Release from Restricted Environmental and Social Investing: Evidence from agreements between asset owners and asset managers

SHIRASU, Yoko
Aoyama Gakuin University

SUZUKI, Katsushi
Hitotsubashi University

EL GHOUL, Sadok
University of Alberta

RIETI
Research Institute of Economy, Trade & Industry, IAA

Release from Restricted Environmental and Social Investing: Evidence from agreements between asset owners and asset managers[*]

Yoko Shirasu

Department of Economics, Aoyama Gakuin University, Japan

Email: shirasu@cc.aoyama.ac.jp

Katsushi Suzuki

Graduate School of Business Administration, Hitotsubashi University, Japan

Email: ksuzuki@hub.hit-u.ac.jp

Sadok El Ghoul

University of Alberta, Canada

Email: elghoul@ualberta.ca

Abstract

We investigate the impact of the awareness gap between asset owners and asset managers on environmental and social (ES) investments, using the signing of the United Nations Principles for Responsible Investing (PRI) by the Japanese Government Pension Investment Fund (GPIF) as an exogenous shock. The results show that the ES scores of firms that received investments from GPIF-entrusted asset managers who had also already signed the PRI improved after the GPIF signed the PRI, but the ES scores of asset managers who had signed the PRI but had not been commissioned by the GPIF did not improve. These results suggest that the agreement on ES investment between asset owners and asset managers plays a more important role in facilitating firms' ES activities.

Keywords: Asset Owner, Asset manager, Corporate Social Responsibility, Exogenous shock, Fiduciary responsibility, Difference-in-Difference Estimation.

JEL Classification Codes: G11; G32; G39

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1. INTRODUCTION

Asset managers raise funds from asset owners to invest in firms. Asset owners are generally institutions such as pension plans, insurance companies, government agencies, banks, foundations, and family offices that own actual assets. Meanwhile, asset manager are finance professionals who manage money, such as mutual funds, investment advisors, securities firms, and other forms of assets, on behalf of an asset owner. It is well known that large asset owners included their own in-house asset managers asset self-management with in-house managers, but in many cases, investments are entrusted to asset managers (agents) separate from the asset owner (principal).[1] When the asset owner and the asset manager are separate organizations, they might not have the same view of the investment portfolio or investment policy.

One investment proposal, in particular, that has divided opinions is environment- and social-related (ES) investments, which have attracted considerable attention in recent years. Some asset managers and asset owners believe that ES investments sacrifice a firm's financial performance and are in conflict with its fiduciary responsibilities, while others believe that they improve financial performance over the long term (Eccles et al. 2017; Gibson et al. 2022). Similarly, empirical studies have been mixed in their assessment of the impact of ES investments on firm financial performance (Albuquerque et al. 2019; Dai et al. 2021; Gillan et al. 2021; Griffin et al. 2021; Shirasu and Kawakita 2020; Masulis and Reza 2015 Cheng et al. 2014; Cronqvist and Yu 2017). How disagreements between asset owners and managers affect asset managers' ES investment activities continues to be debate. The purpose of this paper is to examine whether agreements between asset managers and asset owners affect asset managers' ES investment.

In general, there is a fiduciary responsibility that the asset manager, as an agent, must not act contrary to the interests of the principal, the asset owner, with the goal of maximizing the interests of the principal. In this case, even if the asset manager believes that corporate ES activities will improve firm performance, provided that the asset owner does not agree, the asset manager may not be able to proceed with the ES investments. For example, if asset managers who believe that ES improves investment performance perform poorly, asset owners who do not hold the same belief may blame the poor performance on over-progressive ES investing as fiduciary responsibility. To avoid this, asset managers who believe in ES

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[1] Asset owners may also use gatekeepers when they do not manage their own assets, but outsource the management to another asset manager.

investment may discourage such investments if the asset owner does not believe in it.[2]If asset owners who pursue only financial goals begin to pursue ES goals as well as their fiduciary responsibility, asset managers who agree on ES investments are expected to become more active in promoting ES investments. Therefore, it is hypothesized that asset managers who already have a positive view of ES will promote ES investments more as a result of a positive change in asset owners' attitudes toward ES investments.

To investigate this hypothesis, this paper uses positive change in awareness events for ES investments at the Japanese Government Pension Investment Fund (GPIF), the world's largest asset holder with ¥159 trillion under management (GPIF 2018). The GPIF is a public organization in Japan, and its asset management policies are influenced by the policies of the Japanese government. The benefits of utilizing this GPIF event are twofold. First, the attitudes of asset owners and asset managers towards ES can be tested separately. GPIF is not legally allowed to buy and sell stocks on its own, so it does not manage its own stocks and makes all investments through externally entrusted asset managers from independent organizations. GPIF announces the names of its entrusted asset managers to track the changes in entrusted asset managers. Therefore, we examine the awareness of ES investments of asset owners and managers separately.

Another advantage of using GPIF is that we can address endogeneity problems in testing. These problems of reverse causality may arise when examining whether an ES agreement between asset owners and asset managers promotes ES investments by asset managers. For example, even if we examine the correlation between asset owners' support of ES investing and their asset managers' ES investments, it is difficult to distinguish whether it is the asset owners' support that drives their asset managers' ES investments, or whether asset owners who support ES investing choose asset managers that actively participate in ES investing. To mitigate these endogeneity problems, this study uses the sudden GPIF decision to sign the United Nations (UN) Principles for Responsible Investing (PRI) in 2015 as an exogenous shock to asset owners' increasing awareness of ES investments. The PRI is an industry-led membership network that aims to leverage institutional investors' financial power to achieve sustainable development goals. Principle #1 calls for the incorporation of environmental, social, and governance (ESG) issues in the analysis and selection of investments (Gibson et al. 202). Signing the PRI can be viewed as a statement of support for ES investment. The GPIF's signing of the PRI resulted in a sudden change in the Japanese

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[2] Eccles et al. (2017) argue that the mismatch between the time it takes for an ES investment to impact a firm's financial performance and the asset owner's evaluation period for the asset manager can discourage ES investment.

government's sustainable development policies. The signing of the PRI by the GPIF, an asset owner with a large share of Japanese equities, was an unexpected exogenous shock to Japanese asset managers at the time (see the next section for details). Therefore, we can mitigate the endogeneity problem by examining asset managers' ES investments before and after the GPIF signed the PRI. Until recently, only a few Japanese asset owners other than the GPIF had signed the PRI.[3] The failure of other asset owners to sign the PRI allows us to more clearly examine the impact of the GPIF's signing of the PRI on asset managers' ES investments.

Based on our hypothesis, we predict that the GPIF's signing of the PRI will encourage ES investments (i.e., firms' ES score) by already singed PRI-entrusted asset managers.[4] However, if this signature does not affect the entrusted asset managers' ES investments, then the ES investment strategy of the entrusted asset managers who had originally signed the PRI would not change. Using the difference in differences (DID) approach, this study investigates whether entrusted asset managers who signed the PRI prior to the GPIF promoted their ES investments after the GPIF also signed the PRI.

We found that firms, in which the GPIF-entrusted asset managers were major shareholders, improved their firms' ES scores more after the GPIF signed the PRI. Interestingly, the firms' ES scores of non-GPIF-entrusted asset managers who had signed the PRI did not improve. These results are consistent with our hypothesis that asset managers who already have a positive vision of ES promote more ES investments due to a positive change in asset owners' attitudes toward ES. Our findings are robust to placebo testing with propensity score matching (PSM), legacy samples, and other ES measures.

This study contributes to the literature in several key areas. First, it reveals the impact of institutional investors on firms' ES activities. Previous studies show that the impact of institutional investors on firms' ES activities is controversial (Velte 2022; Dyck et al. 2019; Barnea and Rubin 2010; Dimson et al. 2015). For example, institutional investors' impact on firms' ES activities has been examined in terms of various aspects, such as institutional holding periods, size, activeness, and foreign shareholders (Shirasu and Kawakita 2021; Döring et al. 2021; Ghaly et al. 2020; Harford et al. 2018, Bénabou and Tirole 2010; Kim et al. 2019). This study complements these studies by identifying how asset owner endorsements facilitate ES investments by institutional asset managers.

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[3] The information is obtained from Nikkei, 21/5/2021

[4] Although we examine whether the ES investments of asset managers who did not sign the PRI before the GPIF was signed increased after the GPIF was signed, this does not mean that we have tested the hypothesis of this paper. Even if ES investment by asset managers increased after the GPIF was signed, it may have been because ES investment was (reluctantly) encouraged by the agreement of the asset owner, regardless of the asset manager being not in favor of ES investment.

Second, we contribute to the literature on the impact of PRI signatures on ES investment. Dyck et al. (2019) and Dimson et al. (2018) show that institutional investor commitment encourages corporate ES activities through PRI signing. Contrastingly, Gibson et al. (2022) and Velte (2022) find that the impact of PRI signatures on ES investments varies across countries. They report that while PRI signatures promote ES investments in European and Asian countries, they do not promote ES investments in the United States. They interpret this difference as depending on whether ES investments are included as part of the fiduciary responsibility,[5] and whether it is greenwashing. Our study finds that asset managers' signatures alone are less effective in promoting ES investments, providing another perspective on the differing impact of PRI signatures by institutional investors on ES investments.

Finally, we contribute to the literature on conflicts of interest between asset managers and asset owners. Previous studies such as, Fecht et al. (2018) and Kaneki and Suzuki (2023) indicate that the opposite trading of shares between the asset-owner's and asset-manager's accounts increases the asset managers' profits. Moreover, in entrepreneurial investments, a conflict of interest exists between limited partners and general partners (Sahlman 1990; Gompers and Lerner 1999; Kaplan and Strömberg 2009).[6] This study contributes to the literature by examining the impact of a new agreement between asset owners and asset managers on ES investments.

The remainder of this paper is structured as follows. Section 2 briefly explains the GPIF and PRI, Section 3 describes our sample and presents our methods, Section 4 discusses the empirical results, and Section 5 provides concluding remarks.

2. THE GPIF AND SIGNING OF THE PRI

Institutional investors are classified into two categories: asset owners and asset managers. The asset owner is the natural owner of capital and originator of capital (Eurosif, 2016), who are most typically public pension funds. Asset managers, such as mutual funds and investment advisory firms, obtain funds from asset owners and invest them as entrusted

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[5] Gibson et al. (2022) argue that this is due to differences in whether there is a legislative consensus on the definition of fiduciary responsibility. In Europe, it has been common of responsibility investments, whereby laws require investors to incorporate ES factors into their portfolios as part of their fiduciary responsibility. However, in the United States, there is still an ongoing debate regarding whether fiduciary responsibility takes ES into account in investments.

[6] These studies show that a variety of methods are used to mitigate conflicts in venture investing, where information asymmetries are severe and disagreements are likely to arise (i.e., stage finance, incentive plans, and venture capital (VC) contracts). By mitigating these issues through the use of investment methods and VC agreements, Limited Partners (LP) will be encouraged to invest in General Partners (GP) and facilitate high-risk investments by GPs.

investments. Although asset owners invest directly on their own,[7] the relationship between asset owners and asset managers is known as the agent-principal relationship. Therefore, asset managers have a responsibility to the asset owners to manage the entrusted assets in order to meet the financial and intangible goals of their clients.[8] In short, asset managers have a "fiduciary responsibility" towards the asset owners, which means their investment activities are client-oriented (Goto 2021).[9,10] In fact, asset owners possess a strong power over asset managers; hence, asset owners sit at the top of the institutional investor hierarchy (Monks, 2001).

The GPIF is the largest public pension fund in the world and had ¥159 trillion in assets under management at the end of fiscal year 2018 (GPIF2018 Otsuka 2020).[11] Initially, in Japan, the Ministry of Finance (MoF) managed public pension funding. In April 2006, the GPIF was established as part of the government.[12] The establishment of the GPIF was linked to the political reform of the pension system,[13] which changed the management of public pension fund investments from trusts associated with the MoF to new, independent, and professional management (Otsuka 2020). As of 2018, in case of limited Japanese equity, the market share of GPIF is just over 6 %.[14] The GPIF has come to be described as the "whale" (due to its size) of the financial market.[15] The purpose of GPIF is to maximize medium and long-term

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[7] It is also known as in-house investments. Most of the pension funds in Japan (i.e., asset owners) neither invest directly by themselves nor have the same operational structure as typical global large pension funds.

[8] Goto (2021) shows that the clients' expectations for ESG investments are both demonstrating financial performance and substantial effects to corporate activities for ESG, as well as emotional satisfaction. Hoepner et al. (2021) shows that asset owners can promote responsible investment more extensively in financial markets, thereby creating a ripple effect.

[9] Hoepner et al. (2021) revealed that not only financial aspects, but normative and regulative aspects influence asset owners.

[10] In 2019, the UN and PRI announced the concept of fiduciary responsibility for institutional investors has finally changed. Previously the traditional fiduciary responsibilities had included just loyalty (e.g., acting with honesty and in good faith) and prudence (e.g., investing as an ordinary prudent person). They were then expanded to sustainability-related preferences and ESG, etc. However, note that final this decision was not published until after this study period. The information is obtained from "Fiduciary duty in the 21st century final report". https://www.unpri.org/fiduciary-duty/fiduciary-duty-in-the-21st-century-final-report/4998.article

[11] According to Thinking Ahead Institute, "The world's largest pension funds – year ended 2017," which surveyed pension funds all over the world on March 2018, (https://www.thinkingaheadinstitute.org/news/article/emerging-market-pension-funds-grow-in-prominence-on-the-world-stage/) revealed that the largest pension fund in the world was the GPIF, and second largest was the Norway Government Pension Fund. The actions and powers of the GPIF affect not only the Japanese financial market, but also global financial markets.

[12] The GPIF manages and invests pension fund reserves under the Ministry of Health, Labor, and Welfare's (MHLW) supervision. The GPIF is governed by three main laws which are enforced by the government.

[13] See Stewart and Yermo (2010) for details. Barber et al. (2021) empirically shows that public pensions with mission objectives face political pressure and are subject to legal restrictions.

[14] At the end of fiscal 2018, the GPIF held JPY 39 trillion in Japanese equities. The market capitalization of the Tokyo Stock Exchange First Section was approximately JPY 639 trillion; thus, the GPIF held over 6% of equities.

[15] The second largest asset owner in Japan is the Bank of Japan (BOJ). Although the BOJ holds huge ETFs, unlike the GPIF, the BOJ does not act as an asset owner at all, but it just purchases and holds the ETFs (Nikkei 4/16/2021/). Hirayama (2021) blame the BOJ for being loosely pursuing its ETF purchases aimlessly and is not fulfilling asset owner's responsibilities. Thus, the other asset owners have negligible power, hence, it is not an overstatement to say that the representative asset owner in Japan is the GPIF.

investment returns[16] and carry out the political objectives of the government (Ujikane and Nozawa 2019).

The GPIF has been legally prohibited from directly investing in financial assets by law because they are worried about the low financial performance caused by the use of pension-reserved money for public investment, such as aid for developing countries (Musalem and Palacios 2004; Nomura 2008). The GPIF entrusted asset managers (GPIF approved) operate and invest their funds in the market, under the guidance of the GPIF's methods and rules (see Appendix 1). Figure 1 compares the investment operation systems of both the GPIF and a similar agency, California Public Employees' Retirement System (CalPERS) as an example. The CalPERS invest their pension funds directly by themselves, and they trust outside asset managers through gatekeepers for some of the asset classes (Tokushima 2021). However, the GPIF generally invests their funds through individual GPIF-entrusted asset managers, and their names were announced on its website in 2013.

【Insert Figure 1 around here】

The GPIF unexpectedly announced its signing of the PRI on September 28, 2015, resulting from a sudden change in ES policy by the Japanese government, the Abe Cabinet in 2015, which was revealed at the United Nations Sustainable Development Summit 2015.[17] Mr. Shinzo Abe, Prime Minister of Japan, shared the additional efforts required to achieve a sustainable environment and society, and the signature of GPIF by the PRI. The policy change was an unexpected big shock to the Japanese financial market and almost all asset managers. The research institute of Daiwa Securities, one of Japan's four major securities firms, even issued a short report that began with such a surprising first sentence; "On September 28, news jumped out that will have a major impact on Japan's asset management industry."[18]

The PRI is an investor initiative implemented in conjunction with the UN Environment Program/Finance Initiative and the UN Global Compact. It comprises the six principles published by the UN in 2006 to guide investors in their ESG investment decisions and policies. Institutional investors who agreed to adopt the PRI have the fiduciary responsibility for long-

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[16] According to Otsuka (2020), the GPIF has four basic investment principles, linked to policy: to (1) achieve a return on investment, (2) diversify investment strategies, (3) mix policy assets, and (4) maximize long-term returns.

[17] The information is obtained from https://www.mofa.go.jp/mofaj/ic/gic/page3_001387.html, https://www.mofa.go.jp/mofaj/files/000101404.pdf

[18] The information is obtained from https://www.dir.co.jp/report/column/20151002_010176.html

term, optimal profits, and addressing ES issues.[19] Since the signatories could contribute to developing a more sustainable global financial system, many professional investors have attracted global signatories. The total number of signatories at the end of 2018 was 2276 globally, with only 68 signatories[20] in Japan (including only three private pension funds[21]), ranking 10th in the world. Therefore, PRI signatures among Japanese investors were a very important subject for the promotion of ES investing.

The signing of the PRI by the GPIF indicated the GPIF's support for ES investing. The GPIF announced on the same day as Abe's statements at the UN summit [22] that it promotes ES investment through the following: 1) The GPIF's 2015-Medium-Term Objectives[23] included, for the first time, a commitment to ESG, and 2) The GPIF includes ESG in its assessment of entrusted investors.[24] Therefore, GPIF's investment policy shift regarding ES investing and its explicit evaluation of the results have been a major change for asset investors.

3. DATA and METHODOLOGY

3.1. Data

We collected all available Japanese ESG firms' score data by firm from 2012 to 2018 from GoodBankers (GB), an independent investment advisory firm specializing in social investment research. The GB scores do not include financial information (See Appendix 2) but includes consistent long-term information and information on outcomes. The major global ES rating agencies (e.g., MSCI Inc.) are known to have very different scores among the rating agencies.[25] The main reasons are differences in indicator selection and calculation methods (Berg et al. 2020), as well as issues such as differences due to managerial integration of rating agencies (Escrig-Olmedo et al. 2019) and score inflation of so-called SISTER companies (Tang

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[19] The information is obtained from https://www.fsa.go.jp/singi/stewardship/siryou/20131127/07.pdf
[20] The information is obtained from https://sustainablejapan.jp/2019/01/31/pri-signatories-2018/36906
[21] The information is obtained from Nikkei, May 21, 2021
[22] The information is obtained from https://www.gpif.go.jp/investment/pdf/signatory-UN-PRI.pdf
[23] The GPIF's Medium-Term Objectives, or five-yearly goals of its investment operations, are set by the MHLW. These provide the basis of a "medium-term plan."
[24] ESG is evaluated by the GPIF when the entrusted investment process is assessed. It includes ESG activities in its outsourcing evaluation, with an evaluation weight of 10% for active and 30% for passive entrusted-investor management. The ESG activities results are incorporated into GPIF-entrusted investor evaluations as numerical values, indicating that they are not mere verbal promises or targets and that there are substantial economic sanctions. If the results are unsatisfactory, investors' mandates may be terminated within a year or two, which may cause investors to miss out on big business in the Japanese market, lose their certification from public pension agencies, and suffer the resultant damage to their reputations.
[25] Becht et al. (2023) examine the impact of demand shocks caused by the GPIF's adoption of the FTSE Index and the MSCI ESG Index on firm stock prices in 2017.

et al. 2020). Since Japanese ES initiatives started relatively late and are published in Japanese (not English), it is difficult to understand whether major global rating agencies are fully aware of Japanese firms' unique characteristics and situations. Hence, the firms' score provided by a local agency, with consideration of adequate historical information and independent research is very fair. The ESG scores used in this study are published annually in August.

Descriptions of the firms' ESG scores and accounting and ownership data are presented in Appendix 3. Accounting data were retrieved from Quick databases. We acquired detailed ownership data and information from the Thomson Reuters (Refinitive) database. In Japanese regulatory reporting. Yukashoken Hokokusyo includes the trust accounts with hidden shareholder details.[26] Some of those are revealed in the Thomson Reuters database, which includes that information in its "large holding" and "investment trust management" reports.[27] We obtained owner share information by firm and by investor, then calculated some investor types by firm.

We acquired information about GPIF-entrusted investors from the GPIF website.[28] The GPIF-entrusted investors do not change frequently and remain relatively consistent. The owner shares of non-GPIF institutional investors are the total owner shares of institutional investors minus those of GPIF-entrusted investors. We use this because Japan's Companies Act, a shareholder-ownership ratio of 3% provides the right to demand the dismissal of a director, and a ratio of 5% or more means the obligation to submit an extensive shareholding report as large investors, implying large shares and active ownership. When aggregating the PRI/GPIF ownership share for each firm, the total number of equity shares held by each asset manager was aggregated. The PRI signatory investors promote ES for all firm holdings and are not solely responsible for their holdings.

We acquired information on the 68 PRI signatories from the PRI website.[29] Unlike European institutional investors, asset managers in Japan have not been as active in ESG activities or signing the PRI.

In our sample, an ESG-active firm covered by the respective ESG database must have regular common stock listed on the Tokyo Stock Exchange and accounting data based on

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[26] It is difficult to identify substantial shareholders from shareholdings reports shareholdings reports (Yukashoken Hokokusyo) in Japan because there is no regulatory system to determine who they are, except when the large shareholder reporting system is applied. This is very different from the US, where detailed information on stock holdings is disclosed on Form 13F. However, a few information vendors in Japan disclose detailed information.

[27] For example, BlackRock is one of the largest TAKEDA shareholders, and although the name BlackRock is not in the regulatory financial statement, we acquired the owner share data from Thomson.

[28] The information is obtained from https://www.gpif.go.jp/operation/

[29] The information is obtained from https://d8g8t13e9vf2o.cloudfront.net/Uploads/h/r/j/signatorydirectoryupdated122020_169996_778605_873356_806439.xlsx

Japanese Yen. Observations greater or lower than the 1ˢᵗ or 99ᵗʰ percentiles were winsorized to remove any potential outliers.

3.2. Sample Description

Table 1 presents an outline of ESG score data by year, the number and average raw and normalized score, from 2012 to 2018. The community category addresses societal activities, the employee category comprises capacity development, career development support, and labor unions, and the environmental categories relate to environmental management (organization structure, production process, and products care). We used two categories: social (integrated from the community and employee categories) and environmental and calculated the social score as 1/2*community+1/2*employees. Also, we used raw and maximum–minimum normalized scores. [30] Trinh et al. (2023) have analyzed the original and normalized ESG scores in an additional research study. Due to space limitations, we only show the empirical results for the normalized scores.[31] As shown in Table 1, the number the firms' score is increasing, and average of normalized score is stable throughout every year.

【Insert Table 1 around here】

Table 2 presents basic descriptive statistics. Panel A of Table 2 shows the basic statistics, and Panel B shows the correlation matrix. In panel A, both categories normalized ESG scores and raw scores are similar, and we employ normalized one. The average of shareholding of asset managers' PRI is 15.1% but Shareholding of GPIF is only 4.8%. The maximum of shareholding of asset managers' PRI is 76.3% but Shareholding of GPIF is 3.6%. The firms that operate in ESG activities are heavily owned by PRI-signatory asset managers; however, the share held by GPIF entrusted investors is smaller. Also, Among ESG firms held by GPIF entrusted investors, about 40% are owned as major investors with ownership ratios of 5% or more.

In Panel B, the correlation of the shareholding of asset managers' PRI (11) and the shareholding of non-GPIF-entrusted with PRI-signed (nonGPIFPRI) (12) is 0.91, and that of the shareholding of GPIF-entrusted investors with PRI-signed (nonGPIFPRI) (12) and shareholding of non-GPIF-entrusted investors (10) is 0.76. The correlations are high. Thus, we

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[30] Normalized score = (score-min score) / (max score-min score)
[31] The results for the original scores were similar to raw scores.

do not use the shareholding value itself but the dummy variables of GPIF-entrusted or non-GPIF- entrusted investors' shares of more than 3% or 5% as well PRI-signed investors. This study focuses on the agreement/disagreement on ES between asset owners (GPIF) and asset managers, not the engagement between asset managers and companies; so, it is sufficient to know whether the asset manager is a major shareholder, not the percentage of shares held by them. The dummy variables are used instead of the actual number of shares held, because the impact on firms is constant regardless of the ratio of shares held as long as the investors are large and active. We consider that the impact of ES on a firm is constant for major shareholders, no matter how large or small the proportion of their shareholding, and apply some dummy variables.

【Insert Table 2 around here】

The distribution of GPIF-entrusted investors' ownership ratios is shown in Panel A of Table 2, with the averages of 4.93% and 3.66% in Q2, and half of the investors holding less than 3.6%. Figure 2 shows the distribution of the ownership of GPIF-entrusted investors. The proportion of investors with 0.1% or less holdings is high. Of late, GPIF has mainly invested in passive funds; in 2015, 81.52% of the GPIF's Japanese equity investments were in passive management.[32] The GPIF holds equity in almost all Japanese stocks, with large shareholdings in some stocks and minimal in many stocks. The recent trend toward passive investment may influence this, however, whether investors with excessively low ownership can be considered GPIF-entrusted investors is questionable. Therefore, we define GPIF-entrusted investors as those with a 3%, 5% or more, as dummy variables influencing shareholders.

【Insert Figure 2 around here】

We employ two kinds of variables: the asset owner's share value managed by the GPIF-entrusted investors (owner shares), and the GPIF dummy variable (D(GPIF ≥ 3, 5)), which is 1 if the owner shares of the GPIF-entrusted investors are more than 3% or 5%, respectively, and 0 otherwise. The alternative dummy variable is the non-GPIF institutional dummy variable

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[32] The information is obtained from https://www.gpif.go.jp/operation/state/2016.html

(D(NonGPIF $\geq$ 3, 5)), which equals 1 if the shares of non-GPIF institutional investors are more than 3% or 5%, respectively, and 0 otherwise.

We also identify the PRI dummy (D(AMPRI $\geq$ 3, 5)) is 1 if the owner share of PRI-signed investors is more than 3% or 5%, respectively, and 0 otherwise. The dummy for not-PRI-signed dummy (D(AM_NonPRI $\geq$ 3, 5)) is 1 if the owner share of not-PRI-signed investors is more than 3% or 5%, respectively, and 0 otherwise.

Furthermore, we make the new dummy variable, non-GPFI and without PRI-signed dummy (D(NonGPIFnonPRI >= 3,5)), the share of investors who are neither GPIFs nor PRI signatories is 1 if the owner share of non-GPIF without PRI-signed investors is more than 3% or 5%, respectively, and 0 otherwise.

This paper investigates the effects the gap between two sides, asset owner and asset managers, agree/disagree on ES, in details, the large owner shares held by GPIF-entrusted investors, the more ESG activities are promoted after the GPIF's investment policy change, despite PRI signed; as summarized in table? with the name of dummy variables. Of course, needless to say, asset managers who do not sign the PRI do not promote ES investments at all. Detailed in table3, PRI-signatory asset managers (A, B or C in Table 3) are expected to commit to ESG. On the other hand, a GPIF-entrusted asset manager (B in Table 3), who has a mandate investment contract with the GPIF, promote ESG investments in order to honor with the GPIF's investment policy change. Therefore, even if asset managers are PRI signatory, their firms' investments may differ depending on whether they are GPIF entrusted investors or not[33].

【Insert Table 3 around here】

Figure 3 shows the ESG score change before and after the GPIF's shift in policy. ESG scores are the social and environmental normalized scores. We show the difference between the GPIF-entrusted institutional investors (GPIF) and non-GPIF entrusted with PRI-signed investors (NonGPIFPRI). For social scores, the difference between GPIF-entrusted institutional investors (GPIF) and non-GPIF-entrusted with PRI-signed investors (NonGPPIFRI) expanded after the GPIF's policy change at t = 0. For environmental scores, both differences expanded after the change.

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[33] Of course, asset managers neither signed the PRI nor entrusted by GPIF (E in Table 3) do not promote ES investments at all.

3.3. Methodology

We investigate the effects of having a difference of opinion between asset owners and asset managers with respect to ES investing. The larger the amount of shares held by GPIF-entrusted investors, the more ESG activities are promoted after the GPIF's investment policy change, despite having signed the PRI.

We examine whether sudden external investment policy changes trigger ESG activities. There were two types of triggers. First, in 2015, the GPIF adopted the PRI and announced that GPIF-entrusted investors had to promptly report their activities. Second, by 2017, the GPIF-entrusted investors had to include ESG in their GPIF portfolios. Note that all the investors were announced in 2015, knowing that they had to proceed with ESG investments in 2017. Therefore, we determine the timing of the external shock as 2015, with the second shock in 2017 already included in the first.

ES investment has a long-term perspective (Shirasu and Kawakita 2021) and the impact of exogenous shocks is examined over a medium- to long-term period rather than one year. Thus, our analysis period is 2012–2018, or three years on either side of 2015, when the GPIF adopted the PRI. The post-dummy (postD) equals 1 if the year is between 2016 and 2018, and 0 otherwise.

First, before our basic analyses of the effect of the external GPIF investment policy change, we confirm the effects of signed PRI investors on a firm's ESG activities. We compare the effects of PRI-signed asset management investors, regardless of whether they are GPIF-entrusted investors or non-mandated GPIF investors. We employ the panel DID method with the dependent variables as the firms' ESG scores, independent variables as the two PRI dummies—the dummy of 3% or 5% PRI-signed investors' owner share (D(PRIF $\geq$ 3 or 5)) compared with the dummy variables for non-PRI-signed investors (D(nonPRI), and control variables as the firms' characteristics, such as size, leverage, return on assets (ROA), market-to-book ratio, equity turnover, with fixed effects accounting for unobservable time-invariant individual firm characteristics heterogeneity.

As a basic analysis, we employ the panel DID method between the two dummy variables as independent variables, the GPIF's large shareholder dummy of 3% or 5%-GPIF-entrusted institutional investors owner share (D(GPIF $\geq$ 3 or 5)) compared with the dummy

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variables for non-GPIF-entrusted with PRI-signed investors (D(NonGPIFPRI), and the dummy variables for non-GPIF-entrusted non- PRI-signed investors (D(NonGPPIFNonPRI).

Finally, we match the GPIF stocks with non-GPIF changes using propensity matching with regard to the 2015 data, whereby the treatment group is D(GPIF ≥ 3 or 5) and the control group is D(NonGPIFPRI ≥ 3 or 5), and employ the panel DID regression using dummy variables.

4. EMPIRICAL RESULTS

4.1. Do Political GPIF Changes Promote ESG Activities?

Panel A of Table 4 presents the impact of PRI-signed investors on ESG. The dummy variables D(AMPRI ≥ 5), where the shares of PRI-signed investors are more than 5%, are set to 1, and 0 otherwise. All estimations are including the controlling. For the environmental score, in Equation (2), the D(AMPRI ≥ 5) is positively significant, while (D(AM_NonPRI ≥ 5) is insignificant. The interaction term (D(AM_NonPRI ≥ 5)*postD, is negatively significant for social categories and insignificant in environmental categories after 2015 in Equations (1) and (2). Panel B of Table 4 presents the results for the PRI-signed investors' owner shares of more than 3%. Almost all results are insignificant, except for one negative result for the social intercept term. In previous studies, a higher share of PRI-signed investors has meant ESG (environment) promotion for a long time; however, for PRI-signed investors as a whole, ESG activities have not changed significantly in Japan.

【Insert Table 4 around here】

Next, as in our basic analysis, we examine the effect of the 2015 external GPIF investment policy change using panel DID analyses. As an asset owner, the GPIF engages asset managers (GPIF-entrusted investors) to promote ESG, while PRI-signed asset managers can address ESG activities directly. Almost all GPIF-entrusted investors have already signed the PRI, and the GPIF supports them in promoting ESG investments. This means that asset managers who are PRI-signed investors have restrictions on promoting ESG, but GPIF-entrusted investors can promote ESG without restrictions due to the support of the asset owner, the GPIF. Thus, GPIF-entrusted investors with PRI-signed asset managers would be more actively promoted in ESG investing by firms than non-GPIF-entrusted PRI-signed investors.

We split the PRI dummy (D(AMPRI ≥ 3, 5)) into two dummy variables, The GPIF dummy and the non-GPIF with the PRI-signed dummy. The GPIF dummy (D(GPIF ≥ 3, 5)) is 1 if the owner share of GPIF-entrusted investors is more than 3% or 5%, respectively, and 0 otherwise. The non-GPIF with PRI-signed dummy (D(NonGPIFPRI ≥ 3, 5)) is 1 if the owner share of non-GPIF-entrusted PRI-signed investors is more than 3% or 5%, and 0 otherwise. As previously mentioned, we cannot assume here that some GPIF-entrusted investors are not signatories to the PRI, since almost all GPIF-entrusted investors have already signed the PRI as of 2015. The GPIF-entrusted investors are only GPIF-entrusted investors with PRI-signed. The dependent variables are the ES score (normalized), including the owner share of GPIF-entrusted investors (GPIF), year, and firms' fixed effects.

The control variables for the firms' characteristics also include the controlling dummy variables for the non-GPIF PRI-signed dummy (D(NonGPIFPRI ≥ 5) in Equations (3) and (4) Panel A of Table 4. Focusing on the primary variables, the interaction terms (D(GPIF ≥ 5)*postD, is positively significant in environmental categories after the 2015 investment policy changes, while (D(NonGPIFPRI ≥ 5) is not significant. As Panel B of Table 4 presents the results of the PRI-signed investors' owner share are more than 3%, it shows the same results. The results of Equation (3) and (4) in Panels A and B indicate that it is difficult to increase shareholdings in ESG companies without the strong support of asset owners, regardless of the investors having been PRI signatories, especially at a time ESG investments were not yet well established.

Additionally, to confirm our findings, we compared the difference between asset managers who have not signed the PRI, which are non-GPIF-entrusted investors, and GPIF-entrusted investors. The results for GPIF-entrusted investors controlling for non-GPIF without PRI-signed investors are presented by Equation (5) and (6). In Panel A of Table 4, interestingly, the coefficients of environmental D(NonGPIFnonPRI ≥ 5 *postD) are negatively significant in Equation (5). This indicates that although the non-GPIF not-PRI-signed investors slow down environmental activities, GPIF-entrusted investors promote environmental activities as their owner shares increased after the 2015 change. Non-GPIF not-PRI-signed investors not only did not promote ESG but they invested in environmental firms with dubious practices. The intersection term (D(NonGPIFNonPRI ≥ 3,5 *postD) in Panel A of Equation (5) and Panel B of Equations (5) and (6) are insignificant.

It is possible that GPIF-entrusted asset managers purposely excluded low-scoring stocks from their investment portfolios to keep being selected as GPIF-entrusted investors.

However, since GPIF has been primarily a passive investor and is a universal owner, it should not purposely remove such stocks from its portfolio.[34]

4.2. GPIF Changes with Matched Regression and PSM

For robustness, we examine the effects of the GPIF investment change on ESG activities by employing a PSM methodology. Regarding the other variables, the share of the non-GPIF-entrusted investors that is more than 5% (or 3%) who have signed the PRI, is set to 0. In other words, we compare PRI-signed investors to determine whether they are GPIF-entrusted investors. We matched (propensity score matching) D(GPIF ≥ 5 (or 3)) = 1 to the treatment group and D(GPIF ≥ 5 (or 3)) = 0 to the control group in 2015 (see Appendix 4). As a first step, using only 2015 data, we investigate logit regressions where the dependent variables were dummy variables D(GPIF ≥ 5) and D(GPIF ≥ 3), and the independent variables were ESG scores and firm characteristics. Appendix 5 shows the balanced check between the treatment group (GPIF) and the control group (non-GPIF PRI-signed) after logit regressions. A comparison of the original and matched data reveals almost the same treatment and control group distributions. Companies in the control group were matched using the logit model with 2015 data for all PSM analysis periods.

【Insert Table 5 around here】

Equations (1) to (4) in Panel A of Table 5 show the panel DID regressions using matched data for 2012–2018 [t-3 vs. t+3]. One of the primary variables is the interaction term (D(GPIF ≥ 5,3)*postD) or (D(GPIF ≥ 5,3)*postD), positively significant in environmental ESG categories after the 2015 changes, in Equations (2) and (4). Thus, only GPIF-entrusted investors have promoted ESG among asset managers who are PRI signatories. A discussion on ESG investment maturity provides an additional analysis but our focus in this study is on the three years after the policy change from a medium-/long-term perspective. The results for the first year after the change are shown [t-3 vs. t+1]], in equation (3) to (8),) Panel A of Table 5. The positive impact of the three-year results is also similar to the one-year post- after the policy change.

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[34] To verify the robustness of the results, we examine the same investigations using raw ESG scores. The empirical results are almost all similar (not reported for space constraints).

Panel B of Table 5 shows the results of the placebo test for the PSM regressions and panel DID regressions using matched data from 2012 to 2014 [t-3 and t-2 vs. t-1]. It compares the GPIF investment policy change one year before [t-1] to that three and two years before [t-2 and t-3]. The GPIF-related variables of the coefficient for [t-1] were tested to be parallel and unchanged compared to [t-2 and t-3]. The primary variables are interaction terms (D(GPIF ≥ 5,(or 3))*preD) are not significant. In other words, before the GPIF investment policy change, there was no difference in ESG activities between GPIF-entrusted and non-GPIF PRI-signed investors.

4.3. Other Robustness Checks

Next, we consider two different types of companies: legacy companies (those that have already undertaken ES activities with ESG scores before 2015) and new companies (those that began undertaking ESG activities in 2016). Table 4 presents the results for legacy companies that had already received ESG scores in 2015. The new entrants that obtained new ESG ratings in 2016 or later were subjected to subsample analyses.

The results for the new entrants in Table 6 show only the results of environmental ESG. Equations (2) and (4) display that the coefficient of newer companies' shareholding of GPIF-entrusted investors (D(GPIF >= 3, 5) is significantly negative. By contrast, non-GPIF PRI-signed investors (D(NonGPIFPRI >= 3, 5) is insignificant. This result indicates that PRI-signed investors' shareholding in new entrant companies does not actively encourage ESG activities, even with support from asset owners. Companies that have recently started ESG activities and have little experience find it difficult to produce good ESG results in a short period.

【Insert Table 6 around here】

In practice, ESG scores differ markedly among rating agencies. In this study, we employed scores from GB, the oldest independent rating agency in Japan. Therefore, we test other ESG rating scores for robustness and MSCI. The regression results are presented in Table 7. These results are different from those of the GB scores. Here, we focus on the critical interaction terms, (D(GPIF ≥ 5)*postD) or   (D(GPIF ≥ 3)*postD). Firstly, (D(GPIF ≥ 5)*postD) of equation (1) is positively significant in social categories after the 2015 changes. Although, (D(GPIF ≥ 3)*postD) is in social categories is insignificant but positive, and

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D(GPIF ≥ 3) of Equation (3) is positively significant, then all the effects are positive. In the social category, GPIF-entrusted investors promoted ESG after the 2015 shock, especially larger shareholders. However, the control group (D(NonGPIFPRI >= 3, 5) is insignificant or negatively significant. Our empirical results for GPIF-entrusted investors are robust for other ESG ratings.

【Insert Table 7 around here】

We find significant results for the MSCI in the social category, differing from the GB that showed significant results in the environmental category. However, this is to be expected since it is known that different rating agencies have different ratings. GB began with environmental ratings in 1999 and is more skilled in providing environmental ratings than in social ratings. In addition, the definition of "social" is more ambiguous than the definition of "environmental". It is not surprising then that what is evaluated as social varies depending on the rating agency; hence, each rating agency has different criteria to determine what is considered social.

5. CONCLUSIONS

This study empirically analyzes the relationship between ES activities and shares owned by GPIF-entrusted investors, especially powerful asset owners and investors, after the GPIF's external investment policy change in 2015. The GPIF is a strong asset owner at the top of the financial hierarchy and adopts a public purpose rule as a public asset owner through entrusted asset investors. The increase in ES investment at a substantial starting point in 2015 was due to the change in asset owners' ES investment policies. In short, in an era in which the definition of fiduciary responsibility is not unique, we find that asset managers, despite signing a PRI, need the assistance of a strong asset owner to promote ES.

We divide institutional investors' ES activities into social and environmental, examine those before and after the GPIF investment policy change, and find that the presence of the GPIF-entrusted investors with a major shareholding promoted ESG. We also find that investors not with GPIF (asset owners) have restrictions on ES investing even if asset management investors are PRI signatories. Finally, we confirm the robustness of our empirical results using

PSM to substantiate that the existence of GPIF-entrusted investors greatly facilitated ES activities after the policy change.

Indeed, the GPIF helped to create more than an investment boom. As the GPIF adopted a long-term ESG investment view and aware of ES investing, it ensured that GPIF-entrusted investors were more socially responsible for maximizing shareholder value. Our study provides an empirical analysis of the links between ESG activities and the owner shares of GPIF-entrusted investors after GPIF's external political change. These results corroborate that investigating only institutional investors' or asset managers' ESG activities is insufficient, and the influence of asset owners must be considered.

ESG investments in Japan has been growing rapidly since 2015; this study is only a stepping stone to a wider analysis. Examining what occurred in the early stages is essential for understanding the causes of this phenomenon. In this study, there was only one asset owner, but future research could analyze the influence of other or several asset owners. There are other potential issues that should be considered in future research, such as the power balance among asset owners, and the different evaluations between ESG score agencies.

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Figure 1: The relationships between asset owners and asset managers.
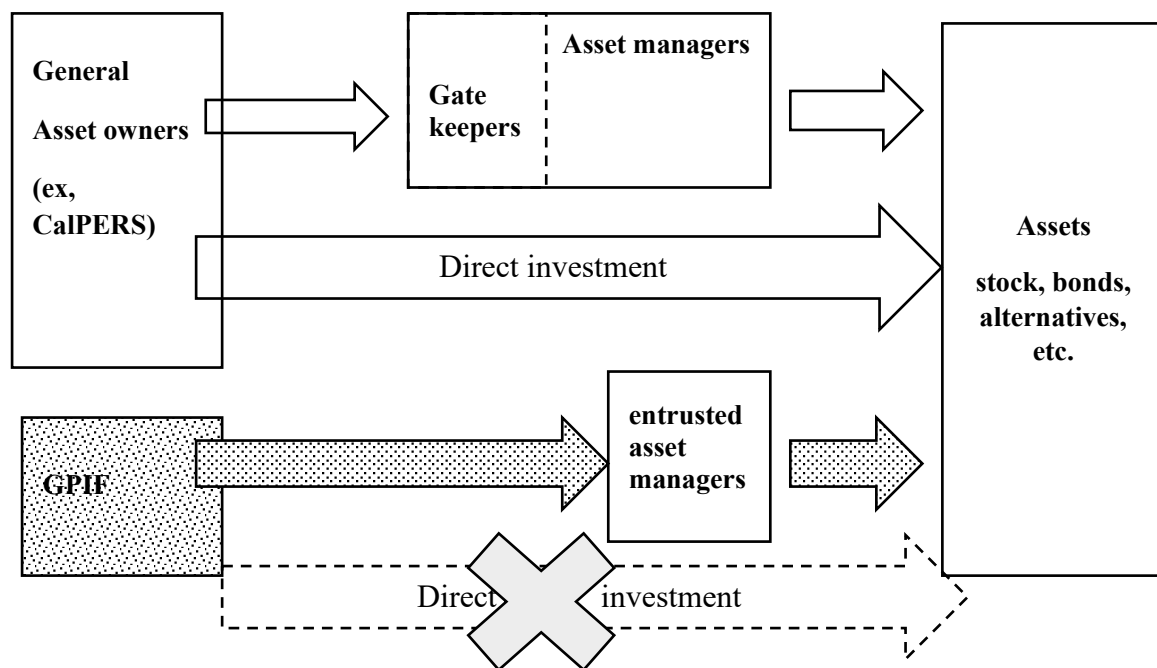
Figure 2: The distribution of GPIF-entrusted investors' owner shares.
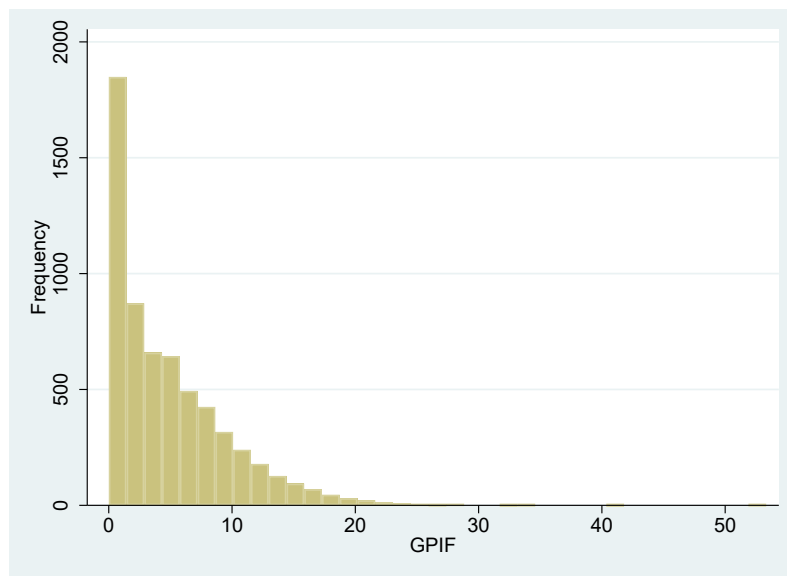
Figure 3: ESG score movements before and after 2015.

Raw   Normalized
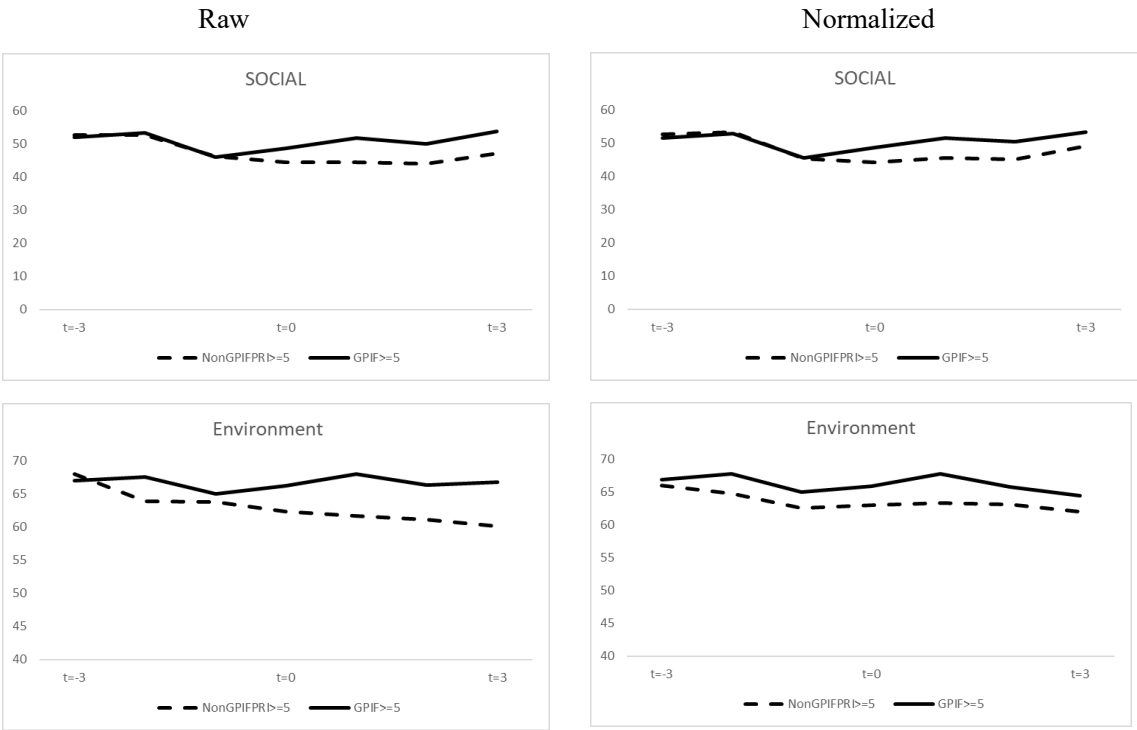
Table 1: Overview of the GB score data for ESG screening.

Categories		Points of screening
S	Community	Activities of socials, community
	Employee	Development of literacy, Support of career-development , labor association, Equal opportunity of working, Diversification, Care for temporally employee, affirmative-action employer
E	Environment	Management of environment-friendliness

	Social			Environment		
	N	score average		N	score average	
		raw	normalized		raw	normalized
2012	676	46.94	47.99	723	57.22	60.43
2013	695	46.34	48.58	756	56.71	60.05
2014	843	40.73	41.73	767	56.96	60.41
2015	858	39.60	41.51	775	57.12	60.22
2016	895	40.75	42.46	792	57.25	60.26
2017	916	41.00	42.29	807	57.91	60.09
2018	908	44.54	46.04	901	55.60	59.31

Table 2: Descriptive statistics.

Panel A: Basic statistics

Variable	Obs	Mean	Std. Dev.	Min.	Max.	Q1	Q2	Q3
Scoial Score(raw)	5791	42.60	28.77	0.00	95.51	13.53	44.41	68.07
Environmental score(raw)	5521	56.94	22.95	0.00	96.38	41.65	61.70	74.64
Scoial Score(normalized)	5791	44.13	30.17	0.00	99.74	13.56	45.98	70.96
Environmental score(normalized)	5521	60.09	24.22	0.00	100.00	43.91	65.06	78.71
Shareholding of Institutional Investor	6109	27.57	14.58	0.00	99.44	16.45	26.42	36.90
Shareholding of asset managers' PRI	6109	15.12	10.27	0.00	76.33	7.47	13.03	20.84
Shareholding of GPIF	6109	4.93	4.81	0.00	53.33	1.11	3.66	7.43
Shareholding of NonGPIFPRI	6109	10.18	7.32	55.50	0.00	4.59	8.59	14.25
Shareholding of NonGPIFnonPRI	6109	4.41	4.54	44.37	0.00	0.83	3.14	6.51
Firm size	5722	12.55	1.41	9.43	16.32	11.57	12.40	13.45
Leverage	5722	47.02	19.44	10.01	89.43	32.04	46.43	61.87
Return on assets (ROA)	5722	6.32	4.54	-4.81	22.61	3.29	5.73	8.63
Market-to-book	5713	0.86	0.66	0.15	4.05	0.44	0.66	1.04
Asset turnover	6089	0.16	0.14	0.01	0.85	0.07	0.12	0.19
D(AM_PRI 5)	6,109	0.85						
D(GPIF 5)	6,109	0.40						
D(NonGPIFPRI 5)	6,109	0.72						
D(NonGPIFNonPRI 5)	6,109	0.35						
D(AM_PRI 3)	6,109	0.92						
D(GPIF 3)	6,109	0.54						
D(NonGPIFPRI 3)	6,109	0.85						
D(NonGPIFNonPRI 3)	6,109	0.51						

Panel B: Correlation matrices.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Scoial Score(normalized)	(1)	1.00												
Environmental score(normalized)	(2)	0.70	1.00											
Firm size	(3)	0.59	0.54	1.00										
Leverage	(4)	0.22	0.21	0.43	1.00									
Return on assets (ROA)	(5)	-0.09	-0.19	-0.20	-0.51	1.00								
Market-to-book	(6)	0.00	-0.08	-0.03	-0.07	0.48	1.00							
Asset turnover	(7)	-0.04	-0.08	-0.08	0.13	-0.02	0.10	1.00						
Shareholding of Institutional Investor	(8)	0.15	0.19	0.19	-0.03	0.13	0.26	0.07	1.00					
Shareholding of GPIF	(9)	0.20	0.22	0.20	0.12	0.00	0.14	0.17	0.69	1.00				
Shareholding of nonGPIF	(10)	0.10	0.14	0.16	-0.08	0.16	0.27	0.01	0.95	0.44	1.00			
Shareholding of asset managers' PRI	(11)	0.12	0.16	0.21	0.01	0.12	0.26	0.12	0.86	0.77	0.74	1.00		
Shareholding of NonGPIFPRI	(12)	0.04	0.08	0.17	-0.07	0.17	0.28	0.06	0.75	0.42	0.76	0.91	1.00	
Shareholding of NonGPIFnonPRI	(13)	0.18	0.19	0.16	0.00	0.01	0.07	-0.07	0.42	0.16	0.46	0.11	0.05	1.00

Table 3: Summary of dummy variables.

			PRI signed	
			Yes: promoting ESG （PRI signatory）	No
All investors (all asset managers)			A: [D(AM_PRI)]≥ 3,5	D: [D(AM_NonPRI)]≥ 3,5 =E
GPIF-entrusted investors	Yes: promoting ESG	(mandated contract between GPIF and asset manager)	B: [D(GPIF)]≥ 3,5	---
	No		C: [D(NonGPIFPRI)]≥ 3,5	E: [D(NonGPIFNonPRI)]≥ 3,5

Table 4: Regression results of the GPIF policy changes in 2015.

This table presents the results of the panel DID regression of the effects of the external GPIF investment policy change in 2015 [t-3 vs. t+3]. P-values are given in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. The dependent variable was the normalized ESG score. The independent variables include a post dummy (postD) that is 1 if the year is 2016–2018 and 0 if not. In addition, there are dummy variables for the GPIF. The GPIF dummy (D(GPIF ≥ 3, 5)) is 1 if the owner share of GPIF-entrusted investors is more than 3% or 5% respectively, else it is 0. The non-GPIF dummy (D(NonGPIF ≥ 3, 5)) is 1 if the owner share of non-GPIF institutional investors is more than 3% or 5%, respectively. In addition, we include the owner share of GPIF-entrusted investors (GPIF) and control variables for firm characteristics.

Panel A: 5%

	Social	Environment	Social	Environment	Social	Environment
	(1)	(2)	(3)	(4)	(5)	(6)
D(AM_PRI>=5)	-0.250	0.658**				
	(-0.342)	(2.053)				
D(AM_PRI>=5)*postD	-2.006*	0.512				
	(-1.872)	(1.169)				
D(AM_NonPRI>=5)	0.0655	-0.284				
	(0.130)	(-1.146)				
D(AM_NonPRI>=5)*postD	0.508	-0.482				
	(0.757)	(-1.601)				
D(GPIF>=5)			-0.217	0.192	-0.108	0.265
			(-0.441)	(0.755)	(-0.236)	(1.253)
D(GPIF>=5)*postD			0.114	0.821**	0.186	1.019***
			(0.172)	(2.517)	(0.291)	(3.393)
D(NonGPIFPRI>=5)			0.393	-0.106	0.881*	-0.00466
			(0.548)	(-0.344)	(1.691)	(-0.0207)
D(NonGPIFPRI>=5)*postD			0.220	-0.493	-1.196	-0.181
			(0.121)	(-0.471)	(-1.245)	(-0.484)
D(NonGPIFnonPRI>=5)					-0.0889	-0.332
					(-0.171)	(-1.340)
D(NonGPIFnonPRI>=5)*postD					0.308	-0.549*
					(0.441)	(-1.803)
lasset	2.684*	1.116	1.869	1.320	2.761**	1.046
	(1.958)	(1.435)	(1.150)	(1.274)	(2.029)	(1.342)
lev	-0.00150	-0.0593***	-0.0386	-0.0658***	-0.000867	-0.0593***
	(-0.0312)	(-2.960)	(-0.760)	(-2.582)	(-0.0182)	(-2.963)
roa	0.0539	-0.0417	0.0321	-0.0320	0.0593	-0.0346
	(0.883)	(-1.245)	(0.478)	(-0.901)	(0.976)	(-1.065)
MtB	0.321	0.359	-0.0913	0.492	0.310	0.398
	(0.708)	(1.423)	(-0.203)	(1.502)	(0.688)	(1.586)
turnovr	-2.312	-1.456**	0.195	-0.705	-2.376	-1.502**
	(-1.152)	(-2.199)	(0.0895)	(-0.808)	(-1.176)	(-2.288)
postD	5.451***	2.858***	5.622***	1.860***	4.875***	2.563***
	(5.551)	(6.714)	(5.198)	(3.367)	(4.763)	(5.740)
Observations	5,419	5,142	4,349	4,073	5,419	5,142
R-squared	0.081	0.103	0.089	0.106	0.082	0.106
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Panel B: 3%

	Social (1)	Environment (2)	Social (3)	Environment (4)	Social (5)	Environment (6)
D(AM_PRI>=3)	-0.957	-0.0005				
	(-1.092)	(-0.001)				
D(AM_PRI>=3)*postD	-2.203*	0.352				
	(-1.801)	(0.695)				
D(AM_NonPRI>=3)	0.0224	-0.0590				
	(0.0431)	(-0.239)				
D(AM_NonPRI>=3)*postD	0.110	-0.0621				
	(0.173)	(-0.221)				
D(GPIF>=3)			0.449	0.233	0.160	0.263
			(0.900)	(1.003)	(0.332)	(1.179)
D(GPIF>=3)*postD			0.367	0.660**	-0.141	0.717**
			(0.545)	(2.146)	(-0.210)	(2.379)
D(NonGPIFPRI>=3)			0.890	-0.311	-0.0359	-0.0849
			(0.873)	(-0.993)	(-0.0554)	(-0.301)
D(NonGPIFPRI>=3)*postD			-2.013	0.579	-1.738*	-0.0639
			(-0.947)	(0.743)	(-1.755)	(-0.153)
D(NonGPIFnonPRI>=3)					-0.000623	-0.164
					(-0.00120)	(-0.669)
D(NonGPIFnonPRI>=3)*postD					0.0785	-0.244
					(0.125)	(-0.870)
Observations	5,419	5,142	4,906	4,622	5,419	5,142
R-squared	0.081	0.100	0.092	0.107	0.081	0.102
Control	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Table 5: Propensity score matching regression.

The results of propensity score matching regression. P-values are given in parentheses. Panel DID regressions using matched data for 2012–2018 [t-3 vs. t+3] or [t-3 vs. t+1]. The symbols ∗∗∗, ∗∗, and ∗ denote statistical significance at the 1%, 5%, and 10% level, respectively. The dependent variable was the normalized ESG score. The independent variables include a post dummy (postD) is 1 if the year is 2016¬–2018, and 0 if not. The pre-dummy (preD) is 1 if the year is 2014, and 0 if not. In addition, there are dummy variables for the GPIF. The GPIF dummy (D(GPIF ≥ 3, 5)) is 1 if the owner share of GPIF-entrusted investors is more than 3% or 5% respectively, else it is 0.

Panel A: GPIF investors

	Social	Environment	Social	Environment	Social	Environment	Social	Environment
		[t-3, t+3]				[t-3, t+1]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
D(GPIF>=5)	0.345	-0.149			0.352	-0.155		
	(0.488)	(-0.520)			(0.723)	(-0.587)		
D(GPIF>=5)*postD	0.310	0.743*			-0.226	0.727*		
	(0.310)	(1.727)			(-0.210)	(1.742)		
D(GPIF>=3)			0.965	0.587*			0.669	0.191
			(1.069)	(1.920)			(0.835)	(1.094)
D(GPIF>=3)*postD			1.332	0.985*			-0.140	1.111***
			(1.069)	(1.723)			(-0.123)	(2.739)
Observations	4,364	4,031	5,785	5,273	2,921	2,715	3,886	3,570
R-squared	0.085	0.096	0.090	0.108	0.028	0.055	0.020	0.083
PostD	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES

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Panel B: Placebo test

	Social	Environment	Social	Environment
	(1)	(2)	(3)	(4)
placebo				
D(GPIF>=5)	0.240	0.285		
	(0.664)	(1.015)		
D(GPIF>=5)*preD	-0.175	0.746		
	(-0.191)	(1.382)		
D(GPIF>=3)			0.855	-0.0008
			(0.591)	(-0.005)
D(GPIF>=3)*preD			-0.586	0.359
			(-0.267)	(0.976)
Observations	1,676	1,631	2,206	2,143
R-squared	0.023	0.085	0.016	0.103
Year FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Table 6: Panel regression for ESG newly entered companies in 2016－2018

The results of panel regression for new entry companies in 2016. P-values are given in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. The dependent variable was the score. The independent variables include the new entrant companies' owner share of the GPIF-entrusted investors (D(GPIF>=3,5) and non-GPIF-entrusted with PRI-signed investors (D(NonGPIFPRI)>=3.5) are included.

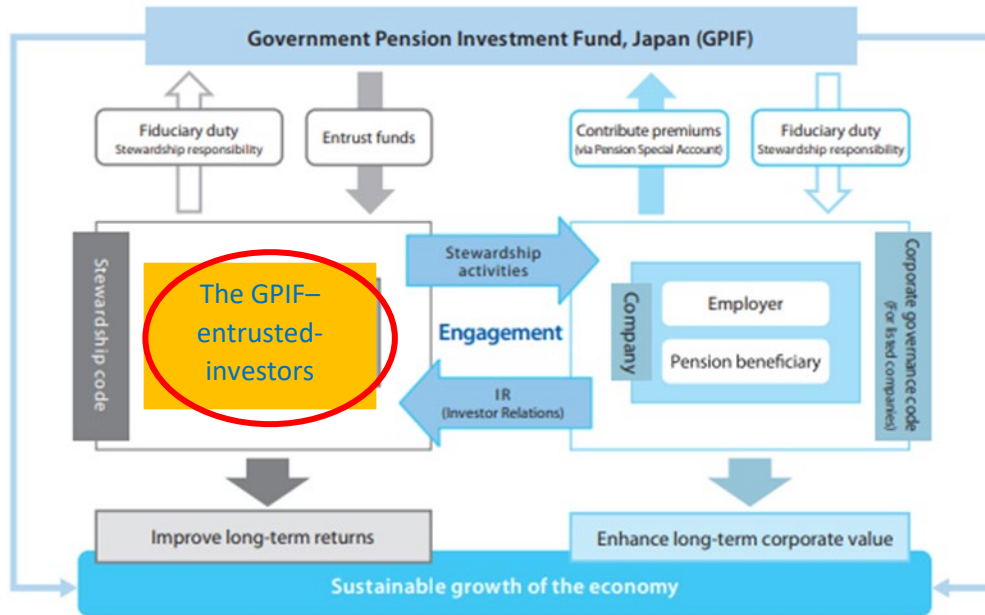|	Social	Environment	Social	Environment
	(1)	(2)	(3)	(4)
Newer				
D(GPIF>=5)	0.0250	-1.546*		
	(0.00891)	(-1.694)		
D(NonGPIFPRI)>=5	-7.545	-0.517		
	(-1.419)	(-0.500)		
D(GPIF>=3)			-0.762	-1.582*
			(-0.249)	(-1.917)
D(NonGPIFPRI)>=3			0.726	-2.990
			(0.0835)	(-1.578)
Observations	130	209	136	209
R-squared	0.204	0.508	0.185	0.515
Control	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

Table 7: Panel regressions using the MSCI score.

This table shows panel DID regression results of the effects of the external GPIF investment policy change in 2015 using the MSCI score. P-values are given in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. The dependent variable was the score. The independent variables include a post dummy (postD) of 1 if the year is 2016–2018 and 0 if not. In addition, there are dummy variables for the GPIF. The GPIF dummy (D(GPIF ≥ 3, 5)) is 1 if the owner share of GPIF-entrusted investors is more than 3% or 5%, else it is 0. The non-GPIF dummy (D(NonGPIF ≥ 3, 5)) is 1 if the owner share of non-GPIF institutional investors is more than 3% or 5%. Control variables for firm characteristics are included.

MSCI	Social (1)	Environment (2)	Social (3)	Environment (4)
D(GPIF>=5)	0.204**	0.0459		
	(2.493)	(0.526)		
D(GPIF>=5)*postD	0.191**	0.0442		
	(2.330)	(0.460)		
D(GPIF>=3)			0.159*	0.0872
			(1.782)	(0.916)
D(GPIF>=3)*postD			0.0938	0.0873
			(1.076)	(0.833)
D(NonGPIF>=5)	0.108	-0.493**		
	(0.448)	(-2.296)		
D(NonGPIF>=5)*postD	0.320	-0.363		
	(1.113)	(-0.971)		
D(NonGPIF>=3)			0.493	-0.432
			(1.063)	(-1.299)
D(NonGPIF>=3)*postD			0.751	-0.475
			(1.491)	(-0.985)
Observations	2,430	2,430	2,430	2,430
R-squared	0.084	0.060	0.082	0.059
Control	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES

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1. Relationship between GPIF and GPIF-entrusted investors

Source: GPIF Annual Report, fiscal year 2018.

2. ESG score (GoodBanker)

GoodBanker is the first independent SRI/ESG special research company in Japan, established in 1999. GB created the first SRI/environmental products, called Nikko Eco Fund, in 1999 in Asia and has continued original and detailed SRI analyses. Thirteen analysts were involved and more than 1000 target companies were examined. They collect not only public but also private information through direct contact, hearing, and Q&A. Every year, more than 200 companies are questioned or meetings held with them. Since its establishment, it has made an effort to continue operating as an independent agency through the no-paid consultant policy. In previous studies, Escrig-Olmedo (2019) shows that the problem with ESG rating agencies that repeatedly integrate their management is the lack of sustainability of ratings because the rating models are not fully integrated. Tang et al. (2020) find that the problem is with companies that have an ownership

relationship with an ESG rating agency (sister companies) experience. However, Goodbanker has never experienced management integration and is an independent institution; therefore, it does not face this problem.

3. Variable descriptions

| Variable	Description
Community, Employee, Environment	The main ESG score was evaluated by GoodBanker, Customer, Community, Employee, and Environment. Social score is min-max normalized and calculated from 1/2*community+1/2* employees.
Firm size:lasset	The natural logarithm of the total asset
Leverage:lev	The total amount of sales.
Return on assets:ROA	Ordinary profit on total asset
Market-to-book:MtB	Market value of capital plus book value of debt over the book value of capital and debt,
Asset turnover:Turnover	Date acquired from Thomson Reuter Ownership Data; "(Absolute value of the total amount sell in this quarterly period + Absolute value of the total amount bought in this quarterly period)/(Total amount held in this quarterly period+ Total amount held in previous quarterly period).
Shareholding of GPIF: GPIF	The owner shares held by the GPIF- mandate investors who are announced on the GPIF website.
Shareholding of nonGPIF: nonGPIF	The owner shares calculated from owner shares of institutional investor minus the owner shares of GPIF- mandated investors.
Shareholding of nonGPIFPRI: nonGPIFPRI:	The owner shares not held by GPIF- mandated investors and signed the PRI.
Shareholding of nonGPIFnonPRI: non GPIFnonPRI investors:	Owner shares not held by GPIF- mandated investors and not signed the PRI
D(AMPRI ≥ 3, 5)	A dummy variable equals 1 if the owner share of PRI-signed investors is more than 3% or 5%, respectively, and 0 otherwise.
D(AM_NonPRI ≥ 3, 5)	A dummy variable equals 1 if the owner share of not-PRI-signed investors is more than 3% or 5%, respectively, and 0 otherwise.
D(GPIF >= 3, 5)	A dummy variable equals 1 if the owner shares of the GPIF-entrusted investors are more than 3% or 5%, respectively, and 0 otherwise.

|	
D(nonGPIFPRI >= 3, 5)	A dummy variable, equals 1 if the owner shares of the non-GPIF-entrusted investors are more than 3% or 5%, respectively, and 0 otherwise.
D(NonGPIFnonPRI >= 3,5)	A dummy variable equals 1 if the owner share of non-GPIF without PRI-signed investors is more than 3% or 5%, respectively, and 0 otherwise. This is same as D(AM_NonPRI $\geq$ 3, 5).
Year dummy: Year F.E.	A dummy variable for the year.
Firm dummy: Firm F.E.	A dummy variable of firm
postD	A dummy variable equals 1 if the year is between 2016 and 2018, and 0 otherwise.

4, Propensity score matching

The share of GPIF-mandate-investors

| The share of GPIF-mandate-investors<3% | **Dummy variable: GPIF_D3=1**
 The owner share of GPIF-mandate-investors>=3% |

0   1   3   5   10 %

Propensity score matching in 2015

| The share of GPIF-mandate-investors<5% | **Dummy variable: GPIF_D5=1**
 The owner share of GPIF-mandate-investors>=5% |

0   1   3   5   10 %
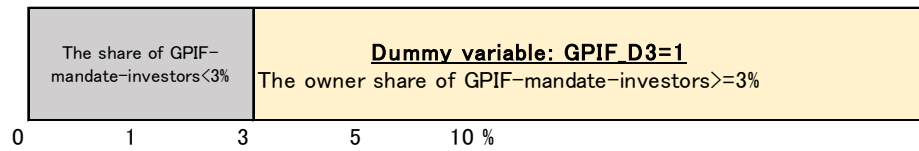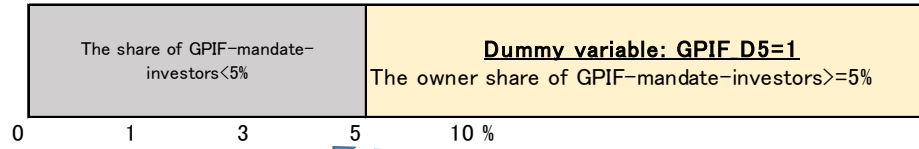
Propensity score matching in 2015
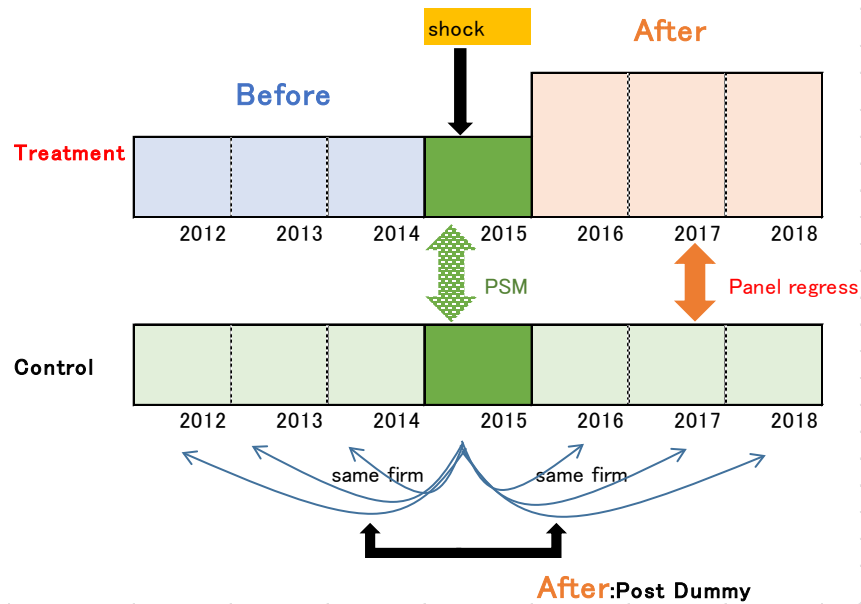
5. Balance plots of propensity score matching

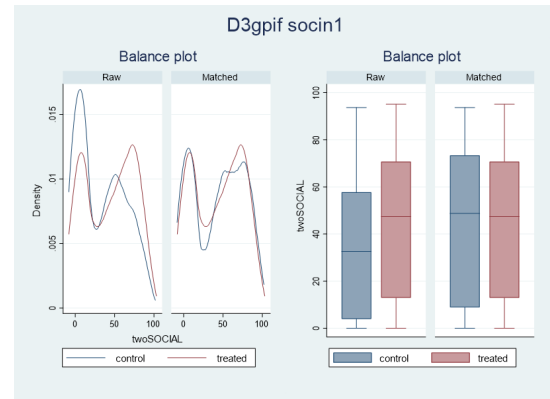**Panel A)** Social: sq(score), lasset, lev, roa, MtB, turnover, and industry dummy

Environment: score, d. score, lasset, lev, ROA, MtB, turnover, Industry Dummy
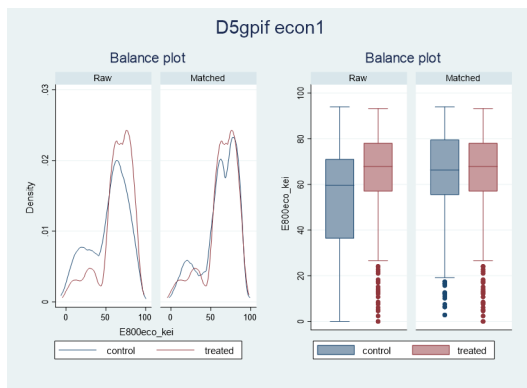
Panel B)   Balance plots

GPIF>=3%, Environment
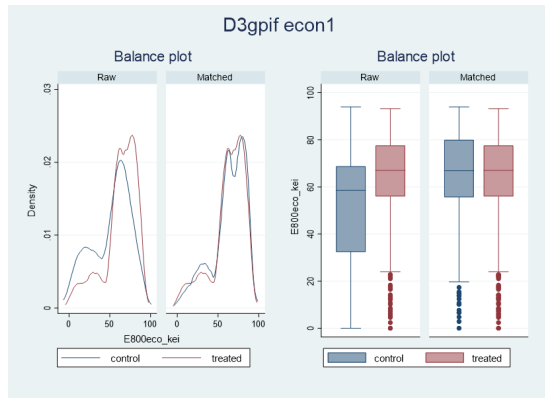
GPIF>=3%, Social

GPIF>=5%, Environment

GPIF>=5%, Social

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