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The market value of sustainable practices in the luxury industry: An identity mismatch and institutional theoretical perspective

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ABSTRACT

Shareholders of luxury firms uphold a view of identity mismatch between being luxury and sustainable. We examine the associated market value with sustainable practice adoption of luxury firms from an institutional theoretical lens and an identity mismatch perspective. Based on 289 announcements made by public luxury firms, results from event study show that the stock market reacts *negatively* to the announcements of sustainable practices. Nevertheless, the negative effect attenuates in more recent year announcements, and more profitable and smaller luxury firms. Our results alert managers to better align their sustainability goals with luxury firms' identity and the ever-changing environment.

1. Introduction

With an increasing population of consumers (Chiu et al., 2018; Ko et al., 2019), the luxury industry contributed sales of €1.2 trillion in 2018 globally (D'Arpizio et al., 2019). Under the increasing pressure from stakeholders, including consumers, governments, NGOs, and media, firms in the luxury industry have begun to pay attention to sustainability in recent years. For example, Hermès has been implementing recycling programs since 2012, while Armani was committed to avoiding the use of hazardous chemicals in production before 2020. However, compared with adverse events (misconducts) from luxury firms, these endeavors seem not so well recognized by the public and NGOs. For example, Gucci was reported that shops in China did not treat employees ethically (Janssen et al., 2014); Low degree of transparency among luxury firms such as Hermès, Chanel, Dior and Vuitton was reported by Greenpeace, an NGO that evaluates firms' transparency in the fashion industry.¹

Unlike firms in other industries where the engagement in sustainable practices are believed to be linked with a positive financial performance (Dam and Petkova, 2014; Flammer, 2012), investing in sustainability by a luxury firm can be questioned by its stockholders. There is no consensus on the benefits of adopting sustainable practices by luxury firms due to the critique arising from an *identity mismatch* between what luxury represents and sustainability addresses (Cervellon and Shammas, 2013; Kapferer and Michaut, 2014). On the one hand, luxury firms often set a higher priority for product quality, whereas they tend to care less about cost control, environmental, and social issues (Hennigs et al., 2013). Nevertheless, sustainability generally addresses issues concerning using fewer resources to make products in compliance with environmental and social requirements, emphasizing more on cost control (Achabou and Dekhili, 2013). Hence, sustainable practices adopted by a luxury firm, attempting for environmental and social improvements (Rahman and Yadlapalli, 2015), may be doubted by stakeholders as imprinting an image of greenwashing

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¹ The website of Greenpeace is available at: <http://www.thefashionduel.com>.

(Achabou and Dekhili, 2013).

In practice, it appears that external pressure toward sustainability from stakeholders on luxury firms may have evolved over the past decades. According to Schemken and Berghaus (2018), consumers have been paying growing attention to luxury products' sustainable performance, especially by new generations born after 2000. Meanwhile, the increasing number of NGOs and media coverage has been cultivating an ever-amplified necessity of adopting sustainability practices by luxury firms. Stakeholders have begun to shape an institutional norm that urges firms to implement sustainability practices (Flammer, 2012). The greater extent to which being sustainable is institutionalized as a norm, the more likely that luxury firms would be rewarded by a stock market growth due to their compliance with the norm. Therefore, the increasingly amplified external pressure (the norm of being sustainable) exerted by NGOs, media, and consumers is likely to influence the market value of luxury firms' adoption of sustainable practices.

In recent years, an increasing number of studies have focused on sustainable practices in the luxury industry. Studies such as Wang et al. (2020), Dean and Athwal (2019) addressed the growing tensions between sustainability and luxury because of contradiction, uncertainty, and cultural turmoil. Zhang et al. (2020) as well as Bhardwaj and Bedford (2017) explored factors that influence consumption of sustainable luxury, such as gained information and some psychological determinants, including symbolic value perception, tendency to conform, and moral judgment. Choi and Luo (2019) examined the effect of data quality on sustainable practice adoption and profit. In their literature review of the "sustainable luxury", Athwal et al. (2019) concluded that research on this issue is underdeveloped, and the relationship between sustainability and luxury appears to be mostly vague and inconsistent. Moreover, several studies discussed the identity mismatch between luxury and sustainability (Amatulli et al., 2017; Nash et al., 2016). Nevertheless, none of the above studies examined the market value of sustainable practice from the perspective of identity mismatch. Furthermore, little is known regarding how the evolving institutional environment, i.e., the growing external pressure over time from stakeholders, can influence shareholders' reactions to luxury firms' sustainable practices. Flammer (2012) examined this effect in a wide range of industries. However, given the unique characteristic of the luxury industry, i.e., there could be the identity mismatch between sustainability and luxury, it is worthwhile to explore whether or not stakeholders in luxury industries react differently. This study develops a framework based on identity mismatch theory, that is, the *inertia in maintaining luxury identity* (the passivity that luxury firms are not willing to adopt sustainability practices due to the self-recognition as being luxury) and the ever-changing institutional environment, that is, the *motivation to fulfill stakeholders' expectations* (the tendency to act in accordance with stakeholders' anticipation) (Balakrishnan et al., 2010; Dobrev et al., 2003; Qian and Li, 2003).

Our analysis uses a sample of 289 announcements made by luxury firms listed in the U.S. stock markets between 1990 and 2019. We analyze how the U.S. stock market responds to the announcements using an event study methodology. The results suggest that there is a *negative* reaction in stock prices to the announcements of luxury firms' sustainable practices. This study further finds that the negative stock returns attenuate as the institutional norm of sustainability amplifies over time. In addition, larger firms experience a stronger negative reaction, and highly profitable firms encounter less negative stock reaction. In this study, we contribute to the literature by proposing a conceptual framework consisting of the shareholder value of luxury firms' sustainable practice adoption, the impact of the practice adoption timing (*the amplifying of institutional norm*), and two critical firm contingency factors (*inertia in maintaining luxury identity* and *motivation to fulfill stakeholders' expectations*).

We organize the remainder of the manuscript as follows. We develop a conceptual model and hypotheses in Section 2. We explain data collection and the methodology used in Section 3. Section 4 presents the results. We discuss theoretical and practical implications and future research directions in Section 5.

2. A conceptual model and hypotheses development

Drawing upon the identity mismatch literature (Amatulli et al., 2017; Nash et al., 2016), we argue that the mismatch between being luxury and sustainable leads to a negative stock market reaction to the sustainable practice adoption in the luxury industry. Despite the identity mismatch, the necessity of managing sustainability has been institutionalized in the past decades. To this end, it is likely that market rewards firms who have complied with the norm. Consequently, the negative stock returns on sustainable practice adoption may attenuate over time. Besides, we propose that two critical firm-level contingency factors affect the shareholder value of sustainable practice adoption, aligned with the identity mismatch and institutional theoretical lenses, respectively. Specifically, from the identity mismatching perspective, firms with higher inertia in maintaining luxury identity would be less likely to perform sustainable practices; otherwise, it would incur a higher degree of identity mismatching (Dobrev et al., 2003). Accordingly, larger luxury firms, which seek to differentiate themselves from their peers, tend to be more inertial in maintaining the status of being a luxury firm (Dobrev et al., 2003). Therefore, sustainable practices implemented by them could be more likely interpreted as being identity mismatching. Thus, they may experience an even stronger negative market reaction than smaller firms.

On the other hand, from the institutional norm perspective, firms with higher motivation to fulfill their stakeholders' expectations would be more likely to follow the institutional norm (Bertels and Peloza, 2008). Highly profitable firms are more inclined to follow the institutional norm of sustainability because they are more motivated to fulfill their shareholders. As a result, the negative stock market reaction to sustainable practice adoption could be attenuated. In sum, we propose the following conceptual model in Fig. 1 to guide this study.

2.1. Sustainable practices and stock market performance in the luxury industry

Research suggests that there is an identity mismatch between what luxury represents and what sustainability addresses (Achabou and Dekhili, 2013). From a quality-cost perspective, luxury firms pursue high-profit margins and surplus values by increasing product

Fig. 1. The conceptual model of this study.

quality or allocating huge cost in advertising (Chiu et al., 2018; Choi and Liu, 2019; Kim et al., 2019), while paying little attention to cost control (Amatulli et al., 2017; Li, 2019). In contrast, sustainability focuses on values such as abstinence, minimized consumption, and reduced damage to the environment and society, which aims at investing as few inputs (costs) as possible to yield high economic, environmental, and social improvements (Bentahar and Benzidia, 2018; Bhattacharya and Dey, 2020; Kapferer and Michaut, 2014). A luxury product is something that is not necessary but desirable, and should be expensive or rare (Ko et al., 2019); while sustainability refers to necessity, frugality, restraint, and ethics (Amatulli et al., 2017; Carrier and Luetchford, 2012). Thus, researchers point out that there is a contradiction between the values of luxury firms and sustainability (Dekhili and Achabou, 2016; Torelli et al., 2012). Due to this identity mismatch, the ultimate motivation of a luxury firm in adopting sustainable practices may be doubted by the market. That is, there can be a deviation between the firm's luxury identity and the value of sustainability perceived by stakeholders. Margolis and Walsh (2003) suggested that firms make use of sustainable practices merely as a means to boost profit margins. In particular, luxury firms have been self-claiming themselves as "sustainable" due to the growing pressure from NGOs and media in recent years (Achabou and Dekhili, 2013). While in such a situation, luxury firms' engagement in sustainability would instead be considered as green or sustainability washing, which actually is symbolic rather than substantial. Thus, sustainable practices may not help them boost shareholder value (Kapferer, 2010). For example, Dekhili and Achabou (2016) found that the incorporation of an eco-friendly attribute (i.e., recycled products) could be in conflict with the identity of luxury products and do harm to the firm performance. Luxury buyers believe that luxury firms should not prioritize sustainable program implementation, according to studies by Kapferer and Michaut (2014) and Biswas et al. (2018). In practice, after Burberry—the famous luxury brand in the U.K.—announced its banning of fur use in products in Sep. 6, 2018, the stock price dropped by 1.97% in a day². Therefore, the stock market can negatively react to luxury firms' sustainable practice implementation.

Based on the discussion above, we propose the first hypothesis:

H1. *The stock market will respond negatively to luxury firms' sustainable practices announcements.*

2.2. The impact of amplifying institutional norm on the market value of sustainable practices

Firms are facing ever-intensified external pressure, which urges them to behave sustainably. As a consequence, the ever-changing institutional environment may affect the market value of sustainable practices. External pressure stems from luxury firms' various stakeholders, including increasingly impactful social groups such as NGOs and media, and customers who show concerns about the firm's sustainable issues. Over the last decades, external pressure imposed on firms to adopt sustainable practices has increased tremendously. In the following, we demonstrate this trend using stylized facts.³

Media attention to sustainability. Firms' behaviors on sustainability have been screened by the media. To objectively show the media attention on firms' sustainability over the past years, we searched news articles published in newspapers and counted the number of articles for each year. We used the keywords of "sustainability", "environmental responsibility" and "social responsibility" from one of the most impactful newspapers, i.e., the *Wall Street Journal*, to search for the news articles in the database of Dow Jones

² From <https://www.londonstockexchange.com/exchange/prices-and-markets/stocks/exchange-insight/trade-data.html?fourWayKey=GB0031743007GBGBXSET1>.

³ We put forward the arguments for external pressure changing over time by providing information and data in practice, which follows the existing literature such as Flammer (2013).

Fig. 2. The increase in media attention on sustainability.

Factiva. The article counts are plotted in Fig. 2, crossing the years from 1979 to 2019. As shown in Fig. 2, the number of news on sustainability drastically grows over the years: there is an average of 886 news articles published after 2009, which was about ten times higher than that of 1979–1988.

NGOs to sustainability. Similar to media attention, NGOs also exert growing pressure on firms' sustainability issues. First, there is a growing number of NGOs on sustainability over the years. For example, the number of NGOs committing to environmental protection increased by 4.6 percent per year since 1995, which is higher than the growth rate of the number of overall NGOs (2.8 percent per year) in the U.S. (Luna, 2008). Second, more tools have been designed and implemented by NGOs to promote sustainable development over the past years. For example, early in the 1990s, NGOs began to rely on standard environmental or labor practices to promote firms' sustainable practices (i.e., ISO9001, 14001 management standards); whereas in recent years, some NGOs such as Greenpeace independently monitor firms' sustainable behaviors and disclose their investigation reports on media. More recently, some other NGOs have begun to screen supply chain members on sustainable practices on behalf of a focal buyer firm or in a coordinator manner with the focal buyer firm. For instance, Responsive Business Alliance has implemented the Conflict-Free Sourcing Initiative since 2012, which requires a collaboration with jewelry dealers and manufacturers to monitor miners' human rights practice management (Carlile, 2019; Islam and van Staden, 2018).

Consumers to sustainability. Recent development also triggers growing consciousness in sustainability among luxury product consumers (Shen, 2014). Studies in earlier years (e.g., Ahabou and Dekhili (2013)) found that luxury consumers are less willing to purchase green products (such as recycled clothes), while recent studies (i.e., 2018) found that younger consumers have higher purchase intention for sustainable luxury products (Schemken and Berghaus, 2018). Moreover, as Generations Y (those born between 1984 and 1996) and Z (those born after 1997) took up 47 percent among all luxury consumers in 2018 with the contribution of 33 percent in purchase of luxury products (D'Arpizio et al., 2019). It was predicted that by 2015, younger consumers' contribution to luxury product purchase would be increased to 55 percent (D'Arpizio et al., 2019), suggesting that there will be a substantial increase in "responsible" consumers in the future.

Based on the analysis of the above-stylized facts, it can be seen that the luxury industry is in a growing trend towards sustainability. Increasing pressure from media, NGOs, and consumers cultivates an institutional norm of being sustainable that has been gradually recognized in the luxury industry. According to the institutional theory, firms tend to behave as legitimate by conforming to the institutional norm. In recent decades, the institutional norm of sustainability has been intensified over time to exert influence on luxury firms. Consequently, the identity mismatch between being luxury and sustainable in the luxury industry can gradually attenuate. In other words, luxury firms would be prone to engage in sustainability, as the norm of sustainability affects stakeholders' (i.e., consumer) behaviors (Bansal, 2005; Chatterji and Toffel, 2010). Thus, the negative impact of sustainable practices on market value predicted by the identity mismatch would attenuate. To this end, we expect that earlier sustainable practices, implemented in a weaker institutional norm of sustainability under a low degree of pressure from external stakeholders (NGOs, media, and consumers), would result in stronger negative stock market reaction than latter practices that are implemented in a stronger institutional norm of sustainability under a high degree of pressure. We, therefore, hypothesize that:

H2. *The negative market reaction to announcements of luxury firms' sustainable practices decreases over time as the institutional norm of sustainability amplifies in the luxury industry.*

2.3. The impact of inertia in maintaining the luxury identity and motivation to fulfill stakeholder

Apart from the influence of ever-amplifying institutional norm, firms themselves with varying characteristics may experience different market reactions to announcements of their sustainable practices due to their varied willingness to respond to the institutional norm and altering the mismatched identities between being luxury and sustainability.

Extending the hypothesis, assuming that sustainable practices decrease the market value of luxury firms, we argue that sustainable practice announcements made by larger firms will lead to a more negative market response than those made by smaller firms. Larger firms can more easily adopt a differentiation strategy to gain competitiveness. That is, to develop new luxury products

that can differentiate themselves from competitors because they have more resource to leverage (Qian and Li, 2003). The pursuit of a differentiation strategy motivates larger firms to be more ambitious in seeking uniqueness compared with smaller firms (Boehe and Barin Cruz, 2010). In other words, the inertia in maintaining luxury identity seems to be stronger in larger firms (Dobrev et al., 2003). According to the identity mismatch perspective, luxury firms with stronger inertia have a higher tendency of emphasizing luxury over sustainability. Thus, under the condition that a mismatch between being luxury and sustainability exists, larger firms are likely to be perceived to leverage the mismatch to make them differentiate from competitors in the industry, which can lead to stronger negative stock returns from sustainable practice adoption. Thus, our hypothesis is:

H3. *The market reaction to announcements of sustainable practices will be more negative for firms with stronger inertia in maintaining luxury identity than those with weaker inertia in maintaining luxury identity.*

Apart from the inertia in maintaining luxury identity, motivation to meet stakeholders' expectations may also exert influence on the market value of sustainable practice adoption in the luxury industry. Research has suggested that a firm's financial performance (profitability) is partly a result of how well it has fulfilled the expectations of stakeholders (Donaldson and Preston, 1995). Therefore, profitable firms have higher motives to meet stakeholders' expectations by conforming to the institutional norm (Balakrishnan et al., 2010). In the luxury industry, the institutional norm of being sustainable amplifies as stakeholders' concerns on sustainability increase. Following the institutional theoretical lens, we postulate that profitable firms that are more motivated to fulfill stakeholders' expectations would readily conform to the institutional norm, i.e., being sustainable. Moreover, since profitable firms have more slack financial resources to invest in sustainable practices (Qian and Li, 2003), shareholders can be more convinced to believe that the claimed sustainable practices implemented by firms are substantive rather than greenwashing. In sum, firms with more slack financial resources have higher motives and capabilities of responding to the institutional norm, which lowers the mismatch between being luxury and sustainable. In such a way, these firms would substantively engage in sustainable practices and gain a less negative stock market reaction. Hence, we propose that:

H4. *The stock market reaction to announcements of sustainable practices will be less negative for luxury firms with higher motives to fulfill stakeholders' expectations (i.e., higher profitability) than those with lower motives to fulfill stakeholders' expectations (i.e., lower profitability).*

3. Data and methodology

3.1. Data collection

This study investigates the market value of luxury firms' sustainable practices announcements. To collect the news announcements, we use Factiva from Dow Jones, one of the main news databases, to search the four most impactful newspapers or newswires in the U.S., including *Business Wires (BW)*, *Wall Street Journal (WSJ)*, *Dow Jones News Service (DJNS)*, and *PR Newswire (PRN)* during January 1990–July 2019 for relevant press coverage.

To identify news articles concerning corporates sustainable practice adoption in the luxury industry, we perform searches in Factiva using the following keywords combinations in Appendix A. Nine segments are identified in the luxury industry according to classification by the most influential consulting firm: Bain & Company (D'Arpizio et al., 2019), which is also acknowledged among researchers (Shen et al., 2019). The segments include personal luxury goods (e.g., fashion), luxury cars, luxury hospitality, luxury cruises, designer furniture, fine food, fine wines and spirits, private jets & yachts, and fine art. We use different combinations of keywords in nine segments, as it might be different in sustainable management practices across segments. For instance, the segment of luxury cars has more practices of greener technologies adoption, while the segment of luxury hospitality includes more practices in sustainable material adoption.

To search for sample firms in each segment, we first refer to the Global Industry Classification Standards, which lists more than 80 luxury goods manufacturers.⁴ Second, we search primary top luxury products/firms from nine segments separately, based on the websites that evaluate firms and their products from the luxury industry.⁵ Noticeably, if a firm has both luxury and non-luxury product lines, we further search its yearly sales volume contributed by luxury products and then dropped firms that had less than 50% of the sales volume from luxury products (e.g., Honda). We also exclude firms from the sample if their sales information on luxury products division is unavailable. In total, there are 904 announcements from the nine segments, as shown in Appendix A.

We carefully read the full texts in the news announcement articles and exclude three types:

- Announcements that did not actually release about sustainable practice adoption. For instance, some announcements generally provide views or analyses on why certain industries were facing sustainability challenges. There are 367 such announcements that were excluded.
- Announcements from firms without available daily stock prices information from the Center for Research in Security Prices (CRSP). We excluded firms that were not listed on the *New York*, or *Nasdaq* stock exchanges at the moment when the

⁴ The website of Global Industry Classification Standards is: <https://www.msci.com/zh/gics>.

⁵ An example of the available website is: https://www.investorideas.com/Luxury-Brand-Retail/Stocks_List.asp.

Table 1

Number of announcements and firms in the sample.

Steps	The number of deleted announcements	The number of rest announcements
Step 1: collected announcements from Factiva without duplication issue		904
Step 2: deleted announcements that were not actually related to sustainable practice adoption	367	537
Step 3: deleted announcements without sufficient stock prices' data (less than 40 days of stock returns existing from Day -220 to Day -21) to conduct the event study	109	428
Step 4: deleted negative announcements on sustainable practices	33	395
Step 5: deleted announcements with confounding events	106	289

announcement was made. Totally, 109 such announcements were excluded.

- Negative announcements on sustainable practices. Announcements revealing that a firm does not implement needed sustainable practices and associated issues such as fines imposed by the government because of the pollution problem were excluded. There were totally 33 for such type of announcements.

To mitigate the concern of confounding effects—multiple announcements made by a firm within the event window (McWilliams and Siegel, 1997), we check the sample announcements by excluding the ones that announced other significant events such as earnings or dividends reporting, management team adjustment, merger and acquisitions, lawsuits, and organization restructuring within the event period (Klassen and McLaughlin, 1996; Modi et al., 2015; Paulraj, 2011). We search the sample firms by using the types mentioned above of confounding events as keywords in *Factiva* from 2 days before and 1 day after the announcement and read the query results one by one to identify possible confounding events. As a result, there are 31 announcements on merger and acquisitions, 31 on earnings and dividends reporting, 27 on management team adjustment, 13 on organization restructuring, and 4 on lawsuits. Totally, we exclude 106 such confounding events in total. The sample reduction process from 904 to 289 is shown in Table 1.

Three examples of announcements are given below. As presented in Panel A of Table 2, nearly 64 percent of the sample announcements are made after 2010, while the rest of them are made during 1990–2009. Approximately 58 percent of the sample comes from post-2009, and 34.6 percent is from 2000 to 2009. We obtain the stock price data from the CRSP and financial data of the sample firms from the COMPUSTAT database. Panel B of Table 2 describes the statistics of the sample firms in most fiscal years before the announcement dates. The medians of total assets, total cash, and the gross are 20407.68 million, 485.85 million, and 5101.94 million (all in U.S.\$), respectively.

- June 11, 2018 – Ballard and Audi Sign a Contract for an Extended 3.5-Year Project of Fuel Cell Passenger Cars. Audi AG today announced that the Company signed an extended 3.5-year contract of the HyMotion program on technology solutions with Ballard Power Systems, which extends the program to August 2022. The extended contract is expected to be valued in 80–130 million in Canadian dollar (62–100 million in the U.S. dollar) aggregately. The project will support Audi in small production lines launching.
- January 16, 2014 – Las Vegas Sands Gives Suppliers in Inaugural Sands Excellence Awards. Las Vegas Sands Corp. (NYSE: LVS) hosted the first Sands Supplier Excellence Awards ceremony to acknowledge the prominent suppliers in their sustainable practices globally.
- December 15, 2017 – Michael Kors Holdings Limited Embraces Fur - Free Policy. The famous luxury firm, Michael Kors Holdings Limited (NYSE: KORS) (the “Company”) today published an announcement on stopping the use of animal fur in the production lines, also indicating that the existing production lines will be phased out by 2018.

Table 2

Descriptive statistics of the 289 sample announcements.

Panel A: Distribution of the announcement year for the sample of 289 announcements of sustainability certifications					
Year		No. of observations		Percentage	
1990–1999		21		7.27	
2000–2009		100		34.6	
2010–2019		168		58.13	
Total		289		100.00	
Panel B: Descriptive statistics for the sample firms. Financial data are based on the most recent fiscal year around the date of announcement					
Measure	Mean	Median	SD	Minimum	Maximum
Total assets (million US\$)	74384.28	20407.68	98707.64	15.80	437,575
Cash (million US\$)	4320.07	485.85	7368.28	0	35,283
Gross profit (million US\$)	13235.72	5101.94	15596.99	0	66,035

3.2. Methodology

This section introduces methods for evaluating the market reaction to luxury firms' sustainable practices announcements and to analyze the effect of institutional norm amplifying over time, inertia in maintaining luxury identity, and motivation to fulfill stakeholders.

3.2.1. The method for evaluating the stock performance: Event study

The event study methodology is employed in the paper to evaluate the stock performance of luxury firms' sustainable practice adoption. The stock price reaction is defined as the abnormal returns. The methodology of event study provides scrupulous procedures to calculate abnormal returns of events by strictly controlling the disturbance of macro market-level factors such as stock market depression and other potential factors that affect stock returns (referring to [Brown and Warner \(1985\)](#) to capture the detailed description of the method). The abnormal return in this study refers to the percent change in stock prices after the announcement of sustainable practice adoption by luxury firms.

We extract the announcements from news sources, including *WSJ*, *DJNS*, *PRN*, and *BW*, in which the announcement time (dates) are available. The event date is assigned as the trading date of publishing the announcement (referring to [Xia et al. \(2016\)](#)). Specifically, if the sustainable practice announcement is released after 4:00 P.M. EST, the next trading day would be the announcement day to account for the possibility that the market is closed until the next trading day. If the announcement is made before 4:00 p.m. EST, then no adjustment is necessary to the announcement day. After the transforming process, the announcement date is defined as Day 0, the day after the announcement as Day +1, the day before the announcement as Day -1.

The market model is adopted as the estimating approach to calculate the daily stock return, which is deemed the most simplified model but capable of controlling the systematic risks from the stock market ([Klassen and McLaughlin, 1996](#)). The model posits that stock return is linearly associated with the return of stock market index over a time period.⁶ The stock return could be estimated using the following expression:

$$R_{it} = \beta_{0i} + \beta_{1i}R_{mt} + \varepsilon_{it} \quad (1)$$

where R_{it} is the stock return of Firm i on Day t ; R_{mt} is the return of stock market index on Day t ; ε_{it} is the error term; β_{0i} is the intercept of stock return of Firm i ; and β_{1i} is the coefficient of the market index return on the return of Firm i .

To estimate the return for Firm i on Day t , an estimation period starting on Day -220 and ending on Day -21 ([Jacobs et al., 2010](#)) is used. In calculating the expected return, it is required that more than 40 days of stock returns existing from Day -220 to Day -21. ([Lo et al., 2018](#)). Then the abnormal return of Firm i on Day t could be calculated as:

$$A_{it} = R_{it} - (\hat{\beta}_{0i} + \hat{\beta}_{1i} R_{mt}) \quad (2)$$

where $\hat{\beta}_{0i}$ and $\hat{\beta}_{1i}$ are estimates of intercept and coefficient in the estimation period.

The mean abnormal return of all announcements on Day t could be calculated as:

$$\bar{A}_t = \sum_{i=1}^N A_{it} / N_t \quad (3)$$

where N represents the number of announcements.

The cumulative return $CAR(t_1, t_2)$ in $[t_1, t_2]$ could be obtained by aggregating the means of abnormal returns over the period:

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} \bar{A}_t. \quad (4)$$

After obtaining the abnormal returns and the cumulative return, the test of statistical significance on means of the abnormal returns by using the t -test is conducted. In case that any of the estimated stock return is influenced by outliers, two non-parametric tests are used as supplements of t -tests for means, following the previous studies ([Jacobs et al., 2010](#)). Specifically, the median of abnormal return is tested under the Wilcoxon signed-rank test; moreover, the binomial sign test is employed in examining whether the significance of the percent of negative abnormal returns is greater than 50, which is the null value.

Apart from estimating the abnormal returns, determining the event period is also critical for event analysis. Following the previous studies, this study adopts a two-day event period as Days (-1, 0).⁷ If the sustainable practice adoption is announced in *WSJ*, which is a daily published journal, the event period is Days (-1, 0) as there is the possibility that the news has been passed to the public before the day when *WSJ* published. If the announcement is published on newswires such as *DJNS* or *BW*, which are real-time updated news sources, the event day is the announcement date translated from the trading dates to account.

⁶ The market model is developed from the Capital Asset Pricing Model (CAPM), a classic stock price estimation model in finance, positing that a firm's stock return is linearly associated with the market return.

⁷ We follow previous literature such as [Lo, et al \(2018\)](#) and [Xia, et al \(2016\)](#) to use $CAR(-1, 0)$ in our analyses. They argue that the period of Days (-1, 0) could efficiently capture the information we need in two ways. First, it is not too narrow to exclude the announcements published in the news journal such as *Wall Street Journal* in which there is the possibility that the public may get the information proceeding the announcement day from sources such as TV news lines. Second, it is not too broad to include the period such as Day 1 in which the market already has absorbed the information of the announcement. We hypothesize that the market is efficient enough to capture the announcement information as soon as it is published.

3.2.2. Analysis of the three contingency factors: Cross-sectional regression

To empirically estimate how the abnormal stock returns of sustainable practice announcements in luxury firms are affected by the variables discussed in Section 2, this study employs cross-sectional OLS regression analysis. The cumulative abnormal return over Days $(-1, 0)$, which assigns as $CAR(-1, 0)$, is the dependent variable. First, $CAR(-1, 0)$ is regressed with all the control variables. Second, $CAR(-1, 0)$ is regressed with three contingency variables. The following variables are used.

Contingency variables. Three contingency variables are used to test Hypotheses 2 to 4.

Amplifying institutional norm. We use the monthly-based announcement time of sustainable practice adoption to reflect the trend of institutional norm amplifying from stakeholders (i.e., NGOs, media, and consumers). That is, we assume that an announcement made in the recent time period (i.e., in December 2018) receives more external pressure from stakeholders than those made in earlier days (i.e., in May 1990), since the institutional norm of becoming sustainability has been amplified in recent years. A similar approach of using continuous-time variables to represent the amplifying institutional norm of sustainability over time can be found in the literature, such as a study by Flammer (2012). We label this variable as the number of the month that each event was announced to the month that the last event was announced, which is a countable variable ranging from 0 to 349. Considering the larger scale of the variable values compared to other variables, we use the standardized values of the variable for the following regression analysis in Section 4.2.

Inertia. Large firms may believe that they are powerful enough and with abundant slack resources to ignore opportunities from the outside (Miller and Chen, 1994). *Firm size*, the natural log of total assets, is included as a contingency variable to represent the firm's inertia in maintaining the status quo of being luxury.

Motivation. Profitability is used to represent a firm's motivation to fulfill stakeholders' expectations as explained in Section 2 based on the previous literature (Donaldson and Preston, 1995) and measured as the return on assets (ROA), the value of net income before depreciation divided by the total assets, which is a commonly used accounting-based measure of profitability.

Financial data for measuring *firm size* and *profitability* were obtained from Standard & Poor's COMPUSTAT database.

Control variables. Additional variables that may influence the abnormal returns of sustainable practice adoption in luxury firms are controlled in the cross-sectional analysis.

Award/Initiative is employed as a dummy variable to describe whether the practice is an award or a prize that the luxury firm received from the third-party such as NGOs, or a sustainable initiative that is launched by the firm itself, such as a plan to improve employee benefits. According to Jacobs et al. (2010), the awards/certifications that were granted by a third party are perceived as different from the self-implemented initiatives. We code this variable by reading the full texts of the sample announcements and use 1 if the announced practice is an award given by or received from a third-party organization, 0 if it is an initiative launched by the focal firm.

Segment represents the nine segments that luxury industry covers, which are personal luxury goods (e.g., fashion), luxury cars, luxury hospitality, luxury cruises, designer furniture, fine food, fine wines and spirits, private jets & yachts, and fine art. We classify all luxury firms in our sample into one of the nine segments based on firms' business segments and main product/service types. Since no announcement in our sample is from the segments of private jets & yachts and fine art, we label each announcement as a category variable of *Segment* ranging from 1 to 7. The segment (industry) variable is included as a control variable because the prior literature suggests that the tendencies of implementing sustainable practices within luxury industries can differ due to various consumer preferences (Seo and Buchanan-Oliver, 2015).

Parent/subsidiary dummy: If an announcement is released by the subsidiary of the firm, the stock market might react less strongly than that made by the parent firm. Therefore, *Parent* is included as a control variable to describe if the announcement is made by a parent firm. We extract such information from each announcement article and code 1 if the announcement is from the parent firm, 0 otherwise.

3.2.3. Selection bias

Our study collects data about sustainable practices adoption based on firms' announcements. For those firms that implemented but did not announce their sustainable practices, we could not examine their stock market reaction. Therefore, the results may suffer from selection bias. To deal with the issue, this study employs the propensity score matching (PSM) method recommended by Rosenbaum and Rubin (1985). We apply a two-step approach suggested by Chen et al. (2018). We first estimate the propensity scores by conducting a pooled cross-sectional regression using variables of *ln_assets*, *ROA*, *financial leverage*, *sales turnover*, *market-to-book*, *earning per share* that might potentially influence the sustainable practices implementation that were used in the previous studies (Ding et al., 2018; Modi et al., 2015), to identify the control group. The fixed effects of industry and year are also incorporated. Then we use the closest propensity score generated in the step to identify the control firm matched with the sample firms (see details of the PSM matching process in Appendix B).

When the matching is completed, for each matched firm, we obtain its abnormal return under the market model. We then compare the abnormal returns of the group containing sample firms to the control group containing matched ones. Our *t*-test result shows differences between the mean values of the stock returns for the sample and matched firm groups (see in Panel C&D of Table 4). We further do the robustness test by deleting one of the variables to identify the control firms, and all *t*-test results show significant differences in mean values between the two firm groups. Thus, the selection bias would not be a concern.

Moreover, we conduct the Heckman (1979) two-stage method to check the potential selection bias further. In the first stage of the selection model, we use the same variables as in finding the PSM matched groups, that are *ln_assets*, *ROA*, *financial leverage*, *sales turnover*, *market-to-book*, *earning per share*, *industry* and *year*, to predict the probability of sustainable practices implementation by conducting a probit model on the full sample including both firms with and without sustainable practices (see details in Appendix C).

Table 3

Event window abnormal returns for the 289 sustainable practices announcements under the market model.

	N	Mean	t	Median	Wilcoxon test	% negative	Binomial sign test
AR (−1)	289	−0.13%*	−1.59	−0.08%*	−1.467	54%	1.176
AR (0)	289	0.02%	0.21	−0.14%	−1.034	55%*	1.765
CAR (−1,0)	289	−0.11%	−0.85	−0.08%*	−1.203	53%	0.824

***, **, * denotes significantly different from zero (50% in the case of positive) at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

In the second stage, we integrate the *inverse Mill's ratio* (derived from the probit regression in the first stage) into the Cross-sectional regression of Section 3.2.2 as a control variable (see results in Table 8 of Section 4.2). The coefficient of the *inverse Mill's ratio* is not significant, and all significant levels remain the same for three moderators as those without the *inverse Mill's ratio*. Thus, the selection bias would not be an issue to affect the estimates.

4. Results

This section shows the hypothesis testing results. We present the results of abnormal returns of luxury firms' sustainable practice adoption, which tests the first hypothesis. The results of how three contingency variables influence the abnormal returns are also tested (Hypothesis 2 to 4).

4.1. Stock market reaction to luxury firms' sustainable practices

The results of event study are described as Table 3, which shows the abnormal returns of 289 announcements on Day −1 and 0, respectively, and the CARs for the period of Days (−1, 0) under the market model. The median of CAR (−1, 0) was −0.08% with 10 percent of significance, which supports H1. The mean and median returns of announcements for Day −1 are −0.13% and −0.08%, respectively, and both are negative at the significance level of 0.1. Besides, the majority of the 159 individual AR (0)s are negative. Moreover, we calculate all CARs before Day −1 and after Day 0 within Days (−5, +5) and results are insignificant, which confirms that the event window from Days (−1, 0) indeed captures the stock price reaction to the announcements and the results are not influenced by noisy issues around the event period. Based on the mean estimation of AR(0), we also calculate the decreased stock market value on the announcement day by multiplying the market value of sample firms, which is \$5525.58 million.

Several procedures of robustness checks are conducted, see Table 4, to address other concerns that may threaten the findings.

Table 4

Robustness checks for the model and estimation of abnormal return.

Panel A. Event period abnormal returns under an alternative model: Fama-French three factor model plus momentum							
	N	Mean	t	Median	Wilcoxon test	% negative	Binomial sign test
AR (−1)	289	−0.16%***	−1.95	−0.06%	−1.370	53%	1.063
AR (0)	289	0.03%	0.32	−0.09%	−0.657	54%	1.242
CAR (−1,0)	289	−0.13%	−1.07	−0.16%*	−1.43	55%	1.535*
Panel B. Analysis of post-announcement abnormal returns							
	N	Mean	t	Median	Wilcoxon test	% negative	Binomial sign test
Days +1 to +60	285	−0.02%	−1.37	−0.02%	1.051	54%	1.18
Days +1 to +120	280	−0.01%	−1.22	−0.02%	−1.313	53%	0.896
Days +1 to +240	268	−0.02%	−1.17	−0.004%	−1.126	51%	0.183
Panel C. Abnormal returns of the PSM matched sample							
	N	Mean	t	Median	Wilcoxon test	% negative	Binomial sign test
AR (−1)	289	−0.003%	−0.03	0.03%	−0.118	49%	−0.202
AR (0)	289	0.12%	0.916	−0.03%	0.149	52%	0.607
CAR (−1,0)	289	0.12%	0.752	0.03%	0.420	50%	−0.067
Panel D. T-test of difference results between the CAR(−1, 0)s of the sampel and PSM matched groups							
	N	Sample group (A)		PSM matched group (B)		t-test of difference	
		Mean	t	Mean	t	Mean difference(A-B)	t
CAR (−1,0)	289	−0.11%	−0.85	0.12%	0.752	−0.23%	1.27*

***, **, * denotes significantly different from zero (50% in the case of positive) at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

Table 5

CAR (−1, 0)s: Subsample of sustainable initiatives and awards & certifications.

CAR (−1, 0)	N	Mean	t	Median	Wilcoxon test	% negative	Binomial sign test
Sustainable initiatives	169	−0.13%	−0.698	−0.24%	−1.197	55%	1.231
Awards and certifications	120	−0.09%	−0.531	0.005%	−0.427	49%	−0.091

***, **, * denotes significantly different from zero (50% in the case of positive) at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

An alternative model. To examine whether our results are consistent and not sensitive to the model that is used to estimate abnormal returns, this study conducts robustness analysis by using an alternative model: the Fama-French three-factor model plus momentum. Panel A in Table 4 reports the abnormal returns under the alternative model. In general, the results are highly similar to those obtained under the market model.

Post-announcement abnormal stock performance. To determine whether the market overreacted or underreacted to sustainable practices of luxury firms and to investigate the stock market reaction over longer periods, we estimate abnormal returns over the periods of Days (1, 60), Days (1, 120), and Days (1, 240). The results using the market model over these longer periods are shown in Panel B of Table 4, and post-announcement abnormal stock returns over longer periods are not significant. The mean abnormal returns over the longer periods range from −0.02% to −0.01%, the medians range from −0.04% to −0.02%, and all are not significantly. In a word, there is no significant abnormal return over a calendar year (240 trading days) after the announcement of sustainable practices in our sample, and the stock market did not overreact or underreact to the announcements.

To further analyze the stock price abnormal returns of luxury firms' sustainable practice adoption, we categorize the announcements and calculated the abnormal returns based on whether the announced practices were: (1) self-reported initiatives to improve the environmental or social impacts of operational activities, or (2) awards and certifications awarded due to recognition of the firm's sustainable practices by a third-party. Table 5 presents these results. The stock market reacts negatively for both types of practices. For the 169 self-reported initiatives and the 120 awards and certification announcements, the mean abnormal returns are −0.13% and −0.09%, respectively, both of which are not statistically significant from zero.

Since some announcements were made by the parent firm while others were by the subsidiaries, we split them into the two subgroups and test the CAR (−1, 0)s for each of them. The results in Table 6 show that the announcements made by the parent firm experienced more negative stock returns (mean = −0.18%, $p < 0.1$) than those made by the subsidiaries.

4.2. Cross-sectional analysis results

To test H2 to H4 in Section 2, we conduct cross-sectional analyses by using variables and models in Section 3.2.2 with the *inverse Mill's ratio* as a control variable (introduced in Section 3.2.3 about the Heckman's two-stage method). The descriptive statistics and bivariate correlations for all variables are presented in Table 7. We drop five announcements for our regression analysis because COMPUSTAT had missing data, making it impossible to compute values of independent variables. Thus, the regression results are based on 284 announcements. Due to potential inter-correlations between some variables, variance inflation factors (VIFs) are computed to check if there is a potential multicollinearity problem. The maximal VIF obtained in all models is 5.72, and the mean VIF is 5.25, which is below the suggested cutoff of 10 (Ryan, 1997). Therefore, multicollinearity should not be a serious issue for our data analyses. All *F*-for-the-regression and *F*-for-the-step values for the two models shown in Table 8 suggest the validity of our model and the results.

Table 8 gives the regression estimates. Model 1 includes all the control variables, including the *inverse Mill's ratio* from the Heckman's two-stage method. Announcements from Segment 2 (hospitality), Segment 3 (fine food), and Segment 7 (golf) have a significant influence on the abnormal returns of luxury firms' sustainable practices. Models 2–5 show the results for the test of H2–4. In Model 2, the coefficient of *amplifying institutional norm* is negative and statistically significant ($p < 0.1$), which provides support for Hypothesis 2. In other words, the negative market reaction to luxury firms' sustainable practices significantly decreased over time. In Model 3, the coefficient of *inertia* is positive and significant ($p < 0.05$), indicating that when announcing sustainable practice adoption, larger luxury firms with higher inertia experience significantly lower negative abnormal returns compared with smaller ones. Therefore, H3 is supported. In Model 4, the coefficient of *motivation* is positive and significant ($p < 0.05$). Hence, highly profitable firms with higher profitability can significantly reduce shareholder value loss due to the announcement of sustainable practices. Thus, H4 is supported. Model 5 includes all the moderators and control variables, and results are consistent with those in Models 2 to 4.

Table 6

CAR (−1, 0)s: Subsamples of announcements from parent or division firms.

	N	Mean	t	Median	Wilcoxon test	% negative	Binomial sign test
Parent	185	−0.18%*	−1.238	−0.19%	−1.347	54%	1.029
Division	104	0.02%	0.094	−0.01%	−0.204	50%	0.000

***, **, * denotes significantly different from zero (50% in the case of positive) at the 1%, 5%, and 10% levels, respectively, for two-tailed tests.

Table 7

Descriptive statistics and correlations.

		mean	S.D.	1	2	3	4	5
1	CAR (−1, 0)	−0.11%	0.021					
2	Award = 1	0.415	0.493	0.140				
3	Parent = 1	0.359	0.481	−0.047	0.115			
4	Amplifying institutional norm	93.51	71.09	−0.061	−0.174**	−0.054		
5	Motivation	0.055	0.047	0.110*	0.196**	−0.006	−0.16***	
6	Inertia	10.005	1.86	−0.123**	−0.124	0.007	0.085	−0.333***

n = 284; ***, **, * denote significantly different from zero at the 1%, 5%, and 10% levels, respectively.

Table 8

Regression results: Dependent variable = CAR (−1, 0).

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Award = 1	0.000	−0.09	−0.000	−0.19	−0.002	−0.1	−0.000	−0.11	−0.001	−0.28
Segment 1	0.003	0.48	0.002	0.38	−0.003	−0.36	0.004	0.6	−0.003	−0.34
Segment 2	0.005	1.03	0.005	1.03	0.005	1.04	0.006	1.04	0.008*	1.32
Segment 3	0.000	0.09	0.000	0.13	0.000	0.03	0.002	0.29	0.003	0.56
Segment 4	0.003	0.72	0.002	0.62	0.001	0.15	0.019	1.35	0.002	0.40
Segment 5			Omitted		Omitted				Omitted	
Segment 6	0.009	1.28	0.009	1.27	0.006	0.88	0.004	0.77	0.009	1.05
Segment 7	−0.019*	−1.84	−0.02*	−1.9	−0.019*	−1.89	−0.018*	−1.76	−0.019*	−1.83
Parent = 1	−0.001	−0.49	−0.004	−1.31	−0.001	−0.43	0.010	1.28	−0.001	−0.48
H2: amplifying institutional norm			−0.001*	−1.50					−0.002*	−1.56
H3: motivation					0.022*	1.57			0.019*	1.81
H4: inertia							−0.004*	−1.89	−0.001*	−1.47
Inverse Mills ratio	0.007	0.43	0.006	0.36	0.007	0.45	0.006	0.4	0.005	0.28
Constant	−0.002	−0.62	−0.001	−0.51	−0.001	−1.12	−0.006	−0.49	0.011	0.75
Number of obs	284		284		284		284		284	
F-for-the-regression	1.01		1.31*		1.42*		2.02**		2.87**	
F-for-the-step	1.01		2.60*		3.60***		5.38***		6.59***	
Adj R-squared	0.002		0.006		0.007		0.008		0.010	
Wald chi2	7.71		8.54		8.88		7.85		10.97	

***, **, * denotes significant level at 1%, 5%, and 10%, respectively.

5. Discussion and implications

5.1. Discussion

This study has four major findings. First, the stock market reacts negatively to sustainable practice adoption in the luxury industry. Despite the growing ethical and environmental concerns in society, in general, the stock investors still do not appreciate luxury firms' announcements in sustainable practices. This result supports the conclusion of [Davies et al. \(2012\)](#) that it takes a long time to form the trend of “everything sustainable”. There is still an identity mismatch between luxury and sustainability. The stock market suspects luxury firms' undertaking of sustainable practices because of the perceived identity mismatch in luxury brands. Like firms in other industries, it is not an exception that luxury firms are obligated to implement socially responsible practices ([Amatulli et al., 2017](#)). However, the current institutional norm may lead to skepticism regarding the underlying motive of the action. Moreover, this finding is consistent with those from studies by [Achabou and Dekhili \(2013\)](#) and [Domina and Koch \(1998\)](#), both of which found that luxury firms' sustainable practices are unfavorable to their performance because of consumer's low preference and willingness to purchase for environment-friendly products.

Second, as the institutional norm of sustainability amplifies over time, the negative market reaction to luxury firms' sustainable practices significantly decreases. This finding supports the conclusion in [Flammer \(2012\)](#), which sheds light on that as environmental sustainability is formed as an institutional norm, engagement in eco-friendly initiatives would become a legitimated behavior and be rewarded by the shareholders. Thus, the marginal stock return of announcing sustainable practice adoption increases over time. In the future, there might be a positive stock market reaction to the luxury firms' sustainable practices if the norm of implementing sustainable practices continuously permeates into the industry.

Third, firms with higher inertia in maintaining luxury identity receive higher negative stock returns on announcing their adoption of sustainable practices. Large firms have long-standing management structures and rules but low flexibility (inertia) in responding to the changing norms, which hinders them from complying with the amplifying institutional norm of being sustainable, instead they are inclined to maintain their identity of being luxury. From this perspective, our finding is in accordance with [Conrad et al. \(2002\)](#)

that larger firms experience a significantly greater negative reaction to “anti-norm” events. Because of the identity mismatch between luxury and sustainability, implementation of sustainable practices by luxury firms would be seen as an “anti-norm” news by the stakeholders, i.e., stock investors. We contribute to the research by theorizing and providing empirical support on the effect of a firm’s inertia in maintaining status on the relationship between luxury firms’ sustainable practices and stock market performance.

Last but not least, firms with higher motivation to fulfill stakeholders’ expectations would be less negatively responded from the stock investors on the adoption of sustainable practices. Higher motivation to fulfill stakeholders’ expectations means a higher willingness to comply with the institutional norm, which is a prerequisite for diminishing the mismatch between sustainability and luxury. We find that firms with high profits reporting sustainable practice adoption can be seen as an attempt to further increase profits by announcing sustainable activities to fulfill the institutional norm and to decrease the identity mismatch. Oppositely, firms with low profits have limited resources to fulfill stakeholders’ expectations, and their reporting of engaging in sustainable practices is viewed as an unnecessary extra expenditure, which may be skeptical by the shareholders as purely “good-for-name” behaviors of managers while in the sacrifice of firm resources.

5.2. Managerial implications

Many luxury firms have been implementing sustainable practices to meet the expectation of stakeholders. Based on the findings in [Section 5.1](#), firms should consider the following insights to manage their sustainable practices better.

From the first finding, promoting sustainable practices by luxury firms tends to receive a negative stock market reaction, regardless of receiving a sustainable award or launching an initiative practice. Currently, a firm that pursues the maximization of market value is not suggested to pass its news on the engagement in sustainable practices to the stock market due to the mismatched identity of being sustainable and luxurious. However, according to the second finding, as time goes on, the institutional norm of “going sustainable” becomes prevailing and the identity mismatch appears to attenuate, the stock market would less negatively react to luxury firms’ sustainable practices. When the norm amplifies to a degree in which sustainability becomes an essential requirement for luxury firms, the mismatch might eventually disappear. Accordingly, luxury firms should actively communicate their adoption of sustainable practices to the broad audience, including the shareholders, in such a way to reap stock returns.

The third and last findings of this study imply that luxury firms with high motivation to fulfill stakeholders’ expectations and low inertia in maintaining luxury should be more proactive in announcing their sustainable practices. In other words, larger luxury firms should take more action to announce their sustainable practices, though they are obligated to implement related practices. However, luxury firms with higher profitability can demonstrate their efforts with necessary resources on sustainable practices. In doing so, firms can reduce identity mismatch between luxury and sustainability. Consequently, they can expect to gain stock return margins. Highly profitable luxury firms should maintain their capability of fulfilling stakeholders’ expectations and conform to the institutional norm in the long run. Small luxury firms should maintain their advantage of flexibility by reducing the organizational inertia as being luxury, which sets a good example for the industry that being luxury and sustainable is not contradictory or a trade-off. Instead, they are compatible in the sense that the luxury industry should be capable of incorporating the diffused institutional norm (sustainability) into its operations and marketing.

6. Conclusions and future research directions

This study examines the stock market reaction to the luxury firms’ sustainable practices announcements, which is the very early one to understand the conflict between the unique characteristic of the luxury industry and the institutionalized norm of being sustainable. We conclude that the adoption of sustainable practices in a luxury firm currently hurts its stock returns. Nevertheless, announcements made earlier would evoke stronger negative stock returns. Moreover, larger firms experience a higher negative stock market reaction. Last, firms with higher profitability receive less negative market reaction by conforming with the institutional norm.

We recommend future studies to examine the implementation of sustainable practices in the luxury industry from the following perspectives. Future research may consider performing an event study based on accounting-based financial performance metrics (i.e., long-term event study). This would capture the impact of sustainable practice in terms of a firm’s economic value in the long run. Furthermore, we urge that replication of this study with additional observations in different stock markets is necessary to further confirm or modify the conceptual model developed in this study. Finally, future studies should also develop alternative variables or include both public and private luxury firms to test our conceptual model. Given the fact that a number of luxury firms are not publicly traded in stock markets, the results of this study may not be generalizable to all luxury firms.

CRedit authorship contribution statement

Yunting Feng: Data curation, Investigation, Formal analysis, Writing - original draft, Conceptualization, Methodology, Software. **Xun Tong:** Conceptualization, Methodology, Writing - review & editing. **Qinghua Zhu:** Supervision, Methodology, Validation, Writing - review & editing.

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Appendix A. . The keywords combinations used in nine segments and their initial searching results

Keywords combination	Firms	Announcements
<i>Luxury cars</i> (((eco or green or environment* or sustainab* or clean or social* responsib* or ethic or safe or transparen*) near5 (suppl* chain or value chain or chain or sourc* or manufactur* or produc* or factory or factories or handshop* or suppl* or fashion* or practic* or techn*) or (block chain*) or ((introduc* or use or reus* or recycl* or reduc* or develop*) near5 (eco or green or environment* or sustainab* or clean or social* responsib*) near5 (material* or ingredient* or collection or line* or product* or fuel or parts)))	22	249
<i>Luxury goods (e.g. fashion)</i> ((eco or eco-friendly or green or environment* or sustainab* or clean or social* responsib* or ethic or safe or transparen* or fur or vegan or vegetable) near5 (suppl* chain or value chain or chain or sourc* or manufactur* or produc* or factory or factories or handshop* or suppl* or fashion* or practic* or techn* or compan* or project* or trade* or trading* or luxury)) or (block chain* or blockchain) or (environment* aware* or conscious*) or (ban* near5 (fur or animal skin*)) or (anti-fur) or ((fur or animal skin*) near5 (free) or (cruelty free) or (animal* right* or welfare*) or (vege* near5 fashio*) or (faux fur*) or (sweatshop* or ((labor* or employee*) practice*) or (employee* right*))	84	79
<i>Luxury hospitality</i> ((sustainab* or green or clean* or environment* or social* or ethic* or social responsib* or transparen*) near5 (((supply or value) and chain*) or sourcing) or supplier* or firm* or compan* or enterprise* or operat* or practice* or tourism)) or (environment* sustainab*) or ((outstanding or excellen*) near5 (supplier* or partner*)) or ((consumpt* or use) near5 plastics) or (LEED*) or (cyber near5 securit*) or (data near5 privacy)	18	89
<i>luxury cruises</i> ((sustainab* or green or environmental or environment friendly or eco- or climate change or emission or air quality or human or labor* or civil or staff* or workforce*) near5 (protection or strateg* or management or technolog* or risk* or practice* or system* or impact* or training or right* or performance*)) or LNG or solar or (sulfur near5 fuel) or (social near5 responsibilit*)	12	75
<i>Designer furniture</i> (sustainab* or environmental or green or social responsib* or carbon or emission or pollution or labor* or employe* or human or workforce* or civil or staff or worker* or female or women*) near5 (welfare or practice* or training or rights or management or technolog* or reduc* or performance* or supply chain* or suppl* or sourcing or marketing or produc* or manufactur* or factory or factories or dealership*)	22	56
<i>Fine food, wines and spirits</i> sustainab* or environmental or social responsible or social responsibilit* or reus* or carbon or emission or regenerat* or recycl* or CSR or ((labor* or employee* or worker* or factory or factories or farm* or farmer* or workforce* or workplace*) near5 (practice* or right* or safety or standard*))	35	206
<i>Private jets and yachts</i> ((sustainab* or socially responsible or social responsibilit* or renewable or environment friendly or environmental or green or clean or eco- or ethic) near5 (technolog* or fuel or power or partner* or corporation* or firm* or leader* or plant* or factory or factories or suppl* or supply chain* or chain* or practice* or activit* or process*)) or ((labor* or employee* or worker* or workforce* or workplace*) near5 (right* or practice* or safety or standard* or equity or diversity)) or biofuel	10	108
<i>Fine art</i> (gender* near5 equality) or female or sustainab* or environmental or environment friend* or social* responsib* or ethic	1	1
<i>Golf</i> ((sustainab* or socially responsible or social responsibilit* or renewable or environment friendly or environmental or green or clean or eco- or ethic) near5 (technolog* or partner* or corporation* or firm* or leader* or plant* or factory or factories or suppl* or supply chain* or chain* or practice* or activit* or process*)) or ((labor* or employee* or worker* or workforce* or workplace*) near5 (right* or practice* or safety or standard* or equity or diversity))	1	41

Appendix B. . Propensity score matching results for evaluating the selection bias

We utilize the propensity score matching method to create a group of matched firms, which did not announce sustainable practice adoption. Our initial firm pool consists of all firms listed on the U.S. stock markets from 2003 to 2019. We exclude B-share (foreign share) firms. A two-step approach is developed to generate the matched sample. In the first step, a logit regression is used to estimate the propensity scores. In the process of implementing PSM, the propensity scores are used to measure the closeness of the potential control firm and sample firms, and the nearest one to a sample firm with the highest propensity score is identified as the control firm. The propensity score $p(x)$ represents the probability of a firm implementing a sustainable practice of x , and $p(x) = pr(\text{Sample} = 1|x)$, where $\text{Sample} = 1$ to indicate that the firm implementing sustainable practice adoption and 0 otherwise. We estimate the conditional probability $p(x)$ by adopting discrete choice logit regression (Rosenbaum and Rubin, 1985). The logit regression should be performed with a series of firms' characteristics variables. According to Heckman and Navarro-Lozano (2004), the incorporation of suitable variables could affect the accuracy in estimating the propensity of the event occurrence. We used $\ln$ assets, ROA, financial leverage, sales turnover, market-to-book, earning per share as what previous studies adopted (Ding et al., 2018; Modi et al., 2015), to identify the control group that is comparable to our sample firms in the treatment group. The regression equation is shown in Expression (1) below. In the second step, the firms are matched based on the closest propensity scores with the sample firms. We use the closest propensity score generated in the step to identify the control firm matched with the sample firm (we chose the control firms by repeatedly sampling, and the caliper propensity score to select as a control firm was set at $0.25 * \text{standard error of a propensity score}$,

see Abadie and Imbens (2006)). Statistics from model estimation are presented in Table A1 and the descriptive statistics of the event firms and the matched firms are presented in Table A2.

Table A1

Logit regression results for estimating propensity scores.

Variables	Estimates	Z value
<i>ln_assets</i>	1.025***	15.49
<i>ROA</i>	−0.010	−0.41
<i>Financial leverage</i>	0.004	0.56
<i>Sales turnover</i>	−0.000***	−3.63
<i>Market-to-book</i>	−0.001*	−0.34
<i>Earning per share</i>	−0.003	−0.54
Fixed-effects	Year, industry	
<i>N</i>	24,281	
Pseudo R2	0.448	

Significance is reported for two-tailed tests. * $p \leq 0.1$. ** $p \leq 0.05$. *** $p < 0.01$.

Table A2

Descriptive statistics for sample and matched firms.

Variables	Sample firms (N = 289)		Matched firms (N = 289)	
	Mean	S.D.	Mean	S.D.
<i>Propensity of announcement</i>	0.235	0.206	0.235	0.205
<i>ln_assets</i>	9.935	1.856	9.908	1.812
<i>ROA</i>	0.267	1.856	0.276	0.183
<i>Financial leverage</i>	0.673	0.438	0.719	0.446
<i>Sales turnover</i>	49498.344	68583.687	45392.055	60231.442
<i>Market-to-book</i>	0.332	13.463	1.650	13.988
<i>Earning per share</i>	2.499	4.272	1.877	4.491

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1(\ln(\text{assets})) + \beta_2(\text{ROA}) + \beta_3(\text{financial leverage}) + \beta_4(\text{sales turnover}) + \beta_5(\text{market-to-book}) + \beta_6(\text{Earning per share}) + \beta_7(\text{year}) + \beta_8(\text{industry}) \quad \text{Expression(1)} \quad (\text{A1})$$

Appendix C. . The Heckman's two-stage model and the results

To deal with the potential selection bias in the cross-sectional regression, this study performs the Heckman's two-stage model. For the first stage, a probit regression to estimate the probability of firms' implementation of sustainable practices is conducted. We use the same variables as in the PSM matching method as the selection variables, they are, *ln_assets*, *ROA*, *financial leverage*, *sales turnover*, *market-to-book*, *earning per share*, *industry* and *year*. The reason for choosing these variables is that they may affect firms' adoption of sustainable practices, according to the previous studies (Ding et al., 2018; Modi et al., 2015). The sample in this stage includes both firms with and without sustainable practices adoption. We generate the sample of 24,513 firms by matching the industries using six-digit GIC codes and months with 284 announced firms. The regression model for the first stage (selection model) is shown in Expression (2) and is as follows:

$$\begin{aligned} \text{Prob}(\text{sustainable-practice-adoption}) = & \alpha + \beta_1 * \ln_assets + \beta_2 * ROA + \beta_3 * \text{financial leverage} + \beta_4 * \text{sales turnover} \\ & + \beta_5 * \text{market-to-book} + \beta_6 * \text{earning per share} + \beta_7 * \text{industry dummy} \\ & + \beta_8 * \text{year dummy} + \varepsilon \quad \text{Expression(2)} \end{aligned} \quad (\text{A2})$$

where Prob (sustainable-practice-adoption) is coded as 1 if the firm is from the sample firms that announcing the adoption of sustainable practices and 0 otherwise.

For the second stage, we incorporate three moderators and control variables (the same as the variables in the cross-sectional regression in Section 3.2.2). The *inverse Mill's ratio* derives from the first-stage regression is also incorporated in the regression as a

control for the potential selection bias. CAR (−1, 0) is employed to regress against the above variables. The sample in this stage includes the 284 sample firms, the same as those in Section 3.2.2.

The results of the first-stage regression are shown in Table A3.

Table A3
Regression results of the Heckman's first-stage model (selection model).

<i>Prob(sustainable-practice-adoption)</i>	<i>Coef.</i>	<i>z</i>
<i>ln_assets</i>	1.042***	20.48
<i>ROA</i>	−0.010	−0.58
<i>Earning Per Share</i>	−0.004	−0.73
<i>FL</i>	0.004	0.62
<i>Sales Turnover</i>	−0.000***	−4.98
<i>Market-to-book</i>	−0.000*	−1.42
<i>Industry dummies</i>	Included	
<i>Year dummies</i>	Included	
<i>Cons.</i>	−16.55***	−17.53
<i>N</i>	24,513	
<i>LR chi2</i>	2526.12***	
<i>Pseudo R2</i>	0.497	

Significance is reported for two-tailed tests. * $p \leq 0.1$. ** $p \leq 0.05$. *** $p < 0.01$.

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