may appear. Therefore, in this paper, the factors and number of backward periods is incorporated into an equation for long-term observation. Doing so facilitates observation of the variation of these factors in the subsequent study, and results from Equation (3) can be obtained.

$$\begin{aligned} R\_SS_t = {} & \beta_0 + \beta_1 Oil\_WTI\_r_t + \beta_2 Gold\_1500\_r_t + \beta_3 Vix_t + \beta_4 US\_CNY_t + \beta_5\, Oil\_WTI\_r_{t-1} \\ & + \beta_6 Gold\_1500\_r_{t-1} + \beta_7 Vix_{t-1} + \beta_8 US\_CNY_{t-1} + \beta_9 Oil\_WTI\_r_{t-2} \\ & + \beta_{10} Gold\_1500\_r_{t-2} + \beta_{11} Vix_{t-2} + \beta_{12} US\_CNY_{t-2} + \varepsilon_t \end{aligned} \quad (3)$$

There is sometimes an asymmetric effect of unknown returns in finance markets. The symmetric GARCH model is often used to handle such situations. However, this method has a major flaw in that it cannot determine the time point or price of the asymmetry. The threshold regression (TR) model can solve this problem. Applications of TR include sample split models, multiple equilibrium models, and the very popular threshold autoregressive (TAR) and self-excited threshold autoregressive (SETAR) specifications (Hansen, 1999, 2011). It can describe a simple form of nonlinear regression featuring piecewise linear specifications and regime-switching that occurs when an observed variable crosses unknown thresholds.

Impact on the Return of the SSEC with Threshold Model

The threshold model proposed by Hansen (1999) is commonly used to calculate the threshold and P-values of the threshold autoregressive (TAR) model, and its basic structure is as shown in Equation 4:

$$y_{it} = \mu_{it} + \beta_1 x_{it} \cdot \delta(q_{it} \le \gamma) + \beta_2 x_{it} \cdot \delta(q_{it} > \gamma) + \varepsilon_{it} \quad (4)$$

In Equation 4, y_{it} is the dependent variable, x_{it} is the independent variable, q_{it} is the threshold variable, γ is the threshold value, subscript i denotes individual, subscript t denotes time, and $\delta(\cdot)$ is the indicator function. In the Hansen model, the observed sample is divided into two stages, depending on the threshold variable, and the parameters β_1 and β_2 are allowed to vary between the two polities, here ($\beta = \beta_1, \beta_2$), ensuring that:

$$y_{it} = \mu_{it} + \beta x_{it}(\gamma) + \varepsilon_{it} \quad (5)$$

Chen and Yang (2019) use the hypothesis that Hansen's (1999) model predicts portfolio returns with a threshold value of oil price. They find a threshold effect of oil price on portfolio returns. Their research demonstrates that after reducing the relationship between the industry and oil through the portfolio, the characteristics of the portfolio will also be affected by changes in oil price. Since the SSEC index is compiled from a weighted composite stock price index that is calculated using all stocks listed on the SSEC, it is not difficult to introduce the threshold effect of oil price on corporate returns. It is also applicable to the SSEC index, which is also verified by the empirical results later in this paper. In this study, we specified the threshold equation by Equation 6:

$$R\_SS_t = \alpha_1 + \beta_2 Oil\_r_t + \omega_1 Oil\_r_t \cdot \delta(Oil\_WTI_t \leq \gamma) + \omega_2 Oil\_r_t \cdot \delta(Oil\_WTI_t > \gamma) + \varepsilon_t \quad (6)$$

In this specification, the current oil price is the threshold considered and Oil_WTI_t is the price of WTI. Oil_r_t are present the price return of WTI. This equation divides the result of the equation into two regimes depending on whether the threshold Oil_WTI_t will be smaller than γ. The coefficient ω_1 and ω_2 and the elements of Oil_r_t varies with time. Meanwhile, ε_t obeys an independent identical distribution. We calculate the threshold effect of gold price on the SSEC index by Equation (6), an equation that is achieved by replacing oil price and oil return equally with gold price and gold return. However, in our study, we find that there is no threshold effect of gold price on the SSEC index, which is consistent with the actual situation. In the Chinese market, gold usually exists not as an investment instrument, but as a collection instrument, so there is no threshold effect of gold in the Chinese financial market. So, we do not present the results of the gold price. To make it easier for readers to understand the variables used in this article, we summarized them in Table 1:

Table 1: Definition of Variables

Variable	Definition
Oil_WTI	The oil price of West Texas Intermediate
Oil_WTI_r	The oil price return of West Texas Intermediate
Oil_r	The oil price return of West Texas Intermediate is used in the threshold model
$Gold\_1500\_r$	London Bullion Market Gold Price at 15:00 hours
US_CNY	the Dollar against the currency of China (mid-price)
Vix	Volatility Index
SSEC	China Shanghai Securities Composite Index

This table summarizes all variables which we have used in the model, and we explain them.

This study firstly explores the impact of gold price, oil price, VIX and CNY/USD exchange rate on SSEC. Second, we discuss the threshold effect of oil price on SSEC.

EMPIRICAL RESULTS

In this section, we discuss the impact of the gold price, oil price, VIX, and the exchange rate between CNY and USD on the Shanghai Securities Composite Index (SSEC). Degiannakis et al. (2018) argue the fluctuation of oil price has a salutary impact on the stock market and the oil market provides hedging opportunities for the stock market. Therefore, the two markets are connected. In addition, Jawadi et al. (2016) demonstrated the price of crude oil shows a collinearity relationship with the return in the exchange rate market. This result implies that we can use the exchange rate as an indicator of monitor the stock market. Chen and Yang (2019) found that VIX returns are similarly significant for the stock market, with a negative correlation in most portfolios. Singhal et al. (2019) found the price of gold is likewise highly correlated with stock prices in an empirical demonstration of the Mexican stock market using the ARDL model. Results show the lag lengths of oil, gold, and exchange rates are different when the system is subject to shocks. Hong and Stein (1999) argue that investors in the market are divided into two categories, news watchers and momentum traders. News watchers have behavioral biases of news, resulting in the prices of the assets traded not reaching the equilibrium price instantaneously. When news watchers start trading and the price gradually rises, momentum traders start to enter the market. Since these investors do not enter the market at the same time, early momentum traders have a lower price than the long-term equilibrium price, so they can profit. When they push the price further up, and another group of momentum traders enter, the prices is driven higher implying stronger momentum. At that time, the trade prices are higher than the long-term equilibrium price, thus allowing an overreaction to form.

In this paper, investors have different reaction times to the SSEC when they get news about gold and oil prices. Table 2 shows the momentum of these assets is different, as we can see from the table, oil returns create a momentum effect that gradually decreases against the return of SSEC as the lag periods changes. The return of gold price to return of SSEC shows significance in the current period. The coefficient reverses and is not significant in the lag one period, but in the lag two periods, gold returns are coefficients reversed again and significant. This pattern is consistent with the reversal effect due to overreaction proposed by Chopra et al. (1992). We first consider the relationship between Oil_WTI_r, $Gold\_1500\_r$, Vix, and US_CNY with SSEC return in the current period. We use Equation (1) for testing. From Table 2, we find that US_RMB is statistically significant at the 5% significance level and other variables are statistically significant at the 1% significance level. Among the three variables of Oil_WTI_r, $Gold\_1500\_r$, and Vix, only the Vix is significantly negative, which is consistent with the results of past research. Take Oil_WTI_r as an example in Table 2. When Oil_WTI_r increases by 1%, SSEC return will increase by 0.0203% and other conditions remain unchanged.

Table 2: The Results for all Variables in the Current Period

Variable	Coefficient	Prob.
$Oil\_WTI\_r_t$	0.0203	0.0003***
$Gold\_1500\_r_t$	0.0576	0.0000***
Vix_t	-0.0001	0.0002***
US_CNY_t	0.0004	0.0263**

Table 2 shows the relationship of Oil_WTI_r, $Gold\_1500\_r$, Vix, and US_CNY. We use equation (1) for testing. Table 2 presents the P-value of Oil_WTI_r, $Gold\_1500\_r_t$, and Vix are 0.0003, 0.0000, and 0.0002 respectively. These factors are statistically significant at the 1% level. US_CNY is 0.0263, it is statistically significant at the 5% significance level. Equation (1) as: $R\_SS_t = \beta_0 + \beta_1 Oil\_WTI\_r_t + \beta_2 Gold\_1500\_r_t + \beta_3 Vix_t + \beta_4 US\_CNY_t + \varepsilon_t$. R_SS_t represent the daily return of the Shanghai Securities Composite Index (SSEC) in the current period. $Gold\_1500\_r_t$ denotes the gold price return at 15:00 in London bullion market. $Oil\_WTI\_r_t$ is the return of WTI price at the end of day t. The Vix_t is the VIX at the end of day t. US_CNY_t is the Dollar against the CNY (mid-price) at the end of day t.

Next, we test the relationship between Oil_WTI_r, $Gold\_1500\_r$, Vix, and US_CNY with SSEC return in the lag one period. We use Equation (2) for testing. In this test, only Oil_WTI_r and Vix have a 1% significant impact on SSEC return, US_RMB shows a 5% significance level. The Vix is still significantly negative at a 1% significance level. The results are shown in Table 3.

Table 3: The Results for all Variables in the Lag One Period

Variable	Coefficient	Prob.
$Oil\_WTI\_r_{t-1}$	0.0184	0.0013***
$Gold\_1500\_r_{t-1}$	-0.0226	0.1900
Vix_{t-1}	-0.0001	0.0006***
US_CNY_{t-1}	0.0004	0.0446**

Table 3 shows the relationship of Oil_WTI_r, $Gold\_1500$, Vix, and US_CNY. We use equation (2) for testing. Table 3 presents the P-value of Oil_WTI_r and Vix are 0.0013, 0.0006 respectively, $Gold\_1500$ is 0.0446. From the results of the table, we can see only Oil_WTI_r and Vix have a 1% significant impact on SSEC return, US_RMB shows a 5% significance level impact on the return of SSEC. Equation (2) as: $R\_SS_t = \beta_0 + \beta_1 Oil\_WTI\_r_{t-1} + \beta_2 Gold\_1500\_r_{t-1} + \beta_3 Vix_{t-1} + \beta_4 US\_CNY_{t-1} + \varepsilon_t$. R_SS_t state the daily return of the Shanghai Securities Composite Index (SSEC) at the current period. $Gold\_1500\_r_{t-1}$ denotes the gold price return of London bullion market at lag one period. $Oil\_WTI\_r_{t-1}$ is the return of WTI price at lag one period. The Vix_{t-1} is the VIX at lag one period. US_CNY_{t-1} is the Dollar against the CNY (mid-price) at lag one period.

We then aggregated all the factors and added the lag two periods. This method is based on Singhal et al. (2019). We use Equation (3) for testing. We find that no matter which backward period is considered, Vix will always show statistically significance at the 1% level. We find that due to momentum, Oil_WTI_r shows a gradually weakening momentum from 1% significance in the current period to non-significance in

the lag two periods. This finding is consistent with historical experience. Chopra et al. (1992) argue that in the reversal effect, losers have strong momentum to becoming better in the subsequent time period, while winners also tend to decline and fall in the subsequent time. We also find that $Gold\_1500\_r$ exhibit a reversal effect due to the overreaction, which $Gold\_1500\_r$ exhibiting a 1% significance only in the current period and lag two periods, and the coefficient with opposite coefficients in lag one period. The Vix also has a reversal phenomenon. However, in the case of Equation (3), the exchange rate is not significant. Table 4 shows the results.

Table 4: Summary Test Results for all Variables and Lagging Periods

Variable	Coefficient	Prob.
$Oil\_WTI\_r_t$	0.0194	0.0010***
$Oil\_WTI\_r_{t-1}$	0.0126	0.0433**
$Oil\_WTI\_r_{t-2}$	0.0080	0.2268
$Gold\_1500\_r_t$	0.0493	0.0004***
$Gold\_1500\_r_{t-1}$	-0.0212	0.2097
$Gold\_1500\_r_{t-2}$	0.0476	0.0057***
Vix_t	-0.0004	0.0000***
Vix_{t-1}	-0.0005	0.0000***
Vix_{t-2}	0.0009	0.0000***
US_CNY_t	-0.0157	0.2793
US_CNY_{t-1}	0.0251	0.2448
US_CNY_{t-2}	-0.0091	0.6167

Table 4 shows the summary test results for the variable definitions are consistent with Table 2 and Table 3 and added the lag two periods. Results show that no matter which backward period if considered Vix show a 1% significance level. Due to momentum, Oil_WTI_r show a gradual weakening momentum from a 1% significance in the current period to the return of SSEC and show non-significance in the lag two periods. The $Gold\_1500\_r$ exhibits 1% significance only in the current period and lag two period, and opposite coefficients in lag one period. The US_CNY is not significant in all periods. Equation(3) as: $R\_SS_t = \beta_0 + \beta_1 Oil\_WTI\_r_t + \beta_2 Gold\_1500\_r_t + \beta_3 vix_t + \beta_4 US\_CNY_t + \beta_5 Oil\_WTI\_r_{t-1} + \beta_6 Gold\_1500\_r_{t-1} + \beta_7 vix_{t-1} + \beta_8 Us\_CNY_{t-1} + \beta_9 Oil\_WTI\_r_{t-2} + \beta_{10} Gold\_1500\_r_{t-2} + \beta_{11} vix_{t-2} + \beta_{12} US\_CNY_{t-2} + \varepsilon_t$. R_SS_t state the daily return of the Shanghai Securities Composite Index (SSEC) at the current period. $Gold\_1500\_r_{t-2}$ denotes the gold price return of London bullion market at lag two period. $Oil\_WTI\_r_{t-2}$ is the return of WTI price at lag two period. The Vix_{t-2} is the VIX at lag two period. US_CNY_{t-2} is the Dollar against the CNY (mid-price) at lag two period.

We want to understand the impact of oil prices on the stock price index. Are high oil prices really bad for the stock market? Chen and Yang (2019) pointed out that "reasonable" high oil prices are not bad for the stock market. Does this condition also exist in China's stock market? We use the threshold model for this experiment, as in Equation (6). In order to distinguish it from the GARCH model in the previous section, we have made some adjustments to the variables. In Equation (6), Oil_WTI is the price of WTI. Oil_r are present the price return of WTI. The result of threshold effect has presented in Table 5 and 6. Table 5 reports the estimation results of the threshold effect. In our result, we find two threshold values respectively 30.25 and 77.18. Using the threshold regression model shows that the return on the SSEC is non-significant at an oil price below 30.25, but the Oil_WTI between 30.25 and 77.18, and the Oil_WTI above 77.18 all have 1% significance on SSEC returns. When the Oil_WTI is between 30.25 and 77.18, the SSEC return will increase by about 0.04 percentage points on average for Oil_r increase of 1 percentage point. Similarly, when the Oil_WTI is above 77.18, for a 1% increase in Oil_r, the return on the SSEC will increase by about 0.15 %.

Table 5: The Threshold Effect of Oil Price

Dependent Variable	Coefficient	Prob.
threshold value	Oil_WTI_t <30.25	
Oil_r_t	-0.0139	0.3110
threshold value	30.25≤ Oil_WTI_t <77.18	
Oil_r_t	0.0412	0.0002***
threshold value	77.18≤ Oil_WTI_t	
Oil_r_t	0.1524	0.0000***

This table reports the results of the threshold model. Results show the Oil_WTI threshold is 30.25 and 77.18. The Oil_WTI between 30.25 and 77.18, and the Oil_WTI above 77.18 all have 1% significance on SSEC returns. In terms of the correlation coefficient, when the Oil_WTI is between 30.25 and 77.18, the SSEC return increases by about 0.04 % on average for Oil_r increase of 1 %. Similarly, when the Oil_WTI is above 77.18, for a 1 % increase in Oil_r, the return on the SSEC increases by about 0.15 percentage points on average. Equation (6) as : $R\_SS_t = \alpha_1 + \beta_2 Oil\_r_t + \omega_1 Oil\_r_t \cdot \delta(Oil\_WTI_t \le \gamma) + \omega_2 Oil\_r_t \cdot \delta(Oil\_WTI_t > \gamma) + \varepsilon_t$. *$Oil\_r_t$ are present the price return of WTI at t. Oil_WTI_t is the price of WTI at the end of t.*

We find that when the Oil_WTI is above 77.18 the coefficient is higher than the Oil_WTI is between 30.25 and 77.18. Although high oil prices do not necessarily have an adverse effect on the economy (Chen and Yang, 2019). Our results show that higher oil prices are better for SSEC returns. The result is inconsistent with historical experience. We analyze the changes in oil prices from 2006 to 2009 and found that oil prices fluctuated sharply because of the financial crisis. In 2008, the oil price increased by 36.04% compared with 2007 and increased by 44.18% compared with 2006. In 2009, the oil price dropped by 51.21% compared with that in 2008. The economy was still at a low point in 2009, but the oil price dropped significantly. The economic downturn in 2008-2009 was not caused by the oil price. We reasoned that this may be the reason why our results had a significant positive effect on the return of SSEC at high oil prices. To prove this inference, we use the sub-period of 2009/01/02 to 2020 /12/30. The results are presented in Table 6. Table 6 shows when the Oil_WTI is between 50.06 and 83.06 there is 1% significance, and when the Oil_WTI is above 83.06 there is 5% significance. When the Oil_WTI is between 50.06 and 83.06, the return of SSEC increases by about 0.14 % on average for a 1% increase in the Oil_r. Although when Oil_WTI is higher than 83.06 there still exists a smaller significant positive impact at 0.0477%.

Table 6: The Threshold Effect of Oil Price From 2009 to 2020

Dependent Variable	Coefficient	Prob.
threshold value	Oil_WTI_t<50.06	
Oil_r_t	0.0172	0.1125
threshold value	50.06≤ Oil_WTI_t<83.06	
Oil_r_t	0.1350	0.0000***
threshold value	83.06≤ Oil_WTI_t	
Oil_r_t	0.0477	0.0403**

This table reports the estimation results of the threshold model for Oil_WTI on the SSEC from 2009 to 2020. Results show Oil_WTI has the best effect on the stock market returns are when prices are between 50.06 and 83.06. When the Oil_WTI is above 83.06, the coefficient of Oil_WTI on stock market returns decreases, indicating that high oil prices do not have an incentive effect on stock market returns. Equation (6) as : $R\_SS_t = \alpha_1 + \beta_2 Oil\_r_t + \omega_1 Oil\_r_t \cdot \delta(Oil\_WTI_t \le \gamma) + \omega_2 Oil\_r_t \cdot \delta(Oil\_WTI_t > \gamma) + \varepsilon_t$. *$Oil\_r_t$ are present the price return of WTI at t. Oil_WTI_t is the price of WTI at the end of t.*

CONCLUSION

Stock markets of many countries are sensitive to oil prices, gold prices or the VIX. China is currently the second largest economy with little evidence on this relationship. This article tests whether these factors have the same effect on China. We use daily data from 1990/01/02 to 2020/12/30 for all variables. This paper analyzes the correlation between the oil price return, the gold price return, the exchange rate, the volatility index, and the return of the Shanghai Securities Composite Index. The uniqueness of this paper is to observe the relationship between these international factors with Shanghai Securities Composite Index.

We adjust the lag periods and use a threshold model to test the relationship of oil price and stock market returns.

We find high oil prices are advantage for the economy. Empirical results show the effect of exchange rate on the stock market is reflected in the lag two periods. This contrasts the case of no effect as found by Kumar et al. (2021) for the Indian market. The VIX is always significant, indicating that the VIX is also valid and significant in China. By adjusting for different lagged periods, we obtain the return of oil price, return of the gold price, VIX, and exchange rate are highly significant in the current period. But when lagged one period, only return of oil price, VIX, and exchange rate are statistically significant. We find that the impact of oil returns on SSEC gradually diminishes until it shows no significance at lag two periods. This is due to the inconsistent speed with which market investors react to news in the market, and the information is gradually reflected in the price. Thus, the price moves in the initial direction in the short run, implying a momentum effect. This is consistent with the findings presented by Hong and Stein (1999). Conversely, the reversal of the coefficients in the lag one period for the SSEC and is not significant. But in the case of lag two periods, the gold return is significant again, which is consistent with the reversal effect due to overreaction proposed by Chopra et al. (1992). Finally, we use a threshold regression to test the threshold effect of oil price. We find a threshold effect of oil price on the return of the SSEC, which is consistent with the model proposed by Barberis et al. (1998). But our result found the gold price has no threshold effect on the return of SSEC. In addition, the threshold of oil price exhibits several characteristics. For example, when the oil price is below the first statistically significant threshold, there is a negative relationship between oil price and SSEC return, but the result is insignificant. There is a positive relationship between oil price and SSEC return when the oil price is between the first and second thresholds. Next, when the oil price is above the second threshold value, the oil price is also positively correlated with SSEC return. We deduce that this situation was affected by the financial crisis. Further research might explore other financial crises in China and elsewhere to gain additional insights.

REFERENCES

Arouri, M.E.H., Lahiani, A., and Nguyen, D.K. (2011) "Return and volatility transmission between world oil prices and stock markets of the GCC countries," *Economic Modelling*, vol. 28(4), July, p. 1815-1825.

Arouri, M.E.H., Lahiani, A., and Nguyen, D.K. (2015) "World gold prices and stock returns in China: Insights for hedging and diversification strategies," *Economic Modelling*, vol. 44, January, p. 273-282.

Arouri, M.E.H., and Nguyen, D.K (2010) "Oil prices, stock markets and portfolio investment: Evidence from sector analysis in Europe over the last decade," *Energy Policy*, vol. 38(8), August, p. 4528-4539.

Barberis, N., Shleifer, A., and Vishny, R. (1998). "A model of investor sentiment," *Journal of Financial Economics*, vol. 49(3), September, p. 307–343.

Batten, J.A., Ciner, C., and Lucey, B.M. (2010) "The macroeconomic determinants of volatility in precious metals markets," *Resources Policy*, vol. 35(2), June, p. 65-71.

Baur, D.G. (2012) "Asymmetric Volatility in the Gold Market," *The Journal of Alternative Investments*, vol. 14(4), January, p. 26-38.

Chen, A.-S., and Yang, C.-M. (2019) "Oil price thresholds and stock returns," *Investment Analysts Journal*, vol. 48(2), April, p. 125-145.

Chopra, N., Lakonishok, J., and Ritter, J.R. (1992) "Measuring abnormal performance: Do stocks overreact?" *Journal of Financial Economics*, vol. 31(2), April, p. 235-268.

Cong, R.-G., Wei, Y.-M, Jiao, J,-L., and Fan, Ying(2008) "Relationships between oil price shocks and stock market: An empirical analysis from China", *Energy Policy*, vol. 36(9), September, p. 3544-3553.

Daskalaki, C., and Skiadopoulos, G. (2011) "Should investors include commodities in their portfolios after all? New evidence," *Journal of Banking & Finance*, vol. 35(10), October, p. 2606-2626.

Degiannakis, S., Filis, G., and Arora, V. (2018) "Oil Prices and Stock Markets: A Review of the Theory and Empirical Evidence," *The Energy Journal*, vol. 5(39), September, p. 85-130.

Escobari, D., and Sharma, S. (2020) "Explaining the nonlinear response of stock markets to oil price shocks," *Energy*, vol. 213, December, p. 118778.

Gavin, M. (1989) "The stock market and exchange rate dynamics," *Journal of International Money and Finance*, vol. 8(2), June, p. 181-200.

Gokmenoglu, K.K., and Fazlollahi, N. (2015) "The Interactions among Gold, Oil, and Stock Market: Evidence from S&P500," *Procedia Economics and Finance*, 25, May, p. 478-488.

Hammoudeh, S., Malik, F., and McAleer, M. (2011) "Risk management of precious metals," *The Quarterly Review of Economics and Finance*, vol. 51(4), November, p. 435-441.

Hansen, B. E. (1999). "Threshold effects in non-dynamic panels: Estimation, testing, and inference," *Journal of Econometrics*, vol. 93(2), December, p. 345-368.

Hansen, B. E. (2011). "Threshold autoregression in economics," *Statistics and its Interface*, vol. 4(2), January, p.123-127.

Hong, H., and Stein, J.C. (1999) "A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets," *The Journal of Finance*, vol. 54(6), December, p. 2143-2184.

Jain, A., and Biswal, P.C. (2016) "Dynamic linkages among oil price, gold price, exchange rate, and stock market in India," *Resources Policy*, vol. 49, September, p. 179-185.

Jawadi, F., Louhichi, W., Ameur, H. B., and Cheffou, A. I. (2016) "On oil-US exchange rate volatility relationships: An intraday analysis," *Economic Modelling*, vol. 59, December, p. 329–334.

Jebran, K., and Iqbal, A. (2016) "Dynamics of volatility spillover between stock market and foreign exchange market: evidence from Asian Countries," *Financial Innovation*, vol. 2(3), December, p. 1-20.

Kumar, S., Choudhary, S., Singh, G., and Singhal, S. (2021) "Crude oil, gold, natural gas, exchange rate and indian stock market: Evidence from the asymmetric nonlinear ARDL model," *Resources Policy*, vol. 73, October, p. 102-194.

Luo, X., and Qin, S. (2017) "Oil price uncertainty and Chinese stock returns: New evidence from the oil volatility index," *Finance Research Letters*, vol. 20, February, p. 29-34.

Sadorsky, P. (1999) "Oil price shocks and stock market activity," *Energy Economics*, vol. 21(5), October, p. 449-469.

Sarwar, G. (2012) "Is VIX an investor fear gauge in BRIC equity markets?" *Journal of Multinational Financial Management*, vol. 22(3), July, p. 55-65.

Singhal, S., Choudhary, S., and Biswal, P.C. (2019) "Return and volatility linkages among International crude oil price, gold price, exchange rate and stock markets: Evidence from Mexico," *Resources Policy*, vol. 60, March, p. 255-261.

Zhang, Y., Wang, M., Xiong, X., and Zou, G. (2021) "Volatility spillovers between stock, bond, oil, and gold with portfolio implications: Evidence from China", *Finance Research Letters*, vol. 40, May, p. 101786.

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SEASONAL VARIATIONS IN TREASURY NOTES YIELDS

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ABSTRACT

We study seasonalities in the yields of Treasury notes (T-Notes) with fixed maturities of two, three, five, seven and ten years. We find that although there are a number of anecdotal patterns, only one passes the more rigorous statistical tests, which is the half-year high (March to August) versus half-year low (September to February) yield measured in terms of their ranks in a year. The results across T-Notes of different maturities also exhibit a striking resemblance. Further analysis on the yield spread of the 10-Year and 2-Year T-Notes shows that although their nominal yield differences have been similar in recent economic cycles, the percentage values of the differences have been increasing quickly especially since the 2010s due to the low levels of short-term Treasury yields.

JEL: G10, G12, G14

KEYWORDS: Seasonality, Treasury Yield, Yield Spread, Asset Pricing

INTRODUCTION

Persistent seasonal anomalies have important implications for market efficiency and asset pricing. Studies of these anomalies contribute to the understanding of where the anomalies come from and help us explore a better-informed price discovery process. Understanding the Treasury yields seasonality is crucial because the Treasury yields play a central role in determining all asset prices as they directly and indirectly affect the interest rates and interest rates movements.

Academic research on the Treasury yields seasonality is very limited. Most research focuses on the seasonalities in the risky assets. The few available research that looks into the risk free assets such as the US Treasury securities studies returns instead of yields. Liu, Lin and Varshney (2018) study the 10-Year Treasury note yields and find that most anecdotally observed yield patterns do not pass the statistical significance test as a seasonal variation. Liu (2018) studies the 2-Year Treasury note yields and find that variations in nominal yields do not pass the statistical significance test. However, when the rank of the monthly yields in a year is used to test the seasonality, there is a statistically significant half-year variation of higher yields from March to August and lower yields from September to February.

This paper expands the scope of the previous seasonality studies on Treasury yields to include all five intermediate term securities issued by the US government, which includes Treasury notes (T-Notes) with fix maturities of two, three, five, seven and ten years. Because of their relative long-term maturities, the yields of these securities are not as heavily influenced by the government policies as the shorter term Treasury Bills. Investors watch and follow the yields of these securities closely. Changes in these yields, especially the yield inversions where the yields of longer-term maturity T-Notes drop below those of the shorter-term maturity T-Notes, typically have a huge impact on the market.

We find that the yields of the five Treasury notes exhibit strikingly similar patterns in both the anecdotal seasonal variations and statistical tests results. Consistent with the findings of the previous 10-Year and 2-Year Treasury notes studies, variations in the nominal yields do not pass the rigorous statistical seasonality tests. However, tests using the ranks of the monthly yields in their calendar years show strong statistical significance to support a half-year seasonal variation of higher yields from March to August and lower yields from September to February.

These findings are both expected and surprising. We expect the Treasury notes with maturities fall in between the two end spectrums would somewhat conform to the patterns and results of those of the 10-Year and 2-Year T-Notes. However, we are surprised at the high similarity of their results. A number of factors come into the play to affect the yield curve, among which levels of short-term interest rate, market expectation of inflation premium and risk premium, and demand for securities of different maturities. We do not expect a uniform combined effect on the Treasury yields of different fixed maturities. When we explore further the yield differences of the 10-Year and 2-Year T-Notes, we notice that while the nominal differences have been holding near constant during the recent economic cycles, the percentages differences have been increasing and are dramatically different since the 2010s. This raises an important question for future studies: would the yield spread be more appropriately measured in nominal or percentage terms?

We organize the rest of the paper in the following way. Section II is literature review. Section III explains the data and methodology. Section IV reports and discusses the results. Section V provides the concluding comments.

LITERATURE REVIEW

A persistent seasonality or seasonal anomaly in asset pricing has important implications for market efficiency because discovered anomalies typically disappear quickly through arbitrage in an efficient market. Research over the years has documented a number of seasonal anomalies across different markets and asset classes. For example, Branch (1977), Gultekin and Gultekin (1993), Wilson and Jones (1990), Maloney and Rogalski (1989) find the turn-of-the-year effect where the return in January is higher than the rest months in the year in both domestic and international stocks, corporate bonds and derivative products. Ariel (1987) among others finds the turn-of-the-month effect where return is only positive around the beginning of the calendar month. French (1980) and Gibbons and Hess (1981) find the day-of-the-week effect where Monday return is negative due to higher Friday prices. Explanations for these anomalies include portfolio rebalancing (Ritter and Chopra, 1989), tax-loss selling (Keim, 1983), macroeconomic seasonalities (Kramer, 1994), standardization of payments at certain times (Ogden, 1987, 1990) and behavioral effect such as variations in risk aversion linked to seasonal mood swings (Kamstra, Kramer and Levi, 2015).

Research on the seasonality of risk free assets such as the US Treasury securities is limited as most research is on the risky assets such as stocks and corporate bonds. The few available ones have mixed findings. For example, Sharp (1988), Krehbiel (1993) and Chen and Chan (1997) find no seasonalities in the Treasury Bond's monthly returns, while other studies such as Flannery and Protopadakis (1988), Clayton, Delozier and Ehrhardt (1989), and Athanassakos and Tian (1998) find Treasury returns have seasonalities in the days-of-the-week, month-of-the-year, and quarter-of-the-year. One thing these studies have in common is that they look at the Treasury holding period returns backed out from some bond indices or portfolios. The problem with using the holding period returns is that they are impossible to calculate without making additional assumptions about the coupon payments and time-to-maturity of the bonds in the indices and portfolios.

A few studies that use the Treasury yield information focus on extracting information from the yield curves. For example, Campbell and Shiller (1991) find the yield spread has a prediction power of the future interest

rate movement. Estrella and Hardouvelis (1991) find the slope of the yield curve contains information of future real economic activities. Estrella and Mishkin (1996) find that yields, especially yield spread, significantly outperformed other financial and macroeconomic indicators in predicting recession two to six quarters ahead.

Academic research on the seasonality of Treasury yield is non-existent until recently when Liu, Lin and Varshney (2018) study the 10-Year Treasury note yields and Liu (2018) studies the 2-Year Treasury note yields. They find that most anecdotally observed yields patterns do not pass the rigorous statistical significance tests as a seasonal variation. In addition, the seasonality findings also depend on the measure of the yields and the seasonal patterns in the test. Variations measured in nominal yields do not pass the statistical significance test due to the substantial drop in the yield levels over the years. However, variation measured in the rank of the monthly yields in a year has a statistically significant half-year variation of higher yields from March to August and lower yields from September to February.

This paper expands the scope of the previous seasonality studies on Treasury yields to include all five intermediate term securities issued by the US government, which includes Treasury notes (T-Notes) with fix maturities of two, three, five, seven and ten years. Investors watch and follow the yields of these securities closely. The purpose is to understand how these important securities behave as a group and their similarities and differences.

DATA AND METHODOLOGY

We use the monthly Treasury Constant Maturity Rate (Not Seasonally Adjusted) for 2-Year, 3-Year, 5-Year, 7-Year and 10-Year Treasury notes obtained from FRED (Federal Research Economic Database) Federal Reserve Bank of St. Louis. The data spans from 1976.06 to 2020.06. This consists of 529 months (44 years and 1 month) of time series observations for each T-Notes.

Our methodology to study the yields seasonality follows the standard dummy variable regression analysis methods used in the earlier seasonality studies of the Treasury returns in Athanassakos and Tian (1998), Chen and Chan (1997) and Kamstra, Kramer and Levi (2015). Specifically, we test the seasonalities in month and in half-year using, respectively,

$$Y_t = \alpha_1 + \sum_{j\neq 5}^{12} \beta_j M_t^j + \varepsilon_t \quad (1)$$

$$Y_t = \alpha_2 + \beta H_t + \varepsilon_t \quad (2)$$

Where Y_t represents the nominal monthly yields. In Equation (1), M_t^j is a dummy variable that is equal to 1 if the month is j and 0 otherwise. j varies from 1 to 12 except 5, i.e., there are 11 dummy variables for every month except the month of May. We use May as the reference month following the earlier Treasury yields studies since May has relatively high yields on average. However, the choice of this reference month should not affect the seasonality result. β_j measures the average difference of yields between the month j and May. α_1 measures the average yield in May. A statistically significant and positive β_j indicates that the associated month j has on average higher yields than May, and vice versa.

In Equation (2), H is a dummy variable that is equal to 1 if the month is from March to August and 0 otherwise. β measures the average difference in monthly yields between the higher-half of the year (from March to August) and the lower-half of the year (from September to February). We follow the same months for higher-half and lower-half year used in Liu (2018). α_2 measures the average monthly yield in the lower-half of the year (from September to February). Similarly, a statistically significant and positive β indicates that the months in the higher-half of the year have on average higher yields than the months in the lower-half of the year, and vice versa.

The null hypothesis is that yields do not vary across different months of the year (or half of the year), i.e., all βs are simultaneously equal to 0, $\beta_1 = \beta_2 = \cdots = \beta_j = 0$ (or $\beta = 0$). If the null hypothesis is rejected, then there is a seasonality because some month(s) (or half of the year) always have higher or lower yield than those in May (or the other half of the year).

F-test is used to test the joint null hypothesis and the overall fitness of the regression. We also use the Durbin-Watson *d* statistics and the White's x^2 test to check the serial correlation and heteroscedasticity of the regression residuals. The presence of serial correlation and heteroscedasticity in the regression residuals invalidates the normality assumptions of the *F*-test and OLS, therefore inferences of seasonalities based on their results may become less reliable. In other words, the conclusion will be more reliable when all three tests give consistent results.

In addition, we conduct a non-parametric Kruskal-Wallis test since we do not know for sure the exact probability distribution of the yields. Kruskal-Wallis test is similar to the *F*-test regarding the joint null hypothesis but compares medians instead of means. It does not make specific assumptions regarding the probability distribution of the variables.

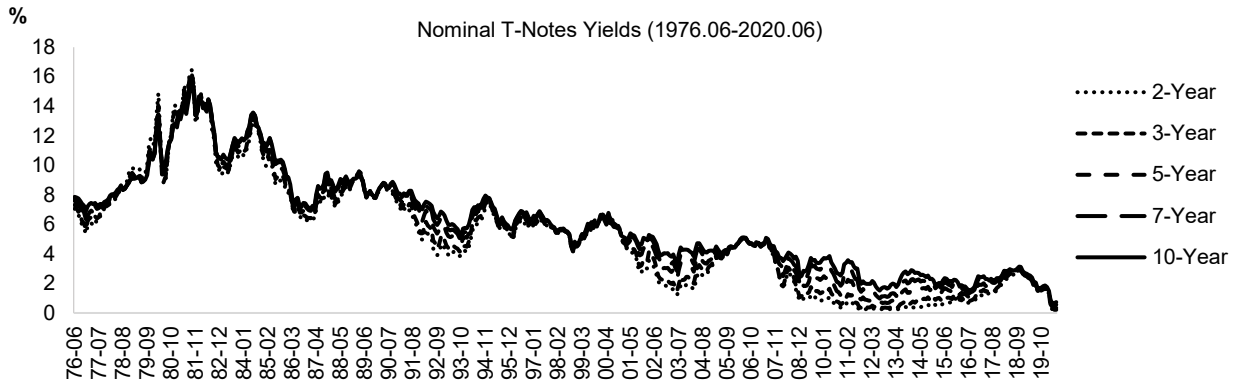
We use the same set up described above to test a number of seasonal variations and measures, therefore Y_t also represents in the other tests: the month-over-month changes of nominal yields, the percentage changes of month-over-month nominal yields, and the ranks of the nominal monthly yields in its calendar year.

RESULTS AND DISCUSSION

Anecdotal Observations

Figure 1 plots the monthly yields of the five Treasury notes (T-Notes) over the period of study. We see that yields have been coming down substantially across board since the 1980s. Yields of the 2-Year T-Note drop more than the longer-term T-Notes. As a result, differences in yields (or yield spread) among the T-Notes of different fixed maturities have been more visible in the recent years.

Figure 1: Monthly Treasury Notes Yields (1976.06-2020.06)

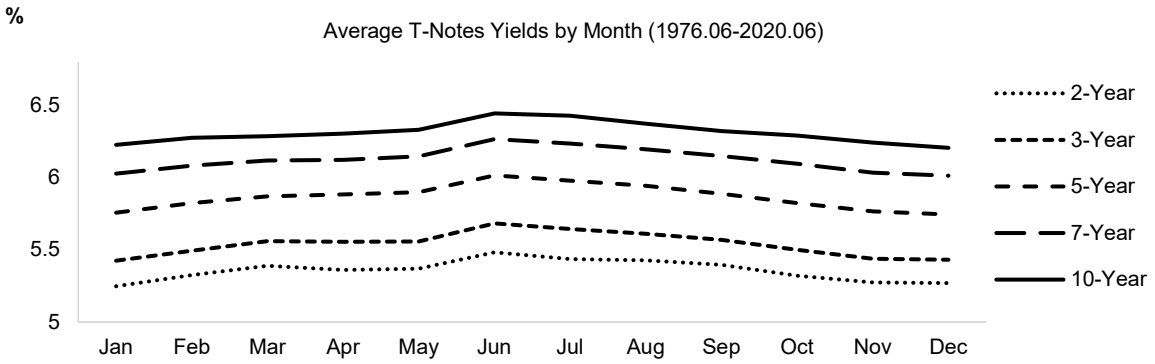


This figure shows the monthly yields of the five Treasury notes for the period from 1976.06 to 2020.06.

Figure 2 plots the average yields by months for the five T-Notes over the period of study. Two things stand out. First, average monthly yields first go up before heading down for the rest of the year. Second, the differences in average yields or yield spreads among the T-Notes of different maturities seem to be almost constant across the months, resulting in curves for longer maturity T-Notes shifting up almost in parallels.

The second finding is a little unexpected as we thought there might be more differences among the T-Notes due to their different maturities.

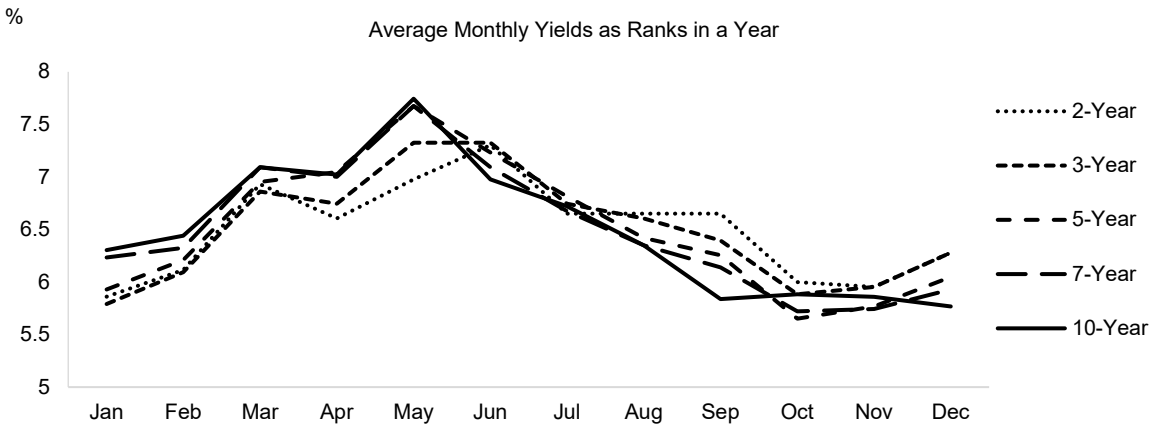
Figure 2: Average Treasury Notes Yields by Month (1976.06-2020.06)



This figure shows the average yields by month for all five Treasury notes for the period from 1976.06 to 2020.06.

Figure 3 plots the average monthly yields in terms of their ranks in a year. The highest and lowest rank values are 12 and 1 respectively. A higher rank value indicates a higher relative monthly yield compared to the other months in a calendar year. Since yields have dropped substantially over the years, the ranks of the monthly yields in a year would be a good measure of the relative high and low positions of the yields in the year as the annual rank measure is independent of the overall levels of yields. We see that although there are similarities in the general pattern of curves going up before heading down, there are more differences among the T-Notes compared to Figure 2. For example, longer-term maturity T-Notes such as the 10-Year and 7-Year T-Notes peak earlier in May while the shorter-term maturity T-Notes such as 2-Year and 3-Year T-Notes peak a little later in June.

Figure 3: Average Ranks of T-Notes Monthly Yields in a Year (Highest as 12 and Lowest as 1)

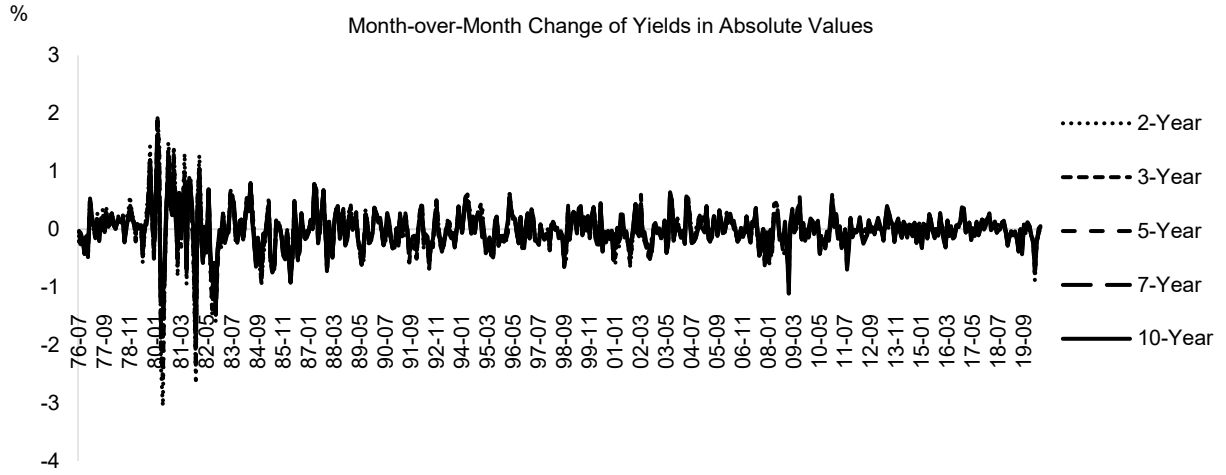


This figure shows the average ranks of the monthly yields in a calendar year for all five Treasury notes for the period from 1976.06 to 2020.06. The highest and lowest rank values are 12 and 1 respectively. A higher rank value indicates a higher relative monthly yield compared to the other months in a calendar year.

Figures 4 plots the month-over-month changes of the T-Notes yields in absolute value amount, while Figures 5 plots the percentage values of these changes. We see that although the month-over-month changes of yields in the 1980s are large in absolute values in Figure 4; their percentage values are much smaller in Figure 5. The opposite happens for the more recent years in the 2010s, where the month-over-month changes of yields in absolute values are small but their percentage values are much higher. While

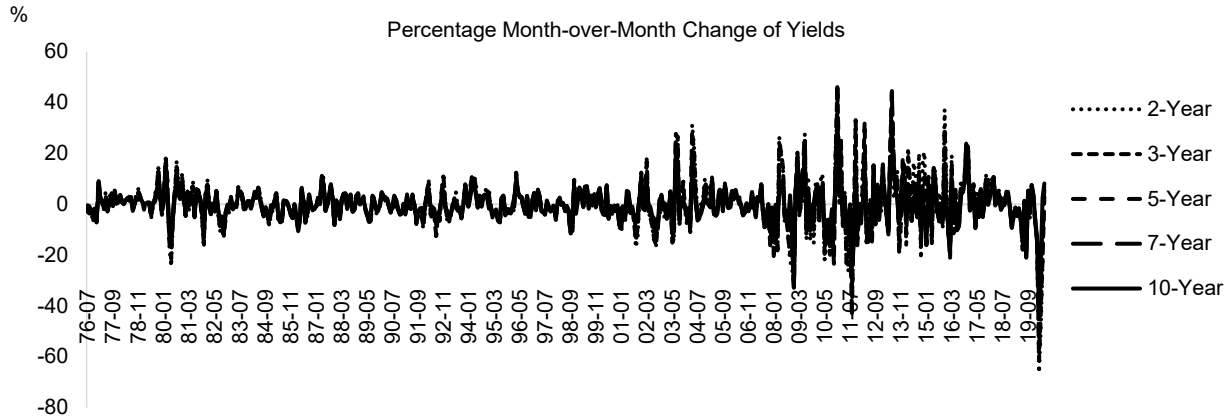
the yields of the shorter-term maturity T-Notes, such as the 2-Year, have bigger changes, all T-Notes seem to move in tandem. In other words, Treasuries of different maturities are not the same as stocks and bonds to investors where they would pull away from one and move into another. Yields of all Treasuries notes move in the same directions.

Figure 4: Month-Over-Month Changes of the T-Notes Yields in Absolute Value Amount (in %)



This figure shows the average absolute amount of the month-over-month changes of yields for all five Treasury notes from 1976.06 to 2020.06.

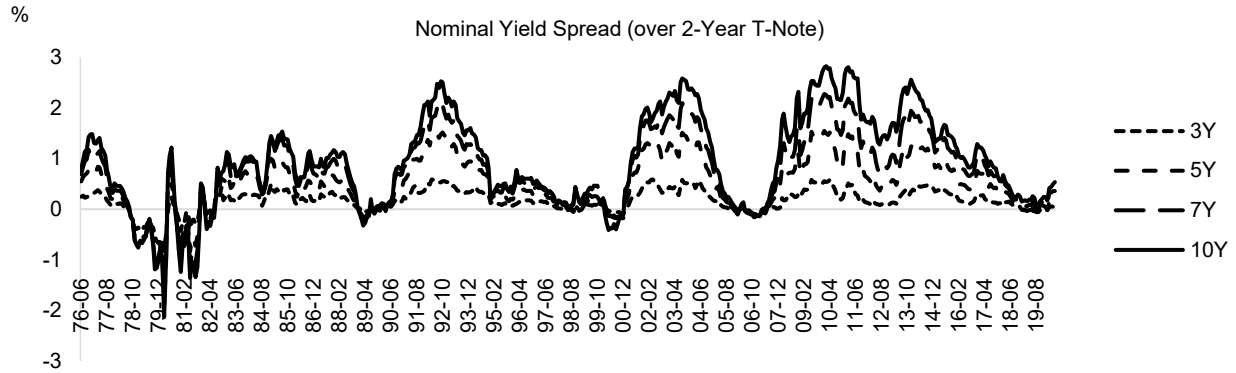
Figure 5: Percentage Month-Over-Month Changes of the T-Notes Yields



This figure shows the percentage amount of the month-over-month changes of yields for all Treasury notes from 1976.06 to 2020.06.

Figure 6 plots the nominal yield spreads of the longer-term maturity T-Notes over the 2-Year T-Note.

Figure 6: Nominal Yield Spread of T-Notes over 2-Year T-Note

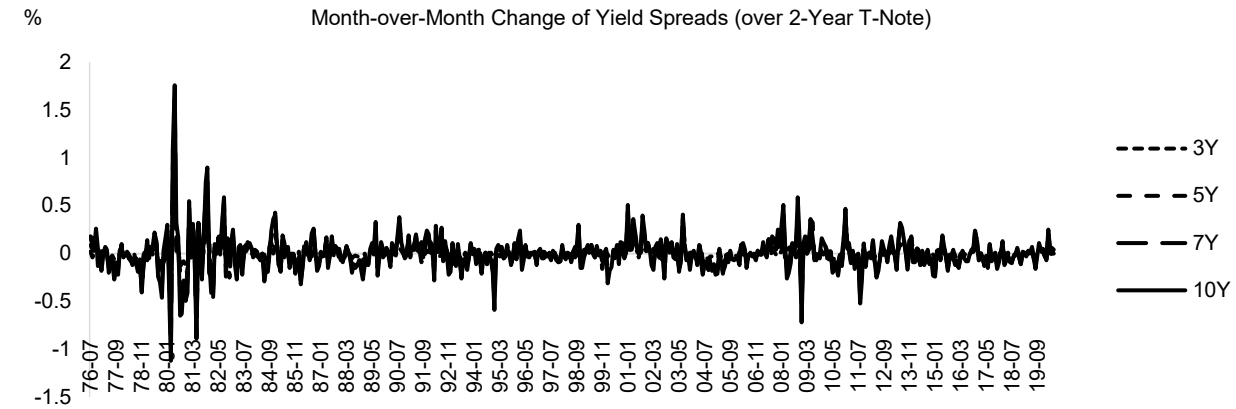


This figure shows the yield spreads (or yield differences) of the Treasury notes with longer-term maturities (3-Year, 5-Year, 7-Year and 10-Year) over the 2-Year T-Note from 1976.06 to 2020.06.

We see from Figure 6 that the fluctuation of the yield spreads since the 1990s seem to exhibit a stable pattern, where the yield inversions (where yield spreads become negative) coincided with onset of the three recessions and the peaks of the yield spreads are about the same amount. For example, the peaks of the yield spread between the 10-Year and 2-Year T-Notes stay close to 2.5% in the three economic cycles.

Figure 7 plots the month over month change of the yield spreads (or yield differences) of the longer-term maturity T-Notes over the 2-Year T-Note. The changes of the yield spreads since the 1990s tend to fluctuate towards a stable central value.

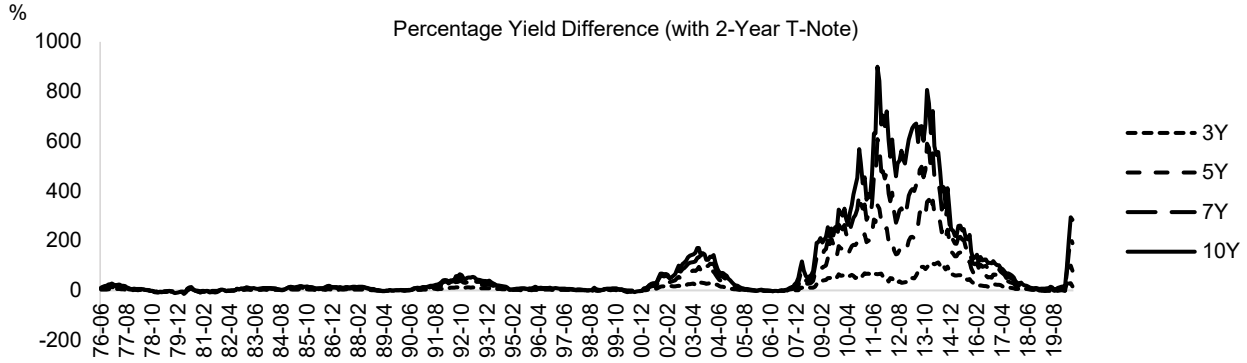
Figure 7: Month-Over-Month Change of T-Notes Yield Spreads over 2-Year T-Note



This figure shows the month-over-month changes of the yield spreads (or yield differences) of the Treasury notes with longer-term maturities (3-Year, 5-Year, 7-Year and 10-Year) over the 2-Year T-Note from 1976.06 to 2020.06.

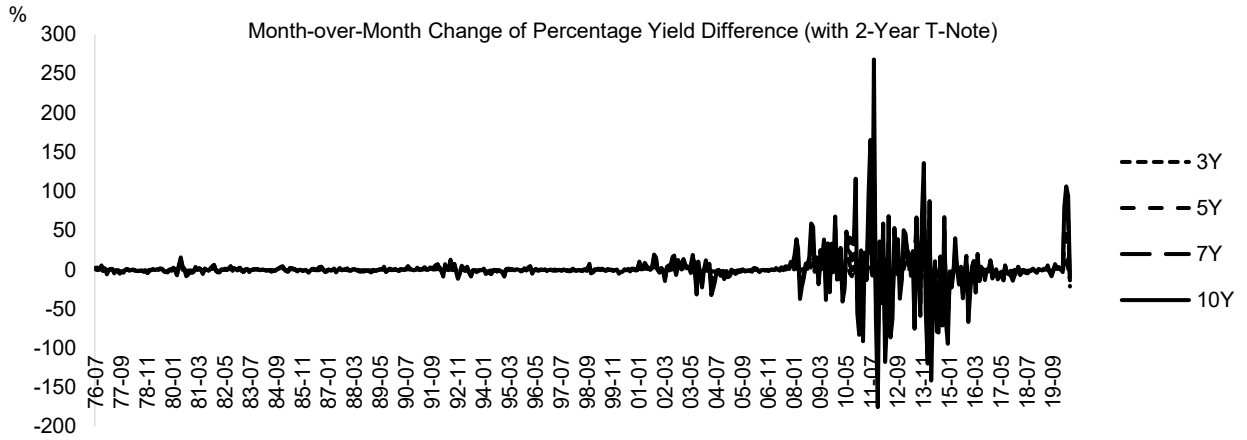
While Figure 6 and Figure 7 show the nominal yield differences of longer-term maturity T-Notes with the 2-Year T-Note have been holding stable over the recent economic cycles, Figure 8 and Figure 9 show a very different picture when we look at these yield differences in percentages. Figure 8 shows that the percentage yield differences of longer-term maturity T-Notes over the 2-Year T-Note have been increasing over the last three economic cycles in the 1990s, 2000s and 2010s, with a most notable quadrupling increase in the 2010s. For example, yields of the 10-Year T-Note are at least 400% higher than the 2-Year T-Note in half of the time, at the highest point of over 900%.

Figure 8: Percentage Yield Difference with 2-Year T-Note



This figure shows the percentage yield differences of the Treasury notes with longer-term maturities (3-Year, 5-Year, 7-Year and 10-Year) over the 2-Year T-Note from 1976.06 to 2020.06.

Figure 9: Month-Over-Month Change of Percentage Yield Difference (with 2-Year T-Note)



This figure shows the percentage month-over-month changes of the yield spreads (or yield differences) of the Treasury notes with longer-term maturities (3-Year, 5-Year, 7-Year and 10-Year) over the 2-Year T-Note from 1976.06 to 2020.06.

Figure 9 confirms that the month over month changes of this percentage yield differences have also been dramatically increasing since the 2010s. This makes us wonder, what would be a good measure for the yield spread of the Treasury notes with different fixed maturities, nominal yield difference or percentage yield difference? Are the peak nominal yield spreads that we have been seeing in the recent economic cycles too high in the low-level short-term yield environment?

Statistical Analysis

Table 1 reports the key summary statistics of the nominal monthly yields of the T-Notes over the period of study. We see that the Mean values of the yields increase more with the maturities than the Median values. Yields of all T-Notes with different fixed maturities have fluctuated over a large range of about 15 percent, and the shorter-term T-Notes tend to fluctuate more and over a wider range.

Table 1: Summary Statistics of T-Notes Yields (in %) (1976.06-2020.06)

	2-Year	3-Year	5-Year	7-Year	10-Year
Mean	5.23	5.40	5.72	5.97	6.16
Standard Error	0.16	0.16	0.15	0.15	0.14
Median	5.05	5.24	5.51	5.71	5.81
Mode	6.28	7.83	6.30	1.98	5.09
Standard Deviation	3.77	3.68	3.52	3.40	3.27
Sample Variance	14.22	13.54	12.39	11.54	10.69
Kurtosis	-0.23	-0.27	-0.29	-0.31	-0.30
Skewness	0.59	0.57	0.57	0.58	0.60
Range	16.29	16.01	15.59	15.12	14.67
Minimum	0.17	0.22	0.34	0.53	0.66
Maximum	16.46	16.22	15.93	15.65	15.32
Sum	2764.87	2858.13	3026.99	3160.22	3256.83
Count	529	529	529	529	529

We conduct a series of tests on two kinds of seasonalities: the monthly yields seasonality and the half-year high versus low yields seasonality. In the unreported results (available upon request), we find that none of the seasonality tests using the nominal yields, month-over-month changes of yields or percentage month-over-month changes of yields shows statistically significant results. None of the coefficients for the month dummies or the half-year dummy is statistically significant. Neither the *F*-test statistics nor the Kruskal-Wallis test can reject the null hypothesis that yields do not vary across months. In other words, the anecdotally observed patterns of monthly and half-year variations in yields measured in nominal amounts are not statistically significant.

We report two tables with interesting results: Table 2 reports the monthly seasonality test results using the ranks of monthly yields in a year; and Table 3 reports the results of half-year high versus low yields seasonality test using the ranks of the monthly yields in a year.

Table 2: Seasonality in Ranks of Monthly Yields (1976.06-2020.06)

	2-Year			3-Year			5-Year			7-Year			10-Year		
Variable	**Coeff**	**t-stat**	**Prob.**	**Coeff**	**t-stat**	**Prob.**	**Coeff**	**t-stat**	**Prob.**	**Coeff**	**t-stat**	**Prob.**	**Coeff**	**t-stat**	**Prob.**
α_1	6.98	13.21	0.00	7.33	13.90	0.00	7.67	14.64	0.00	7.67	14.61	0.00	7.74	14.76	0.00
JAN	-1.12	-1.49	0.14	-1.53	-2.06	0.04**	-1.74	-2.35	0.02**	-1.44	-1.94	0.05**	-1.44	-1.94	0.05**
FEB	-0.86	-1.15	0.25	-1.23	-1.65	0.10*	-1.47	-1.98	0.05**	-1.35	-1.82	0.07*	-1.30	-1.76	0.08*
MAR	-0.05	-0.06	0.95	-0.47	-0.62	0.53	-0.72	-0.97	0.33	-0.58	-0.78	0.43	-0.65	-0.88	0.38
APRIL	-0.37	-0.50	0.62	-0.58	-0.78	0.44	-0.63	-0.85	0.40	-0.67	-0.91	0.36	-0.72	-0.97	0.33
JUN	0.33	0.44	0.66	0.00	0.00	1.00	-0.44	-0.60	0.55	-0.58	-0.78	0.43	-0.77	-1.03	0.30
JUL	-0.33	-0.44	0.66	-0.58	-0.78	0.44	-0.86	-1.16	0.25	-1.00	-1.35	0.18	-1.02	-1.38	0.17
AUG	-0.33	-0.44	0.66	-0.72	-0.97	0.33	-1.26	-1.69	0.09*	-1.33	-1.78	0.08*	-1.40	-1.88	0.06*
SEP	-0.33	-0.44	0.66	-0.93	-1.25	0.21	-1.42	-1.91	0.06*	-1.53	-2.07	0.04**	-1.91	-2.57	0.01***
OCT	-0.98	-1.31	0.19	-1.44	-1.93	0.05**	-2.02	-2.73	0.01***	-1.95	-2.63	0.01***	-1.86	-2.51	0.01***
NOV	-1.02	-1.37	0.17	-1.37	-1.84	0.07*	-1.91	-2.57	0.01***	-1.93	-2.60	0.01***	-1.88	-2.54	0.01***
DEC	-0.70	-0.93	0.35	-1.05	-1.40	0.16	-1.63	-2.20	0.03**	-1.74	-2.35	0.02**	-1.98	-2.66	0.01***
R-squared		0.02			0.02			0.03			0.03			0.03	
Adjusted R^2		-0.01													
F-statistic		0.75	0.69		0.99	0.45		1.47	0.14		1.36	0.19		1.41	0.16
Durbin-Watson		0.82			0.83			0.84			0.84			0.80	
White's χ^2		90.89	0.00		71.75	0.00		57.73	0.00		64.10	0.00		54.91	0.00
Kruskal-Wallis		8.18	0.70		10.84	0.46		15.94	0.14		14.70	0.20		15.31	0.17

*Results are based on the regression Equation (1) $Y_t = \alpha_1 + \sum_{j\neq 5}^{12} \beta_j M_t^j + \varepsilon_t$, where Y_t measures the rank of monthly yields in a calendar year, highest as 12 and lowest as 1. M_t^j is a month dummy variable varies from January to December except May. β_j is reported as "Coeff" for the respective months. ***, ** and * indicate significance at 1, 5 and 10 percent levels respectively.*

Table 3: Seasonality in Half-Year High versus Low Ranks of Monthly Yields (1976.06-2020.06)

	2-Year			3-Year			5-Year			7-Year			10-Year		
Variable	**Coeff**	**t-stat**	**Prob.**	**Coeff**	**t-stat**	**Prob.**	**Coeff**	**t-stat**	**Prob.**	**Coeff**	**t-stat**	**Prob.**	**Coeff**	**t-stat**	**Prob.**
α_2	6.14	28.70	0.00	6.07	28.40	0.00	5.98	28.08	0.00	6.02	28.19	0.00	6.02	28.22	0.00
H	0.71	2.34	0.02**	0.87	2.87	0.00***	1.05	3.48	0.00***	0.97	3.20	0.00***	0.97	3.21	0.00***
R-squared		0.01			0.02			0.02			0.02			0.02	
Adjusted R^2		0.01													
F-statistic		5.49	0.02**		8.26	0.00***		12.09	0.00***		10.23	0.00***		10.33	0.00***
Durbin-Watson		0.83			0.83			0.85			0.85			0.81	
White's χ^2		39.84	0.00***		27.42	0.00***		22.95	0.00***		19.60	0.00***		16.33	0.00***
Kruskal-Wallis		5.40	0.02**		8.09	0.00***		11.75	0.00***		9.96	0.00***		10.07	0.00***

*Results are based on the regression Equation (2) $Y_t = \alpha_2 + \beta H_t + \varepsilon_t$, where Y_t measures the average rank of yields in the high versus low half-year months, i.e. average rank of March to August and average rank of September to February (highest yield is ranked 12 and lowest yield is ranked 1). H is a half year dummy variable that is equal to 1 if the month is from the high yields month of March to August and 0 otherwise (September to February). β is reported as "Coeff". ***, ** and * indicate significance at 1, 5 and 10 percent levels respectively.*

In Table 2, we see that although the *F*-test statistics and Kruskal-Wallis test cannot reject the null hypothesis, the coefficients of some months in the lower-half yield of the year show statistically significant negative values, indicating yields in these months are lower than May. A closer look shows that the 10-Year, 7-Year and 5-Year T-Notes each has seven such months (from August to February); the 3-Year T-Note has four such months (October, November, January and February) and the 2-Year T-Note has none. In this regard, the longer-term maturity 10-Year, 7-Year and 5-Year T-Notes are more similar to each other than the shorter-term 2-Year T-Note.

In Table 3, we find that once we compare yields using the relative yield levels in a year instead of the nominal values, we see a strong statistical significance to support the high versus low half-year yields seasonality for all five T-Notes. Both the *F*-test statistics and Kruskal-Wallis test to reject the null hypothesis of no variation in half-year pattern. The Durbin-Watson *d* statistics indicates there is some serial correlation in the regression residuals, while the White's x^2 test rejects the presence of heteroscedasticity. The high-half year also have a positive coefficient that is statistically significant at 5% level for the 2-Year T-Note and 1% level for all the other longer-term maturity T-Notes. These are strong evidence that there is a seasonality of high yields from March to August and low yields from September to February in the yields of Treasury notes of all different fixed maturities.

CONCLUDING COMMENTS

In this paper, we study the seasonality in the yields of all five intermediate term Treasury notes with the fixed maturities of two, three, five, seven and ten years. Our goal is to understand how these securities behave as a group and their similarities and differences. We believe understanding the Treasury yields seasonality is crucial because these yields play a central role in asset pricing as they directly and indirectly influence all interest rates and interest rates movements. Using the dummy variable regression method, we test a number of seasonal patterns in these yields since the inception of the 2-Year T-Note in 1976.06 until 2020.06. Consistent with the findings of the earlier studies on the 10-Year and 2-Year Treasury notes yields, we find that variations in the nominal yields of the five Treasury notes do not pass the rigorous statistical seasonality tests likely due to the significant drop of the yield levels since the 1980s. Similarly, we find strong statistical significant evidence of a high versus low half-year seasonality where yields are higher from March to August than from September to February using the rank of monthly yields in a year for all five Treasury notes.

Although we expect similarities in these Treasury notes, we are surprised to see all five Treasury notes have similar anecdotal patterns and variations of their yields as well as their statistical test results. We expect

more differences due to the different maturities as some are closer than others do. For example, 2-Year T-Note might have more in common with the 3-Year T-Note than the 10-Year T-Note. Why they all act so similarly is puzzling but outside the scope of this paper. It would be an interesting area for our future research.

We also find that while the nominal yield spread of the 10-Year and 2-Year T-Notes have been holding near constant patterns at least in terms of the peaks and troughs during the recent economic cycles since the 1990s, their percentage yield differences have been increasing dramatically since the 2010s because of the low short-term yields. This raises an important question for further studies: is the yield spread better measured in a nominal or percentage term? What would be the implications for the investors and policy makers if the yield spread is measured differently?

REFERENCES

Ariel, R.A. (1987) "A Monthly Effect in Stock Returns," *Journal of Financial Economics*, 18(1), p. 161-174

Athanassakos, G. and Y.S. Tian (1998) "Seasonality in Canadian Treasury Bond Returns: An Institutional Explanation," *Review of Financial Economics*, 7(1), p. 65-86

Branch, B. (1977) "A Tax Loss Trading Rule," *Journal of Business*, 50(2), p. 198-207

Campbell, J.Y. and R.J. Shiller (1991) "Yield Spreads and Interest Rate Movements: A Bird's Eye View," *Review of Economic Studies*, 58, p. 495-514

Chen, C.R. and A. Chan (1997) "From T-bills to Stocks: Seasonal anomalies revisited," *Journal of Business Finance and Accounting*, 24(5), p. 573-592

Clayton, R., J. Delozier and M.C. Ehrhardt (1989) "A Note on January Returns in the U.S. Government Bond Market: The Term Effect," *Journal of Financial Services Research*, 2, p. 307-318

Estrella, A. and G.A. Hardouvelis (1991) "The Term Structure as a Predictor of Real Economic Activity," *Journal of Finance*, 46(2), p. 555-576

Estrella, A. and F.S. Mishkin (1996) "The Yield Curve as a Predictor of U.S. Recessions," *Federal Reserve Bank of New York Current Issues in Economics and Finance*, 2(7), p. 1-7

Flannery, M.J. and A.A. Protopadakis (1988) "From T-Bill to Common Stock: Investigating the Generality of Intra-Week Return Seasonality," *Journal of Finance*, 43(2), p. 431-450

French, K.R. (1980) "Stock Returns and the Weekend Effect," *Journal of Financial Economics*, 8(1), p. 55-69

Gibbsons, M.R. and P. Hess (1981) "Day of the Week Effects and Asset Returns," *Journal of Business*, 54(4), p. 579-596

Gultekin, M.N. and N.B. Gultekin (1983) "Stock Market Seasonality: International Evidence," *Journal of Financial Economics*, 12, p. 469-482

Kamstra, M.J., L.A. Kramer and M.D. Levi (2015) "Seasonal Variation in Treasury Returns," *Critical Finance Review*, 4, p. 45-115

Keim, D.B. (1983) "Size-related Anomalies and Stock Market Seasonality: Further Empirical Evidence," *Journal of Financial Economics*, 12(1), p. 13-32

Kramer, C. (1994) "Macroeconomic Seasonality and the January Effect," *Journal of Finance*, 49(5), p. 1883-1891.

Krehbiel, T., 1993, "A Note on the Disappearance of Day-of-the-Week Seasonals in the Daily Price Changes of Treasury Bond Futures," *Applied Financial Economics*, 3, p. 73-78

Liu, L. (2018) "Seasonal Variations in Two-Year Treasury Note Yields," *International Journal of Business and Finance Research*, 12(2), p. 27-37

Liu, L., H. Lin and S. Varshney (2018) "Seasonality in the 10-year Treasury Yield," *International Research Journal of Applied Finance*, 9(6), p. 291-302

Maloney, S. and R. Rogalski (1989) "Call-Option Pricing and the Turn of the Year," *Journal of Business* 62(4), p. 539-552

Ogden, J.P. (1987) "The End of the Month as a Preferred Habitat: A Test of Operational Efficiency in the Money Market," *Journal of Financial and Quantitative Analysis*, 22(3), p. 329-344

Ogden, J.P. (1990) "Turn-of-Month Evaluations of Liquid Profits and Stock Returns: A common Explanation for the Monthly and January Effects," *Journal of Finance*, 45(4), p. 1259-1272

Ritter, J.R. and N. Chopra (1989) "Portfolio Rebalancing and the Turn-of-the-Year Effect," *Journal of Finance*, 44(1), p. 149-166

Sharp, K.P. (1988) "Tests of U.S. Short and Long Interest Rate Seasonality," *Review of Economics and Statistics*, 70(1), p. 177-182

Wilson, J.W. and C.P. Jones (1990) "Is There a January Effect in Corporate Bond and Paper Returns?" *Financial Review*, 25(1), p. 55-79

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NEXUS AMONG IMMIGRANTS, SELF-EMPLOYMENT, AND ECONOMIC GROWTH IN NORTH CAROLINA

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ABSTRACT

The study was to scrutinize the connection of immigrants, self-employment, and economic growth in North Carolina. The study used county level data mainly from the American Consumer Survey for the period of 2010- 2017. Pooled OLS regression analysis was conducted using STATA. The results brought some significant insights. The findings highlight the significant and positive impacts of both immigrants and self-employment to the economic growth of the state. The counties with more self- employment opportunities are more attracted by immigrants. Growth in the construction, manufacturing, and service sectors show significant and positive impacts on self-employment opportunities. The lower the average income Counties show higher rates of self-employment. Growth in the service and education sectors, lead to higher household incomes. Thus, the investment priorities in the construction, services, and education sectors can accelerate the economic growth of North Carolina.

JEL: D00, D12

KEYWORDS: Economic Growth, Immigrants, Self-Employment

INTRODUCTION

Economic growth is the key to development that can be measured by modifying GDP, income, or other increases in the market value of goods and services. Among the main factors affecting economic growth, labor force (human capital), and entrepreneurial activities (entrepreneurship) are important within the context of natural resources and physical capital availability. A diversified labor force with different skill sets could bring significant changes in economic growth (Fernald & Chares, 2014). Immigrants are such a diversified workforce that brings entrepreneurial ideas to make a difference in an economy. Self-employment is an important aspect of the immigrant experience in the labor market. It simply offers immigrants the possibility of upward mobility and integration into society. Interestingly, self-employment appears to be a vital means for immigrants to integrate into the foreign economy.

Studies show how immigrants and self-employment contribute to U.S. economic growth. Immigrant entrepreneurship creates about 25% of new businesses in the U.S., which is common in the states of California and New York (Kerr and Kerr, 2020). Over a million immigrants arrive in the United States every year, mostly from China, India, Mexico, and the Philippines (National Geographic, 2018). Immigrants contribute a high share of patent filings, science and technology graduates, and leadership positions in large venture capital-funded firms ("Patent Pending, 2012). In addition, by creating opportunities for the least skilled indigenous workers, and their productivity ("Patent pending, 2012). It is noted that immigrant labor has proven to be a major component of American agriculture (USDA ERS, 2016a). According to Bureau of labor statistics, nearly 15 million people, or 10 percent of total U.S. employment, were self-employed in 2015. Immigrants are more likely to be self-employed, and this rate is high, as the longer an immigrant remains in the U.S. (Borjas, 1986).

The impact of immigration and self-employment on economic growth varies across states in the United States. Recent studies show that North Carolina's economy is transforming in many ways and moving towards knowledge-intensive business services, requiring more skilled workers, particularly in metropolitan areas. In the meantime, in labor-intensive rural areas like agriculture and construction, there are labor shortages that demand more workers. Studies show that the part of the labor demand is filled by immigrants. The state reports that nearly 8% of the state's population was composed of immigrants in 2018, and the number is increasing. Thus, it is important to understand the relationship between immigrants, small business growth (self-employment) and state economic growth to make effective and efficient strategic decisions. The main objective of this paper is to evaluate immigrants, self-employment and economic growth in North Carolina to provide policy suggestions for improving economic growth in North Carolina. Although some research studies focus on economic growth and small business development across different sectors of North Carolina, the analysis of these factors taken together is limited. Rest of the paper consists of four sections. Section 2 presents the literature review for the United States and particularly for North Carolina. Section 3 presents the data and methodology. Section 45 focuses on empirical findings and the last section, section 5 brings concluding comments.

LITERATURE REVIEW

Economics theory points out that diversified labor force with different skill sets could bring significant changes in an economy. Over the past decades, the skilled, diversified, and innovative workforce has brought massive change to the American economy (Fernald and Chares, 2014). The contribution of immigrants to certain industries is very high and their geographical mobility facilitates labor shortages, reducing barriers that could weaken the economy. Immigrant workers help sustain an aging population by increasing the number of workers relative to retirees and strengthening social security and Medicare trust funds. In addition, children from immigrant families are mobile and promise benefits for their families and the broader American economy (Sherman et al., 2019). Brieger and Gielnik (2021) highlighted the high level of immigrant support for the country's economic growth. According to Peri (2012), states with high concentrations of foreign-born workers are experiencing much faster productivity growth due to certain technological developments. However, the economic gains of immigrants depend upon market structures, services, and business opportunities (Raith, 2000; Eckhardt and Shane, 2010). Immigrants represent 13.7% of the U.S. population, nearly three times more than in 1970 (Pew, 2017). Most immigrants, 77%, are legal, and the rest is unauthorized. In 2017, almost 45% were naturalized United States citizens. Asian immigrants have experienced the fastest growth in the past 10 to 15 years and this trend is expected to continue in the coming years (National Geographic, 2018). It is projected to become the largest immigrant population by 2055, ahead of Hispanics (Pew 2017; Krogstad 2017).

Studies show that in recent years, foreign-born workers or immigrants occupy most of the jobs in agriculture (Aquirre International, 2005), and are significant contributors to the economy (USDA ERS, 2016a). The contribution of immigrants is significant, particularly in labor-intensive agriculture such as the produce, fruit, and livestock sectors in recent years (USDA ERS, 2016b). Sherman et al. (2019), show that immigrants with no college education account for more than one-third of the agriculture, fishing, construction, cleaning and maintenance occupations in the country. It is important to note that immigrants have implications not only for the industry but also for the local economies of the country (Hernandez, Gabbard & Carroll, 2016; Fairlie et al. 2016; Krogstad, 2017). Immigrants will be critical to filling future labor shortages across the economy, with 76 million baby boomers retiring and 46 million U.S. -born workers entering the workforce by 2030.

Self-employment based on innovative ideas and creativity continues to be an important source of employment and income in the U.S. According to labor statistics, only 10% of the US labor force were self-employed in 2015. Of these, 9.5 million were unincorporated; the remaining 5.5 million were incorporated (US Burau of Labor Statistics, 2016). Hipple (2010) found that the self-employment sector accounted for

10.9% of total employment in 2009. According to the Pew Research Center (2021), over 150 million workers in the United States comprise approximately 16 million (10.6%) self-employed workers. Self-employment seems to be an essential means for immigrants to integrate into the U.S. economy (Carpenter & Loveridge, 2017; Borjas, 1986). The differences in self- employment or engage in entrepreneurial activities across immigrant groups are persistent and substantial as well (Fairlie & Meyer,1996; Lofstorm, 2002; Fairlie et al. 2010). Differences can be seen between groups such as Asians and Hispanics, including age, education, immigration status, and time spent in the country (Fairlie and Meyer, 1996). Lassmann & Busch (2015) reveal a significant relation between immigrants and entrepreneurial activities, which is related to the country of origin. Oyelere and Belton (2012) show that the income level of the country of origin plays a crucial role in the independent work of immigrants in the United States. According to Kerr & Kerr (2020), immigrant entrepreneurial activity creates about 25% of new businesses in the United States. According to Bates et al. (2018) there are unique challenges faced by immigrants as well minorities in pursuing entrepreneurial alternatives with the specific social, political, historical, and economic contexts that differ from nation to nation. Dutta et al. 2021, found that self-employment is a key source of earnings for immigrants and the primary means of social assimilation. Moreover, the difficulty employers have in assessing the quality of immigrants' higher education has a positive impact on immigrants' self-employment. Small businesses and micro-enterprises are the trend in self-employment, accounting for approximately 18% of employment, creating approximately 900,000 jobs annually in the United States (Carpenter and Loveridge, 2017).

Background of the Study Area

North Carolina is the 28th largest state with approximately 10.5 million people currently, and its population density is relatively high (Agency Census, 2017). It shows a constant increase in population each year with natural growth in health and net immigration. The gender ratio in the state is about 51.4% for women and 48.6% for men in 2017. The median household income is approximately $50,320 USD. Considering the racial makeup, 69% is white, approximately 21.5% is black and the remainder is with Asians and South Americans. According to census data, poverty and unemployment predominate among Black and other racial groups in relation to the white population. The Job creation of the state is mostly concentrated in service-providing industries. Professional and business services create the most jobs, representing 31% of new jobs (Agency Census, 2017). North Carolina is one of the major states that is attracted skilled and unskilled immigrants. According to the American Immigration Council (AIC), almost 8% of the state's total population is foreign-born, and they contribute significantly to the state's labor force. The largest proportion of immigrants is in the agriculture, fisheries and forestry category (44%), and the second largest is in construction and mining (24%). There are 21% engaging in building and grounds cleaning & maintenance, 20% in computer and math sciences and 15% in production related activities (Immigrants in North Carolina, 2017). Based on the same sources, undocumented immigrants accounted for about 5% of the labor force in North Carolina. With regard to immigrant education, more than 25% of adult immigrants had a college diploma or more, while about 33% did not have a high school diploma.

Self-employment is high among young men at all levels of schooling, and it seems to be on the rise in North Carolina (US Burau of Labor Statistics, 2016). Immigrants create jobs for the local population, and every three to five H-2A agricultural workers in North Carolina create jobs for a U.S.-born worker (Clemens, 2013). According to North Carolina Business Statistics, there were 821,189 small businesses in 2007 and an estimated 551,040 self-employed workers. It shows that the number of employees increases each year, and in 2013 it was 1.6 million increased by 2.5% in 2015 (North Carolina Small Business Profile, 2016). This increase is mostly seen in firms with less than 100 employees. Women small business owners were large in North Carolina and 32.8% of self-employed individuals were women in 2007. In addition, it shows strong participation by minority groups in self-employment (US SBA, 2009). In 2015, the state had about 55,867 immigrant business owners, including 14.9 per cent in the Raleigh metropolitan area and 11.8 per

cent in the Charlotte metropolitan area (North Carolina immigrants, 2017). Immigrants contribute billions of dollars in taxes (over $5 billion), and as consumers more than $14 billion to the state economy.

DATA AND METHODOLOGY

To estimate the relationship between immigrants, self-employment and economic growth, county-level data were used for the 2010 to 2017 period for all North Carolina counties. The main source of data is the US Community Survey (ACS). The American Survey is a demographic survey program conducted by the U.S. Census of Bureau. County level, population shares, sectoral employment shares, and education were main data collected from ACS. In addition, additional county data were collected from the United States Bureau of Economic Analysis, the United States Bureau of Labor Statistics, and the United States Department of Agriculture. The variables considered for the analysis with their definitions and the theoretical signs expected from the associated parameters are shown in Table 1.

Table 1**:** Definitions of Variables Used for Analyses

Variable	Description and Unit	Expected Effect
IMMI	Immigrant population share	N/A
SEMP	self-employed population share	N/A
MINC	Average HH income in dollars	NA
WHIT	White population share of the total	+
BLAC	Black population share of the total	+
ASIA	Asian population share of the total	+
HISP	Hispanic population share of the total	+
AGRI	Total share working in agricultural sector	+
CONS	Total share working in construction sector	+
MANU	Total share working in manufacturing sector	+
SERV	Total share working in service sector	Undetermined
EDUC	Total share with bachelor's degree	Undetermined

This table shows the variables considered for the research study with their definitions and expected signs. The first 3 variables are the dependent variables of the regression analysis. Source: Author's construction from the literature review

Table 2 presents descriptive statistics of the selected variables for the analysis. The table shows that the average share of the immigration population (IMMIGRA) is 11.77%, while the share of the self-employed population is 2.81% in 2017. The mean household income (MINC) is 44551.67 for the state. The highest proportion of people is white, 72.29%, and the second is black, 20.38%. Asian and Hispanic people, mainly report that immigrants have averages of 1.15% and 7.09%. The share of the population in the agricultural sector (AGRI) is 1.155, whereas construction (CONS), manufacturing (MANU) and services (SERV) account for 3.23%, 5.96% and 36.18%. The average proportion of having a college diploma (EDUC) is 14.73% in the state.

Table 2: Descriptive Statistics of Variables for 2017

Variable	Mean	Std. Dev.	Min	Max
IMMI	11.77	16.99	2.39	18.36
SEMP	2.81	0.92	1.23	6.01
MINC	44551.67	8913.93	31287	73577
WHIT	72.29	17.54	28.98	98.13
BLAC	20.38	16.27	0.162	62.01
ASIA	1.15	1.34	0.001	7.68
HISP	7.09	4.01	0.71	21.73
AGRI	1.15	1.11	0.12	7.59
CONS	3.23	0.95	1.19	5.97
MANU	5.96	2.57	1.34	1.44
SERV	36.18	43.63	27.97	34.22
EDUC	14.73	6.32	5.19	35.52

This table shows the average, standard deviation, minimum and maximum values of the variables considered for the analysis for 2017.

Formulation of Empirical Model

Multiple double log pooled OLS (POLS) regressions and lag the likely endogenous variables of interest by one time-period (seven-year period) were used as the analytical method. Borjas (1986) found that immigrants are more likely to become self-employed in the five to ten years following their immigration. The argument underpins the seven-year lag; and longer the lag catches the full extent of the impact. The theoretical background of the analytical method is as follows:

$$\ln lnY_{it} = \ln\left(X_{i,t-1}\right) + \gamma \ln\left(W_{it}\right) + \in_{it} \quad (1)$$

Three simultaneous equations used for the analysis. The three simultaneous dependent variables are the natural logs of self-employment population share, immigrant population share, and median household income at time t ($ln(y_{it})$). Each of the regression uses the natural log of the single time period (seven-year period) lag of the other two variables which are not used as the dependent variable $ln\ (X_{i,\,t\text{-}1})$ and a vector of the natural logs of the other concurrent variables $ln(W_{it})$. These variables include racial shares of population, population in manufacturing, service, construction, agriculture, and education.

Empirical Model

Starting from the theoretical model of equation 1, the estimated econometric models for each dependent variable can be written as:

$$\text{LIMMI} = \beta_0 + \beta_1\,\text{LAGLSEMP} + \beta_2\,\text{LAGLMINC} + \beta_3\,\text{LWHIT} + \beta_4\text{LBLAC} + \beta_5\,\text{LASIA} + \beta_6\,\text{LHISP} + \beta_7\,\text{LAGRI} + \beta_8\,\text{LCONS} + \beta_9\,\text{LMANU} + \beta_{10}\,\text{LSERV} + \beta_{11}\,\text{LEDUC} + \in_{it} \quad (2)$$

$$\text{LSEMP} = \beta_0 + \beta_1\,\text{LAGLIMMI} + \beta_2\,\text{LAGLMINC} + \beta_3\,\text{LWHIT} + \beta_4\text{LBLAC} + \beta_5\,\text{LASIA} + \beta_6\,\text{LHISP} + \beta_7\,\text{LAGRI} + \beta_8\,\text{LCONS} + \beta_9\,\text{LMANU} + \beta_{10}\,\text{LSERV} + \beta_{11}\,\text{LEDUC} + \in_{it} \quad (3)$$

$$\text{LMINC} = \beta_0 + \beta_1\,\text{LAGLSEMP} + \beta_2\,\text{LAGLMMI} + \beta_3\,\text{LWHIT} + \beta_4\text{LBLAC} + \beta_5\,\text{LASIA} + \beta_6\,\text{LHISP} + \beta_7\,\text{LAGRI} + \beta_8\,\text{LCONS} + \beta_9\,\text{LMANU} + \beta_{10}\,\text{LSERV} + \beta_{11}\,\text{LEDUC} + \in_{it} \quad (4)$$

Where, LIMMI is the logarithm of Immigrant population share, LSEMP is the logarithm of self-employment population share, and LMINC is the logarithm of average household income at county level. LWHIT, LBLAC, LASIA, LHISP present logarithm values of population share of each racial group of White, Black, Asian, and Hispanic for 2017. These shares were generated in the form of percentages of the county's total population for the year and would show the relationship between them and the dependent variables separately. LAGRI presents the logarithm of total employees working share in the sector in each county for the year. In the same manner, LMANU presents logarithm of the total working in manufacturing sector, LCONS presents the log value of total working in construction sector, and LSERV presents the log value of total working in service sector. These sectoral representations would help to understand the impact of each sectoral change on dependent variables. LEDUC presents the log value of percentage of population 25 years or more with at least a college degree. β_0 is the constant term. β_i are elasticity of productivity with respect to the corresponding input parameters; ε_t is the error term.

RESULTS

The empirical results for the regression results are presented in Table 3. The first column of the table shows the exogenous variables from each equation. Columns 2, 3 and 4 provide the log results for the immigrant population (LIMMI), the self-employed population (LSEMP) and household income (LMINC).

Table 3: POLS Regression Results For 2017

	LIMMI	**LSEMP**	**LMINC**
LAGLIMMI	--------	-0.0122	-0.0152
		(0 .086)	(0.051)
LAGLSEMP	0.3916 **	--------	-0.0602
	(0. 061)		(0.049)
LAGLMINC	0.1216	-0.4135 **	--------
	(0.164)	(0.185)	
LWHIT	-0.3921 **	0.5671 **	0.4633**
	(0.134)	(0.153)	(0.077)
LBLAC	0.0336	0.0146	0.0530**
	(0.028)	(0 .031)	(0.017)
LASIA	0.0587 **	-0.0126	0.0160**
	(0.014)	(0.016)	(0.009)
LHISP	0.8576 **	0.0441	0.0172
	(0.042)	(0.089)	(0.0526)
LAGRI	-0.0141	0.0910	-0.0119
	(0.039)	(0.042)	(0.0259)
LCONS	0.3988**	0.2747**	-0.0256
	(0.062)	(0.097)	(0.0572)
LMANU	0.1912**	-0.0554 **	-0.078**
	(0.038)	(0.047)	(0.026)
LSERV	0.2012**	0.6711**	0.2096**
	(0.0981)	(0.128)	(0.0889)
LEDUC	0.0012**	0.0001	0.0001**
	(0.0006)	(0.0006)	(0.0004)
Cons	-0.2818	0.5248	7.9553
	(1.4823)	(1.6493)	(0.4604)
N	100	100	100
F	605.74	217.44	13.8
R^2	0.88	0.84	0.62

*This table shows Pooled OLS regression analysis at county level for 2017.Column 1 shows the dependent variables used for the analysis. Column 2 shows regression results for log of immigration population share, column shows regression results for log of self-employed population share, and column 4 shows results for log of average household income. All variables used for each of the three regressions were tested for correlation; multicollinearity and variance; heteroscedasticity using the variance inflation factor (LIVELY) and the Breusch-Pagan Cook-Weisberg test to minimize errors. The VIF resulted no multicollinearity while the Breusch-Pagan Cook-Weisberg test demonstrated homoscedasticity. ** indicate significance at 5% level. Standard errors in parentheses. The term 'LAG' emphasizes which explanatory variables are lagged by one time-period (7-year period).*

Results for Immigration Population (LIMMI) are in column 2. The significant and positive relationship between LIMMI and the LAGLSEMP population indicates that a 1% increase in self-employment over the lagged period increases immigration by 0.39%. This implies that counties that have shown more possibilities for self-employment are more attracted to immigrants. Other findings indicate that the white population is negatively related to immigration, when the share of the white population increases by 1%t, the share of the immigration population decreases by 0.39%. This means that counties with a larger percentage of the white population are less attractive to immigrants. This may be related to the rural counties of North Carolina, with a higher white population where small-scale possibilities are less compared to metropolitan areas. The shares of the Black (LBLAC), Hispanic (LHISP) and Asian population (LASIA) demonstrate a significant and positive relationship with the share of the immigrant population. For instance, when the share of the Hispanic population (LHISP) increases by 1%, the share of the immigrant population (LIMMI) increases by 0.85%. Therefore, the higher these population shares, the higher the rate of immigrants. This could be linked to more employment opportunities, more connection, more experience, or easier settlement. Construction (LCONS), manufacturing (LMANU) and services (LSERV) have an important and positive relationship with the immigrant population, indicating that immigrants are working in all these areas. When the total proportion of persons employed in the construction sector (LCONS) increases by 1%, the proportion of the immigrant population (LIMMI) increases by 0.39%. Similarly, the total share of people working in the manufacturing sector (LMANU) increases by 1% of the share of the immigrant population (LIMMI) by 0.19%. When the total share of people working in services (LSERV) increases by 1%, the share of the immigrant population (LIMMI) increases by 0.20%. Theses can be associated with rapid development of cities and market areas in Raleigh, Charlotte, and Greensboro where

higher rates of immigrants are getting job opportunities. However, the highest rate reports from the construction sector, could be more of the Hispanic population involved in the sector. Education (LEDUC), percentage of graduates in the county shows a positive relationship with the proportion of immigrants. It is known that immigrants commit themselves to different industries with higher education (Artz, 2003).

The results for the self-employed population (LSEMP), in column 3, show that LSEMP is significantly and negatively related to the lag in average household income (LAGLMNC). A 1% increase in LAGLMINC, decreases LSEMP by 0.41%. This means that the higher household income in previous years, decreases the self-employment potential of the county population. Individuals tend to be self-employed with low income and unemployment (Pew research, 2015). The results show that when the proportion of the white population is higher (LWHIT), the self-employed potential (LSEMP) is higher. As the LWHIT rises by 1%, the LSEMP rises by 0.56%. This could be mostly due to small business development in rural counties where the presence of the white population is much higher. Small Business Administration (SBA) financial and consulting services support small businesses among locals in rural North Carolina counties. Given the employment sectors, service (LSERV) and construction (LCONS) sectors indicate significant and positive relationship with self-employment. When the total share of people working in services (LSERV) increases by 1%, the share of self-employment population (LSEMP) increases by 0.67%. The service sector appears to play a significant role in creating self-employment opportunities in the state. Similarly, When the total proportion of persons employed in the construction sector (LCONS) increases by 1 the share of self-employment population (LSEMP) increases by 0.20%. Results are supported by previous findings as well (Hipple, 2010; Toussaint-Comeau, 2005; Goetz and Rupasingha, 2013; Carpenter and Loveridge, 2017). However, manufacturing sector indicates significant and negative relationship with self-employment. Previous studies indicate that manufacturing sector is one of the three lowest contributors on self-employment growth in USA (Pew research, 2015). The manufacturing sector in North Carolina includes chemicals, food process, pharmaceutical and electronic products mainly.

Results for average household income (LMINC) are in column 4. It shows that LMINC is positively and significantly related to the white proportion of the population (LWHIT). When white population share increases by 1%, average household income increases by 0.46%. Furthermore, the Asian (LASIA) and Black (LBLAC) population shares show a positive relationship with average household income (LMINC). This reflects in particular the impact of the immigrant population on the average income level of the counties. The findings indicate that the service sector (LSRV) also has a strong impact on average income (LMINC). 1% increases in service sector population (LSERV), increases average household income (LMINC) by 0.21%. This could be linked to Asian immigrants, who are heavily involved in the service industry in metropolitan areas. The manufacturing sector (LMANU) shows a significant and negative relation with household income. This may be due to low wages in the manufacturing sector (pew research, 2015) relative to other major industrial sectors in the state. Education (LEDUC), percentage of graduates in the county shows a positive and meaningful relation with average family income (LMINC). Higher education is known to have higher earnings.

CONCLUDING COMMENTS

The study was to evaluate the connection between immigrants, self-employment, and economic growth for North Carolina using county level data from American Consumer Survey for the period of 2010- 2017. Pooled OLS regression analysis was followed with three Results indicate that service sector (LSERV) impacts highly on medium income (LMINC) as well. 1% increases in service sector population (LSERV), increases average household income (LMINC) by 0.21%. This could be related to Asian immigrants, significantly engaged in the service sector in metropolitan areas. Interestingly, manufacturing sector (LMANU) indicates significant and negative relationship with household income, and this could be due to low wages engaged in manufacturing sector (pew research, 2015) compared to the other leading industrial sectors of the state. Education (LEDUC), percentage of graduates in the county shows a positive and

significant relationship with average household income (LMINC). It is known that higher education leads to higher incomes. regressions for the immigrant share, self-employment share, and average household income growth. The statistical package of STATA was continued for the analysis. The results highlight the significant and positive impact of immigrants and self-employment on the economic growth of the state. Further, the counties with more self- employment opportunities are more attracted by immigrants. Growth in the construction, manufacturing, and service sectors has significant and positive impacts on self-employment opportunities. The lower the average income counties show higher rates of self-employment. Growth in the service and education sectors, lead to higher household incomes. Thus, the investment priorities in the construction, services, and education, especially to rural North Carolina would enhance economic growth in North Carolina. These investments could be well conceived adequate plans to create entrepreneurial opportunities with diverse immigrants with their talents and abilities. North Carolina has eighty-five rural counties out of hundred that need more investments where economic growth has still fallen behind. Although the agricultural sector works well in rural North Carolina and attracts many immigrant workers, the study found no significant results. The sector includes establishments whose primary activity is growing crops, raising animals, and harvesting fish and other animals. Therefore, an in-depth, stand-alone analysis would be required to examine the impact of agriculture in that context as a future study. The findings of the study for North Carolina may be generalized to some similar states such as Virginia, South Carolina and sometimes Georgia with caution.

REFERENCES

Aquirre International. (2005). The California farm labor force: Overview and trends from the national agricultural workers survey. Retrieved from http://agcenter.ucdavis.edu/documents/CalifFarmLaborForceNAWS.pdf

Artz, G. (2003). "Rural Area Brain Drain: Is It a Reality"? CHOICES: The magazine of food, farm and resource issues. Retrieved from http://www.choicesmagazine.org/2003-4/2003-4-03.pdf

Bates, T., Bradford, W.D. & Seamans, R. (2018). Minority entrepreneurship in twenty-first century America. *Small Bus Econ* 50, 415–427. https://doi.org/10.1007/s11187-017-9883-5

Borjas, G.J. 1986. The self-employment experience of immigrants. The Journal of Human Resources 21(4):485-506.

Brieger, S.A., Gielnik, M. M. (2021) "Understanding the gender gap in immigrant entrepreneurship: a multi-country study of immigrants' embeddedness in economic, social, and institutional contexts". *Small Bus Econ* 56, p. 1007–1031. https://doi-org.ezproxy.libproxy.db.erau.edu/10.1007/s11187-019-00314-x

Carpenter, C.W. and Loveridge, S. (2017) "Immigrants, Self-Employment, and Growth in American Cities", The Journal of Regional Analysis and Policy, 47(2): p.100-109.

Clemens. M. A. (2013) "International Harvest: A Case Study of How Foreign Workers Help American Farms Grow Crops—and the Economy," Partnership for a New American Economy and the Center for Global Development, p.2. http://www.renewoureconomy.org/wp-content/uploads/2013/07/nc-agrreport-05-20131.pdf

Dutta, N., Kar, S. & Sobel, R.S. (2021) "What influences entrepreneurship among skilled immigrants in the USA? Evidence from micro-data". *Bus Econ* 56, p. 146–154. https://doi-org.ezproxy.libproxy.db.erau.edu/10.1057/s11369-021-00220-9

Eckhardt, J. T., & Shane, S. (2010) "An update to the individual-opportunity nexus". In Z. J. Acs & D. B. Audretsch (Eds.), *Handbook of entrepreneurship research* (pp. 47–76). New York, NY: Springer New York.

Fairlie, R. W., & Meyer, B. D. (1996) "Ethnic and racial self-employment differences and possible explanations". *The Journal of Human Resources*, *31*(4), p..757–793. doi:10.2307/146146.

Fairlie, R. W., Zissimopoulos, J., & Krashinsky, H. (2010) "The international Asian business success story? a comparison of Chinese, Indian and other Asian businesses in the United States, Canada and United Kingdom". In J. Lerner & A. Schoar (Eds.), *International differences in entrepreneurship,* pp. 179–208. Chicago: University of Chicago Press. doi:10.7208/chicago/9780226473109.003.0007.

Fairlie, R., Reedy, E. J., Morelix, A., & Russell, J. (2016) "Kauffman Index of startup activity: National Trends 2016". In *Kauffman Index of startup activity*. Kansas City: Ewing Marion Kauffman Foundation.

Fernald, John G. and Charles I. Jones. (2014) "The Future of US Economic Growth." *American Economic Review*, 104(5): p. 44-49. Retrieved from http://dx.doi.org/10.1257/aer.104.5.44

Goetz, S.J., and Rupasingha, A. (2013) "The determinants of self-employment growth: Insights from county-level data, 2000-2009". Economic Development Quarterly I-19.

Hernandez, T., Gabbard, S., & Carrol, D. (2016) "Findings from the national agricultural workers survey (NAWS) 2013-2014: A demographic and employment profile of the United States farmworkers". Retrieved from https://www.doleta.gov/agworker/pdf/NAWS_Research_Report_12_Final_508_Compliant.pdf

Hipple, S.F. (2010) "Self-employment in the United States. Monthly Labor Review", Bureau of Labor Statistics, September Immigrants in North Carolina. Retrieved from https://www.americanimmigrationcouncil.org/sites/default/files/research/immigrants_in_north_carolina.pdf

Kerr, S.P. & Kerr, W. (2020) "Immigrant entrepreneurship in America: Evidence from the survey of business owners 2007 & 2012". Research Policy, Vol. 49(3).

Krogstad, J. M. (2017) "U.S. Hispanic population growth has leveled off". *Factank* (Vol. 2017): Pew Research Center. http://www.pewresearch.org/fact-tank/2017/08/03/u-s-hispanic-population-growth-has-leveled-off/

Lassmann, A., Busch, C. (2015) "Revisiting native and immigrant entrepreneurial activity. *Small Bus Econ* 45, 841–873 (2015). https://doi-org.ezproxy.libproxy.db.erau.edu/10.1007/s11187-015-9665-x

Lofstrom, M. (2002) "Labor market assimilation and the self-employment decision of immigrant entrepreneurs". *Journal of Population Economics*, *15*(1), 83–114. doi:10.1007/PL00003841.

National Geographic. (2018) "Asian-Americans Make Up Most of the New U.S. Immigrant Population". Published article on September 14th

North Carolina Small Business Profile (2016) Retrieved from https://www.sba.gov/sites/default/files/advocacy/North_Carolina.pdf

Oyelere, R. U., and Belton, W. (2012) "Coming to America: Does having a developed home country matter for self-employment in the United States?" *American Economic Review*, *102*(3), p. 538–542. doi:10.1257/aer.102.3.538.

"Patent Pending: How Immigrants are Re-inventing the American Economy," Report of the Partnership for a New American Economy. (June 2012). Retrieved from http://www.renewoureconomy.org/wp-content/uploads/2013/07/patent-pending.pdf

Peri, G. (2012) "The Effect of Immigration on Productivity: Evidence from U.S. States," Review of Economics and Statistics 94 (1), p. 348–358, available at: http://www.mitpressjournals.org/doi/pdf/10.1162/REST_a_00137

Pew research center (2015) "Three in Ten U.S. Jobs re held by the Self-employed and workers they hire". www.pewresearch.org. Retrieved from https://www.pewresearch.org/wp-content/uploads/sites/3/2015/10/2015-10-22_self-employed_final.pdf

Pew Research Center. (2017) "Key Facts about Asian Americans, A Diverse and Growing Population". https://www.pewresearch.org/fact-tank/2017/09/08/key-facts-about-asian-americans.

Pew Research Center. (2021) "The self-employed are back at work in pre-COVID-19 numbers, but their businesses have smaller payrolls". https://www.pewresearch.org/fact-tank/2021/11/03/the-self-employed-are-back-at-work-in-pre-covid-19-numbers-but-their-businesses-have-smaller-payrolls/

Rath, J. & Kloosterman, R. (2000) "Outsiders' business: A critical review of research on immigrant entrepreneurship". *International Migration Review,* 34(3), p. 657–681.

Sherman, A., Trisi, D., Stone, C., Gonzales, S., & Parrott, S. (2019). Immigrants contribute greatly to U.S. economy, despite administration's "public charge" rule rationale. Retrieved from Center on Budget and Policy Priorities website: https://www.cbpp.org/research/poverty-and-inequality/immigrants-contribute-greatly-to-us-economy-despite-administrations

Toussaint-Comeau, M. (2005) How Enclaves Matter in Immigrant Self-employment Decisions. Federal Reserve Bank of Chicago.

US Burau of Labor Statistics (2016) Spot light on Statistics, Retrieved from https://www.bls.gov/spotlight/2016/self-employment-in-the-united-states/pdf/self-employment-in-the-united-states.pdf

US Small Business Administration-SBA (Oct. 2009) Office of Advocacy, North Carolina Small Business Profile. October.

USDA ERS. (2016a) Background. Retrieved from https://www.ers.usda.gov/topics/farm-economy/farm-labor/background.aspx

USDA ERS. (2016b) Immigration and the rural workforce. Retrieved from https://www.ers.usda.gov/topics/in-the-news/immigration-and-the-rural-workforce.asp

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CONSUMER BOYCOTT RESPONSES TO CORPORATE SOCIAL IRRESPONSIBILITY: EVIDENCE FROM TAIWAN

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ABSTRACT

The irresponsible practices of financial institutions could raise concerns about damaging the environment or stakeholders' rights, thereby prompting consumers to impose boycott sanctions. Drawing upon previous literature, this study develops a conceptual framework incorporating both external and internal antecedents of the perceived egregiousness and anticipated guilt that subsequently induce consumers' boycott. This study collects 377 valid samples and employs structural equation model (SEM) to test the hypotheses. The findings show that negative publicity is insignificantly associated with the perceived egregiousness; however, blame attribution could generate consumers' perceived egregiousness and, in turn, lead to consumers' boycott. On the other hand, internal factors (i.e., self-accountability and justice restoration potential) are found to directly or indirectly influence boycott participation. Specifically, a greater extent of self-accountability will yield boycott intention via the anticipated guilt whereas justice restoration potential will directly facilitate boycotting. As expected, a higher substitute cost will reduce boycott intention. Compared with those who had prior consumption experiences, those who did not tended to reveal higher levels of boycott intention. In addition, consumers are more likely to engage in a boycott when the corporate social irresponsibility is related to a product/service crisis rather than corporate culture.

JEL: M14

KEYWORDS: Boycott, Negative Publicity, Blame Attribution, Self-Accountability, Justice Restoration Potential, Substitute Cost

INTRODUCTION

Corporate social responsibility (CSR) has been construed to be a sustainable way of doing business because CSR initiatives help a company strengthen stakeholder relationships by demonstrating its "commitment to maximize long-term economic, societal and environment well-being through business practices, policies, and resources" (Du, Bhattacharya, and Sen, 2011; Peloza and Shang, 2011). Meanwhile, corporate social irresponsibility (CSI), the counterpart of CSR, could be devastating for a company by jeopardizing its revenue and brand reputation (Laufer and Coombs, 2006), eliciting negative word-of-mouth (Grappi, Romani, and Bagozzi, 2013), and leading to even stronger consumer reactions against brands (e.g., Xie and Bagozzi, 2019). As a violation of the social contract between society and the company, CSI may cause various types of harms (physical, financial, or mental) to other societal members (He, Kim, and Gustafsson, 2021), which in turn yield the expected downward volatility of a firm's earnings (Kolbel, Bush, and Jancso, 2017) via stakeholder sanctions at both individual and collective levels (Xie and Bagozzi, 2019; He et al., 2021).

Banks have been served an essential role in the development of economies and societies by providing people and businesses with everyday financial services (Chamber and Day, 2009; Herold, Dietrich, and Breitbarth,

2021). A stream of studies in the banking sector has revealed that stakeholders, especially customers, assess the ethics and social facets of their banks after a series of outrageous bank frauds and irresponsible practices break out (Bennett and Kottasz, 2012). In particular, financial institutions financing projects with concerns about damaging the environment or stakeholders' rights are condemned to be immoral and thus face customer boycott, even if they may not be the company that directly takes the transgressing actions. One of the well-known events spawning customers' boycotts against financial institutions is Wells Fargo's participation in making loans to the developers of Dakota Access Pipeline, which raised concerns about environmental sustainability and the rights of Indigenous communities. Recent bank boycotts also include #BoycottAccessBank within a Nigerian community on Twitter for freezing protesters' accounts and calls for boycotting Bank of America for handing over the account information of hundreds of customers. Other irresponsible practices of financial institutions, such as excessive and disputed lending, may also generate human misery and financial distress (Richards, Palmer, and Bogdanova, 2008). As society becomes more concerned about banks'/insurance companies' sustainable practices (Palazzo, Vollero, and Siano, 2020), researching the impact of CSI and consumer reactions could provide valuable managerial implications.

In light of the public's rapidly increasing attention to firms' ethics and corporate social responsibility, consumer boycotts has become especially relevant for management and public policy implications because they represents a social control mechanism to prevent consumers from purchasing unethical products while fighting against the dark side of capitalism (Klein, Smith, and John, 2004). Put differently, consumers are empowered to make a "purchase vote" or "responsible consumption," not only to favor companies with positive societal impact, but also to force those condemned to take responsibilities for their egregious misconduct, which Klein et al. (2004) called consumer sovereignty. In doing so, consumers express their disapproval of a company's wrongdoings and dissatisfactions toward the injustice (Braunsberger and Buckler, 2011; Yuksel and Mryteza, 2009; Zeng, Audrain-Pontevia, and Durif, 2021). As a form of anti-consumption behavior, John and Klein (2003, p. 1198) defined boycott as "when a number of people abstain from purchase of a product, at the same time, as a result of the same egregious act or behavior, but not necessarily for the same reasons." In an extreme case, consumers may even exert aggressive actions against a brand or company, such as retaliation and sabotage, to restore their own or others' interests and to harm the brand image (Kahr, Nyffenegger, Krohmer, and Hoyer, 2016). Evidently, consumers' concerns about safety, the environment, and society dominate their purchase decisions. Therefore, a better understanding of consumer boycott and its psychological mechanisms is useful in helping managers prepare organizations to better handle the risks caused by CSI (Xie and Bagozzi, 2019).

A growing body of literature documents consumer boycott in response to CSI. Such research has been conceptual or descriptive in nature, with a focus on the distinctive process of boycotting in a single case, mostly regarding four concerns: the underlying motivations of boycott participation (e.g., De Matos and Vargas Rossi, 2007; Klein et al., 2004; Sen, Gürhan-Canli, and Morwitz, 2001), types of boycott behavior (Kozinets and Handelman, 1998; He et al., 2021), consumers' emotional intensity (Antonetti and Maklan, 2016), and a company's strategic responses toward consumer boycott (Cleeren, Heerde, and Dekimpe, 2013; Yuksel and Mryteza, 2009; Yilmaz and Alhumoud, 2017). Most of these studies have revealed that cognitive constructs such as the cost-benefit analysis (e.g., Klein et al., 2004), moral justification (e.g., Ishak, Khalid, and Sulaiman, 2018), justice evaluation (Carlsmith, Darley, and Robinson, 2002), and egregious judgment (e.g., Yilmaz and Alhumoud, 2017) are pivotal in precipitating boycott participation.

All these studies probe distinctive facets of consumer boycotts, yet researchers argue that consumer boycotts are still underexplored and warrant more attention to examine consumer boycotts either from a more holistic perspective (Braunsberger and Buckler, 2011; De Matos and Vargas Rossi, 2007) or based on a psycho-cognitive framework (Zeng et al., 2021). Thus, in addition to the cognitive drivers of consumer boycotts, the emotional facet (e.g., angry feeling) should also be considered to understand boycotts (Trautwein and Lindenmeier, 2019). Xie and Bagozzi (2019) proposed two distinct mediating processes in terms of emotional and evaluative reactions to understand the psychological mechanisms underlying how

consumers react to irresponsible practices. Negative moral emotions such as contempt, anger, moral outrage, and disgust could be provoked and become informational to consumers, which subsequently yield anti-consumption behaviors (Antonetti and Maklan, 2017). With relatively limited research on the effect of negative emotions, Scheidler and Edinger-Schons (2020) have called for more research to examine the effect of negative emotions on boycotts. As a result, the current work aims to probe the mediating effect of the anticipated guilt, a salient self-conscious emotion, to fill the research gap.

Moreover, concerns about justice for others are relevant to consumers' behavior in supporting ethical consumption (White, MacDonnell, and Ellard, 2012). A firm's wrongdoings could generate injustice and harms for stakeholders. However, despite the current knowledge, limited studies have examined consumer boycotts from the perspective of the just-world theory, which embraces the belief that people in the world receive the rewards and punishments they deserve. Therefore, this work aims to incorporate the concept of justice restoration potential to explain boycott and extend the just-world literature on consumer boycott. However, participating in a boycott often incurs some cost for consumers, particularly when they have built an emotional bonding or behavioral loyalty with the transgressing companies. Seeking a substitute product or service also implies a higher cost of the boycott. The current work, thus, includes justice restoration potential and substitute cost in the conceptual framework.

In addition, extant research with various foci on consumer boycotts often collects data and tests models by examining a specific case of CSI (e.g., He et al., 2021) via a field study or survey. Such studies have generated important managerial insights for the specific context of a case. However, the type of CSI could be diverse, and consumers' responses may differ accordingly. To provide advanced insights for companies, the present study examines consumer responses in four cases, among which half relate to a product/service crisis and half pertain to corporate culture crisis. With the CSI typology, the study may provide further managerial insights.

To recap, this study aims to address the antecedents of consumer boycotts by developing a psycho-cognitive framework that incorporates both cognitive and emotional facets (i.e., the anticipated guilt) precipitating consumer boycotts. This research further synthesizes the just-world theory and cost-benefit perspective into the conceptual framework. In addition, the effect of the typology of CSI is considered and analyzed. The rest of the paper is organized as follows: This study first reviews the related literature and develops the conceptual framework and hypotheses. Next, this paper describes the data and methodology, followed by the empirical results. The concluding comments and contributions are then discussed, along with managerial implications, limitations, and future directions.

LITERATURE REVIEW

According to Friedman (1985, p. 97), a consumer boycott refers to "an attempt by one or more parties to achieve certain objectives by urging individual consumers to refrain from making selected purchases in the marketplace." In other words, consumers can purposely refrain from consuming a specific product, product category, or brand in response to a company's perceived wrongdoing and subsequently impinge upon the company's brand equity. A consumer boycott is construed to be a type of collective behavior that prevents market transactions because its success depends on the constant participation of a large group of consumers (Sen et al., 2001). Boycotting could be instrumental or expressive (Cissé-Depardon and N'Goala, 2009). An instrumental boycott involves consumers' active decision to refuse to consume or conduct marketing transactions with another actor due to its misconduct. Being aware of their sovereignty, boycotters believe that they can make a noticeable impact and determine what products or services will be produced or capitalized by coercing the boycott target to cease its egregious behavior and even take social responsibility for its actions (Klein et al., 2004), such as using eco-friendly materials in product manufacturing, improving employees' working conditions, and prioritizing consumers' benefits. As a kind of social movement and collective action, a boycott is viewed as the catalyst for social and economic change (e.g., Friedman, 1999;

Yang and Rhee, 2019). Meanwhile, an expressive boycott is a more abstract form of protest that simply expresses consumers' displeasure and negative psychological states caused by the transgressing company, allowing consumers to unleash their negative emotions (Zeng et al., 2021). Ishak et al. (2018), drawing upon the moral sentiment theory (Smith, 1991), argued that human beings are moral creatures who can feel the misery of the sufferers of egregious misconduct and, therefore, urge individuals to take actions to address their sentimental feelings.

Drawing on the helping literature as well as cost-benefit evaluations, Klein et al. (2004) construed boycotting as a pro-social behavior by which individuals benefit one or more people other than themselves. In their preliminary study using an open-ended questionnaire, the researchers examined why some consumers engage in boycotts while others do not by categorizing motivations into four categories: make a difference (i.e., the extent to which boycott participation can contribute to the achievement of collective goals), self-enhancement (i.e., boycott participation boosts self-esteem and makes boycotters feel good about themselves), counterarguments (i.e., individuals choose not to boycott because they believe their participation may induce intended harm), and constrained consumption (i.e., the direct costs of boycotting).

An egregious act is regarded as the fundamental trigger of a boycott action (John and Klein, 2003). According to Klein et al. (2004, p. 96), perceived egregiousness refers to the extent to which an individual believes that "a firm has engaged in conduct that is strikingly wrong and that has negative and possibly harmful consequences for various parties (e.g., workers, consumers, society at large)." Research has suggested that consumers who perceive higher levels of egregiousness show a higher motivation to engage in boycotts (Klein et al., 2004; John and Klein, 2003). In this way, boycott behavior may serve as an approach for consumers to unleash their condemnation and angry feelings toward the transgressing companies (Trautwein and Lindenmeier, 2019). A boycott serves as a response to a company's wrongdoings that are perceived to be harmful to one or more parties. Although such a perception may vary notably across consumers under different circumstances, not all consumers will engage in boycotts, especially when some of them may interpret a firm's actions as not being seriously wrong (Klein et al., 2004; Yuksel and Mryteza, 2009). As a result, H1, is developed as:

H1: Perceived egregiousness is positively associated with consumer boycott.

Media news reporting and message content about business wrongdoings could draw attention and stimulate public concerns on certain issues, in turn motivating boycott intention (Hoffmann, 2013; Trautwein and Lindenmeier, 2019). Empirical studies have found that consumers are more sensitive to negative information (Sun and Ding, 2020). Media communication and reporting could elicit ethical concerns among consumers, thereby increasing boycott intention (Hoffmann, 2013; Trautwein and Lindenmeier, 2019).

Negative publicity refers to the extent to which the media report on the product harm crisis (Cleeren et al., 2013), which will influence a firm's reactions to crisis, business performance, and brand equity (Liu and Shankar, 2015). Negative publicity also implies issue salience that reflects the extent to which the issue received attention or resonance from society (He et al., 2021). Issue salience can further influence the social expectations of the focal firm and drive it to take actions for failure recovery (Clark, Bryant, and Griffin, 2017). Thus, CSI with salient publicity may yield a greater degree of consumers' perceived violation of the social contract and thus increase the perceived harms.

Negative publicity is derived from media reports and public concerns rather than from company-generated communications; as a result, the messages are construed to be more credible (Wang, 2006). Dean (2004) argued that negative publicity is more powerful and influential with a longer-lasting effect and greater public impression, so it may incur substantial revenue losses. Researchers have also found that negative publicity can harm a firm's performance (e.g., Lei, Dawar, and Lemmink, 2008) and elicit negative online reviews (Chevalier and Mayzlin, 2006). As Zhu and Chang (2013) suggested, negative publicity is

associated with a perceived severity of unethical behavior, public intensity of media concerns, and recovery performance of a firm's remedial measures. Moreover, He et al. (2021) argued that the salience of an issue will influence the extent to which consumers negatively respond to the transgressing company due to the perceived harm. In other words, the negative publicity unravels the egregious act and potential damages, thereby influencing consumers' perceptions and responses. The negative publicity determines the way consumers receive, process, and interpret the egregious act of a company. Thus, the more negative the publicity, the more likely consumers perceive the egregiousness of the company. Hence,

H2: Negative publicity is positively associated with perceived egregiousness.

Attribution theory could be used to infer stakeholders' reactions toward brand culpability (He et al., 2021). According to Weiner (1986), individuals need to impute a negative incident to a specific individual. Lei, Dawar, and Gürhan-Canli (2012) found that consumers tend to impute the rise of an event to a specific target, especially those incidental negative events. Being associated with whether a company should take responsibility for product/service harm crisis, blame attribution may damage firm value via stakeholder sanctions.

Blame attribution, also known as "locus of causality," includes internal and external attribution (Weiner, 1986). The former relates to the originator of an irresponsible practice whereas the latter mainly pertains to situational and environmental causes (Lange and Washburn, 2012; Scheidler and Edinger-Schons, 2020). Compared to an externally attributed cause, an internally attributed originator of irresponsible actions often elicits stronger reactions in consumers (Carvalho, Muralidharan, and Bapuji, 2015). Studies have also demonstrated that consumers tend to take negative reactions against the transgressing company when they perceive that the company has the ability to control incidents and should take responsibility (Scheidler and Edinger-Schons, 2020). A greater level of control implies that the company could have prevented the incidents and, thus, is more likely to be judged culpable (Scheidler and Edinger-Schons, 2020). In other words, internal blame attribution may amplify corporate culpability, decrease consumers' intention to forgive, and in turn develop negative reactions toward the focal company. Consequently,

H3: Internal blame attribution is positively associated with perceived egregiousness.

Consumers' moral beliefs and ethical ideologies are believed to influence their responses to a firm's irresponsible behavior (He et al., 2016). Researchers have examined the concept of self-accountability, drawing upon the literature on self-standard and self-discrepancy theory. The former refers to self-beliefs that guide a person's behavior; the latter relates to the discrepancy between the real self and ideal self in order to eliminate which individuals would change their behavior to avoid potential negative feelings (Peloza, White, and Shang, 2013; Rowe, Wilson, Dimitriu, Breiter, and Charnley, 2017). Self-accountability, defined as "the activation of a person's desire to live up to internal self-standards" (Peloza, et al., 2013, p. 105), refers to consumers holding the standards and beliefs that they should behave in an ethical and sustainable manner. Accordingly, consumers with greater self-accountability are more likely to opt for ethical products because they want to stay with their intrinsic self-standards and take responsibilities for their choices. As previous researchers have suggested, the intrinsic morality of consumers could influence their moral judgment and evoke sympathetic feelings toward the aggrieved parties or victims, thereby motivating individuals to adopt pro-social behaviors (Ishak et al., 2018). In a similar vein, Scheidler and Edinger-Schons (2020) proposed "consumer culpability" to describe consumers' acknowledgment that their behavior may partially encourage CSI if they choose to do nothing. In order to stay in line with their moral standards and reestablish a positive self-perception, consumers tend to engage in helping behaviors and boycott the transgressing company for moral identity restoration (Scheidler and Edinger-Schons, 2020; Klein et al., 2004).

Gregory-Smith, Smith, and Winklhofer (2013) further examined the effect of emotional feelings (both positive and negative) on consumers' ethical choice. They found guilt to be the most salient negative emotion that consumers feel and use to manage cognitive dissonance in an ethical purchase. In general, guilt refers to an individual's unpleasant emotional state (Baumeister, Stillwell, and Heatherton, 1994). Peloza et al. (2013) suggested that guilt arises when a person is unable to maintain his/her own standards. They argue that self-accountability will yield anticipated guilt, which will in turn influence the individual's ethical and pro-social behavior. In other words, due to the self-appraisal of morality about how one should act or behave, guilt serves as an antecedent to refrain consumers from making unethical choices (Kroll and Egan, 2004; Gregory-Smith et al., 2013).

According to the helping behavior literature, individuals are likely to engage in pro-social behavior because of a good self-feeling. Self-blame and public blame may occur if they do not engage in the helping behavior (Dovidio, Piliavin, Gaertner, Schroeder, and Clark, 1991), which could lead to guilt. Previous researchers have suggested that feelings of guilt may provoke ethical purchase decisions (Antonetti and Baines, 2015) and motivate an individual to act in favor of other people's interests (Yilmaz and Alhumoud, 2017). Thus, the avoidance of feelings of guilt could predict the willingness to boycott (Yilmaz and Alhumoud, 2017). Based upon the literature, H4 is inferred.

H4: Self-accountability will lead to consumer boycott via an increase in anticipated guilt.

Researchers have also suggested that people need to believe in a just world, where good and evil are always rewarded and punished, respectfully, because such a belief enables people to view the world as stable (e.g., Lerner, 1980; White et al., 2012). This paper uses the just-world theory in the context of corporate social irresponsibility, in which an injustice is presented to stakeholders. To redress the injustice, consumers may choose ethical products/services and punish the transgressing companies, particularly when the irresponsible practice is pronounced and has the potential to be restored (White et al., 2012).

Justice restoration potential refers to "whether the particular avenue is perceived of having the possibility to restore justice" (White et al., 2012, p. 104). Specifically, consumers may evaluate the extent to which they can rely on their actions or a specific approach to restore fairness for people. In the context of fair trade consumption, White et al. (2012) concluded that the potential for justice restoration influences consumers' willingness to support fair trade products because it reflects a belief that consumers' purchases will substantially contribute to those in need of help, improve the quality of life of third-place farmers, and save them from exploitation at the hands of intermediaries. In other words, the support of ethical choices will be enhanced when consumers believe that they can actually bring forth impact (White et al., 2012). In contrast, a low level of justice restoration potential is less likely to generate helping behavior. Instead, consumers tend to adopt defensive strategies rather than providing assistance or engaging in pro-social responses (Lerner and Simmons, 1966). Thus, the potential for justice restoration gives consumers an opportunity to resolve the threat of injustice so that bad guys are punished and good things happen to good people (Lerner, 1980). As a result, this study argues that a high level of justice restoration potential will lead to boycott intention.

Some researchers have also referred to "make a difference" (Klein et al., 2004) or "perceived efficacy" (Braunsberger and Buckler, 2011; Sen et al., 2001) as the extent to which a boycotter believes his/her boycott participation can contribute to the attainment of collective social goals. That is to say, when consumers believe they are competent in helping others and their actions will bring forth positive change in outcomes, boycott participation is more likely to take place (Klein et al., 2004). Thus,

H5: Justice restoration potential is positively associated with consumer boycott.

Previous researchers have conceptualized consumers' decision to boycott as a cost-benefit analysis wherein consumers weigh the potential gains from boycotting (e.g., to change a firm's behavior and contribute to collective goals) against the potential costs of boycotting (Klein et al., 2004; Yuksel and Mryteza, 2009; Zeng et al., 2021). In some irresponsible initiatives, consumers may reap the benefits. For example, unpaid labors in the supply chain usually indicate low costs to the manufacturers and low prices for obtaining the goods. As such, consumers are likely to downplay unethical behaviors due to economic benefits and reduce their boycott intention (Scheidler and Edinger-Schons, 2020). Moreover, heavy users or loyal customers need to spend more time and effort searching for and adapting to other substitute brands. As consumers develop a stronger preference or commitment to a product, they will feel a higher cost for resisting the product, making them reluctant to boycott the company (Klein et al., 2004; Yuksel and Mryteza, 2009). Similarly, He et al. (2021) argued that consumers are less likely to participate in a boycott when they have built a stronger consumer–brand relationship, especially if other satisfactory substitutes are not yet readily available (Braunsberger and Buckler, 2011; Sen et al., 2001). Due to the switching cost and lock-in behavior, this study infers that:

H6: Perceived boycott costs are negatively associated with consumer boycott.

DATA AND METHODOLOGY

The current study develops a psycho-cognitive framework comprising both external and internal antecedents that precipitate boycott participation (shown in Figure 1). Specifically, negative publicity and blame attribution serve as the external motivators that prompt consumers' perceived egregiousness and, in turn, boycotting behavior. Self-accountability, justice restoration potential, and substitute cost serve as the individual-level antecedents that either directly or indirectly influence boycotts via an increase in individuals' anticipated guilt. This study employs structural equation model (SEM) to test the hypotheses.

This study selects four infamous negative incidents from the last decade, including both domestic and international corporate misconduct: Ting-Hsin's oil scandal in Taiwan, Zara's sweatshop of its supply chain, Uber's sexual harassment, and United Airlines (UA) dragging a customer off a flight after overbooking the flight. The four incidents cover both product/service-related crises (i.e., Ting-Hsin and UA) and corporate culture-related scandals (i.e., ZARA and Uber). Two of the four incidents (i.e., Uber and UA) are listed in the top 10 corporate scandals and misconduct in the United States in 2017 (Shen, 2017). The Ting-Hsin scandal, which occurred in 2014, yielded large-scale boycotting in Taiwan for years, with follow-up reports continuing for more than 5 years, forcing the corporation to withdraw from Taiwan. Furthermore, ZARA—a company known worldwide—faced an unpaid labor issue in its supply chain a few years ago.

Figure 1: The Conceptual Framework

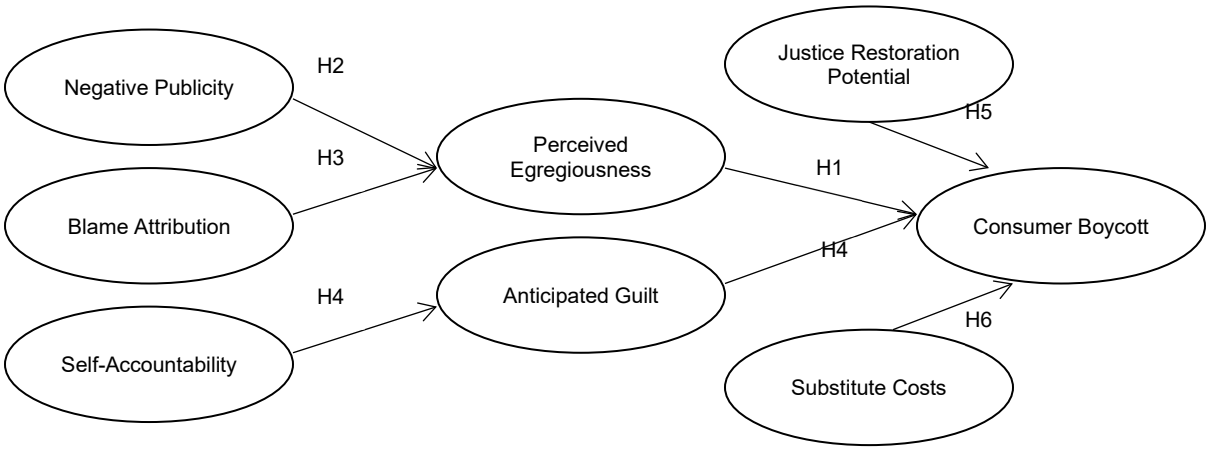

Figure 1 depicts the conceptual framework and hypotheses. This study infers that perceived egregiousness and anticipated guilt serve as the mediators leading to consumer boycotts. Although negative publicity and blame attribution evoke the cognitive perception of a firm's egregiousness, self-accountability elicits a negative feeling of guilt that then results in boycotting. Justice restoration potential and substitute costs also influence consumer boycotts.

This study used convenience sampling, recruiting subjects both online and offline to answer the survey questions in the first quarter of 2018. Subjects were general consumers in Taiwan who were randomly assigned to one of the four cases of corporate irresponsibility shown on the first page of the questionnaire. Respondents were asked to carefully read a news passage about a firm's irresponsible practice before completing the questionnaire, which measured items for each construct in terms of boycott participation, perceive negative publicity, blame attribution, self-accountability, substitute cost, egregiousness, anticipated guilt, and justice restoration potential. The research collected 400 samples in total. After eliminating samples with omitted and invalid answers, 377 usable responses were analyzed, for a response rate of 94%. The 377 responses included 134 online responses and 247 offline responses. The online responses were collected via Facebook posts and Line group messages. This study collected offline responses in public spaces such as university campuses, shopping malls, and department stores. Our samples included 118 responses to Ting-Hsin's oil scandal, 89 responses to ZARA's unpaid labor in the supply chain, 83 responses to Uber's sexual harassment, and 87 responses to UA's overbooked flight.

This study used modified measures from previous studies (shown in Table 1). Specifically, this study employed 5 items to assess the negative publicity (Zhu and Chang, 2013), 3 to measure blame attribution (Lei, Dawar, and Gurhan-Canli 2012; Klein and Dawar, 2004), 3 to measure self-accountability (Rowe et al., 2017; Peloza et al., 2013), 2 to assess substitute cost (Klein et al., 2004), 2 to measure perceived egregiousness (Klein et al., 2004), 2 to evaluate the anticipated guilt (Rowe et al., 2017), 2 to measure the justice restoration potential (White et al., 2012), and 2 to measure consumer boycott behavior (Klein et al., 2004; Hoffman and Müller, 2009).

Table 1: Constructs and Measures

Construct	Measures	Reference
Negative publicity	Received long-term attention from the media and public	Zhu and Chang, 2013
	Had high exposure frequency	
	Was a concern of a lot of media and people	
	Was a concern of reputable media and people	
	Generated intense discussions among the media and public	
Blame attribution	This company is to blame for consumers' illnesses	Lei, Dawar, and Gurhan-Canli 2012; Klein and Dawar, 2004
	This company is responsible for consumers' illnesses	
	This company is at fault for consumers' illnesses	
Self-accountability	Feel accountable to behave in an ethical manner	Rowe et al., 2017; Peloza et al., 2013
	Motivated to live up to my own standards	
	Feel accountable for my own standards	
Substitute cost	The targeted product has satisfactory substitutes	Klein et al. (2004)
	Substitutes are easy to identify	
Perceived egregiousness	The firm's actions are very wrong	Klein et al. (2004)
	The firm's action is inexcusable	
Anticipated guilt	Feel remorse	Rowe et al. (2017)
	Feel guilt	
Justice restoration potential	To help make the world a fairer place	White et al. (2012)
	To contribute to restoring fair and just outcomes	
Consumer boycott behaviors	I am boycotting the products of XX	Klein et al., 2004; Hoffman and Müller, 2009
	I am not boycotting the products of XX	

This table reveals the relevant variables and measures included in the analysis. Based upon previous literature, this study modified items in the questionnaire, which used 5 items to assess negative publicity, 3 to measure blame attribution, 3 to measure self-accountability, 2 to assess substitute cost, 2 to measure perceived egregiousness, 2 to assess anticipated guilt, 2 to measure justice restoration potential, and 2 to measure consumer boycott behaviors.

RESULTS

Of the 377 usable samples, 51% were male and 49% were female. Approximately 73% of respondents had heard of irresponsible practice before and 31% of them had prior consumption experience with the company. Most respondents (80%) ranged in age from 18 to 34 years old. Following Anderson and Gerbing's (1988) suggestion, this study conducted a two-stage approach to test the conceptual model, including a confirmatory factor analysis to assess the quality of the measurement model and a structural model to test the hypotheses.

Despite of the significant x^2 that may be induced by the large sample size (x^2=280.96; p=0.00)(Bagozzi, 1981), all other goodness-of-fit indicators are higher than the suggested value (Bagozzi and Dholaki, 2002): the x^2 ratio=1.7, root mean square error of approximation (RMSEA)=0.045, goodness-of-fit index (GFI)=0.93, adjusted goodness-of-fit index (AGFI)=0.90, normed fit index (NFI)=0.97, non-normed fit index (NNFI)=0.98, comparative-fit index (CFI)=0.99, and incremental fit index (IFI)=0.99. Table 2 shows that the lambda loadings of each measure are higher than the threshold of 0.6, whereas the square multiple correlations (SMCs) are higher than the suggested value of 0.5, except for one item (Hair, Anderson, Tatham, and Black, 1998). To keep the complete measures of a construct, this item was not eliminated. The results show that the measures are adequate. Moreover, the composite reliability (CR) ranged from 0.56 to 0.89. Almost all the CRs were higher than the suggested threshold of 0.6 (Fornell and Larcker, 1981). The average variance extracted (AVE) ranged from 0.40 to 0.77. Almost all the AVEs of the constructs exceeded the 0.5 threshold (Fornell and Larcker, 1981), indicating acceptable convergent validity.

Table 2: Measurement Model

Measures	SMC	Factor Loadings	CRs	AVEs
Perceived Egregiousness				
The firm's actions are very wrong	0.59	0.77	0.68	0.52
The firm's action is inexcusable	0.70	0.84		
Anticipated Guilt				
Feel remorse	0.91	0.95	0.87	0.77
Feel guilt	0.88	0.94		
Justice Restoration Potential				
To help make the world a fairer place	0.83	0.91	0.78	0.64
To contribute to restoring fair and just outcomes	0.83	0.91		
Substitute Cost				
The targeted product has satisfactory substitutes	0.81	0.90	0.86	0.75
Substitutes are easy to identify	0.84	0.91		
Consumer Boycott Behaviors				
I am boycotting the products of XX	0.73	0.85	0.56	0.40
I am not boycotting the products of XX	0.55	0.74		
Negative Publicity				
Received long-term attention from the media and public	0.44	0.66	0.86	0.56
Had high exposure frequency	0.73	0.85		
Was a concern of a lot of media and people	0.80	0.90		
Was a concern of reputable media and people	0.90	0.95		
Generated intense discussions among the media and public	0.85	0.92		
Blame Attribution				
This company is to blame for consumers' illnesses	0.77	0.88	0.78	0.54
This company is responsible for consumers' illnesses	0.45	0.67		
This company is at fault for consumers' illnesses	0.80	0.90		
Self-Accountability				
Feel accountable to behave in an ethical manner	0.58	0.76	0.89	0.72
Motivated to live up to my own standards	0.91	0.95		
Feel accountable to my own standards	0.85	0.92		

This table shows the measure items of each construct as well as the reliability and validity of the construct measures. The lambda loadings here are standardized solutions. The squared multiple correlations (SMCs), factor loadings, and composite reliability (CR) reflect the reliability of construct measures, whereas the average variance extracted (AVE) reflects the discriminant validity of the constructs. Most values are higher than the suggested threshold. In the formulas, $CR = \frac{(\sum \lambda)^2}{(\sum \lambda)^2 + \sum(\theta)}$ *and* $AVE = \frac{(\sum \lambda^2)}{(\sum \lambda^2) + \sum(\theta)}$

This study also checked the discriminant validity using the chi-square difference test suggested by Anderson and Gerbing (1988). First, the study estimated the correlations between all the possible pairs of constructs and then constrained each correlation to equal 1 to examine whether the constraint statistically degraded the model fit. The results indicated that most pairs of constructs revealed significant chi-square differences except for the differences between anticipated guilt and blame attribution ($\triangle x^2 = 1$, $\triangle$df=1), between justice restoration potential and consumer boycott behavior ($\triangle x^2 = 1.62$, $\triangle$df=1), and between justice restoration potential and blame attribution ($\triangle x^2 = 0$, $\triangle$df=1), which may imply an inferior discriminant validity in the three pairs of constructs. To further confirm the discriminant validity, this study adopted Espinoza's (1999) and Fornell and Larker's (1981)'s approach, according to which, AVEs should be higher than any square of correlations between two latent constructs. The results in Table 3 present satisfactory discriminant validity.

Table 3: Discriminant Validity

Latent Construct	1	2	3	4	5	6	7	8
1. Perceived Egregiousness	0.52							
2. Anticipated Guilt	0.16	0.77						
3. Justice Restoration Potential	0.09	0.39	0.64					
4. Substitute Costs	0.07	0.08	0.04	0.75				
5. Consumer Boycott Behaviors	0.13	0.38	0.23	0.10	0.40			
6. Negative Publicity	0.05	0.09	0.08	0.01	0.04	0.56		
7. Blame Attribution	0.17	0.15	0.21	0.09	0.08	0.07	0.54	
8. Self-Accountability	0.07	0.12	0.06	0.04	0.07	0.07	0.08	0.72

The values on the diagonal reveal the AVEs of each latent variable, whereas the values in the lower triangular matrix show the square of correlation between two latent variables. According to past researchers' suggestion (Fornell and Larker, 1981), the AVEs should be higher than any square of correlations between two latent variables. Hence, this table reveals satisfactory discriminant validity.

The structural model showed an acceptable goodness of fit, with x^2 ratio of 2.33, RMSEA of 0.06, GFI of 0.91, AGFI of 0.88, PGFI of 0.66, IFI of 0.97, and CFI of 0.97. The x^2 ratio was below the threshold of 3 suggested by Kline (1998), and the RMSEA was below the cut-off value of 0.08 (McDonald and Ho, 2002). The GFI was higher than the suggested value of 0.9, but the AGFI was slightly lower (Tanaka and Huba, 1989). The PGFI was higher than the suggested value of 0.5 (Mulaik et al., 1989). Both IFI and CFI were far higher than threshold of 0.9 (Bentler and Bonett, 1980). All indicators implied a satisfactory model fit.

Table 4 shows that most hypotheses were supported. Specifically, perceived egregiousness was significantly and positively associated with consumer boycott (β_{31}=0.14, t-value=1.97), supporting H_1. However, the effect of negative publicity on perceived egregiousness was insignificant (γ_{11}=0.07, t-value=1.37), showing no support for H_2. Moreover, blame attribution appeared to be a significant predictor of perceived egregiousness (γ_{12}=0.47, t-value=6.99), supporting H_3. Justice restoration potential was significantly and positively associated with consumer boycott (γ_{34}=0.14, t-value=3.43). Thus, H_5 was statistically supported. As expected, a lower substitute cost yielded a higher possibility to engage in a boycott, with a coefficient of 0.18 (t-value=3.14). H_6 was therefore supported.

Table 4: Hypotheses' Tests

Hypothesis	Standardized Coefficient (t-value)	Results
H_1: Perceived egregiousness →Consumer boycott behavior	0.14^{*}(1.97)	Accepted
H_2: Negative publicity→Perceived egregiousness	0.07(1.37)	Unaccepted
H_3: Blame attribution →Perceived egregiousness	0.47^{***}(6.99)	Accepted
H_4: Self-accountability→Anticipated guilt→ Consumer boycott behavior	0.69^{***}(8.35); 0.44^{***}(9.63)	Accepted
H_5: Justice restoration potential→Consumer boycott behavior	0.15^{***}(3.33)	Accepted
H_6: Substitute costs→ Consumer boycott behavior	0.18^{**}(3.14)	Accepted

*This table shows the results of hypothesis testing. The sign * denotes that p< 0.05, ** denotes that p<0.01, and *** denotes that p<0.001. The value in the parentheses following the standard coefficient shows the t-value. All hypotheses were statistically supported except H2, in which negative publicity is inferred to be positively associated with perceived egregiousness.*

As for the mediating role of anticipated guilt, this study compares the overall goodness of model fit among the nested model, full mediation model, and partial mediation model in Table 5. In the nested model, the relationships among self-accountability, anticipated guilt, and consumer boycott are unconstrained. The direct path effect of self-accountability on consumer boycott is constrained in the partial mediation model

and unconstrained in the full mediation model. The results show that the chi-square difference between the full mediation model and the nested model was significant, with a x^2difference of 82.63 and degree of freedom difference of 2, whereas the difference between the full mediation model and partial mediation model revealed insignificant results (x^2 difference=0.22; degree of freedom difference=1). The direct effect of self-accountability on consumer boycott was insignificant, with a coefficient of -0.01 (t-value=-0.17). As expected, self-accountability was significantly associated with anticipated guilt (γ_{23}=0.69, t-value=8.34), which then influenced consumer boycott behavior (β_{32}=0.44, t-value=10.82). Hence, the results support H_4.

Table 5: Mediating Effect of Anticipated Guilt between Self-accountability and Boycott Behavior

Model	x^2	df	x^2 ratio	RMSEA	GFI	AGFI	CFI	IFI	PGFI
Nested model	476.92	171	2.79	0.069	0.89	0.85	0.96	0.96	0.66
Full mediation	394.29	169	2.33	0.060	0.91	0.88	0.97	0.97	0.67
Partial mediation	394.51	168	2.33	0.060	0.91	0.88	0.97	0.97	0.66

This table shows the comparison of goodness-of-fit indexes among three models: the nested model, full mediation model, and partial mediation model. The results show that the chi-square difference between the full mediation model and nested model was significant, whereas between the full mediation model and partial mediation model it was insignificant. The goodness-of-fit indicators all showed that the full mediation and partial mediation models performed better fitness than the nested model. These results imply that anticipated guilt serves as a mediator between self-accountability and consumer boycott behavior. Thus, H4 is supported.

To gain more insights into the potential influence of CSI typology on consumer boycott behavior, the present study further distinguished the four CSI incidents into product/service-related CSIs (N=205) and corporate culture-related CSIs (N=172). This study conducted T tests and found that, in cases of corporate culture-related CSIs, consumers showed a significantly lower boycott intention (Mean $_{\text{product/service crisis}}$=3.64 < Mean $_{\text{culture crisis}}$=4.7, *p*-value<0.001) than those in the cases of product/service-related CSIs, implying that a product/service-related crisis is more likely to induce consumer boycott behavior. The results may be ascribed to the potential damages to personal consumption rights and physical risks. However, these two groups of consumers reveal indifferent purchase intention in their near future (Mean $_{\text{product/service crisis}}$=1.97 < Mean $_{\text{culture crisis}}$=2.10, *p*-value=0.12).

This study further distinguished between respondents who had consumed the brand (N=115) and those who never had (N=262) by employing the T test to examine consumer responses in the boycott intention and purchase intention. The data indicated that consumers who had consumed products or services of the company involved in the scandal indicated a significantly lower intention to boycott the company (Mean=3.9, SD=1.38, *p*-value=0.006) than those who had never consumed its products of services (Mean=4.36, SD=1.49). These consumers also revealed greater purchase intention (Mean=2.61, SD=0.78, *p*-value<0.001) than those with no prior experiences with the products or services (Mean=1.77, SD=0.70). Among consumers with prior consumption experiences (N=115), subjects in the product/service-related CSI scenario (N=46) were more inclined to boycott the company than those in the corporate culture-related CSI scenario (N=69) (Mean $_{\text{culture CSIs}}$=3.19; Mean $_{\text{product/service CSIs}}$ = 4.38, *p*-value <0.001). For subjects with no prior consumption experiences (N=262), their boycott intention was still significantly higher in the product/service-related CSI scenario (N=136) than the corporate culture-related CSI scenario (N=126) (Mean $_{\text{product/service CSIs}}$=4.86; Mean $_{\text{culture CSIs}}$=3.81, *p*-value<0.001).

CONCLUDING COMMENTS

With stakeholders becoming more interested in the ethics and sustainable actions of their banks, financial institutions have started publishing CSR reports or disclosing their CSR initiatives on their websites to address their sustainability engagement (Botshabelo, Mbekomize, and Phatshwane, 2017; Palazzo et al., 2020). Researchers have suggested that banks/insurance organizations, like many other companies, are dedicated to showing stakeholders their long-term commitment via a variety of CSR communication

strategies (Palazzo et al., 2020). A more holistic understanding of CSI is also pivotal in the banking industry because irresponsible practices may harm stakeholders' trust and generate customer sanctions that then cause financial risks. Therefore, the findings of this research may shed light on developing communication strategies in response to CSI.

This present study answered previous researchers' call (Scheidler and Edinger-Schons, 2020) for the further investigation of consumers' boycott behaviors based upon a psycho-cognitive framework that incorporates both external and internal drivers of consumer boycotts. The perceived egregiousness and anticipated guilt served as mediators triggering consumer boycotts. This study also examined consumers' boycott intention in four different cases with the typology of product-related irresponsible practices and corporate culture-related irresponsible practices. Consumers' prior consumption experience, which may yield higher substitute costs, was considered. This study aimed to contribute to the current understanding of consumer boycotts, providing insights for organizations facing CSI issues. By employing SEM to analyze 377 samples collected online and offline, the research provided statistical evidence to test the hypotheses.

This study results led to four major findings. First, the results revealed that negative publicity will not necessarily increase perceived egregiousness, whereas internal blame attribution serves as a critical antecedent of perceived egregiousness and, consequently, consumer boycott behaviors. Second, consumers' intrinsic self-accountability leads to a greater extent of anticipated guilt and, thus, boycott intention. Third, justice restoration potential and substitute costs are influential in yielding consumer boycott behaviors. Finally, compared with corporate culture-related irresponsible practices, product/service-related irresponsible practices are more likely to induce boycotts due to the direct linkage to consumers' rights and risks. Interestingly, consistent with the cost-benefit analysis perspective, consumers with prior consumption experiences were more reluctant to participate in a boycott due to the higher substitute cost.

Furthermore, this study demonstrated an insignificant relationship between negative publicity and perceived egregiousness. The researcher ascribes this outcome to the design of the communication message. Although negative publicity may yield negative image association (Einwiller, Fedorikhin, Johnson, and Kamins, 2006), the effect may depend on the media source credibility, the disclosure of message argument, the exposure frequency as well as intensity, and the follow-up reports of the transgressing company's remedies. In other words, despite the negative exposure putting the target company under the spotlight, it does not necessarily lead to a greater extent of perceived egregiousness. As some researchers have suggested, negative information can serve as a double-edged sword that increases a firm's awareness and product accessibility in the meantime because, over time, people may forget the negative content but still remember the product or brand name (Cleeren et al., 2013). On the other hand, whether consumers can access sufficient information and how they process information are also critical in forming consumers' ethical judgment, thereby influencing their perception of egregious misconduct. Future researches are needed for further examination.

Moreover, the findings indicate that consumers' perceived egregiousness is mainly derived from the blame attribution—that is, whether they can ascribe the harm of CSI to a specific target (Carvalho et al., 2015; Lei et al., 2012; Scheidler and Edinger-Schons, 2020). Consistent with previous findings (Kahr et al., 2016; Scheidler and Edinger-Schons, 2020), this study has provided additional evidence demonstrating that consumers tend to evaluate a company's culpability and ability to control the occurrence of incidents. In this way, blame attribution influences perceived egregiousness and negative emotions that then encourage consumer boycotts.

Drawing on the self-standard and self-discrepancy theory, this study found that self-accountability motivates boycott participation via the anticipated feeling of guilt. This finding is in line with the arguments presented in previous literature. Consumers with higher self-standards in ethics are inclined to engage in ethical and pro-social choices in order to avoid the anticipated guilt (Antonetti and Baines, 2015;

Braunsberger and Buckler, 2011; Peloza et al., 2013). Although Rowe et al. (2017) found that the effect of pride can better predict ethical consumer behavior than the effect of guilt can, the current study demonstrated that anticipated guilt indeed acts as a mediating role in influencing boycott participation. As Gregory-Smith et al. (2013) indicated, negative emotions can discourage consumers from making unethical decisions. Although consumers may feel determine to maintain their intrinsic morality, they are more likely to feel culpable for irresponsible practices and have negative emotions toward the suffering parties. To avoid such negative feelings, consumers are motivated to take helping or pro-social actions (i.e., boycott the transgressing company) to restore their moral identity as well as reduce the vicarious emotional tension.

According to this study's findings, when consumers believe that their actions can substantially redress justice and fairness, their willingness to boycott a company will be higher. This result is consistent with prior researchers' findings (White et al., 2012) and the concept of "make a difference" proposed by Klein et al. (2004). Reflecting the belief and confidence of restoring fairness in the world, justice restoration potential can encourage consumer boycotts. Once individuals believe their engagement and actions are able to coerce the transgressing company to change and contribute to improving the welfare of the third party, they are more willing to boycott the company.

As the findings indicate, consumer boycotts are also closely related to boycott costs. The additional time and efforts that consumers need to pay for similar products and services will constrain their boycott participation, implying that boycott activity is driven by not only helping behavior, but also self-benefitting behavior. Specifically, consumers will assess the pros and cons they receive from boycotts. Furthermore, consumers with prior consumption experiences revealed significantly lower boycott intention and were more likely to purchase the target case's product/service in the near future. These results are not surprising as these consumers often face higher substitution and switching costs. When benefitting from the product/service of the transgressing company, consumers are inclined to tolerate the irresponsibility. Meanwhile, consumers with no prior consumption experience showed a greater willingness to avoid future purchases after the CSI. Without the constraint of substitute costs, they face no conflicts between benefits and costs.

Finally, this study has provided evidence showing that, in different types of CSIs, consumers react differently in terms of their boycott decisions. In particular, product/service-related CSIs are associated with consumers' consumption rights and risks. For example, the Ting-Hsin food oil product crisis directly jeopardized consumers' physical health, whereas the UA's overbooked flight that resulting in dragging customers off the plane evidently damaged customers' benefits. In contrast, CSIs involving unpaid labors and sexual harassment—although both pertinent to stakeholders' interests—showed relatively less power in triggering consumer boycotts. These misconducts impinge less urgently or immediately on individuals' consumption rights.

Managerial Implications

Despite more than 40% of companies listed Fortune's top 50 facing consumer boycotts (John and Klein, 2003), marketers and policy makers still have an insufficient understanding of boycott behaviors and motivations (Braunsberger and Buckler, 2011; Yuksel and Mryteza, 2009). Boycotts not only damage a firm's revenues, but also encourage consumers to switch to competitors' products. Beyond the theoretical contributions to understanding consumer boycotts, the findings from this study provide several practical implications for companies.

First, companies should try to measure the level of perceived egregiousness and learn the antecedents of this perception so they can craft more effective strategies in response to boycott participation. The current study found that, although external communication plays a pivotal role for a company facing CSI issues, it is not so much a question of whether the public relations department is able to reduce the exposure of

negative publicity but rather how the company influences consumers' blame attribution and takes immediate as well as accountable actions in response to the scandals. As demonstrated in the present study, the latter is conducive for mitigating the egregiousness perception and, subsequently, consumers' resistance reactions. In other words, firms should consider approaches that can abate their culpability and consumers' egregiousness perceptions. Transferring the public focus to the subsequent initiatives may be feasible. For example, response actions like immediately apologizing with sincerity and showing a firm's accountability as well as the locus of causality of the specific event may allow consumers to modify their judgments of the company's culpability by providing them with relatively sufficient information. These remedial measures may alleviate consumers' perceived egregiousness and, in turn, their participation in a boycott.

Second, the results of this study indicated that consumers' self-accountability can lead to boycotts because they attempt to avoid feelings of guilt. Although this study did not focus understanding consumers' morality standards, the findings suggest that marketers should learn more about the ethical self-perception of consumers nowadays because their standards of morality are actually associated with a firm's business sustainability by motivating consumers to adopt pro-social behaviors against transgressing companies. According to Kotler, Kartajay, and Setiawan (2021), young consumers, particularly the Generation Z, tend to reveal a greater extent of self-accountability than other generations because they have been educated to care about sustainability issues and show s higher preference for ethical products or brands with social and environmental responsibilities (Kotler et al., 2021). More importantly, marketers should consider how to leverage the salient self-conscious emotion, guilt, in its crisis communication strategies to influence consumers' boycott behaviors as well as future purchase decisions. Considering the negative feelings of guilt and ethically conscious consumers, crisis communication messages may convey credible information demonstrating the remedial actions taken to fix societal contracts. The communication strategies could not only sway consumers' judgments, but also attenuate the effect of negative emotions on consumer boycotts. Furthermore, with a belief of making a difference in the world, consumers may feel responsible for society and the environment. As the findings of this study indicated, stronger justice restoration potential will increase the intention to boycott. Thus, companies should conduct market research to get a better understanding of consumers' ethical attitudes, the issues they are concerned about, and their self-perceptions, which may be conducive for enacting remedial strategies as well as message appeal design.

Third, a boycott often implies higher substitute costs for some customers due to the existing emotional bond or purchase inertia stemming from past consumption. This does not suggest that companies can neglect irresponsible events; rather, these companies should make even more efforts in their remedial initiatives. By doing so, they are more likely to expand markets and sustain their long-term profits, not only enhancing existing customers' trust and belief, but also convincing current non-users that they are taking their responsibilities seriously and worthy of trust. In addition, companies involved in a CSI crisis should prioritize resource allocation when dedicated to CSR or societal impacts. A firm or brand should be more cautious in campaigns and communication strategies when the incidents are directly associated with the product or service crisis, which would especially attract consumers' attention and concerns in view of the potential harm to individual self-benefits. In this circumstance, companies should placate the target audience by ensuring their benefits of consumption, health, and safety.

Limitation and Future Research

This study is limited in several ways. Despite this study's attempts to develop a conceptual framework that includes both psycho and cognitive antecedents of consumer boycott, consumer boycott per se could be a complex process driven by intertwined motivations and a wide array of reasons under different contexts. For example, Although the present study categorized these antecedents into external factors (e.g., negative publicity) and individual-level factors (e.g., self-accountability and justice restoration potential), more individual-level factors in terms of demographics may also be incorporated to understand consumer boycott behaviors. Specifically, will an individual's geographic area and cultural context influence their boycott

behaviors? The herding effect and bandwagon effect might be more prominent in some cultural contexts, making it more likely to yield group animosity and encourage boycott participation. Are young consumers, such as Generation Z or Centennials, more likely to use their purchase power to impose sanctions against unethical brands because of their rising consciousness of CSR and sustainability concerns (Kotler et al., 2021)? In this vein, it would be interesting to examine whether these groups of consumers experience stronger anticipated guilt and perceived egregiousness if their favored brands become involved in product/service-related versus corporate culture-related CSI issues. By considering different individual-level factors and sample distributions, future research can investigate whether the significant results still hold and whether new findings emerge in boycott behaviors.

In addition, when a negative corporate scandal or CSI occurs, a firm's subsequent remedy may immediately attenuate or intensify the perceived egregiousness and boycott behaviors. Further research should scrutinize the circumstances and corporate initiatives that may alleviate consumers' negative emotions and revenge behavior. As Yilmaz and Alhumoud (2017) suggested, the accused company's response to crisis—whether appropriate or inappropriate—will influence perceived egregiousness. Therefore, future research could explore how and which type of CSI response strategies can be effectively used to alleviate perceived egregiousness and boycott intention.

Finally, the generalizability of the framework needs to be addressed. Although the research objects in this study included both domestic and international cases that share high awareness and publicity, covered key incidents in early 2017, and encompassed product/service-related and corporate culture-related crises, the selection of research cases could still be biased due to the researchers' subjective interpretations. Using consumers' recall of CSI incidents may enable subjects to experience real-life scandals; however, multiple factors may be out of the researchers' control and, consequently, influence the research findings (Scheidler and Schons, 2020). As a result, an interesting avenue for future research would be to conduct an experimental design to clarify the effect of different CSI types on perceived egregiousness and consumer boycott behaviors. In the present study, CSI scenarios were simplified and categorized into product/service-related harm and corporate culture-related harm involving customers and employees as stakeholders. The current academic contributions could be extended, by examining boycott participation in different typologies of CSI incidents. Furthermore, the majority of subjects (80%) in the current study were between 18 and 34 years old, which may constrain the generalizability of the framework. Extended groups of respondents should be recruited. The sample in this study corresponded to Centennials, who care deeply about sustainability issues and prefer brands that contribute to social and environmental responsibilities (Kotler et al., 2021). Moreover, this study was limited in its cross-sectional data analysis. A longitudinal analysis or process study could clarify the complicated relationships among variables.

REFERENCES

Anderson, J.C. and D.W. Gerbing (1988) "Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach," *Psychological Bulletin*, vol. 103(3), p. 411-423.

Antonetti, P. and P. Baines (2015) "Guilt in Marketing Research: An Elicitation-Consumption Perspective and Research Agenda," *International Journal of Management Reviews*, vol. 17, p. 333-355.

Antonetti, P. and S. Maklan (2016) "An Extended Model of Moral Outrage at Corporate Social Irresponsibility," *Journal of Business Ethics*, vol. 135(3), p. 429–444.

Antonetti, P. and S. Maklan (2017) "Concerned Protesters: From Compassion to Retaliation," *European Journal of Marketing*, vol. 51(5/6), p. 983–1010.

Bagozzi, R.P. (1981) "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error: A Comment," *Journal of Marketing Research*, vol. 18(3), p. 375-381.

Bagozzi, R.P. and U.M. Dholakia (2002) "Intentional Social Action in Virtual Communities," *Journal of Interactive Marketing*, vol. 16(2), p. 2-21.

Bennett, R. and R. Kottasz (2012) "Public Attitudes towards the UK Banking Industry Following the Global Financial Crisis," *International Journal of Bank Marketing*, vol. 30(2), p. 128-147.

Bentler, P.M. and D.G. Bonett (1980) "Significance Tests and Goodness of Fit in the Analysis of Covariance Structures," *Psychological Bulletin*, vol. 88, p. 588–606.

Botshabelo, I., C.J. Mbekomize and P.M.D. Phatshwane (2017) "Corporate Social Responsibility Reporting in Banking Industry: An Analysis of Disclosure Levels in Botswana," *International Journal of Business and Management*, vol. 12(12), p. 224-241.

Braunsberger, K. and B. Buckler (2011) "What Motivates Consumers to Participate in Boycotts: Lessons from the Ongoing Canadian Seafood Boycott," *Journal of Business Research*, vol. 64, p. 96-102.

Baumeister, R.F., A.M. Stillwell and T.F. Heatherton (1994) "Guilt: An Interpersonal Approach," *Psychological Bulletin*, vol. 115(2), p. 243-267.

Carlsmith, K.M., J.M. Darley and P.H. Robinson (2002) "Why do We Punish? Deterrence and Just Deserts As Motives for Punishment," *Journal of Personality and Social Psychology*, vol. 83, p. 284-299.

Carvalho, S.W., E. Muralidharan and H. Bapuji (2015) "Corporate Social Irresponsibility: Are Consumers' Biases in Attribution of Blame Helping Companies in Product-Harm Crises Involving Hybrid Products?" *Journal of Business Ethics*, vol. 130(2), p. 651-663.

Chambers, C. and R. Day (2009) "The Banking Sector and CSR: An Unholy Alliance?" *Financial Regulation International*, vol. 12(9), p. 1-7.

Chevalier, J.A. and D. Mayzlin (2006) "The Effect of Word of Mouth on Sales: Online Book Reviews," *Journal of Marketing Research*, vol. 43(3), p. 345-354.

Cissé-Depardon, K. and G. N'Goala (2009) "The Effects of Satisfaction, Trust and Brand Commitment on Consumers' Decision to Boycott," *Recherche et Applications en Marketing*, vol. 24(1), p. 43–66.

Clark, C.E., A.P. Bryant and J.J. Grin (2017) "Firm Engagement and Social Issue Salience, Consensus, and Contestation," *Business & Society*, vol. 56(8), p. 1136–1168.

Cleeren K., H.J. van Heerde and M.G. Dekimpe (2013) "Rising from the Ashes: How Brands and Categories Can Overcome Product-Harm Crises," *Journal of Marketing*, vol. 77(March), p. 58-77.

De Matos, C.A. and C.A. Vargas Rossi (2007) "Consumer Reaction to Product Recalls: Factors Influencing Product Judgment and Behavioral Intentions," *International Journal of Consumer Studies*, vol. 31, p. 109-116.

Dean, D.H. (2004) "Consumer Reaction to Negative Publicity Effects of Corporate Reputation, Response, and Responsibility for A Crisis Event," *Journal of Business Communication*, vol. 41(2), p. 192-211.

Dovidio, J.F., J.A. Piliavin, S.L. Gaertner, D.A. Schroeder and R.D. Clark III (1991) "The Arousal: Cost-Reward Model and the Process of Intervention: A Review of the Evidence." In *Prosocial Behavior*, Margaret S. Clark, ed. Newbury Park, CA: Sage Publications, p. 86–118.

Du, Shuili, C.B. Bhattacharya and S. Sen (2011) "Corporate Social Responsibility and Competitive Advantage: Overcoming the Trust Barrier," *Management Science*, vol. 57(9), 1528- 1545.

Peloza, J. and J. Shang (2011) "How Can Corporate Social Responsibility Activities Create Value for Stakeholders? A Systematic Review," *Journal of the Academy of Marketing Science*, vol. 39(1), p. 117-135.

Einwiller, S.A., A. Fedorikhin, A.R. Johnson and M.A. Kamins (2006) "Enough is Enough! When Identification No Longer Prevents Negative Corporate Associations," *Journal of the Academy of Marketing Science*, vol. 34(2), p. 185–194.

Espinoza, M.M. (1999) "Assessing the Cross-Cultural Applicability of A Service Quality Measure: A Comparative Study between Quebec and Peru," *International Journal of Service Industry Management*, vol. 10(5), p. 449-468.

Fornell, C and D.F. Larcker (1981) "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *Journal of Marketing Research*, vol. 18, p. 39-50.

Friedman, M. (1985) "Consumer Boycotts in the United States, 1970–1980: Contemporary Events in Historical Perspective," *Journal of Consumer Affairs*, vol. 19 (1), p. 96–117.

Friedman, M. (1999) *Consumer Boycotts*. New York: Routledge.

Grappi, S., S. Romani and R.P. Bagozzi (2013) "The Effects of Company Offshoring Strategies on Consumer Responses," *Journal of the Academy of Marketing Science*, vol. 41(6), p. 683-704.

Gregory-Smith, D., A. Smith and H. Winklhofer (2013) "Emotions and Dissonance in 'Ethical' Consumption Choices," *Journal of Marketing Management*, vol. 29(11-12), p. 1201-1223.

Herold, D.M., T. Dietrich and T. Breitbarth (2021) "Banking on Bullshit: Indifferences towards Truth in Corporate Social Responsibility," *International Journal of Bank Marketing*, vol. 39(4), p. 618-637.

Hair, J.F., R.E. Anderson, R.L. Tatham and W.C. Black (1998) *Multivariate Data Analysis*, N.J. : Prentice-Hall.

He, H., S. Kim and A. Gustafsson (2021) "What Can We Learn From #StopHateForProfit Boycott Regarding Corporate Social Irresponsibility and Corporate Social Responsibility?" *Journal of Business Research*, vol. 131, p. 217-226.

Hoffmann S. and S. Műller (2009) "Consumer Boycotts Due to Factory Relocation," *Journal of Business Research*, vol. 62(2), p. 239–247.

Hoffmann S. (2013) "Home Country Bias in Consumers' Moral Obligation to Boycott Offshoring Companies," *Journal of Marketing Theory and Practice*, vol. 21(4), p. 371-388.

Ishak, S., K. Khalid and N. Sulaiman (2018) "Influencing Consumer Boycott: Between Sympathy and Pragmatic," *Journal of Islamic Marketing*, vol. 9(1), p. 19-35.

John, A. and J.G. Klein (2003) "The Boycott Puzzle: Consumer Motivations for Purchase Sacrifice," *Management Science*, vol. 49 (9), p. 1196–1209.

Kahr, A., B. Nyffenegger, H. Krohmer and W.D. Hoyer (2016) "When Hostile Consumers Wreak Havoc on Your Brand: The Phenomenon of Consumer Brand Sabotage," *Journal of Marketing*, vol. 80(May), p. 25-41.

Klein, J.G. and N. Dawar (2004) "Corporate Social Responsibility and Consumers' Attributions and Brand Evaluations in a Product-Harm Crisis," *International Journal of Research in Marketing*, vol. 21(3), p. 203-217.

Klein, J.G., N.C. Smith and A. John (2004) "Why We Boycott: Consumer Motivations for Boycott Participation," *Journal of Marketing*, vol. 68(July), p. 92-109.

Kline, R.B. (1998) *Principles and Practice of Structural Equation Modeling*, The Guilford Press, New York, NY.

Kolbel, J.F., T. Busch and L.M. Jancso (2017) "How Media Coverage of Corporate Social Irresponsibility Increases Financial Risk?" *Strategic Management Journal*, vol. 38, p. 2266-2284.

Kotler, P., H. Kartajaya, and I. Setiawan (2021) *Marketing 5.0: Technology for Humanity*, John Wiley & Son, Inc.

Kozinets, R.V. and J.M. Handelman (1998) "Ensouling Consumption: A Netnographic Exploration of Boycotting Behavior," *Advances in Consumer Research*, vol. *25*(1), p. 475–480.

Kroll, J. and E. Egan (2004) "Psychiatry, Moral Worry, and Moral Emotions," *Journal of Psychiatric Practice*, vol. 10, p. 352–360.

Lange, D. and N.T. Washburn (2012) "Understanding Attributions of Corporate Social Irresponsibility," *Academy of Management Review,* vol. 37(2), p. 300–326.

Laufer D. and W.T. Coombs (2006) "How Should A Company Respond to A Product Harm Crisis? The Role of Corporate Reputation and Consumer-Based Cues," *Business Horizons*, vol. 49, p. 379-385.

Lei, J., N. Dawar, and J. Lemmink (2008) "Negative Spillover in Brand Portfolios: Exploring the Antecedents of Asymmetric Effects," *Journal of Marketing*, vol. 72(3), p. 111-123.

Lei, J., N. Dawar and Z. Gürhan-Canli (2012) "Base-Rate Information in Consumer Attributions of Product-Harm Crises," *Journal of Marketing Research*, vol. 49, p. 336-348.

Lerner, Melvin (1980) *The Belief in a Just World: A Fundamental Delusion*. New York: Plenium Press.

Lerner, M. and C.H. Simmons (1966), "Observer's Reaction to the 'Innocent Victim': Compassion or Rejection?" *Journal of Personality Social Psychology*, vol. 4 (2), p. 203–210.

Liu, Y. and V. Shankar (2015) "The Dynamic Impact of Product-Harm Crises on Brand Preference and Advertising Effectiveness: An Empirical Analysis of the Automobile Industry," *Management Science*, vol. 61(10), p. 2514-2535.

McDonald, R.P. and M.R. Ho (2002) "Principles and Practice in Reporting Structural Equation Analyses," *Psychological Methods*, vol. 7(1), p. 64-82.

Mulaik, S.A., L.R. James, J. Van Alstine, N. Bennet, S. Lind and C.D. Stilwell (1989) "Evaluation of Goodness-of-Fit Indices for Structural Equation Models", *Psychological Bulletin*, vol. 105(3), p. 430-445.

Palazzo, M., A. Vollero and A. Siano (2020) "From Strategic Corporate Social Responsibility to Value Creation: An Analysis of Corporate Website Communication in the Banking Sector," *International Journal of Bank Marketing*, vol. 38(7), p. 1529-1552.

Peloza, J., K. White and J. Shang (2013) "Good and Guilt-Free: The Role of Self-Accountability in Influencing Preferences for Products with Ethical Attributes," *Journal of Marketing*, vol. 77(January), p. 104-119.

Richards, M., P. Palmer and M. Bogdanova (2008) "Irresponsible Lending? A Case Study of A UK Credit Industry Reform Initiative," *Journal of Business Ethics*, vol. 81(3), p. 499-512.

Rowe, Z.O., H.N. Wilson, R.M. Dimitriu, K. Breiter and F.J. Charnley (2017) "The Best I Can Be: How Self-Accountability Impacts Product Choice in Technology-Mediated Environments," *Psychology & Marketing*, vol. 34(5), p. 521-537.

Scheidler, S. and L.M. Edinger-Schons (2020) "Partners in Crime? The Impact of Consumers' Culpability for Corporate Social Irresponsibility on Their Boycott Attitude," *Journal of Business Research*, vol. 109, p. 607-620.

Sen, S., Z. Gürhan-Canli and V. Morwitz (2001) "Withholding Consumption: A Social Dilemma Perspective on Consumer Boycotts," *Journal of Consumer Research*, vol. 28 (December), p. 399–417.

Shen, L. (2017) "The 10 Biggest Business Scandals of 2017," *Fortune*, Accessed January 1, 2018 at http://fortune.com/2017/12/31/biggest-corporate-scandals-misconduct-2017-pr/

Smith, N.C. (1991) "Morality and the Market: Consumer Pressure for Corporate Accountability," *Journal of Business Ethics*, vol. 10(11), p. 881-882.

Sun, W. and Z. Ding (2020) "Is Doing Bad Always Punished? A Moderated Longitudinal Analysis on Corporate Social Irresponsibility and Firm Value," *Business and Society*, June, p. 1-38.

Tanaka, J.S. and G.J. Huba (1989) "A General Coefficient of Determination for Covariance Structure Models Under Arbitrary GLS Estimation," *British Journal of Mathematical and Statistical Psychology*, vol. 42, p. 233–239.

Trautwein, S. and J. Lindenmeier (2019) "The Effect of Affective Response to Corporate Social Irresponsibility on Consumer Resistance Behavior: Validation of a Dual-Channel Model," *Journal of Marketing Management*, vol. 35(3-4), p. 253-276.

Wang, A. (2006) "When Synergy in Marketing Communication Online Enhance Audience Response: The Effects of Varying Advertising and Product Publicity Messages," *Journal of Advertising Research*, vol. 46(2), p. 160-170.

Weiner, B. (1986) *An Attributional Theory of Motivation and Emotion*. New York: Springer-Verlag.

White, K., R. MacDonnell, and J.H. Ellard (2012) "Belief in A Just World: Consumer Intentions and Behaviors Toward Ethical Products," *Journal of Marketing*, vol. 76(January), p. 103-118.

Xie, Chunyan and R.P. Bagozzi (2019) "Consumer Responses to Corporate Social Irresponsibility: The Role of Moral Emotions, Evaluations, and Social Cognitions," *Psychology & Marketing*, vol. 36, p. 565-586.

Yang, J. and J.H. Rhee (2019) "CSR Disclosure Against Boycotts: Evidence from Korea," *Asian Business and Management*, vol. 19, p. 311-343.

Yilmaz, H. and A. Alhumoud (2017) "Consumer Voycotts: Corporate Response and Responsibility," *International Review of Management and Marketing*, vol. 7(3), p. 373-380.

Yuksel U. and V. Mryteza (2009) "An Evaluation of Strategic Responses to Consumer Boycotts," *Journal of Business Research*, vol. 62(2), p. 248–259.

Zeng, T., A-F. Audrain-Pontevia and F. Duriff (2021) "Does Corporate Social Responsibility Affect Consumer Boycotts? A Cost-Benefit Approach," *Corporate Social Responsibility and Environmental Management*, vol. 28, p. 796-807.

Zhu, D.H. and Y.P. Chang (2013) "Negative Publicity Effect of the Business Founder's Unethical Behavior on Corporate Image: Evidence from China," *Journal of Business Ethics*, vol. 117, p. 111-121.

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