

Article

Does Integrated Reporting Affect Real Activities Manipulation?

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Abstract: Integrated reporting (IR) by firms is intended to improve not only the quality of information available to external parties, but also internal managerial decision making. IR is considered useful to address the short-term orientation of firms caused by pressure from short-term oriented shareholders. This study examines whether the introduction of IR discourages real activities manipulation, a form of myopic behavior. Using a large sample of Japanese listed companies, the study empirically tests the effect of IR on real activities manipulation through panel data regression analysis. We find that the introduction of IR is related to higher level of abnormal cash flows from operations, lower level of abnormal production costs, and lower level of total activities manipulation. These results generally suggest that firms tend not to engage in real activities manipulation after IR is introduced. Our results also show that while there is insignificant difference in the degree of real activities manipulation between IR and non-IR firms immediately after the introduction of IR, the degree of real activities manipulation is generally smaller in IR firms than in non-IR firms after more time has passed since the introduction of IR, consistent with the view of practitioners that IR is a continuous improvement process of internal decision making. Regarding the non-financial aspects, additional analysis shows that introducing IR is positively associated with the performance of environmental, social and governance (ESG). Our findings suggest that IR could discourage companies' short-term oriented behavior and promote long-term value creation, which is of interest to a wide range of stakeholders. Thus, our findings provide insightful evidence for researchers, practitioners, and policy makers interested in the role of IR in stakeholder-oriented corporate governance mechanisms.

Keywords: integrated reporting; corporate governance; real effect; short-term orientation; real activities manipulation; ESG; sustainability



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1. Introduction

Voluntary efforts by firms have promoted the worldwide use of integrated reporting (IR) in recent years and thus attracted burgeoning investor interest. A survey performed by the Association of Chartered Certified Accountants (ACCA) in 2013 shows that “more than 90% of the investors surveyed said it would be valuable for companies to combine financial and non-financial information into an IR model” [1] (The IIRC [2] also reports that participating investors in the IIRC's IR Pilot Programme consider integrated reports useful in communicating a more holistic view of performance, and providing insight regarding strategy, risk, governance, and future targets). The International Integrated Reporting Council (IIRC) (The IIRC and Sustainability Accounting Standards Board (SASB) was merged into Value Reporting Foundation (VRF) in June 2021) issued a Discussion Paper in 2011 and published the International Integrated Reporting Framework (IIRF) in 2013 [3,4]. The revised IIRF was published in January 2021. Prior to the IIRC's publication of these documents, there were no international guidelines for companies to follow during the IR process. Various efforts have been made to disclose non-financial information leading up to IR. Information on non-financial aspects, such as social and environmental information, has traditionally been voluntarily disclosed in annual reports. Non-financial information

is gradually being disclosed separately from annual reports [5]. These reports have been called environmental and social reports, corporate social responsibility (CSR) reports, sustainability reports, and so on. The Global Reporting Initiative (GRI), established in 1997 under the auspices of the United Nations Environment Programme, has since published and revised its guidelines on sustainability reporting, which many organizations have referred to and complied with to engage in sustainability reporting. The GRI guidelines were revised to the GRI Standard in 2016. The GRI Standards reflect the “triple bottom line” concept proposed by Elkington [6], and the GRI Standards require reporting on the impact of corporate activities from the three aspects of economy, environment, and society (de Villiers et al. [5] provide a concise and straightforward summary of the multiple forms of nonfinancial reporting that are precursors to integrated reporting).

As more and more companies have engaged in sustainability reporting and the volume of their disclosures has increased in response to the growing demand for disclosure from stakeholders, including investors, problems with standalone sustainability reports have also become apparent. For report users, this manifested itself as a lack of connectedness of information. Many institutional investors perceive that sustainability reporting is not connected to business strategy and risk and does not provide sufficient information to assess financial materiality [7]. In this situation, information users may suffer from information overload, even if sustainability reporting discloses a lot of non-financial information. Integrated reporting is a new reporting format created in response to these problems with existing standalone sustainability reporting. In the IIRF, the IIRC listed the following aims of IR [8]:

- Improve the quality of information available to providers of financial capital to enable a more efficient and productive allocation of capital.
- Promote a more cohesive and efficient approach to corporate reporting that draws on different reporting strands and communicates the full range of factors that materially affect the ability of an organization to create value over time.
- Enhance accountability and stewardship for the broad base of capitals (financial, manufactured, intellectual, human, social and relationship, and natural) and promote understanding of their interdependencies.
- Support integrated thinking, decision-making, and actions that focus on the creation of value over the short, medium, and long term (In December 2021, the VRF published the Integrated Thinking Principles (ITP) [9]. The ITP states that “The Integrated Thinking Principles (‘Principles’) provide a structured approach, rooted in the International Integrated Reporting Framework—or Framework—to embed integrated thinking into an organization year-round”, and identifies six principles, that is, purpose, strategy, risks and opportunities, culture, governance, and performance).

Thus, IR is intended to improve not only the quality of information available to a company’s external parties, but also its managerial decision making. Eccles and Serafeim [10] term this IR function as a “transformation function” and distinguish it from the “information function”, which is more generally emphasized by conventional financial reporting. Therefore, examining the impact of IR on managerial decision making and behavior within a company would be helpful to those involved in formulating the IIRF, and other standards.

IR also differs from traditional financial reporting in that it encourages managers to make decisions focused on long-term value creation. Since the 2008 global financial crisis, short-term investors, whose main goal is to maximize short-term return on investment, have been criticized for promoting managers’ short-termism and disturbing companies’ long-term value creation [11,12]. Bushman and Smith [13] show that financial reporting plays an important role in shareholder-oriented corporate governance by aligning directors’ incentive with shareholders’ interests. IR is expected to aid in resolving this situation by correcting firms’ short-term orientation and promoting long-term value creation, which concerns a wide range of stakeholders, including employees, customers, suppliers, and business partners. [14,15]. Freeman [16] defines a stakeholder as “Any group or individual who can affect or is affected by the achievement of an organization’s purpose” in p. 53.

In this paper, we refer to stakeholder-oriented governance as a form of governance that has mechanisms to discipline management to align with the interests of a wide range of stakeholders other than shareholders, which is not emphasized in shareholder-oriented corporate governance, which aims to maximize shareholder value. While trade-offs may occur when there are conflicting interests among stakeholders, short-term oriented actions taken by management in response to shareholders' pressure to maximize short-term returns are likely to damage corporate value in the long run. This would not be a desirable outcome for all stakeholders, including shareholders, who engage with firms over the long term and therefore have an interest in long-term value creation. Jensen [17] introduces the concept of "long-term" value maximization to address trade-offs among stakeholders. Therefore, if IR can fulfill its expected role in curbing myopic behavior of companies, IR may contribute to stakeholder-oriented governance in that IR changes firms to act in accordance with stakeholders' interests. Although there is a strong support for IR, some studies suggest that IR is not fully utilized by practitioners in the financial industry, such as fund managers and securities analysts, and that its usefulness for investment decision making is limited [18,19]. Therefore, there is a need to empirically examine whether IR can correct short-term orientation and promote long-term value creation.

The objective of this study is to reveal whether the introduction of IR improves firms' internal decision making. In this study, we focus on firms' real activities manipulation. Real activities manipulation can impair long-term firm value creation because action undertaken to increase earnings in the short-term can negatively impact future cash flows. Roychowdhury [20] defines real activities manipulation as "departures from normal operational practices, motivated by managers' desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations". The main methods of manipulating real activities include sales manipulation, overproduction, or reductions in discretionary expenditures [20]. IR is intended to instill integrated thinking, requiring firms to practice business while actively considering the relationship between their business units and capitals, resulting in company decisions and actions with a long-term focus [8]. Thus, the introduction of IR may discourage myopic behavior such as real activities manipulation. Financial capital providers, one of the main user groups of integrated reports, have a strong interest in understanding the impact of IR on firms' reported earnings, as this information is useful for investment decisions. Therefore, these discussions raise the research question, "Does the introduction of IR affect firm's real activities manipulation?"

To answer this research question, we empirically examine the relation between IR and real activities manipulation using data from Japan. Evidence on the economic consequences of the voluntary introduction of IR is very limited, as most previous studies use data from South Africa, where listed companies are mandated to issue integrated reports. However, using Japanese data also yields valuable evidence on the economic consequence of voluntary IR since many Japanese companies voluntarily practice it. The market capitalization of IR companies has reached 71% of the total market capitalization of the Tokyo Stock Exchange First Section [21]. In addition, KPMG [22] surveyed the top 100 companies (in terms of sales) in 49 countries to identify the number of companies issuing integrated reports; as of 2020, South Africa has the largest number at 94, followed by 73 in Japan, 53 in Sri Lanka, 45 in France, and 33 in Brazil. As of May 2022, South Africa is the only country that requires companies listed on its stock exchange to issue integrated reports. Japan is considered to have the largest number of companies voluntarily working on IR. Providing evidence on voluntary IR from the analysis of a large sample of voluntary IR firms could be useful to policy makers and practitioners interested in the voluntary initiatives of IR.

Furthermore, the Japanese government has encouraged companies to practice IR. Several documents have been published as part of the Japan Revitalization Strategy -JAPAN is BACK-, which is the growth strategy of Abenomics, a series of economic policies by the second Shinzō Abe Cabinet; these include the Ito Review (The official name of the Ito Review is the "Ito Review of Competitiveness and Incentives for Sustainable Growth—

Building Favorable Relationships between Companies and Investors—”, released by the Ministry of Economy, Trade and Industry (METI) in August 2014. The key message of the Ito Review includes “the need for a shift to capital efficiency-focused management, optimization of the investment chain, and promotion of two-way dialogue between companies and investors” [23]), Japan’s Stewardship Code (Japan’s Stewardship Code is known as “Principles for Responsible Institutional Investors”, issued by the Financial Services Agency of Japan (FSA) in February 2014. This Code is expected to “be helpful for institutional investors who behave as responsible institutional investors in fulfilling their stewardship responsibilities with due regard both to their clients and beneficiaries and to investee companies [24].”) and Japan’s Corporate Governance Code [23–25] (Japan’s Corporate Governance Code was released by the Tokyo Stock Exchange (TSE) in June 2015. This Code defines its role as to establish “fundamental principles for effective corporate governance at listed companies in Japan. It is expected that the Code’s appropriate implementation will contribute to the development and success of companies, investors and the Japanese economy as a whole through individual companies’ self-motivated actions so as to achieve sustainable growth and increase corporate value over the mid- to long-term [25]”). Following these documents, in May 2017, the Ministry of Economy, Trade, and Industry (METI) published Guidance for Collaborative Value Creation (The official name of the Guidance for Collaborative Value Creation is “Guidance for Integrated Corporate Disclosure and Company-Investor Dialogues for Collaborative Value Creation: ESG Integration, Non-financial Information Disclosure and Intangible Assets into Investment” [26]) as a guideline for promoting the dialogue between companies and investors in the Japan Revitalization Strategy [26]. The objective of this guideline is “to contribute to deepening mutual understanding between companies and investors through information disclosure and dialogues and to encourage companies and investors to cooperatively create value”. This objective is consistent with that presented in the IIRF. In addition, METI has held the Forum for Integrated Corporate Disclosure and ESG Dialogue several times since December 2017 as a platform for a dialogue between companies and investors based on the Guidance for Collaborative Value Creation. These facts clearly demonstrate that the Japanese government is proactive in promoting IR.

The corporate governance mechanisms of Japanese companies have traditionally been stakeholder-oriented [27]. In such companies, managers are required to consider the interests of other stakeholders besides shareholders in making decisions. Stakeholders such as customers, suppliers, creditors, and employees have a longer-term relationship with the company than shareholders, and thus have a greater interest in the long-term value creation of the company. Some previous studies argue that in code law countries, i.e., stakeholder-oriented countries, companies could be more engaged in voluntary disclosures, including IR, to those stakeholders than in common law countries as they are perceived to be responsible to all stakeholders, not only shareholders [28–30]. In addition, earnings quality is found to be improved by the well-functioning monitoring mechanism under stakeholder-oriented corporate governance in Japan [31]. Therefore, IR, which is expected to promote long-term value creation, is a reporting format suitable for Japanese companies, which adopt stakeholder-oriented corporate governance, and IR may work better for such companies.

Even Japanese companies with stakeholder-oriented corporate governance systems are under strong pressure from their shareholders. As in other countries, foreign shareholders have a large presence in the Japanese stock market, and they are the largest traders on the First Section of the Tokyo Stock Exchange, accounting for approximately 70% of all transactions by value [32]. Several studies show that foreign shareholders have an influence on Japanese firms [33–35]. Just as managers of U.S. firms believe that they have to sacrifice corporate value to achieve their profit targets [36], so do many managers of Japanese firms [37]. On the other hand, the increase in foreign shareholders mitigates the lower dividend payments [38] and informational efficiency of stock prices [39] in Japanese publicly listed firms. As for the disclosure quality problems, foreign shareholders care about the

importance to enhance disclosure quality to mitigate information asymmetry [40] and enhance the role of analysts' monitoring [41]. Thus, we do not simply predict the attitude of foreign shareholders related to disclosure problems such as IR.

The Japanese setting offers a useful research opportunity with respect to whether IR can constrain short-term oriented corporate behavior. The insights gained from analyzing Japanese firms, which are ahead of their counterparts in other countries in the voluntary adoption of IR, would be valuable for firms and policy makers in other countries, such as Germany and France, which have well-developed stock markets and stakeholder-oriented governance. Nevertheless, to the best of our knowledge, there are no empirical studies that use the Japanese setting to examine the impact of IR adoption on corporate behavior. Therefore, examining the impact of IR by Japanese companies is meaningful in terms of contributing to policy making by governments and other policy makers.

We hypothesize and find that firms tend not to engage in real activities manipulation after the introduction of IR. These results are robust to a difference-in-differences (DiD) approach in conjunction with propensity score matching and Heckman's two-stage treatment effect model. Moreover, we also find that the effect of IR on real activities manipulation appears approximately two years or more after its introduction. We also examine the effect of IR on environmental, social, and governance (ESG) performance, and find a significantly positive effect of IR on ESG performance. Overall, our findings suggest that IR can play its role in stakeholder-oriented corporate governance in that it makes management's decision-making more long-term oriented.

The remainder of the paper proceeds as follows. Section 2 reviews the literature and develops a hypothesis. Section 3 describes the empirical models, sample, and descriptive statistics. The results of our main analysis are reported in Section 4, Section 5 reports the results of additional analysis, followed by conclusions in Section 6.

2. Literature Review and Hypothesis Development

This study aims to reveal whether IR can play the unique role of stimulating better decision making with a long-term focus. However, very few studies focus on these unique features of IR. Much of the early literature on IR focuses on empirical analysis of the determinants of IR adoption at the country, industry, and firm levels. These previous studies examine the institutional environments, such as legal system, investors protection, and national cultural characteristics as the country level determinants of introducing IR [29,30,42–45]. At the industry and firm level, firm size, profitability, growth opportunities, board characteristics, industry sector, and industry concentration are examined [46,47]. Most of the former studies that focus on country-level factors rely on institutional theory to develop their arguments. Although the results of the prior literature on the determinants of IR adoption at the country level are not always consistent, they suggest that isomorphism, as proposed by DiMaggio and Powell [48], may drive IR adoption to some extent. In particular, the Japanese government actively encourages companies to introduce IR, and the Japanese Government Pension Investment Fund (GPIF), the largest pension fund in the world, selects companies that publish excellent integrated reports by requesting their entrusted external asset managers [49]. Therefore, it is not surprising that companies in Japanese society adopt IR due to formal and informal pressure exerted by public institutions. This can be viewed as a form of coercive isomorphism.

However, this does not necessarily mean that the introduction of IR does not have economically significant consequences. Even if IR is introduced as a result of isomorphism, with no intention to improve the quality of information available to a company's external parties or internal decision making of companies, once IR is introduced, IR can have an effect both inside and outside the company through its integrated information content and integrated thinking. External stakeholders including shareholders will make decisions based on the newly available information in the integrated report and, in some cases, will seek to engage with corporate management through formal and informal channels. Internally, the permeation of integrated thinking within companies may result in changes in

corporate behavior. Regarding the effect of IR, previous studies primarily examine the effect of IR on firms' information environments in terms of analysts' forecasts [50–53], the cost of capital [50,54–58], and firm value [59–63]. These studies generally find results suggesting that the introduction of IR tends to have a positive effect on the information environment. Moreover, Barth et al.'s [54] study is one of the few that focus on IR objectives: better insider decision making. Using South African data, they find that the integrated report's quality is positively related to firm value through liquidity and expected future cash flow. Moreover, they also find that higher quality IR is related to higher future operating cash flow and investment efficiency. Therefore, these findings generally suggest that IR is effective for achieving the dual objectives of improved external information and better managerial decision making. In terms of whether IR improves internal decision making, Donkor et al. [64] examines the impact of IR on corporate tax avoidance behavior. They find that IR quality is negatively related to the level of corporate tax avoidance for South African listed companies. This result suggests that IR changes companies' decision to align with stakeholders' interests. Serafeim [65] focuses on the impact of IR on long-term value creation by analyzing the relationship between IR and investor composition (Serafeim [59] relies on Bushee [66] to classify institutional investors into transient, dedicated, and quasi-index, and defines the extent to which the investor base is dominated by long-term ownership as the difference between the ratio of shareholding by dedicated investors and transient investors). Using data from US-listed companies, he examines whether the degree of IR undertaken is associated with ownership by long-term investors, who are generally more interested in long-term value creation. Serafeim [65] finds that companies actively engaging in IR have a more long-term oriented investor base. In addition, he finds that the relationship between IR and a long-term oriented investor base is more pronounced for non-family companies and companies with high-growth opportunities. According to Serafeim's [65] findings, IR efforts can attract long-term oriented investors and play a role in promoting managers' long-term decision making. Therefore, when examining the impact of IR on corporate behavior, we should consider its expected role of correcting companies' short-term orientation and promoting long-term value creation.

In this study, we focus on real activities manipulation as a form of short-term oriented behavior. The concept of real activities manipulation is widely accepted in the research area of financial accounting, and many previous studies empirically examine the real activities manipulation. As already mentioned, real activities manipulation refers to actions taken by firms or managers that deviate from normal business practices with the intention of misleading stakeholders. Such actions are based on a short-term perspective in that they are undertaken to temporarily boost current period earnings, and deviating from normal business practices for such purposes can be value destructive. Cohen and Zarowin [67] show that firms that largely boost earnings through real activities manipulations prior to the seasoned equity offerings experience a larger decline in operating performance after the seasoned equity offerings. This result suggests that the real activities manipulation temporarily makes current performance look better at the expense of future performance. Many prior studies use abnormal operating cash flow, abnormal production costs, and abnormal discretionary expenses, estimated based on the model proposed by Roychowdhury [20], as proxy variables for real activities manipulation [67–73]. Following the prior literature, this study also uses these as proxy variables for real activities manipulation to examine the association between the introduction of IR and real activities manipulation.

In the literature on the effect of disclosure, apart from the effects on capital market (Among the previous studies on the effect of disclosure on information asymmetry, there has been a lot of research in recent years on the impact of IFRS adoption [74–83]. See De George et al. [84] for a comprehensive review on the impact of IFRS adoption), the real effects of disclosure have attracted increasing attention in recent years (See Kanodia and Sapra [85] for a framework and review of analytical studies of real effects, Leuz and Wysocki [86] and Roychowdhury et al. [87] for a recent review on the real effect of financial disclosures, and Christensen et al. [88] and Haji et al. [89] for a recent review on the real

effect of nonfinancial disclosures). Real-effect studies investigate how firms or managers change their behavior in the real economy because of changes in corporate or managerial disclosure. It is assumed that changes in disclosure may lead to changes in monitoring by outsiders, and consequently to changes in the managerial decisions [85]. Over the past two decades, the prior literature has shown that various behavioral changes are associated with changes in financial disclosure [90–98] or nonfinancial disclosure [99–102]. This study could be placed in the stream of real-effects studies in that it focuses on the effect of a form of disclosure, that is, IR on the companies' behavior in the real economy. If so, how can IR affect companies' real activities manipulation?

This paper discusses the effect of IR on real activities manipulation based on the real effect perspective and its conceptual framework proposed by Kanodia [103]. He states that "(real effect) perspective, argues that how accountants measure and report firms' economic transactions, earnings, and cash flows to capital markets has substantial effects on firms' real decisions and, more generally, on resource allocation in the economy". He emphasizes the importance of focusing on the effect of accounting information disclosed by companies to capital market on firms' decision-making in the real economy. Although Kanodia [103]'s discussion focuses primarily on accounting disclosures, as discussed below, he emphasizes the impact of information about firms' future earnings or cash flows. Hence, we believe that the real effect perspective can be applied to IR that discloses more comprehensive and long-term oriented information. Kanodia [103] proposes the conceptual framework for understanding real effect. He believes that corporate behavior is determined by the equilibrium of three different sectors. The three sectors are the real sector, the information sector, and the financial sector. The real sector refers to the firms that produce goods and services and invest. The financial sector includes individuals, financial intermediaries, and share prices, which allocates capital from households to firms. The information sector refers to the factors producing new information such as analysts. Regarding the relationship between the real sector and the financial sector, the link from real sector to the financial sector indicates that firms' earnings and investment choice affect their values in the capital market. As Kanodia [103] states, assuming that valuation models such as residual income model or earnings growth model are used in the financial sector, the information disclosed by firms to capital market will affect the link from the real sector to the financial sector through changing the outlook on future earnings and growth in financial sector. On the other hand, the link from the financial sector to the real sector indicates the real effect of interest in this framework. Companies in the real sector depend on the financial sector to raise the funds needed for their activities from the capital market. The financing is then affected by the valuation of the firms in the financial sector. Since companies are assessed based on the information available in the financial sector, the information available in the capital market will ultimately influence the behavior of companies. Information disclosures by firm, change the information available in the capital markets, thus creating a link from the financial sector to the real sector, or real effects (Explanations regarding the links from the information sector to the real and financial sectors are omitted, as they are not directly relevant to the discussion in this paper. Interested readers are referred to Kanodia [103]).

In this paper, we discuss how the introduction of IR affects firms' real decision, focusing on real activities manipulation. As previously discussed, IR is considered helpful for companies to overcome an agency problem attributable to pressure from shareholder. Serafeim [65] suggests that the introduction of IR attracts long-term oriented investors by providing more information about firms' long-term prospects because such information is more relevant in assessing the value of firm. Some previous studies [66,104] imply that the existence of long-term oriented investors can reduce aggressive earnings management, where earnings are inflated to avoid earnings decreases and losses [105]. Bushee [106] observes that high levels of transient shareholding are related to overweighting near-term earnings and underweighting long-term earnings. Asker et al. [107] also find that public firms invest less than private firms, which are under less pressure from short-term oriented investors. These findings suggest that short-term oriented investors strongly

prefer short-term results and managers could face difficulty making decisions that focus on creating long-term value under short-term pressure from investors. As companies adopt IR and disclose more long-term oriented, integrated, and comprehensive information, the information available in the capital markets will change, resulting in a change in capital allocation, i.e., long-term oriented investors will hold more shares of the company. Increased equity ownership by long-term oriented investors will lead to an easing of pressure on firms to achieve higher short-term performance, and such investors will expect firms to operate with a more long-term orientation. In order to gain higher valuations from these changed investors, firms could be less likely to engage in real activities manipulation damaging to long-term value creation. Therefore, firms are expected to be less likely to engage in real activities manipulation after IR adoption.

In addition, real activities manipulation could lead to the impairment of the six categories of capital identified in the IIRF (financial, manufactured, intellectual, human, social and relationship, and natural capital). Specifically, real activities manipulation that directly affects cash flow due to changes in business activities could damage these forms of capital through sales manipulation, overproduction, or reductions in discretionary costs such as research and development, advertising, and labor, resulting in a greater negative impact on long-term value creation (Regarding this argument, the IIRF states that “because value is created over different time horizons and for different stakeholders through different capitals, it is unlikely to be created through the maximization of one capital while disregarding the others. For example, the maximization of financial capital (e.g., profit) at the expense of human capital (e.g., through inappropriate human resource policies and practices) is unlikely to maximize value for the organization in the longer term” ([8], par. 2.9)). Therefore, if IR works effectively to promote integrated thinking, emphasizing long-term value creation based on broad measures of capital within the enterprise, companies will stop making short-term decisions and focus on the long term. Through a scenario-based experiment, Esch et al. [108] show that decision makers with integrated information make more sustainable decisions than those with only financial information or unlinked financial and nonfinancial information. In addition, by conducting a case study on an Italian insurance company, Mio et al. [109] provide evidence that IR helps employees to increase their long-term orientation. In the Japanese context, Hosoda [110,111] finds that the adoption of IR changes management control systems and internal mechanisms through a case study of Japanese companies adopting IR. These findings also lead us to expect that the introduction of IR will improve companies’ internal decision-making and lead to longer-term oriented actions. Thus, we propose the following hypothesis.

Hypothesis 1 (H1). *Firms tend not to engage in real activities manipulation after the introduction of IR.*

Although managers can manage earnings using accrual-based manipulation as well as real activities manipulation, we focus on real activities manipulation. Graham et al.’s [36] survey evidence suggests managers prefer real activities manipulation to accrual-based earnings management as a means of managing earnings. In addition, Cohen et al. [68] show that real activities manipulation increased significantly after the passage of the Sarbanes-Oxley Act, while accrual-based earnings management decreased, consistent with firms switching from accrual-based to real activities manipulation after its passage. As in the US, the Japanese version of the Sarbanes-Oxley Act became effective in September 2007. Given the growing presence of real activities manipulation, we look at the relationship between IR and real activities manipulation.

3. Research Design

3.1. Regression Models

To test our hypothesis on the relationship between the introduction of IR and real activities manipulation, we estimate Equation (1) for panel data consisting of firms and years:

$$\begin{aligned} RAM_{PROXY_{i,t}} &= \alpha + \beta_1 POSTIR_{i,t} + \beta_2 TA_{i,t-1} + \beta_3 PBR_{i,t-1} + \beta_4 LEV_{i,t-1} \\ &+ \beta_5 ROA_{i,t-1} + \beta_6 RETURN_{i,t-1} + \beta_7 DSH_{i,t-1} + \beta_8 ID_{i,t-1} \\ &+ \beta_9 FIRMAGE_{i,t-1} + YearDummy + IndustryDummy + \varepsilon_{i,t} \end{aligned} \quad (1)$$

As proxy variables for real activities manipulation ($RAM_{PROXY_{i,t}}$), we use abnormal cash flows from operations ($ABN_CFO_{i,t}$); abnormal production costs ($ABN_PROD_{i,t}$); and abnormal discretionary expenses ($ABN_EXP_{i,t}$), obtained from the model proposed by Roychowdhury [20]. Following Cohen et al. [68] and Cohen and Zarowin [67], we consider three manipulation methods: (1) *sales manipulation including excessive price discounts and more lenient credit terms*, which lead to abnormally low cash flows from operations, relative to sales; (2) *overproduction*, which leads to abnormally high production costs and low cash flows from operations, relative to sales; and (3) *reductions in discretionary expenditures*, which lead to abnormally low discretionary expenses, relative to sales (We recommend that readers interested in the detailed mechanisms of real activities manipulation read Roychowdhury [20] and Cohen et al. [68]). We expect that the introduction of IR mitigates pressure from short-term investors and promotes integrated thinking in the enterprise, resulting in lower levels of these manipulations.

We use the residuals obtained from Roychowdhury's [20] model as estimates of the firm's abnormal cash flows from operations, $ABN_CFO_{i,t}$. We estimate the following model cross-sectionally by each industry-year:

$$\begin{aligned} CFO_{i,t} / ASSETS_{i,t-1} &= \beta_0 + \beta_1 (1 / ASSETS_{i,t-1}) + \beta_2 (SALES_{i,t} / ASSETS_{i,t-1}) \\ &+ \beta_3 (\Delta SALES_{i,t} / ASSETS_{i,t-1}) + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where $CFO_{i,t}$ denotes cash flows from operations for company i at year t . $ASSETS_{i,t-1}$ is the total assets for company i at year $t-1$. $SALES_{i,t}$ is the sales for company i at year t . $\Delta SALES_{i,t}$ is the change in sales in year t from year $t-1$. A smaller $ABN_CFO_{i,t}$ indicates a greater real activities manipulation, since excessive price discounts and more lenient credit terms, and overproduction are expected to lead to abnormally low cash flows from operations, relative to sales.

To measure the real activities manipulation through overproduction, we use the residuals obtained from Roychowdhury's [20] model as estimates of the firm's abnormal production costs, $ABN_PROD_{i,t}$. We estimate the following model cross-sectionally by each industry-year:

$$\begin{aligned} PROD_{i,t} / ASSETS_{i,t-1} &= \beta_0 + \beta_1 (1 / ASSETS_{i,t-1}) + \beta_2 (SALES_{i,t} / ASSETS_{i,t-1}) \\ &+ \beta_3 (\Delta SALES_{i,t} / ASSETS_{i,t-1}) + \beta_4 (\Delta SALES_{i,t-1} / ASSETS_{i,t-1}) + \varepsilon_{i,t} \end{aligned} \quad (3)$$

where $PROD_{i,t}$ represents production costs for company i at year t , defined as cost of goods sold plus change in inventory. Other variables are as defined above. A larger $ABN_PROD_{i,t}$ indicates a greater real activities manipulation, since overproduction are expected to lead to abnormally high production costs, relative to sales.

We use the residuals obtained from Roychowdhury's [20] model as estimates of the firm's abnormal cash flows from operations, $ABN_CFO_{i,t}$. We estimate the following model cross-sectionally by each industry-year:

$$\begin{aligned} EXP_{i,t} / ASSETS_{i,t-1} &= \beta_0 + \beta_1 (1 / ASSETS_{i,t-1}) + \beta_2 (SALES_{i,t} / ASSETS_{i,t-1}) + \varepsilon_{i,t} \end{aligned} \quad (4)$$

where $EXP_{i,t}$ denotes discretionary expenses, including selling, general, and administrative expenses, advertising and research and development expenses for company i at year t . Other variables are as defined above. A smaller $ABN_EXP_{i,t}$ indicates a greater real activities manipulation, since reductions in discretionary expenditures are expected to lead to abnormally low discretionary expenses, relative to sales. Note that in the estimation of all three proxy variables, we eliminate observations where there are fewer than ten observations in each industry-year group.

To capture the total effects of real activities manipulation, we create the fourth measure of real activities manipulation by combining the three variables described above. Following Cohen and Zarowin [67] and Zang [70], we calculate the total measure of real activities manipulation, $TotalRAM_{i,t}$, by multiplying ABN_CFO and ABN_EXP by negative one each and summing them and ABN_PROD ($TotalRAM_{i,t} = ABN_CFO \times -1 + ABN_PROD + ABN_EXP \times -1$). A higher the amount of $TotalRAM_{i,t}$, the more likely the firms engage in overall real activities manipulation.

$POSTIR_{i,t-1}$ is a dummy variable that equals 1 for firm-year observations after the issuance of an integrated report. To identify the first year of integrated report issuance for each company, we use the List of Corporations in Japan Engaged in the Publication of Self-Declared Integrated Reports 2018 included in the Corporate Value Reporting Lab [112] (The Corporate Value Reporting Lab [112] defines an integrated report issuer as a company issuing a report that is self-labeled as an integrated report in an editorial policy and that comprehensively relates financial and non-financial information and indicates the considerations for integrated reporting). The coefficient of $POSTIR_{i,t-1}$ captures the effect of IR on real activities manipulation. If the regression results are consistent with our hypothesis, $POSTIR_{i,t-1}$ will be positively related to $ABN_CFO_{i,t}$ and $ABN_EXP_{i,t}$, and negatively related to $ABN_PROD_{i,t}$ and $TotalRAM_{i,t}$. Positive relation between $POSTIR_{i,t-1}$ and $ABN_CFO_{i,t}$ or $POSTIR_{i,t-1}$ and $ABN_EXP_{i,t}$ means that firms are less likely to engage in sales manipulation or reductions in discretionary expenditures after introducing IR. Negative relation between $POSTIR_{i,t-1}$ and $ABN_PROD_{i,t}$ or $POSTIR_{i,t-1}$ and $TotalRAM_{i,t}$ means that firms are less likely to engage in overproduction or overall real activities manipulation after introducing IR.

Following previous studies, we add several control variables to Equation (1) to control firm characteristics that may affect the introduction of IR and real activities manipulation. Since Roychowdhury [20] suggests that firm size and growth opportunities could greatly influence firms' real activities manipulation, we control firm size ($TA_{i,t-1}$) and growth opportunities ($PBR_{i,t-1}$). Debt contracts are known to affect firm earnings management [113,114], hence the debt ratio ($LEV_{i,t-1}$) is also added. We control accounting performance ($ROA_{i,t-1}$) and stock performance ($RETURN_{i,t-1}$), as managers of poorly performing companies are more likely to manipulate earnings to avoid negative reputational effects or dismissal. In addition, we include the ratio of shares held by directors ($DSH_{i,t-1}$), the proportion of independent directors ($ID_{i,t-1}$), and year and industry fixed effects. Following Kim et al. [71], we include $FIRMAGE_{i,t-1}$ to control the possibility that the relationship between IR activities and real activities manipulation could change as a firm matures. The upper and lower 1% of each continuous variable are replaced with the upper and lower one-percentile values to control for the influence of abnormal values on the regression results. We use standard errors clustered by both the firm and year when calculating the significance level of the coefficient estimates [115].

3.2. Sample and Data

We obtain financial and stock data from 2004 through to 2017 (In this study, the COVID-19 pandemic period is not included in the analysis. In order to create each proxy variable for real activities manipulation, it is necessary to estimate the normal level of each variable and then subtract it from the actual level to extract the abnormal portion of each variable. The inclusion of the COVID-19 pandemic period would make the analysis and interpretation of the results more difficult since the continuity of operational practices is not maintained

during the COVID-19 pandemic period and the conditions for estimating normal levels of each variable may not been met) from the NEEDS-Financial QUEST database, which is commonly used for the analysis of Japanese companies. Data on shareholding ratios and boards of directors are obtained from NEEDS CGES. To confirm the existence of an integrated report and the first year of integrated report issuance for each company, we use the List of Corporations in Japan Engaged in the Publication of Self-Declared Integrated Reports 2018 included in the Corporate Value Reporting Lab [112].

In our sample, we include firm-year observations that meet the following criteria in our sample: (1) companies listed on the Japanese stock market; (2) companies belonging to industries other than financial industries, such as banking, securities, insurance, and other financial businesses; (3) companies compliant with the Japanese Generally Accepted Accounting Principles; and (4) companies for which all the variables used in the regression analysis are available. Our final sample contains 45,000 firm-year observations for 5785 unique firms; Table 1 shows the distribution of observations by year. Of the observations, 685 are labeled as integrated report issuers and 44,315 are labeled as non-issuers (Of the 5785 unique firms, 397 firms have issued at least one integrated report at some point during the sample period. While the remaining 5388 firms did not issue an integrated report during the sample period). The number of firm-year observations where $POSTIR_{i,t-1}$ equals 1 has gradually increased, reaching 217 observations in 2017. To examine the relationship between IR and real activities manipulation, regression analysis is applied to this large panel data.

Table 1. Distribution of observations.

Fiscal Year	$POSTIR = 1$	$POSTIR = 0$	Total
2004	0	3125	3125
2005	1	3174	3175
2006	1	3265	3266
2007	3	3329	3332
2008	6	3286	3292
2009	8	3337	3345
2010	13	3267	3280
2011	17	3187	3204
2012	24	3120	3144
2013	44	3087	3131
2014	75	3076	3151
2015	107	3054	3161
2016	169	3007	3176
2017	217	3001	3218
	685	44,315	45,000

3.3. Summary Statistics

Table 2 shows the descriptive statistics. Panel A of Table 2 shows that the mean value of $POSTIR_{i,t-1}$ is 0.015, which means that 1.5% of the firm-year observations in the full sample have already issued an integrated report. Panel B of Table 2 compares the means and medians of variables between integrated report issuers and non-issuers. The mean and median values of $ABN_CFO_{i,t}$ and $ABN_EXP_{i,t}$ are statistically larger for integrated report issuers than non-issuers. In contrast, the mean and median values of $ABN_PROD_{i,t}$ and $TotalRAM_{i,t}$ for integrated report issuers are statistically smaller than non-issuers. Overall, these univariate comparisons suggest that firms tend not to engage in real activities manipulation after the introduction of IR.

Table 3 presents the correlation matrix. The variable of interest, $POSTIR_{i,t-1}$, is negatively correlated with $ABN_PROD_{i,t}$, and positively correlated with $ABN_CFO_{i,t}$ and $ABN_EXP_{i,t}$. These correlations suggest that, after introducing IR, companies tend not to engage in real activities manipulation, as stated by our hypothesis.

Table 2. Descriptive statistics.

Panel A								
	Mean	S.D.	Min	25%	Median	75%	Max	N
ABN_CFO	−0.001	0.069	−0.282	−0.032	0.000	0.033	0.235	45,000
ABN_PROD	0.003	0.178	−0.749	−0.056	0.020	0.095	0.484	45,000
ABN_EXP	−0.004	0.164	−0.381	−0.086	−0.023	0.039	0.726	45,000
RAM	0.008	0.350	−1.710	−0.104	0.041	0.190	1.136	45,000
POSTIR	0.015	0.122	0	0	0	0	1	45,000
TA	10.378	1.625	5.969	9.270	10.237	11.347	14.922	45,000
PBR	1.482	1.705	0.255	0.631	0.970	1.627	13.115	45,000
LEV	0.498	0.208	0.087	0.334	0.503	0.658	1.099	45,000
ROA	0.024	0.065	−0.329	0.008	0.025	0.050	0.266	45,000
RETURN	0.024	0.166	−0.471	−0.062	0.025	0.113	0.506	45,000
DSH	0.087	0.130	0.000	0.003	0.022	0.119	0.595	45,000
ID	0.126	0.149	0.000	0.000	0.091	0.222	0.600	45,000
FIRMAGE	2.958	0.898	0.109	2.346	2.972	3.827	4.249	45,000
Age of firm (in year)	27.240	19.983	1.115	10.512	19.630	46.301	69.460	45,000

Panel B							
	POSTIR = 1		POSTIR = 0		Difference test (p-Value)		
	Mean	Median	Mean	Median	t test	Wilcoxon test	
ABN_CFO	0.012	0.009	−0.001	0.000	<0.001	<0.001	
ABN_PROD	−0.018	−0.008	0.003	0.020	<0.001	<0.001	
ABN_EXP	0.003	−0.011	−0.004	−0.024	<0.001	<0.001	
RAM	−0.033	−0.011	0.009	0.042	<0.001	<0.001	
TA	13.073	13.166	10.337	10.210	<0.001	<0.001	
PBR	1.458	1.255	1.482	0.965	0.709	<0.001	
LEV	0.519	0.529	0.498	0.502	<0.01	<0.01	
ROA	0.036	0.034	0.024	0.025	<0.001	<0.001	
RETURN	0.041	0.039	0.023	0.025	<0.01	<0.001	
DSH	0.010	0.001	0.088	0.023	<0.001	<0.001	
ID	0.276	0.273	0.123	0.091	<0.001	<0.001	
FIRMAGE	3.692	4.016	2.946	2.966	<0.001	<0.001	
Age of firm (in year)	47.549	55.471	26.920	19.501	<0.001	<0.001	

Table 3. Correlations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) ABN_CFO		−0.309	0.049	−0.402	0.029	0.053	0.148	−0.131	0.304	0.055	0.010	0.007	−0.050
(2) ABN_PROD	−0.312		−0.805	0.961	−0.031	−0.036	−0.137	0.147	−0.161	−0.018	−0.026	−0.001	0.020
(3) ABN_EXP	0.047	−0.864		−0.860	0.021	0.044	0.074	−0.078	−0.002	−0.004	0.015	0.003	0.006
(4) TotalRAM	−0.378	0.975	−0.917		−0.033	−0.053	−0.132	0.135	−0.147	−0.018	−0.019	−0.001	0.014
(5) POSTIR	0.023	−0.015	0.006	−0.015		0.171	0.047	0.014	0.034	0.017	−0.136	0.124	0.115
(6) TA	0.066	0.011	−0.023	0.004	0.206		−0.012	0.134	0.059	0.049	−0.507	0.054	0.490
(7) PBR	0.047	−0.135	0.129	−0.138	−0.002	−0.154		0.111	0.349	0.216	−0.005	0.153	−0.171
(8) LEV	−0.106	0.112	−0.054	0.103	0.013	0.150	0.104		−0.308	−0.006	−0.090	−0.043	0.091
(9) ROA	0.321	−0.139	−0.001	−0.134	0.022	0.119	0.088	−0.207		0.238	0.077	0.068	−0.118
(10) RETURN	0.059	−0.013	−0.001	−0.018	0.013	0.042	0.190	−0.002	0.255		−0.010	−0.005	0.040
(11) DSH	0.023	−0.104	0.100	−0.104	−0.073	−0.398	0.155	−0.045	0.076	−0.029		−0.185	−0.566
(12) ID	−0.001	−0.014	0.018	−0.016	0.125	0.039	0.145	−0.044	0.008	−0.010	−0.090		0.050
(13) FIRMAGE	−0.023	0.074	−0.076	0.078	0.102	0.474	−0.249	0.082	−0.048	0.059	−0.537	0.006	

Pearson (Spearman) correlations are reported below (above) the diagonal. Variables are defined in Appendix A.

4. Results and Discussion

4.1. IR and Real Activities Manipulation

Table 4 presents the regression results regarding the relationship between the introduction of IR and real activities manipulation. The first column shows the estimation results of Equation (1) when $ABN_CFO_{i,t}$ is the dependent variable. The coefficient of the variable of interest, $POSTIR_{i,t-1}$, is significantly positive at the 1% level. Larger abnormal cash flows from operations means that firms are less likely to engage in excessive price discounts and more lenient credit terms. This result shows that firms tend not to engage in real activities manipulation through excessive price discounts and more lenient credit terms after introducing IR, hence supporting our hypothesis.

Table 4. Introduction of IR and real activities manipulation: regression results of Equation (1).

Dependent Variable	ABN_CFO	ABN_PROD	ABN_EXP	$TotalRAM$
$POSTIR$	0.009 [4.12] ***	-0.024 [-3.17] ***	0.007 [0.96]	-0.040 [-2.74] ***
TA	0.002 [3.29] ***	-0.004 [-2.14] **	0.005 [3.07] ***	-0.010 [-3.08] ***
PBR	0.002 [3.43] ***	-0.018 [-8.65] ***	0.016 [9.20] ***	-0.037 [-8.84] ***
LEV	-0.022 [-5.74] ***	0.114 [8.77] ***	-0.075 [-6.57] ***	0.211 [8.37] ***
ROA	0.333 [17.85] ***	-0.296 [-6.24] ***	-0.096 [-2.45] **	-0.533 [-5.83] ***
$RETURN$	-0.011 [-1.92] *	0.052 [3.52] ***	-0.014 [-1.03]	0.076 [2.91] ***
DSH	0.002 [0.32]	-0.133 [-4.27] ***	0.130 [4.59] ***	-0.266 [-4.25] ***
ID	0.004 [0.83]	-0.020 [-1.25]	0.019 [1.22]	-0.043 [-1.34]
$FIRMAGE$	-0.002 [-1.99] **	0.006 [1.78] *	-0.010 [-3.29] ***	0.018 [2.79] ***
<i>constant</i>	-0.011 [-1.63]	0.002 [0.09]	-0.022 [-0.96]	0.035 [0.76]
<i>Year effects</i>	Yes	Yes	Yes	Yes
<i>Industry effects</i>	Yes	Yes	Yes	Yes
Adj-R ²	0.116	0.068	0.044	0.068
N	45,000	45,000	45,000	45,000

This table shows the regression results of Equation (1) for the relation between the introduction of IR and real activities manipulation. Variables are defined in Appendix A. All t -statistics in parentheses are calculated based on standard errors adjusted for heteroscedasticity, and clustered by firm and year. *, **, and *** indicate that the estimated coefficients are statistically significant at the 10, 5, and 1 % levels, respectively.

The second column presents the regression results of Equation (1) when $ABN_PROD_{i,t}$ is the dependent variable. The coefficient of $POSTIR_{i,t-1}$ is significantly negative at the 1% level. This result shows that firms report smaller abnormal production costs after the introduction of IR. Smaller abnormal production costs means that firms are less likely to increase production more than necessary. This result is consistent with firms being less likely to engage in real activities manipulation through overproduction after introducing IR.

The third column reports the regression results of Equation (1) when the dependent variable is $ABN_EXP_{i,t}$. The coefficient estimate of $POSTIR_{i,t-1}$ is positive, but not statistically significant. Therefore, we do not find evidence to suggest that companies are less likely to engage in real activities manipulation through reducing discretionary expenditures after adopting IR.

Regression results of Equation (1) when the dependent variable is $TotalRAM_{i,t}$ are presented in the fourth column. Significantly negative coefficient of $POSTIR_{i,t-1}$ indicates that the introduction of IR is related to a lower degree of the total measure of real activities

manipulation. This result suggests that the introduction of IR constrains firms' overall real activities manipulation. The average variation inflation factors (VIF) are smaller than 2.0 in all regressions of Table 4, suggesting that the multicollinearity problem is negligible.

In summary, the results in Table 4 generally reveal that the degree of real activities manipulation decreases after the introduction of IR, and that the decrease in real activities manipulation is attributed to the firms less engaging in excessive price discounts, more lenient credit terms, and overproduction after the introduction of IR. These results generally support our hypothesis and are consistent with the notion that IR corrects firms' short-term oriented decisions (If there are any omitted trends and/or unobservable differences in characteristics between integrated report issuers and non-issuers, which affect both the introduction of IR and real activities manipulation, the results reported above may be affected by an endogeneity problem. To address the endogeneity problem related to the issuance of an integrated report, we add a dummy variable, $IRFIRM_i$, which equals 1 during the entire sample period for companies that issue integrated reports at any point in time, and re-estimate the regressions. $IRFIRM_i$ captures time-invariant differences between integrated report issuers and non-issuers. We find that the regression results obtained from the re-estimation are qualitatively like those reported in Table 4). In other words, we show that IR affects firms' real decision, i.e., IR has real effect regarding real activities manipulation. However, we do not find evidence suggesting IR could constrain real activities manipulation through reductions in discretionary expenditures.

4.2. Is IR a Continuous Improvement Process?

Some practitioners point out that IR is a continuous improvement process, and a significant improvement in internal decision making could take several years [116–119]. Therefore, to answer the question, "Is IR a continuous improvement process?" we examine whether the relationship between the introduction of IR and real activities manipulation changes with the number of years since introduction. In place of $POSTIR_{i,t-1}$ in Equation (1), we add the indicator variables, $IRPERIOD_{0Y_{i,t}}$, $IRPERIOD_{1Y_{i,t}}$, $IRPERIOD_{2Y_{i,t}}$, $IRPERIOD_{3Y_{i,t}}$, $IRPERIOD_{4Y_{i,t}}$, $IRPERIOD_{5Y_{i,t}}$, and $IRPERIOD_{6YA_{i,t}}$, which equal 1 for firms with 0-years, 1-year, 2-years, 3-years, 4-years, 5-years, and 6-years or more experience with IR, respectively. For example, in the case of company j , which first issued an integrated report in 2015, each of $IRPERIOD_{0Y_j, 2015}$, $IRPERIOD_{1Y_j, 2016}$, and $IRPERIOD_{2Y_j, 2017}$ equals 1. If we create individual dummy variables for firm-years with more than six years of experience with IR, the number of firm-year observations that equal 1 for each dummy variable would be insufficient. Thus, we aggregate firm-year observations that are dated six years or more since the first issuance of an integrated report, into a single dummy variable, $IRPERIOD_{6YA_{i,t}}$. Estimating Equation (5) using these dummy variables instead of $POSTIR_{i,t-1}$ allows us to examine whether the association between the introduction of IR and real activities manipulation varies with the elapsed time since introduction. If IR is a continuous improvement process, then the effects of IR would not appear immediately after its introduction, but only after some time has passed since its introduction. Therefore, the coefficients of $IRPERIOD_{0Y_{i,t}}$ and $IRPERIOD_{1Y_{i,t}}$ that equal 1 for firm-years soon after the introduction of IR are expected not to be significant, while the coefficients of $IRPERIOD_{2Y_{i,t}}$, $IRPERIOD_{3Y_{i,t}}$, $IRPERIOD_{4Y_{i,t}}$, $IRPERIOD_{5Y_{i,t}}$, and $IRPERIOD_{6YA_{i,t}}$ that equal 1 for firm-years sometime after the introduction of IR are expected to be significant with signs implying that the degree of real activities manipulation decreases, that is, positive for.

$$\begin{aligned}
 RAM_{PROXY_{i,t}} = & \alpha + \beta_1 IRPERIOD_{0Y_{i,t}} + \beta_2 IRPERIOD_{1Y_{i,t}} + \beta_3 IRPERIOD_{2Y_{i,t}} \\
 & + \beta_4 IRPERIOD_{3Y_{i,t}} + \beta_5 IRPERIOD_{4Y_{i,t}} + \beta_6 IRPERIOD_{5Y_{i,t}} \\
 & + \beta_7 IRPERIOD_{6YA_{i,t}} + \beta_8 TA_{i,t-1} + \beta_9 PBR_{i,t-1} + \beta_{10} LEV_{i,t-1} \\
 & + \beta_{11} ROA_{i,t-1} + \beta_{12} RETURN_{i,t-1} + \beta_{13} DSH_{i,t-1} + \beta_{14} ID_{i,t-1} \\
 & + \beta_{15} FIRMAGE_{i,t-1} + YearDummy + IndustryDummy + \varepsilon_{i,t}
 \end{aligned} \tag{5}$$

Table 5 shows the estimation results of Equation (5), which uses proxy variables for real activities manipulation as the dependent variable. When $ABN_CFO_{i,t}$ is the dependent variable, the coefficient estimates of $IRPERIOD_2Y_{i,t}$, $IRPERIOD_3Y_{i,t}$, $IRPERIOD_4Y_{i,t}$, and $IRPERIOD_6YA_{i,t}$ are positive and statistically significant at the 1% or 5% levels, while the coefficients of $IRPERIOD_0Y_{i,t}$, $IRPERIOD_1Y_{i,t}$, and $IRPERIOD_5Y_{i,t}$ are insignificant (see the first column). This result indicates that although there is insignificant difference in the degree of real activities manipulation through excessive price discounts and more lenient credit terms between IR and non-IR firms in the early period after the introduction of IR, the degree of these real activities manipulation is generally smaller in IR firms than in non-IR firms two years after the introduction of IR, hence suggesting that IR is a continuous improvement process (As with the regression of Equation (1), we add $IRFIRM_i$ to Equation (5) and re-estimate the regressions. We find that the regression results obtained from the re-estimation are qualitatively unchanged from those reported in Table 5).

Table 5. IR as a continuous improvement process: regression results of Equation (5).

Dependent Variable	<i>ABN_CFO</i>	<i>ABN_PROD</i>	<i>ABN_EXP</i>	<i>TotalRAM</i>
<i>IRPERIOD_0Y</i>	0.003 [0.90]	−0.011 [−1.29]	0.001 [0.17]	−0.015 [−1.00]
<i>IRPERIOD_1Y</i>	0.003 [1.15]	−0.010 [−0.91]	0.001 [0.06]	−0.013 [−0.64]
<i>IRPERIOD_2Y</i>	0.010 [2.94] ***	−0.026 [−2.92] ***	0.015 [1.89] *	−0.050 [−3.03] ***
<i>IRPERIOD_3Y</i>	0.011 [4.39] ***	−0.036 [−3.71] ***	0.017 [1.70] *	−0.064 [−3.38] ***
<i>IRPERIOD_4Y</i>	0.010 [2.68] ***	−0.039 [−3.22] ***	0.021 [2.57] **	−0.070 [−3.75] ***
<i>IRPERIOD_5Y</i>	0.008 [1.60]	−0.025 [−2.21] **	0.008 [0.81]	−0.042 [−1.97] **
<i>IRPERIOD_6YA</i>	0.023 [4.35] ***	−0.033 [−1.66] *	−0.022 [−1.45]	−0.034 [−1.43]
<i>TA</i>	0.002 [3.19] ***	−0.004 [−2.06] **	0.005 [3.05] ***	−0.010 [−3.02] ***
<i>PBR</i>	0.002 [3.35] ***	−0.018 [−8.64] ***	0.016 [9.25] ***	−0.037 [−8.84] ***
<i>LEV</i>	−0.022 [−5.73] ***	0.114 [8.76] ***	−0.075 [−6.57] ***	0.211 [8.36] ***
<i>ROA</i>	0.333 [17.86] ***	−0.296 [−6.23] ***	−0.096 [−2.44] **	−0.533 [−5.82] ***
<i>RETURN</i>	−0.011 [−1.91] *	0.051 [3.52] ***	−0.014 [−1.03]	0.076 [2.92] ***
<i>DSH</i>	0.002 [0.31]	−0.133 [−4.26] ***	0.131 [4.59] ***	−0.265 [−4.25] ***
<i>ID</i>	0.004 [0.82]	−0.020 [−1.24]	0.019 [1.22]	−0.042 [−1.33]
<i>FIRMAGE</i>	−0.002 [−1.98] **	0.006 [1.78] *	−0.010 [−3.28] ***	0.018 [2.78] ***
<i>constant</i>	−0.011 [−1.57]	0.001 [0.05]	−0.022 [−0.96]	0.034 [0.73]
<i>Year effects</i>	Yes	Yes	Yes	Yes
<i>Industry effects</i>	Yes	Yes	Yes	Yes
Adj-R ²	0.116	0.068	0.044	0.068
N	45,000	45,000	45,000	45,000

This table shows the regression results of Equation (5) to examine whether the relationship between the introduction of IR and real activities manipulation differs depending on the number of years since its introduction. Variables are defined in Appendix A. All t-statistics in parentheses are calculated based on standard errors adjusted for heteroscedasticity, and clustered by firm and year. *, **, and *** indicate that the estimated coefficients are statistically significant at the 10, 5, and 1 % levels, respectively.

In the second column, we show the regression results of Equation (5) when $ABN_PROD_{i,t}$ is the dependent variable. The coefficient estimates of $IRPERIOD_2Y_{i,t}$, $IRPERIOD_3Y_{i,t}$, $IRPERIOD_4Y_{i,t}$, $IRPERIOD_5Y_{i,t}$, and $IRPERIOD_6YA_{i,t}$ are negative and statistically significant at the 1%, 5%, or 10% levels, while the coefficients of $IRPERIOD_0Y_{i,t}$ and $IRPERIOD_1Y_{i,t}$ are insignificant. Similar to the result for $ABN_CFO_{i,t}$, this result also suggests that IR gradually affect real activities manipulation through overproduction after its introduction, consistent with the notion that IR is a continuous improvement process.

The third column reports the regression results of Equation (5) when the dependent variable is $ABN_EXP_{i,t}$. The coefficient estimates of $IRPERIOD_2Y_{i,t}$, $IRPERIOD_3Y_{i,t}$, and $IRPERIOD_4Y_{i,t}$ are positive but marginally significant at the 5% or 10% levels. Thus, we could not provide strong evidence suggesting that IR is a continuous improvement process in terms of real activities manipulation through decreases in discretionary expenditures.

The fourth column shows the regression results of Equation (5) when the dependent variable is $TotalRAM_{i,t}$. The coefficient estimates of $IRPERIOD_2Y_{i,t}$, $IRPERIOD_3Y_{i,t}$, $IRPERIOD_4Y_{i,t}$, and $IRPERIOD_5Y_{i,t}$, are negative and statistically significant at the 1%, 5% levels. On the other hand, the coefficients of $IRPERIOD_0Y_{i,t}$, $IRPERIOD_1Y_{i,t}$, and $IRPERIOD_6YA_{i,t}$ are insignificant. Similar to the results for $ABN_CFO_{i,t}$ and $ABN_PROD_{i,t}$, this result generally suggests that while IR does not have an immediate effect on the overall real activities manipulation, after a certain amount of time, its effect becomes significant. The average VIF are smaller than 2.0 in all regressions of Table 5, suggesting that the multicollinearity problem is negligible.

In total, these results generally suggest that while IR does not have an immediate effect, IR gradually affect real activities manipulation mainly through sales manipulation and overproduction, but not for reductions in discretionary expenses after its introduction. We provide evidence supporting the notion that IR is a continuous improvement process (We also examine the association between the number of years since the first issuance of an integrated report and real activities manipulation by treating the number of years as a continuous variable. We find that the number of years elapsed since the introduction of IR are positively (negatively) related to $ABN_CFO_{i,t}$ ($ABN_PROD_{i,t}$), suggesting that firms tend not to gradually engage in real activities manipulation as time passes after IR is introduced).

4.3. Difference-in-Differences Approach Combined with Propensity Score Matching

Managers can choose whether to issue integrated reports; however, the choice might not be random, which would introduce a selection bias in our analysis. To address this concern, we employ a difference-in-differences (DiD) approach in conjunction with propensity score matching. We first estimate a probit model to obtain the propensity score, that is, the probability of issuing an integrated report. Previous studies that examine the firm-level determinants of introducing IR, show that firm size, growth opportunities, profitability, and board characteristics could affect the introduction of IR [29,43,46,47]. These factors are included in the control variables used in the main analysis. Therefore, we estimate the probit model for each year, with the control variables used in the main analysis as explanatory variables, except for the ratio of outside directors, year fixed effects, and industry fixed effects (To conduct this test, we exclude the ratio of outside directors from the explanatory variables since the proportion of independent directors equals zero for many firm-year observations, especially in the early part of the sample period, disallowing us to estimate the Probit model). We define the firms issuing their first integrated report for each year as treatment firms for that year, because IR could be voluntarily adopted in any year over the sample period. First, we identify treatment firm-year observations for each year. Then, we match each treatment firm-year observation with a control firm-year observation for each year using the nearest-neighbor pair matching without replacement. Finally, we expand the matched treatment and control groups over the sample period, allowing us to employ a DiD approach. Our sample comprises 6921 firm-year observations for 540 unique firms. The 2760 firm-years have $IRFIRM_i$ of 1 and $POST_{i,t}$ of 0, while the 676 firm-years have

$IRFIRM_i$ of 1 and $POST_{i,t}$ of 1. Similarly, for the 2835 firm-years, $IRFIRM_i$ equal 0 and $POST_{i,t}$ equal 0, and for the 650 firm-years, $IRFIRM_i$ equal 0 and $POST_{i,t}$ equal 1. Figure 1 illustrates an example of the procedure for constructing a matching sample. We estimate the following Equation (6):

$$\begin{aligned}
 RAM_{PROXY_{i,t}} = & \alpha + \beta_1 POST_{i,t} * IRFIRM_i + \beta_2 POST_{i,t} + \beta_3 IRFIRM_i + \beta_4 TA_{i,t-1} \\
 & + \beta_5 PBR_{i,t-1} + \beta_6 LEV_{i,t-1} + \beta_7 ROA_{i,t-1} + \beta_8 RETURN_{i,t-1} \\
 & + \beta_9 DSH_{i,t-1} + \beta_{10} ID_{i,t-1} + \beta_{11} FIRMAGE_{i,t-1} + YearDummy \\
 & + IndustryDummy + \varepsilon_{i,t}
 \end{aligned}
 \tag{6}$$

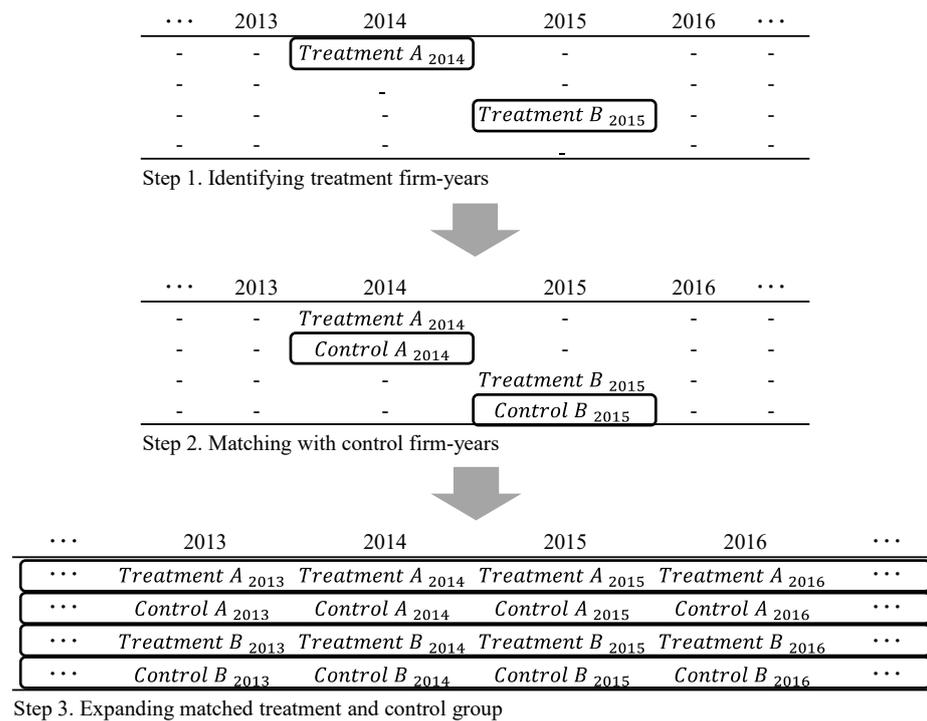


Figure 1. Example of the procedure for constructing a matching sample.

Figure 1 shows an example of the procedure for constructing a matching sample when Company A issues its first integrated report in 2014 and Company B issues its first integrated report in 2015.

$POST_{i,t}$ is an indicator variable that equals 1 for the firm-year observations of both the treatment and control groups in the post-treatment period, and 0 for the firm-year observations in the pre-treatment period. The coefficient estimate of $POST_{i,t}$ reflects the change in the real activities manipulation for the control firms around the first issuance of integrated reports by the matched treatment firms. $IRFIRM_i$ equals 1 for companies that issue integrated reports at any point in time, and 0 otherwise. The other variables are as defined above (see Appendix A).

The variable of interest is $POST_{i,t} * IRFIRM_i$, which is the interaction term of $POST_{i,t}$ and $IRFIRM_i$. This interaction term captures the incremental change in real activities manipulation for the treated firms relative to the control firms around the year IR is introduced. Based on the results of the main analysis, we expect that $POST_{i,t} * IRFIRM_i$ will be positively related to $ABN_CFO_{i,t}$ and negatively related to $ABN_PROD_{i,t}$ and $TotalRAM_{i,t}$. Table 6 shows the regression results of Equation (6) using the propensity score matched sample. The first column shows that $POST_{i,t} * IRFIRM_i$ is positively related to $ABN_CFO_{i,t}$ at the 1% level of significance. In addition, the second column shows that the coefficient of $POST_{i,t} * IRFIRM_i$ is significantly negative at the 1% level when $ABN_PROD_{i,t}$ is the dependent variable. The third column shows that the coefficient esti-

mate of $POST_{i,t} * IRFIRM_i$ is positive, but not statistically significant when $ABN_EXP_{i,t}$ is the dependent variable. In the fourth column, we report that $POST_{i,t} * IRFIRM_i$ is negatively related to $TotalRAM_{i,t}$ at the 5% level of significance. The average VIF are smaller than 2.0 in all regressions of Table 6, suggesting that the multicollinearity problem is negligible. These results are qualitatively similar to the results reported in Table 4 and indicate that our main results are robust to a potential selection bias.

Table 6. DiD approach combined with propensity score matching: regression results of Equation (6).

Dependent Variable	<i>ABN_CFO</i>	<i>ABN_PROD</i>	<i>ABN_EXP</i>	<i>RAM</i>
<i>POST*IRFIRM</i>	0.011 [4.25] ***	−0.019 [−2.13] **	0.004 [0.53]	−0.034 [−2.05] **
<i>POST</i>	−0.005 [−1.76] *	0.003 [0.33]	0.000 [−0.00]	0.008 [0.44]
<i>IRFIRM</i>	−0.005 [−1.92] *	−0.012 [−1.18]	0.018 [1.69] *	−0.026 [−1.22]
<i>TA</i>	0.005 [4.78] ***	0.003 [0.67]	−0.007 [−1.99] **	0.005 [0.67]
<i>PBR</i>	0.007 [5.73] ***	−0.032 [−5.80] ***	0.022 [4.23] ***	−0.061 [−5.44] ***
<i>LEV</i>	−0.048 [−5.52] ***	0.175 [5.95] ***	−0.122 [−4.39] ***	0.345 [5.86] ***
<i>ROA</i>	0.320 [7.84] ***	−0.156 [−1.49]	−0.282 [−3.30] ***	−0.195 [−0.98]
<i>RETURN</i>	−0.008 [−0.79]	0.046 [3.42] ***	−0.017 [−1.08]	0.071 [2.71] ***
<i>DSH</i>	−0.011 [−0.34]	−0.160 [−1.46]	0.139 [1.40]	−0.289 [−1.33]
<i>ID</i>	0.001 [0.09]	−0.051 [−1.63]	0.046 [1.49]	−0.098 [−1.55]
<i>FIRMAGE</i>	−0.002 [−1.04]	−0.004 [−0.63]	0.000 [−0.03]	−0.002 [−0.18]
<i>constant</i>	−0.036 [−2.36] **	−0.114 [−1.95] *	0.170 [3.13] ***	−0.248 [−2.14] **
<i>Year effects</i>	Yes	Yes	Yes	Yes
<i>Industry effects</i>	Yes	Yes	Yes	Yes
Adj-R ²	0.220	0.223	0.156	0.215
N	6921	6921	6921	6921

This table shows the regression results of Equation (6) in order to employ a difference-in-difference approach in conjunction with propensity score matching. Variables are defined in Appendix A. All t-statistics in parentheses are calculated based on standard errors adjusted for heteroscedasticity, and clustered by firm and year. *, **, and *** indicate that the estimated coefficients are statistically significant at the 10, 5, and 1 % levels, respectively.

4.4. Heckman's Treatment Effect Model

We also address a selection bias by applying Heckman's treatment effect model using the inverse Mills ratio. In the first step, we obtain the inverse Mills ratio, $IMR_{i,t}$, by estimating the probability of issuing an integrated report using the following Equation (7).

$$\begin{aligned}
 POSTIR_{i,t} = & \alpha + \beta_1 IndustryIR_{j,t} + \beta_2 TA_{i,t-1} + \beta_3 PBR_{i,t-1} + \beta_4 LEV_{i,t-1} \\
 & + \beta_5 ROA_{i,t-1} + \beta_6 RETURN_{i,t-1} + \beta_7 DSH_{i,t-1} + \beta_8 ID_{i,t-1} \\
 & + \beta_9 FIRMAGE_{i,t-1} + \varepsilon_{i,t}
 \end{aligned} \quad (7)$$

$IndustryIR_{j,t}$ is the percentage of companies introducing IR in industry j in year t . This variable captures the extent to which industry peers have adopted IR, and the more IR is adopted by industry peers, the greater the probability that the firm will adopt IR. This is because managers who notice that their industry peers have adopted IR may have an incentive to adopt IR in order to gain legitimacy or to appeal to their stakeholders against

their peers. Thus, we include $IndustryIR_{j,t}$ in the first step. In the second step, we add $IMR_{i,t}$ to Equation (1) and re-estimate Equation (1) to adjust for the selection bias.

Table 7 reports the second step estimation results. We find that the coefficients on $IMR_{i,t}$ are significant when the dependent variable is $ABN_CFO_{i,t}$ or $ABN_EXP_{i,t}$, indicating the presence of a selection bias. The coefficients of $POSTIR_{i,t-1}$ are significantly positive when the dependent variable is $ABN_CFO_{i,t}$ or $ABN_EXP_{i,t}$ and significantly negative when it is $ABN_PROD_{i,t}$ or $TotalRAM_{i,t}$, consistent with that the firms tend not to engage in real activities manipulation after introducing IR. Thus, the robustness check using the Heckman's treatment effect model also confirms that the main results reported in Table 4 are robust to the selection bias issue.

Table 7. Regression results of Equation (1) using a Heckman's treatment effect model.

Dependent Variable	<i>ABN_CFO</i>	<i>ABN_PROD</i>	<i>ABN_EXP</i>	<i>TotalRAM</i>
<i>POSTIR</i>	0.015 [3.86] ***	−0.026 [−2.57] **	−0.006 [−0.58]	−0.035 [−1.81] *
<i>TA</i>	0.003 [4.40] ***	−0.004 [−1.97] **	0.003 [1.65] *	−0.010 [−2.59] ***
<i>PBR</i>	0.002 [3.30] ***	−0.018 [−8.57] ***	0.016 [9.09] ***	−0.037 [−8.76] ***
<i>LEV</i>	−0.022 [−5.63] ***	0.114 [8.77] ***	−0.075 [−6.60] ***	0.211 [8.37] ***
<i>ROA</i>	0.336 [18.14] ***	−0.297 [−6.22] ***	−0.102 [−2.60] ***	−0.531 [−5.76] ***
<i>RETURN</i>	−0.010 [−1.81] *	0.051 [3.54] ***	−0.016 [−1.15]	0.077 [2.98] ***
<i>DSH</i>	0.000 [0.03]	−0.132 [−4.24] ***	0.135 [4.68] ***	−0.267 [−4.26] ***
<i>ID</i>	0.008 [1.47]	−0.022 [−1.28]	0.010 [0.62]	−0.040 [−1.20]
<i>FIRMAGE</i>	−0.002 [−1.84] *	0.006 [1.74] *	−0.011 [−3.42] ***	0.018 [2.80] ***
<i>IMR</i>	−0.003 [−2.29] **	0.001 [0.22]	0.005 [1.28]	−0.002 [−0.23]
<i>constant</i>	−0.028 [−3.11] ***	0.008 [0.25]	0.012 [0.39]	0.024 [0.39]
<i>Year effects</i>	Yes	Yes	Yes	Yes
<i>Industry effects</i>	Yes	Yes	Yes	Yes
Adj-R ²	0.116	0.068	0.044	0.068
N	45,000	45,000	45,000	45,000

This table shows the regression results of Equation (1) using a Heckman's treatment effect model for the relation between the introduction of IR and real activities manipulation. Variables are defined in Appendix A. *IMR* is the inverse Mills ratio obtained by estimating the probability of adopting IR. All t-statistics in parentheses are calculated based on standard errors adjusted for heteroscedasticity, and clustered by firm and year. *, **, and *** indicate that the estimated coefficients are statistically significant at the 10, 5, and 1% levels, respectively.

5. The Effect on ESG Performance

Our findings in Section 4 suggest that IR firms tend not to engage in real activities manipulation, supporting the notion that IR corrects managers' short-term orientation and promotes firms' long-term value creation. In other words, we have revealed that IR could play its expected role of constraining short-term oriented behavior, which is in the interest of a wide range of stakeholders. However, we do not yet know the impact of IR on managers' nonfinancial decision making. As we are primarily interested in whether IR facilitates long-term orientation, we conduct an additional test to examine its impact

on ESG performance, which may have greater impact on long-term value than short-term financial performance. We estimate Equations (8) and (9):

$$ESG_{i,t} = \alpha + \beta_1 POSTIR_{i,t} + \beta_2 TA_{i,t-1} + \beta_3 PBR_{i,t-1} + \beta_4 LEV_{i,t-1} + \beta_5 ROA_{i,t-1} + \beta_6 RETURN_{i,t-1} + \beta_7 DSH_{i,t-1} + \beta_8 ID_{i,t-1} + \beta_9 FIRMAGE_{i,t-1} + YearDummy + IndustryDummy + \varepsilon_{i,t} \quad (8)$$

$$ESG_{i,t} = \alpha + \beta_1 IRPERIOD_0Y_{i,t} + \beta_2 IRPERIOD_1Y_{i,t} + \beta_3 IRPERIOD_2Y_{i,t} + \beta_4 IRPERIOD_3Y_{i,t} + \beta_5 IRPERIOD_4Y_{i,t} + \beta_6 IRPERIOD_5Y_{i,t} + \beta_7 IRPERIOD_6YA_{i,t} + \beta_8 TA_{i,t-1} + \beta_9 PBR_{i,t-1} + \beta_{10} LEV_{i,t-1} + \beta_{11} ROA_{i,t-1} + \beta_{12} RETURN_{i,t-1} + \beta_{13} DSH_{i,t-1} + \beta_{14} ID_{i,t-1} + \beta_{15} FIRMAGE_{i,t-1} + YearDummy + IndustryDummy + \varepsilon_{i,t} \quad (9)$$

where $ESG_{i,t}$ is the ESG rating obtained from FTSE Russel Sustainable Investment Data. The ESG ratings range from 0 to 5, and are available from 2014. The higher the ESG rating, the higher the ESG performance. The remaining variables are as described above (see Appendix A). We obtain a sample which comprises 2430 firm-year observations for 478 unique firms. Of the observations, $POSTIR_{i,t}$ takes one for 488 firm-years, and zero for 1942 firm-years. Of the 478 unique firms, 247 firms issued an integrated report at least once, while the remaining 231 firms did not issue a single integrated report. The mean value of $ESG_{i,t}$ for IR firm-years (non-IR firm-years) is 2.76 (1.95), indicating that, on average, the ESG performance of IR firm-years is higher than that of non-IR firm-years.

Table 8 presents the regression results of Equations (8) and (9). In the first column, the positive and significant coefficient of $POSTIR_{i,t}$ indicates that ESG performance is higher after the introduction of IR. The second column of Table 8 shows that all $IRPERIOD$ dummies except $\beta_7 IRPERIOD_6YA_{i,t}$ are positively associated with $ESG_{i,t}$ at the 1% level. The average VIF are smaller than 2.0 in all regressions of Table 8, suggesting that the multicollinearity problem is negligible. Overall, these results suggest that introducing IR has a positive impact on ESG performance, consistent with Esch et al. [108], revealing that integrated information could lead to more sustainable decision making.

Table 8. The effect on ESG performance: regression results of Equations (8) and (9).

	Equation (8)	Equation (9)
Dependent Variable	ESG	ESG
<i>POSTIR</i>	0.377 [4.98] ***	
<i>IRPERIOD_0Y</i>		0.366 [4.98] ***
<i>IRPERIOD_1Y</i>		0.389 [6.16] ***
<i>IRPERIOD_2Y</i>		0.469 [4.86] ***
<i>IRPERIOD_3Y</i>		0.487 [5.41] ***
<i>IRPERIOD_4Y</i>		0.462 [3.81] ***
<i>IRPERIOD_5Y</i>		0.468 [5.15] ***
<i>IRPERIOD_6YA</i>		0.323 [1.81] *
<i>TA</i>	0.422 [10.22] ***	0.411 [10.31] ***
<i>PBR</i>	0.076 [4.29] ***	0.076 [4.25] ***
<i>LEV</i>	0.124 [0.57]	0.082 [0.38]

Table 8. Cont.

	Equation (8)	Equation (9)
ROA	−0.286 [−0.58]	−0.311 [−0.65]
RETURN	−0.184 [−2.27] **	−0.142 [−1.75] *
DSH	0.141 [0.36]	0.193 [0.49]
ID	1.127 [6.24] ***	1.088 [6.28] ***
FIRMAGE	0.071 [2.24] **	0.077 [2.48] **
constant	−4.193 [−8.87] ***	−4.060 [−8.89] ***
Year effects	Yes	Yes
Industry effects	Yes	Yes
Adj-R ²	0.539	0.548
N	2430	2430

This table shows the regression results of Equations (8) and (9) for the relation between the introduction of IR and ESG performance. Variables are defined in Appendix A. All t-statistics in parentheses are calculated based on standard errors adjusted for heteroscedasticity, and clustered by firm and year. *, **, and *** indicate that the estimated coefficients are statistically significant at the 10, 5, and 1 % levels, respectively.

6. Conclusions

This study empirically examines the impact of IR on real activities manipulation. According to the IIRF, published by the IIRC in 2013, IR is intended to improve not only the quality of information available to external parties, but also managerial decision making. The introduction of IR is expected to correct companies' short-termism and promote long-term value creation. This means that IR could address agency problems caused by pressure from short-term oriented shareholders. Although the voluntary introduction of IR has been rapidly increasing in recent years, there is little evidence on the economic consequence of voluntary IR. Thus, it is an empirical issue whether voluntary IR effectively achieves its distinguishing objective of better internal decision making. Taking a large sample of Japanese IR and non-IR firms, we examine whether companies' real activities manipulation, a form of short-term oriented behavior, change with the introduction of voluntary IR.

This study's findings are summarized as follows. We first find that firms tend not to engage in real activities manipulation after the introduction of IR. We also find that the effect of IR on real activities manipulation increase as time passes after IR is introduced. In addition, we show that ESG performance is higher after the introduction. Thus, our findings are consistent with the suggestion that IR gradually instills integrated thinking within the firm, constrains short-term orientation, and promotes decision making with a long-term focus. IR could align managers' incentives with a wide range of stakeholders' interests, resulting in more effective stakeholder-oriented corporate governance mechanisms.

This study makes both academic and practical contributions. First, we enrich the literature on the real effect of disclosure by examining the impact of IR on real activities manipulation, a form of myopic behavior. One of the objectives of IR is to achieve better internal decision making [8]. Through empirical research, this study complements existing studies, such as Mio et al. [109] and Esch et al. [108] by providing evidence that voluntary IR has real effect, i.e., improves firms' internal decision making in Japan, a country where corporate governance is stakeholder-oriented. Empirical studies on the real effects of IR are still limited. Therefore, this study is academically significant in that it reveals the economic consequences of IR in the context of real effects research. Second, we provide evidence for policy makers who are interested in the merits of IR. Many studies have investigated the IR in South Africa, showing that mandatory IR has a positive economic effect. On the other hand, this study investigates voluntary IR of Japanese firms with stakeholder-oriented

corporate governance and finds that voluntary IR can also improve corporate behavior of firms adopting stakeholder-oriented corporate governance mechanisms. Therefore, firms with stakeholder-oriented corporate governance can benefit from a voluntary approach to IR. This study provides empirical evidence to which policy makers, especially in countries where stakeholder-oriented corporate governance is dominated, can refer to when deciding on the application of the voluntary approach to IR adoption. Third, our study provides empirical evidence that supports practitioners' views on IR. We find that it takes approximately two years or more after introducing IR for companies to be less likely to engage in real activities manipulation. This finding is consistent with the practitioners' perspective that IR is a continuous improvement process, and thus takes several years to improve internal decision making.

One of the limitations of this study is related to the external validity of our findings obtained from the investigation of IR in Japan. It cannot be ruled out that differences in the institutional environment between Japan and other countries may affect the resultant relationship between voluntary IR and real activities manipulation. Future research could extend this study by using a broader sample base. Second, there are limitations regarding the sample. As Table 1 shows, the number of firms introducing IR has only recently begun to increase. Thus, the percentage of firms that have adopted IR becomes low in this study. Despite this limitation, we believe that this study is meaningful in that it provides insights into the emerging research issue: the effect of IR on corporate behavior in the early stages of IR spread. It would be necessary to revisit this issue in the future to confirm the results when IR has more widely spread into business practices. Third, the study has limitations stemming from the adoption of regression analysis methods using large sample data. The study provides evidence to suggest that, on average, the introduction of integrated reporting has changed corporate behavior to be more long-term oriented. However, this study does not cover how the introduction of IR has led to changes in decision making in different departments within companies or at different levels of the companies' internal hierarchy. Therefore, the findings of this paper could be complemented by applying other analytical methods that delve deeper into changes within individual companies, such as case study approach.

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Appendix A. Variable Definitions

Variables	Definition
Dependent Variables	
<i>ABN_CFO</i>	Level of abnormal cash flows from operations obtained from the model proposed by Roychowdhury [11].
<i>ABN_PROD</i>	Level of abnormal production costs obtained from the model proposed by Roychowdhury [11].
<i>ABN_EXP</i>	Level of abnormal discretionary expenses, including selling, general and administrative expenses, research and development expenses, and advertising expenses from the model proposed by Roychowdhury [11].
<i>TotalRAM</i>	Total measure of real activities manipulation calculated by multiplying <i>ABN_CFO</i> and <i>ABN_EXP</i> by negative one each and summing them and <i>ABN_PROD</i> ($ABN_CFO \times -1 + ABN_PROD + ABN_EXP \times -1$).
<i>ESG</i>	ESG rating obtained from FTSE Russel Sustainable Investment Data. The ESG ratings range from 0 to 5.
Variable of Interest	
<i>POSTIR</i>	Indicator variable that equals 1 for firm-year observations after the issuance of an integrated report, 0 otherwise. To identify the first year of integrated report issuance for each company, we use the “List of Corporations in Japan Engaged in the Publication of Self-Declared Integrated Reports 2018 [39].”
<i>POST</i>	Indicator variable that equals 1 for the firm-year observations of both treatment and control groups in the post-treatment period, and 0 for the firm-year observations in the pre-treatment period.
<i>IRPERIOD_nY</i>	Indicator variables that equal 1 for firms with 0-years, 1-year, 2-years, 3-years, 4-years, 5-years, and 6-years or more experience with IR.
Control Variables	
<i>TA</i>	Natural logarithm of total assets.
<i>PBR</i>	Market value of equity divided by book value of equity.
<i>LEV</i>	Total liabilities divided by total assets.
<i>ROA</i>	Net income divided by total assets.
<i>RETURN</i>	1-year stock return by the end of fiscal year $t-1$.
<i>DSH</i>	Ratio of shares held by directors.
<i>ID</i>	Proportion of independent directors
<i>FIRMAGE</i>	Natural logarithm of 1 plus number of years since listing.
<i>IRFIRM</i>	Indicator variable that equals 1 for companies that issue integrated reports at any point in time, and 0 otherwise.
<i>IMR</i>	Inverse Mills ratio obtained by estimating the probability of issuing an integrated report using Equation (7).

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