



# A worldwide empirical analysis of the accounting behaviour in the waste management sector

Silvia Ferramosca

Department of Economics and Management, University of Pisa, Via C. Ridolfi, 10 – 56124 Pisa, Italy



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## ABSTRACT

Drawing on stakeholder theory, the premise in this manuscript is that moral and ethical behavior in terms of correct financial information contribute to higher sustainable performance that satisfies the wide range of stakeholders who are interested in the economic feasibility and environmental viability of waste management firms. On the basis of a scientific literature review and by using a balanced panel data set of 416 waste management firms worldwide over the period 2013–2016, the empirical evidence shows that ownership structures (e.g. governmental, institutional, corporate group, family, and concentrated) as well as corporate governance characteristics (e.g. size of the board, directors' gender, nationality, and expertise) diversely affect waste management firms' accounting behavior in terms of both discretionary accruals and earnings smoothness. The findings bring into focus the “black boxes” of ownership structures and corporate governance encouraging the policy makers to shape up laws that can constrain accounting misbehavior in waste management firms.

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## 1. Introduction

The regulatory and public focus on waste management firms can affect not only their environmental, and economic performance but also their accounting behavior. Prior studies argue that companies that adhere to what are generally considered “good” corporate governance practices are better able to create sustainable value for both shareholders and stakeholders (Elkington, 2006; Hung et al., 2007; Aras and Crowther, 2008). A company equipped with corporate governance systems that can contain financial accounting manipulation can provide users with a “true and fair view” of the economic-financial condition, and can better determine management accountability in the interest of all stakeholders (Melè et al., 2017; Vladu et al., 2017). Overall, the use of earnings management practices is considered unethical and irresponsible (Scholtens and Kang, 2013). Corporate governance systems that can ensure the adoption of “good” practices can also enforce stakeholders' trust which is necessary for a company's sustainable development (Levitt, 1998; Kolk, 2008).

Given these premises, it is clear that the intervention of regulators and various standard setters at a global level is required to establish rules aimed at encouraging consistent principles of transparency and correctness of financial information, corporate governance, and sustainability (e.g. COSO, 1992; Sarbanes-Oxley Act,

2002; ICGN, 2017). Good corporate governance becomes a *conditio sine qua non* for a firm's sustainability over time; in fact, it impacts aspects such as the control system, the risk management system, and the reporting system, which are all essential elements to stimulate stakeholder confidence and access to capital market at the most advantageous costs (Lazonick and O'Sullivan, 2000; Jamali et al., 2008). This vision of corporate governance is aimed at ensuring that companies take responsibility for directing and controlling their operations in a fair manner *vis-à-vis* their stakeholders (Kolk, 2008). More so than other industries, the waste management industry is highly accountable to various stakeholders that demand transparency and legitimacy (Patten, 1991; Bansal and Roth, 2000).

In this context, expressions such as social responsibility, business ethics, corporate governance, and environmental respect all move on the common *fil rouge* of establishing solid stakeholder relations (Bhattacharya et al., 2008).

The ever-growing piles of waste worldwide and the dissatisfaction with pure governmental firms led to increasing privatization (Warner and Bel, 2008; Bel and Mur, 2009) which altogether produced a proliferation of firms in this industry whose ownership and corporate governance practices differ and diversely affect their accounting behavior and sustainability impact (Rasche and Esser, 2006; Freeman et al., 2010).

The peculiarities of each territory compel many companies to successfully break even economically and financially, while maintaining sustainable and environmentally favorable practices

E-mail address: [silvia.ferramosca@unipi.it](mailto:silvia.ferramosca@unipi.it)

(Boyce, 2000; Tregidga et al., 2014). Even though much is known about the practices to measure the costs and revenue in these companies, there is a lack of evidence on how ownership structures and corporate governance systems affect their accounting behavior. In addition, in this industry the environmental effects that pose a risk to public health (Yang et al., 2008; Giusti, 2009) may deflect the public attention from the financial results. It appears of paramount concern to verify whether and under which corporate governance characteristics waste management firms may take the opportunity to manage earnings.

Our study focuses on the waste management and remediation services subsector group establishments engaged in the collection, treatment, and disposal of waste materials and on one type of corporate misconduct, namely, earnings management in the forms of discretionary accruals and earnings smoothing.<sup>1</sup> The analysis bases on a balanced panel data set of 416 waste management firms worldwide, with annual observations from 2013 to 2016. The findings indicate that governmental, institutional, and corporate group ownerships can affect the accounting behaviour when it comes to discretionary accruals while they are less likely to smooth the earnings. Family-owned waste management firms provide higher quality financial reporting, both in terms of lower discretionary accruals and earnings smoothness. With increased concentrated ownership, waste management firms are more likely to engage in earnings smoothing activities. The results furthermore suggest that the bigger the board of directors, the higher the chances of female representation on the board, the more variation in the directors' nationality, and the more expert the board members, the less likely it is that waste management firms will engage in earnings management activities, with variation in terms of discretionary accruals and earnings smoothness.

## 2. Literature review and hypotheses development

### 2.1. Theoretical framework

Over an extended period, corporate governance literature has primarily studied the association between certain corporate governance characteristics and firm performance or financial reporting quality (e.g. Core et al., 1999; Bushman et al., 2004; Brown et al., 2011).

Another established body of literature investigates how the industry in which firms operate affects the process of firm value creation or performance (e.g. Mason, 1939; Rumelt, 1991; Hawawini et al., 2003) and the related incentives to engage in earnings management activities (Key, 1997; Roychowdhury, 2006; Chen et al., 2011). However, the research presented in these two streams of literature was mainly conducted along parallel lines, without attention to possible intersections.

Based on agency theory prior studies try to identify the mechanisms and structures that allow better monitoring and resources allocation, and to explain the incentives of managers in the application of accounting rules (Warfield et al., 1995; Fischer and Louis, 2008; Beaudoin et al., 2014). This study's research questions do not differ much from those posed by agency theory, with the difference – particularly in the waste management industry – that managers

<sup>1</sup> This paper refers to a widely accepted view of earnings management that “occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers” (Healy and Wahlen, 1999: 368). Under this perspective, “earnings management could occur in any part of the external disclosure process, and could take a number of forms” (Schipper, 1989: 92). In detail, this study looks at earnings management in the forms of discretionary accruals, resulting in either upwards or downwards earnings, and earnings smoothness, resulting in “smoothed” accounting numbers in the sense that their over-time variability is limited.

manipulate results not only for shareholders but for multiple stakeholders, as waste management firms have to compound diverse interests. A huge body of research has identified several stakeholders of waste management firms, such as national and local governments, political forces, investors, private contractors that provide services, waste pickers collecting door to door, and service users (e.g. households, civil organizations, and the commercial and industrial sector) (Guerrero et al., 2013; Soltani et al., 2015). Earnings management practices may therefore be used beyond simply aiming to maximize company value, in order to reconcile waste management firms' multiple objectives (Phillips et al., 2003). An investigation of the waste management industry makes it possible to look into the political cost arguments which may incentivize these firms to use earnings management to assuage the political scrutiny and the tightening of industry regulation (Key, 1997; Han and Wang, 1998; Vansant, 2016). Given that political costs comprise any expected cost imposed on a company based on political actions deriving from, for example, antitrust, regulation, duties, and tariffs (World Bank Group, 2018), political costs arguments in the waste management industry become relevant and understandable (Watts and Zimmerman, 1978; Cahan et al., 1997; Patten and Trompeter, 2003; Yip et al., 2011).

This work finally takes an ethical-moral perspective, where earnings management practices are linked to “social irresponsibility,” deriving from the communication of unfair economic-financial information (Martínez-Ferrero et al., 2015). While waste management firms are sensitive to the regulations about environmental disclosure and requirements (Pathak et al., 2017; European Commission JRC, 2018), it appears that financial results and corporate governance characteristics play second fiddle to the environmental sustainability reporting. It is worth to note, indeed, that the sustainable development derives from the integration of economic, environmental and societal aspects in the triple bottom-line (Ilyas et al., 2018).

All in all, the stakeholder, political and ethical perspectives inspired the two research questions of this study.

**RQ1:** Are ownership structures associated with earnings management activities in waste management firms?

**RQ2:** Are corporate governance characteristics associated with earnings management activities in waste management firms?

The following subsections develop these research questions into several hypotheses that are related to the effects of ownership structures and of corporate governance on earnings management in the waste management industry.

### 2.2. Ownership structures and earnings management in the waste management industry

The first research question focuses on the role ownership structures play regarding earnings management in waste management firms. This question links to five hypotheses, each depending on the ownership structures identified, namely governmental ownership, corporate group ownership, institutional investor ownership, family ownership, and concentrated ownership.

Considering that waste management is identified as one of the four top priorities in the Sixth Environment Action Program and continues to be considered paramount for a “circular economy where nothing is wasted and where natural resources are managed sustainably” in the Seventh Environment Action Program (European Union, 2014), the European Commission includes state aid as a primary objective in order to “separate waste generation from economic activity, so that EU growth will not lead to more and more waste” (2008/C 82/01). It is possible that the state may aid firms under its control by giving them access to grants, for

example making environmental activities worthwhile for them. The state can facilitate investments and strategic alliances, issue favorable licenses and regulations (e.g. tax allowances for firms that invest in environmental activities), advance access to infrastructure and to well-connected state networks (Chang et al., 2006), overall contributing to governmental waste management firms' sustainability.

The leading interpretation in literature is that the state follows its political and social interests, even if these are to the detriment of the primary purpose of maximizing the value of firms they control (North, 1990; Olson, 1993; Claessens and Peters, 1997). Politicians are intent on remaining in power and controlling wealth, with a relatively short-term perspective of wishing to be re-elected (North, 1990; Lin and Zhang, 2009). In this context, it is worth mentioning that policymakers often include the objective to create jobs in their waste management regulations (Imam et al., 2008; Cools and Oosterlynck, 2015; European Commission, 2015, 2018; Hartmann, 2018). Politically connected companies typically prefer to invest where they can benefit socially and politically, such as preserving the employment levels and the subsidies to supporters that will improve politicians' positions (Bushman and Piotroski, 2006). In this sense, state-controlled waste management firms may "cook their books" in order to beautify their earnings with the ultimate scope to achieve political objectives (e.g. avoid labour dismissals) (Firth et al., 2007). In contrast, the development theories (Gerschenkron, 1962; Shleifer, 1998) ascribe a benevolent nature to the state ownership which appears to be worth to mitigate market imperfections (e.g. monopoly power or externalities), and to develop peculiar strategic industries (e.g. waste management industry) (Liu et al., 2014). In this context, governmental influence may contribute to governmental waste management firms' sustainability, also in terms of "responsible" financial reporting, showing to the stakeholders a fair view of the waste management financial performance (Chang et al., 2006; Choi et al., 2012). Considering that the relationship between state ownership and earnings management appears to be still unanswered, it is predicted the following null hypothesis:

**HP1a** State ownership is not associated with earnings management in waste management firms.

A typical type of corporate ownership is ownership by another company. There may be layers of control that create ownership pyramids, or independent firms with shares that connect them, resulting in business groups or conglomerates. Prior studies on business groups indicate that ownership by industrial companies contributes to higher performance, facilitating the financing of new investment opportunities (Duchin, 2010), strengthening technological relationships with other firms (Choi et al., 2011), or allowing participation in innovative activities (Mahmood and Mitchell, 2004).

In the waste management sector, industrial symbiosis, especially within group of firms in relative geographic proximity, occurs commonly in the search of cooperation for competitive advantage (Bain et al., 2010), improving efficiency (Earley, 2015), synergetic opportunities (Ruiz Puente et al., 2015) and compliance with regulations (Lehtoranta et al., 2011; Jiao and Boons, 2014)<sup>2</sup>. Thus, investigating the effects of business groups in the waste management industry appears to be extremely relevant. As a matter of fact, the activities

of this industry require a massive effort to achieve high technological capabilities, cooperation amongst entities, and actions to find innovative tools to contain waste generation and improve its collection (World Bank Group, 2018). Corporate groups are in a better position to get external cash, because they have diverse investments that reduce their operating risks and provide mutual insurance or risk sharing (Khanna and Yafeh, 2005). They may also obtain investment funds at advantageous interest rates more easily, without needing external financing (Duchin, 2010), which aligns with the call for huge investment in tangible infrastructures such as incinerators, recycling facilities, and landfills (Zotos et al., 2009).

There is evidence that business groups are more innovative than standalone companies (Belenzon and Berkovitz, 2010). The control of other companies can in fact facilitate the development of scale and scope economies, also in terms of intangibles, R&D investments, and technological advancements (Hahn and Lee, 2006). The research and development of new waste treatment technologies to create friendlier environmental processes, as well as of new technologies for energy production, are only selected examples of the numerous advancements this industry relentlessly focuses on (Breidenbach and Eldredge, 1969; Brunner and Rechberger, 2015; Soltani et al., 2016). As a case in point, the European Union's Seventh Environment Action Programme set waste prevention and management as one of the top objectives drawing attention to the relevance of technological innovations in this context (Cecere and Corrocher, 2016)<sup>3</sup>.

In corporate groups, there is often a beneficial flow of information from the controlling to the controlled firm, and *vice versa*. This creates an environment suitable for talent sharing, training activities, and scientific knowledge spillovers (Chang et al., 2006; O'Mahony and Vecchi, 2009). All in all, control by other companies can build corporate reputation, making a firm more attractive to, for example, technology providers or technological relationships with other firms (Choi et al., 2011) and a more in-depth focus on research programs, innovative projects, or human resources (Mahmood and Mitchell, 2004). These are key strategic factors in waste management firms.

The counterbalance of all the benevolent findings is that group-controlled entities are more likely to report higher levels of related party transactions in order to boost earnings to meet governmental requirements or prevent delisting (Jian and Wong, 2004). Many waste management firms are spin-offs of large state-owned firms, and they continue to use the parent companies' address as well as their incentives to manage earnings (Liu and Lu, 2007).

Corporate groups may be the nexus of a set of related party transactions that help to transfer wealth from the entity to its controlling shareholders, and earnings management practices may be employed to obfuscate tunneling activities (Cheung et al., 2006). Taking into account the inheritance hypothesis of corporate groups that assimilate them to state ownership in waste management firms, it is again predicted the following null hypothesis:

**HP1b** Group ownership is not associated with earnings management in waste management firms.

Institutional investors may exert a varied impact on earnings management, having different time horizons (Gaspar et al., 2005)

<sup>2</sup> For instance, in the UK the National Industrial Symbiosis Programme has generated a market which puts together those producing waste with those who can reuse it, and are willing to pay the most for it. "By turning pastry waste into electricity, converting fatty acids into biodiesel, and so on, they estimate that the whole programme has boosted the UK economy by as much as €3 billion" (European Union, 2010).

<sup>3</sup> The relevance of innovation to improve resource efficiency is explicitly referred to in the General Union Environment Action Programme to 2020 where we read: "In order to turn the Union into a resource-efficient, green and competitive low-carbon economy, the 7th EAP shall ensure that by 2020 [...] c) structural changes in production, technology and innovation, as well as consumption patterns and lifestyles have reduced the overall environmental impact of production and consumption [...]; (d) waste is safely managed as a resource and to prevent harm to health and the environment, absolute waste generation and waste generated per capita are in decline [...]" (European Union, 2014).

and investment preferences (Dalton et al., 2007). By definition, institutional investors have the financial resources and specialized knowledge to select among multiple investment options, which may present entry barriers for less experienced participants. The waste management industry typically has several entry barriers, starting with the initial physical investments to set up all the activities. It is also difficult for a new waste management firm to gain economies of scale and be competitive, and regulations often impose access terms and conditions on the market (Nordic Competition Authorities, 2016).

Non-expert investors may find financial and non-financial information difficult to interpret, and managers often keep such information private, which increases information asymmetries between insiders and outsiders (Chen et al., 2007; Ferreira and Matos, 2008). Institutional investors have the ability to collect and interpret information and management's future plans (Tihanyi et al., 2003). Even though the interpretation of financial information of waste management firms may not differ much from that of other industries, the non-financial information that is expected from waste management firms is often much more complex to interpret, requiring specialist knowledge of business administration as well as of, for example, engineering, biology, and chemistry.

It is worth noting that institutional investors may have the expertise to detect earnings management, while they may also indirectly influence management to report "unreliable" financial reporting to attract banks, investment companies, private equity, and advisers who can dedicate large portions of their resources to companies with high growth opportunities and technological prospects (Zahra, 1996). Firms that realize higher returns are usually considered to be more convenient and those with stable returns are seen as less risky, which respectively provide incentives to increase earnings management activities and earnings smoothing. As waste management firms need external approval as well as financing, they may be more incentivized at managing their earnings. Given this tension, it is proposed the following null hypothesis:

**HP1c** Institutional ownership is not associated with earnings management in waste management firms.

Several publications argue that many family firm characteristics, such as shareholder interest in a high reputation, business passed down across generations, socio-emotional wealth and investment in staff training, jointly foster their long-term orientation (Anderson and Reeb, 2003; Miller et al., 2007) and their interest in providing reliable financial information (Ferramosca and Allegrini, 2018). There is empirical evidence that family firms practice better financial reporting (Cascino et al., 2010), less persistence of lost transitory components (Wang, 2006), higher earnings information (Ali et al., 2007), and fewer restatements (Tong, 2008).

Family ownership is commonly linked to a higher degree of concentrated ownership, which restrains the agency conflict of ownership and control (Jensen and Meckling, 1976; Zellweger and Kammerlander, 2015). In this sense, Greco et al. (2015) show that family firms are less likely to use long-term asset write-offs for earnings management purposes and Siregar and Utama (2008) maintain that family firms are less likely to adopt opportunistic earnings management practices. Even though family firms in the waste management industry may be incentivized to manage earnings in order to obtain grants and public aid, their fear of reputational damage should manipulated accounting be discovered may prevail. These firms may be closer to communities and a loss of legitimacy may be even worse than losing a public grant. As a consequence, it is expected the following:

**HP1d** Family ownership is negatively associated with increased earnings management in waste management firms.

Concentrated ownership may both benefit and limit earnings management preferences. The managerial entrenchment hypothesis holds that the dominant owner in a concentrated ownership context may extract wealth from a firm to obtain private benefit (Stulz, 1988; Aguilera and Crespi-Cladera, 2016), taking advantage of, for example, related party transactions (Cheung et al., 2006). Controlling shareholders report misleading accounting disclosure for self-interested purposes and are associated with low earnings information to keep proprietary information about a firm's rent-seeking activities confidential (Fan and Wong, 2002).

On the other hand, excessive concentration of ownership could affect the reliability of financial reporting positively. These owners may be less interested in short-term and "fictitious" results, while they prefer maintaining the firm's high reputation (Alves, 2012). Prevailing incentives are not expected, therefore, it is formulated the following:

**HP1e** Concentrated ownership is not associated with earnings management in waste management firms.

### 2.3. Board of directors' characteristics and earnings management in the waste management industry

The second research question concerns the role of board characteristics on earnings management in waste management firms.

Several studies explore the effect of board characteristics on decision-making (Armstrong et al., 2010). A great deal of attention has been paid to board composition in terms of size and the combination of members, expertise and skills, or diversity related to gender, nationality, age, or education (Carter et al., 2003). Several studies have explored the effects of these characteristics on board decisions, financial reporting choices, and a firm's sustainability (Klein, 2002; Zhao et al., 2012; Ferrero-Ferrero et al., 2015).

Waste management firms tend to have multiple stakeholders whose interests may vary and conflict, and the board of directors may have to find compromises. However, as positive accounting theory notes, in the "composition of all the interests" the directors' personal incentives may dominate (Watts and Zimmerman, 1986). It is not rare for the interests of a board of directors and those of the executives to be aligned, but to then be in conflict with the interests of shareholders (Armstrong et al., 2010). To this end, a board that is able to accommodate directors having non-uniform or diverse characteristics in terms of gender, nationality, or experience is able to balance multiple interests more effectively.

The larger the board of directors, the wider the services it offers (Kang et al., 2007) and the more likely a firm will be to appoint directors with diverse characteristics (Luoma and Goodstein, 1999). Larger boards also tend to have more external connections, more information, and more expertise than smaller boards (Pearce and Zahra, 1992). Consistent with this prevailing perspective, it is likely that the more directors are involved, the tighter the control of financial reporting will be (Saleh et al., 2005), as the board is focused on preserving its reputation.

This argument appears to be even more convincing in the waste management industry. The public attention drawn by this sector as well as the need to handle with several matters span multiple areas, comprising environmental sustainability, compliance with regulations, financial sustainability, social protection and good work conditions, infrastructures, and advanced technologies which ultimately reflect in the inclusion of multiple expertise (e.g. engineers, lawyers, financial accountants, chemists, public relations officers, and human resource managers) (World Bank Group, 2018). Accordingly, it is expected that:

**HP2a** The size of the board of directors is negatively associated with earnings management in waste management firms.

Copious literature and initiatives support companies contemplating their obligations towards their stakeholders with the purpose of integrating economic, governance, social, and environmental concerns into their administration (Russo and Perrini, 2010; OECD, 2015).

Recently, some initiatives have highlighted the crucial role of women in the waste management industry,<sup>4</sup> acknowledging their multifaceted contribution on the home front and as engineers, managers, and policymakers. As a case in point, the president of the Institute of Waste Management Southern Africa, Suzan Oelofse, argues that “women are much-needed in the waste industry, due to their natural instincts to protect human health and potential to make a real difference”.<sup>5</sup>

Several studies have explored the effect of gender diversity, but to date evidence in the specific waste management industry specifically is scarce. From prior literature we derive that the monitoring of earnings depends on the capacity of decision making which is related also to the gender (Labelle et al., 2009). Indeed, the gender influence is exercised through a different use of power, organizational politics, conflict management style and trust which altogether influence decision making outcomes (Klenke, 2003). Within this stream of literature, there is evidence that earnings quality is positively associated with gender diversity among senior management (Krishnan and Parson, 2008) and with a higher presence of female CFOs (Barua et al., 2010). Overall, the results show that women can better conduct monitoring activities, favoring earnings quality (Srinidhi et al., 2011). The following is therefore expected:

**HP2b** Higher gender diversity on a board of directors is negatively associated with earnings management in waste management firms.

In terms of diversity, the appointment of foreign directors who can bring different cultural approaches to problems is considered a wise choice in many cases and this argument seems even more pertinent in the waste management industry. It is noteworthy that national and supranational regulations apply to this industry and that agreements amongst different countries about waste transport are quite common, also as far as combating the illegal trade and disposal of waste is concerned (Boudier and Bensebaa, 2011). Foreign directors can help waste management firms to sign agreements with other countries, preventing illicit trafficking of waste, and constraining the use of earnings management to hide illegal activities. In addition, foreign directors can provide different competencies than local members, changing minority investors' perception of professional (external) management (Oxelheim and Randøy, 2003). These considerations lead to the prediction that the higher the diversity in terms of nationality on a board, the more likely the board will be to constrain earnings management activities:

**HP2c** Higher nationality diversity on a board of directors is negatively associated with earnings management in waste management firms.

Concerning directors' experience, previous studies provide evidence that CEOs with a background in roles such as that of CFO tend to make more conservative accounting choices and that ana-

lysts' forecasts are more accurate – less dispersed and less volatile – in these companies (Matsunaga and Yeung, 2008). A related aspect explored in the literature concerns board members' number of appointments on other boards and committees. Appointments on multiple boards can add value to the company by allowing “busy” directors to acquire alternative approaches, methods, tools, and management strategies (Booth and Deli, 1996; Carpenter and Westphal, 2001). Directors' with more commitments are more likely to establish social and economic networks that will allow them to develop their consulting skills by offering an enriched experience in the field. These benefits go hand in hand with the idea that friendships, networks, alliances, and interfirm relationships contribute to the ability of directors to provide more informed advice and mitigate environmental uncertainty.

All these arguments are even more pronounced in a highly regulated and continuously changing industry, such as waste management (Zahra and Pearce, 1989; Harris and Shimizu, 2004). Overall, it is expected that multiple appointments enforce the monitoring role of the board, resulting in better financial reporting.

**HP2d** A more expert board of directors is negatively associated with earnings management in waste management firms.

Fig. 1 shows the research model of the hypothesized relationships between ownership types, corporate governance, and earnings management in the waste management industry. Specifically, the dotted lines in Fig. 1 are used when the sign of the relationship is not predicted, otherwise the sign “–” indicates a predicted negative association with earnings management.

### 3. Research design

#### 3.1. Sample description

The data source was constructed by using the Orbis Bureau van Dijk database, comprising accounting and financial information provided in consolidated financial statements as well as corporate governance and ownership structures information.<sup>6</sup> The selection procedure considers all the companies in the database (217,552,306) whose NAICS primary code is 562, meaning waste management and remediation services companies (289,448). The sample selection procedure requires that all companies adopt the IAS/IFRS International Accounting Standards (2913), as the dependent variable and other measures are based on accounting data; firms must therefore adhere to the same level of accounting regulation. Then, it is ascertained that all companies have accounts and almost complete data available for the 4-year period of 2013–2016 and, simultaneously, that they generate revenue higher than USD 3 million.<sup>7</sup>

<sup>6</sup> The Orbis Bureau van Dijk database provides information on around 300 million companies across the globe. It is a global resource for company data, comprising data on company activity, account and status information, the directors, the financial and stock data, ownership, and royalties. For the purpose of this research, the data used is that of a sample of waste management companies selected according to the criteria specified in this section. The data used to verify whether these waste management companies adopt (ir)responsible accounting behavior is the financial data derived from the annual reports which allow measuring the earnings management in terms of discretionary accruals and earnings smoothness, constituting the dependent variables. Details on the construction of the dependent variables and on the independent and control variables are in Section 3.2.

<sup>7</sup> The research design purposely investigates only the latest available four years (2013–2016) considering that prior years may have been adversely affected by the global financial and economic crisis, which compromised the financial results. This is relevant because the crisis effect might also have influenced prior years' earnings management incentives for firms. The manuscript therefore includes the more recent period in which firms globally have operated in more stable financial conditions. In addition, as these firms operate in a highly regulated environment, it is considered more appropriate to include only the more recent years, avoiding different impacts of regulations.

<sup>4</sup> In this context is representative the initiative conceived at the ISWA World Congress in Novi Sad in 2016 labelled “Women of Waste” (WoW) aiming at supporting women's work in the waste industry.

<sup>5</sup> See <http://www.infrastructurene.ws/2013/08/08/do-women-have-a-future-in-the-waste-management-industry/> date accessed November 6, 2018.

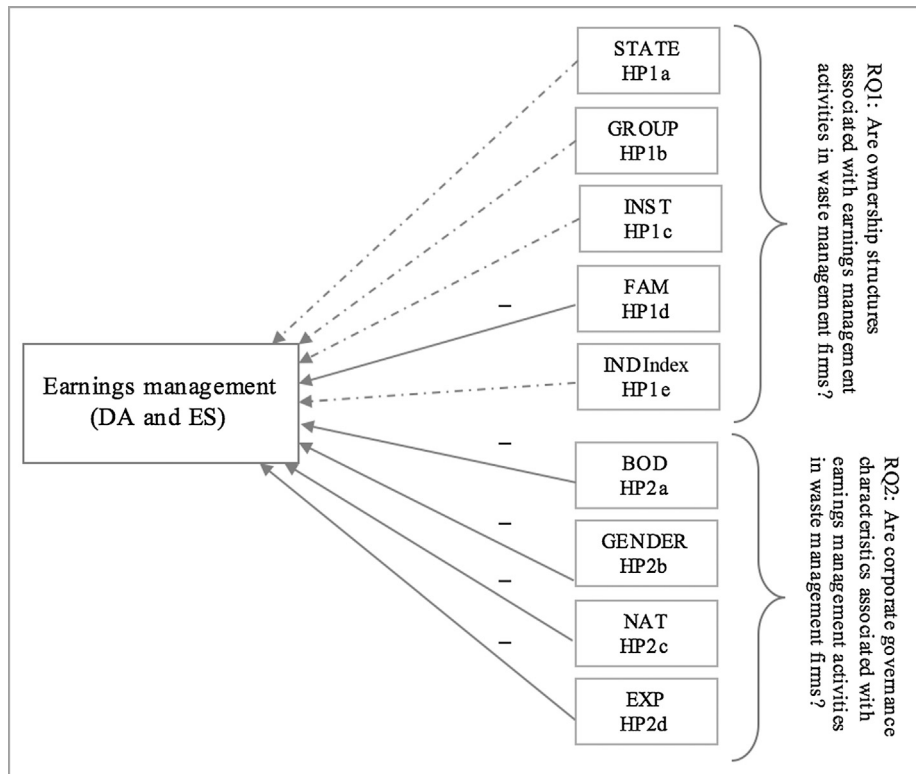


Fig. 1. Research model.

These filters led to a sample of 104 firms and a total data set of 416 firm-year observations. The companies selected are from different countries: Canada (2), Chile (2), Colombia (14), the Cayman Islands (1), France (2), Germany (1), Great Britain (25), Greece (5), Italy (16), Malaysia (2), Poland (8), Portugal (17), Singapore (1), Thailand (4), and Taiwan (3).

### 3.2. Measures of earnings management

Earnings present attributes employed to proxy financial reporting quality which are based on certain “accounting” characteristics (Francis et al., 2004) such as accrual quality, smoothness, persistence, and predictability. These attributes assume that earnings reflect the attribution of cash flow via the accrual process (Dechow and Dichev, 2002)<sup>8</sup> and their assessment provides a view over accounting decisions, which reveal the quality of financial reporting, or – from the other side of the coin – the use of earnings management.

The quality of financial reporting has an innate character of responsibility and legitimacy towards stakeholders (Belski et al., 2008; Melè et al., 2017). Earnings management constitutes an

<sup>8</sup> The assessment of earnings management generally requires to refer to the assessment of accruals. Indeed, earnings derive from the sum of two elements: accrual and cash flow. Accruals represent “the change in non-cash working capital less depreciation expense” (Sloan, 1996). Cash usually is more hard to manipulate by means of accounting decisions because it is easily assertable and less tied to discretionary choices. Accruals, instead, provide great discretion to managers (Dechow et al., 2010). Accrual accounting is characterized by the recognition of financial benefits and obligations accruing over the reporting period, regardless of cash flow. This accounting approach opens to subjectivity, assumptions, and consequently, discretion. Examples of accrual items often manipulated may be: amortization expenses; net account receivables; inventory. Discretionary (or abnormal) accruals are generally perceived as being of low quality, meaning that the firms’ manage the earnings, and as such they are considered less informative to financial reporting users.

obstacle to information integrity breaking the bond between the stakeholders and the firms (Levitt, 1998). Earnings management is thus considered unethical impairing the firms’ responsibility and endangering societal trust and morality (Greenfield et al., 2008; Johnson et al., 2012; Vladu et al., 2017). Moreover, earnings management can have negative outcomes on the reporting firm such as higher litigation risk, lower market valuations, increased cost of equity and cost of debt, reduced analysts forecast accuracy (Healy and Wahlen, 1999; Dechow et al., 2010; Das et al. 2011).

Prior studies on earnings management have elaborated on several proxies to determine how it can be measured (Dechow et al., 2010). In this work, to assess the impact of corporate governance and ownership structures of waste management firms and earnings management (EM), the magnitude of accruals (DA) and earnings smoothness (ES) models are adopted (see Section 3.3).

### 3.3. Variable definition

#### 3.3.1. Dependent variables

When the dependent variable is discretionary accruals (DA), it is measured according to the Jones (1991) model. The magnitude of accruals is derived from the following equation:

$$ACCUALS_{i,t}/TA_{i,t-1} = \beta_0 + \beta_1 \Delta REV_t/TA_{i,t-1} + \beta_2 PPE_t/TA_{i,t-1} + \varepsilon \quad (1)$$

where  $ACCUALS_{i,t}$  are the total accruals at time  $t$ , derived from the difference between earnings before extraordinary items (E) and cash flow from operations (OCF) at time  $t$ ;  $REV$  is the total revenue;  $TA$  is the total assets;  $PPE$  is the net book value of property, plant, and equipment; and  $\varepsilon$  is the residual value. Eq. (1) is estimated in each year. The residuals of Eq. (1) are then used to capture the magnitude of discretionary (abnormal) accruals (DA).

When the dependent variable is the earnings smoothness (ES) behavior of waste management firms, the model included the

smoothness (ES) ratio. In detail, the earnings smoothness (ES) is measured through the ratio between the standard deviation of the earnings at time  $t$  and the standard deviation of cash flow at time  $t$ :

$$\sigma(\text{Earnings})/\sigma(\text{Cash flow}) \quad (2)$$

### 3.3.2. Independent variables

To test the effect of ownership structures and corporate governance characteristics, the study includes several explanatory variables.

Concerning ownership structures, the models consider whether the ultimate owner type is:

- a government entity, including states, government agencies, government departments, or local authorities (STATE);
- a corporate company, including all companies that are not banks, financial institutions, or insurance providers; they can be involved in manufacturing activities but also in trading activities (wholesalers, retailers, brokers, etc.); they also include companies that render non-financial business-to-business or business-to-consumers services (GROUP);
- an institutional investor, meaning banks, financial institutions, insurance providers, mutual and pension funds/nominees/trusts/trustees, private equity firms, venture capital, and hedge funds (INST);
- a private individual or families, including shareholders designated by more than one named individual or families; the idea behind this is that they would probably exert their voting power together (FAM).

The ultimate owner is defined as the shareholder with the highest direct or total percentage of ownership. An innovation of this study is the inclusion of the variable Bureau van Dijk's independence indicator (INDIndex), which helps to identify independent companies, aligned with the degree of a company's independence regarding its shareholders. The Bureau van Dijk's independence indicator is a categorical variable from 1 to 9, indicating the level of higher to lower independence assigned to each company.

Different ownership types may exert diverse types of pressure on managers' financial reporting choices. Shareholders may influence the firm's direction significantly: by electing directors, they indirectly determine the future management, programs, and plans. Shareholders can pressure the board to adopt certain policies and to take a specific direction, threatening to replace management with more "acquiescent" managers and directors. In addition, shareholder approval is mostly needed for strategic and fundamental decisions (Klein and Zur, 2009).

Relating to corporate governance characteristics, the models consider the following variables on the board of directors and its composition:

- the size of the board of directors measured as the number of directors (BOD);
- the directors' gender diversity, measured as the percentage of female directors on the board (GENDER);
- the directors' diversity in terms of nationality, measured as the standard deviation of the differing board directors' nationality (NAT);
- the directors' expertise, deriving from their involvement in other boards and committees, measured by the relative number of appointments of each board (EXP).

All these proxies can affect directors' behavior and their earnings management incentives.

### 3.3.3. Control variables

This paper also controls for several firm and environmental characteristics that prior literature proved may affect a firm's financial reporting behavior and its economic, social, and environmental practices (Martínez-Ferrero et al., 2016).

A set of variables controls for a firm's financial and economic performance. Firm performance is controlled through the return-on-assets ratio, which is measured as profit before tax scaled by total assets (ROA) (Dyer, 2006). A firm's financial position is measured by the sum of non-current liabilities and loans scaled by equity (DEBT) (Carpenter et al., 1998). The change in revenue from year  $t$  to year  $t - 1$  scaled by total assets at year  $t - 1$  proxies a firm's growth (GROWTH) (Achleitner et al., 2014). Prior research also reports that earnings management may be affected by a firm's age, its public or non-public status, and its size. There is therefore a control for a firm's age (FIRMAGE) as the number of years since its establishment (Le Breton-Miller et al., 2011), for a firm's listing status measured by a dummy equal to 1 when it is listed (LIST), and for firm size as the natural logarithm of total assets (SIZE) (Prior et al., 2008). Given that the analysis focuses on the effect of corporate governance and ownership structures on earnings management in waste management firms, it is important to control for possible differences due to the overall economic condition of the country where a firm operates. The study therefore includes a dummy equal to 1 when a firm operates in a OECD country (OECD) (see Table 1).

## 3.4. Methodology

The dataset was organized as a strongly balanced panel data from 2013 to 2016. Several specification checks were performed. First, the model was regressed as a pooled ordinary least squares (pooled OLS), assuming neither cross-sectional nor period differences.

Next, to decide between a random effects regression and a simple OLS regression, the Breusch-Pagan Lagrange Multiplier (LM) test was used to verify that variances across entities were zero (no panel effect). The null hypothesis was rejected, concluding that the random effects model was preferable. It was then ran the Hausman test on the panel data to decide between random and fixed effect models, but the results were negative, therefore the overidentification test was carried out. The results suggested that the random effects model was more appropriate (Greene, 2003). Next, the analysis tested for time/country-fixed effects, and the results indicated that all periods and countries were not equal to zero, so year- and country-fixed effects were included in the model.

After these preliminary tests, two models arose: Model A, with discretionary accruals (DA) as the dependent variable, and Model B, with the earnings smoothness ratio as the dependent variable, to test for hypotheses 1 and 2:

$$\begin{aligned} DA = & \beta_0 + \beta_1 STATE + \beta_2 GROUP + \beta_3 INST + \beta_4 FAM \\ & + \beta_5 INDIndex + \beta_6 BOD + \beta_7 GENDER + \beta_8 NAT \\ & + \beta_9 EXP + \beta_{10} Controls + \beta_{11} YEARDummies \\ & + \beta_{12} COUNTRYdummies + \varepsilon \end{aligned} \quad \text{Model A}$$

$$\begin{aligned} ES = & \beta_0 + \beta_1 STATE + \beta_2 GROUP + \beta_3 INST + \beta_4 FAM \\ & + \beta_5 INDIndex + \beta_6 BOD + \beta_7 GENDER + \beta_8 NAT \\ & + \beta_9 EXP + \beta_{10} Controls + \beta_{11} YEARDummies \\ & + \beta_{12} COUNTRYdummies + \varepsilon \end{aligned} \quad \text{Model B}$$

Lastly, a test for heteroscedasticity indicated that heteroscedasticity-robust standard errors should be adopted. Considering the output of all these tests, a linear panel model with

**Table 1**  
Variable labels, definition and function.

Variable label	Definition	Function
DA	$\text{ACCRUALS}/\text{TA}_{i,t-1} = \beta_0 + \beta_1 \Delta \text{REV}_t / \text{TA}_{i,t-1} + \beta_2 \text{PPE}_t / \text{TA}_{i,t-1} + \varepsilon$ where: ACCRUALS = difference between earnings before extraordinary items (E) and cash flow from operations (OCF) REV = total revenue TA = total assets PPE = net book value of property, plant and equipment $\varepsilon$ = residual value	(1) Dependent variable (main analysis)
ES	$\sigma(\text{Earnings}) / \sigma(\text{Cash flow})$ where: $\sigma(\text{Earnings})$ : standard deviation of earnings at time t $\sigma(\text{Cash flow})$ : standard deviation of cash flow at time t	(2) Dependent variable (main analysis)
DA'	$\text{ACCRUALS}(t) = \beta_0 + \beta_1 (\Delta \text{REV}_t - \Delta \text{REC}_t) / \text{TA}_{i,t-1} + \beta_2 \text{PPE}_t / \text{TA}_{i,t-1} + \varepsilon$ , where: ACCRUALS = difference between earnings before extraordinary items (E) and cash flow from operations (OCF) REV = total revenue REC = accounts receivable TA = total assets PPE = net book value of property, plant and equipment $\varepsilon$ = the residual value	(3) Dependent variable (robustness analysis)
STATE	Dummy, 1 if the ultimate shareholder is a government entity (e.g. states, government agencies, government departments, or local authorities)	Test HP1a
GROUP	Dummy, 1 if the ultimate shareholder is a corporate company (e.g. all companies that are not banks, financial companies, or insurance companies; they can be involved in manufacturing activities but also in trading activities, such as being wholesalers, retailers, or brokers)	Test HP1b
INST	Dummy, 1 if the ultimate shareholder is an institutional investor (e.g. banks, financial companies, insurance companies, mutual and pension funds/nominees/trusts/trustees, private equity firms, venture capital, or hedge funds)	Test HP1c
FAM	Dummy, 1 if the ultimate shareholder is a single private individual or family	Test HP1d
INDIndex	Bureau van Dijk's independence indicator (INDIndex) is a nine-scale categorical variable from 1 to 9, indicating from higher to lower independence assigned to each company; the lower the company independence, the higher the ownership concentration	Test HP1e
BOD	Number of directors on the board	Test HP2a
GENDER	Percentage of female directors on the board	Test HP2b
NAT	Standard deviation of the different directors' nationality	Test HP2c
EXP	Percentage of the number of appointments of each board relative to the number of members	Test HP2d
ROA	$(\text{Profit before tax} / \text{Total assets}) \times 100$	Control variable
GROWTH	Change in revenue from year t to year t–1, scaled by total assets at year t–1	Control variable
DEBT	$(\text{Non-current liabilities} + \text{loans}) / \text{shareholders' funds} \times 100$	Control variable
FIRMAGE	Firm age as years since the firm has been established	Control variable
LIST	Dummy, 1 if the firm is listed	Control variable
SIZE	Natural logarithm of total assets at year t	Control variable

standard errors to estimate robust to heteroscedastic disturbance was performed.

## 4. Results

### 4.1. Descriptive statistics

Table 2 displays the descriptive statistics. Relating to continuous variables, it is clear that the waste management firms in the sample are on average not very independent (INDIndex) and the boards have an average number of 12 directors (BOD). In terms of board diversity, the average female representation is 17.8%, ranging from 0% to 66.7% (GENDER), the nationality standard deviation is 2.87 (NAT), and the average number of appointments of the boards is 1.35% (EXP). The companies in the sample have an average ROA of about 1.78%, ranging from a negative performance of 90.06% to a positive performance of 52.27%. The sample firms average DEBT is 38.47% and their average FIRMAGE is 18.74 years.

Graph 1 shows the correlation matrix heat map of all the variables that were used. Positive correlations are displayed in red and negative correlations in blue color. The circle size and the intensity of colors are proportional to the correlation coefficients. The dependent variable DA strongly correlates with board diversity in terms of nationality (NAT), while the dependent variable ES strongly correlates with three explanatory variables, namely

FAM, GENDER, and EXP. Regarding the correlations of the explanatory variables, STATE ownership is correlated with GENDER, EXP, ROA, LIST, and DEBT. The ownership held by a GROUP or institutional investors (INST) correlates with INDIndex, BOD, NAT, and some control variables. The variable FAM correlates with INDIndex, GENDER, ROA, LIST, GROWTH, and DEBT. Moving to board characteristics, both BOD and GENDER strongly correlate with NAT.

### 4.2. Multivariate analysis

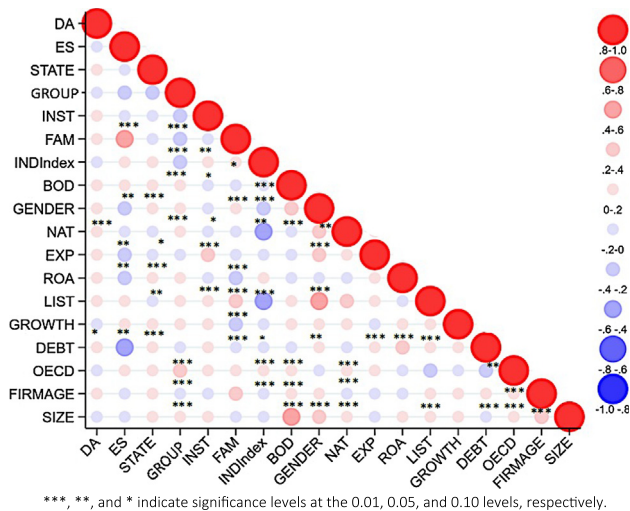
Graph 2 provides the graphical displays of the results of the regression models (Jann, 2014). The dependent variable used to estimate the earnings management activities in waste management firms was alternatively the amount of discretionary accruals estimated with the Jones model (DA) (Graph 2a) and the ratio of earnings smoothness (ES) (Graph 2b). A higher ES ratio implies lower income smoothing activities, while lower values indicate that the firms are more inclined toward smooth earnings (Dechow et al., 2010).<sup>9</sup>

<sup>9</sup> The ES proxy is the ratio of the standard deviation of the earnings to the standard deviation of the cash flow. In the case of earnings smoothness, the firms aim to provide a constant flow of earnings. In this case, the numerator of the ratio is likely to be low, while the denominator will be more volatile and higher. The lower the ratio, the higher the earnings smoothness activities. In contrast, without earnings smoothness activities, the cash flow and earnings will undergo similar trends.



**Table 2**  
Descriptive statistics.

	Obs.	Mean	Std. Dev.	Min	Max
DA	416	-1,200	27,198	-551,248	157,522
ES	416	2,429	5,477	0,076	25,380
STATE	416	0,048	0,214	0,000	1,000
GROUP	416	0,606	0,489	0,000	1,000
INST	416	0,087	0,281	0,000	1,000
FAM	416	0,067	0,251	0,000	1,000
INDIndex	416	8,067	2,370	1,000	9,000
BOD	416	11,683	13,948	0,000	123,000
GENDER	408	0,178	0,165	0,000	0,667
NAT	168	0,979	2,871	0,000	15,971
EXP	408	1,352	2,470	0,000	16,400
ROA	408	1,778	13,293	-90,060	52,270
LIST	416	0,221	0,416	0,000	1,000
GROWTH	282	-94,863	1580	-26,534	1,000
DEBT	414	38,471	31,414	-79,010	96,670
OECD	412	0,738	0,440	0,000	1,000
FIRMAGE	416	18,740	22,226	1,000	205,000
SIZE	416	10,840	1,980	3,059	16,807



**Graph 1.** Scatterplot of the correlation matrix.

Starting from RQ1, relating to ownership structures, the results are consistent with all the predictions (with a partial exception for the INDIndex variable used to test HP1e). There is evidence that ownership by STATE, GROUP, and INST is positively associated with discretionary accruals at the 5% level, implying lower financial reporting quality. When measuring the earnings management activities with the ES ratio, the results indicate that STATE, GROUP and INST are less likely to smooth earnings at the 10%, 5%, and 1% levels, respectively.

As predicted, when the controlling ultimate owner of a waste management firm is a family, earnings management activities are constrained. There is a negative association with DA ( $p < .1$ ) and a positive association with ES ( $p < .05$ ). Ultimately, there is lack of evidence that concentrated ownership (INDIndex) is associated with discretionary accruals, while the higher the ownership concentration, the more likely the waste management firms will be to smooth their earnings ( $p < .01$ ).

All in all, the results confirm that in waste management firms certain ownership structures (STATE, GROUP, and INST) manage earnings in order to achieve their reporting incentives. This finding is not only new, but also relevant, because while there is a growing interest on the reporting of non-financial information, it puts at risk the reliability of financial information under certain corporate ownership structures. On the contrary, and as shown in prior liter-

ature with reference to other industries, also in the waste management industry, family ownership seems to guarantee the reliability of financial reporting. Consistent with socio-emotional wealth theory, family-owned waste management firms are more concerned about reputational damage when any kind of financial reporting breach is discovered than about managing their earnings to achieve any financial reporting incentive (Gomez-Mejia et al., 2014; Martin et al., 2016; Ferramosca and Ghio, 2018).

Moving to RQ2, relating to board characteristics, the results are almost entirely consistent with the predictions (with a partial exception for the GENDER and NAT variables used to test HP2b and HP2c). The variables BOD, NAT, and EXP constrain the use of DA at the 10% and 5% levels. The variables BOD and EXP also constrain the use of ES by waste management firms, with significance at the 1% level. Similarly, the higher the presence of women on boards, the less likely the firms are to smooth their earnings ( $p < .01$ ), while, contrary to expectations, higher diversity in terms of directors' nationality does not limit the use of ES ( $p < .01$ ).

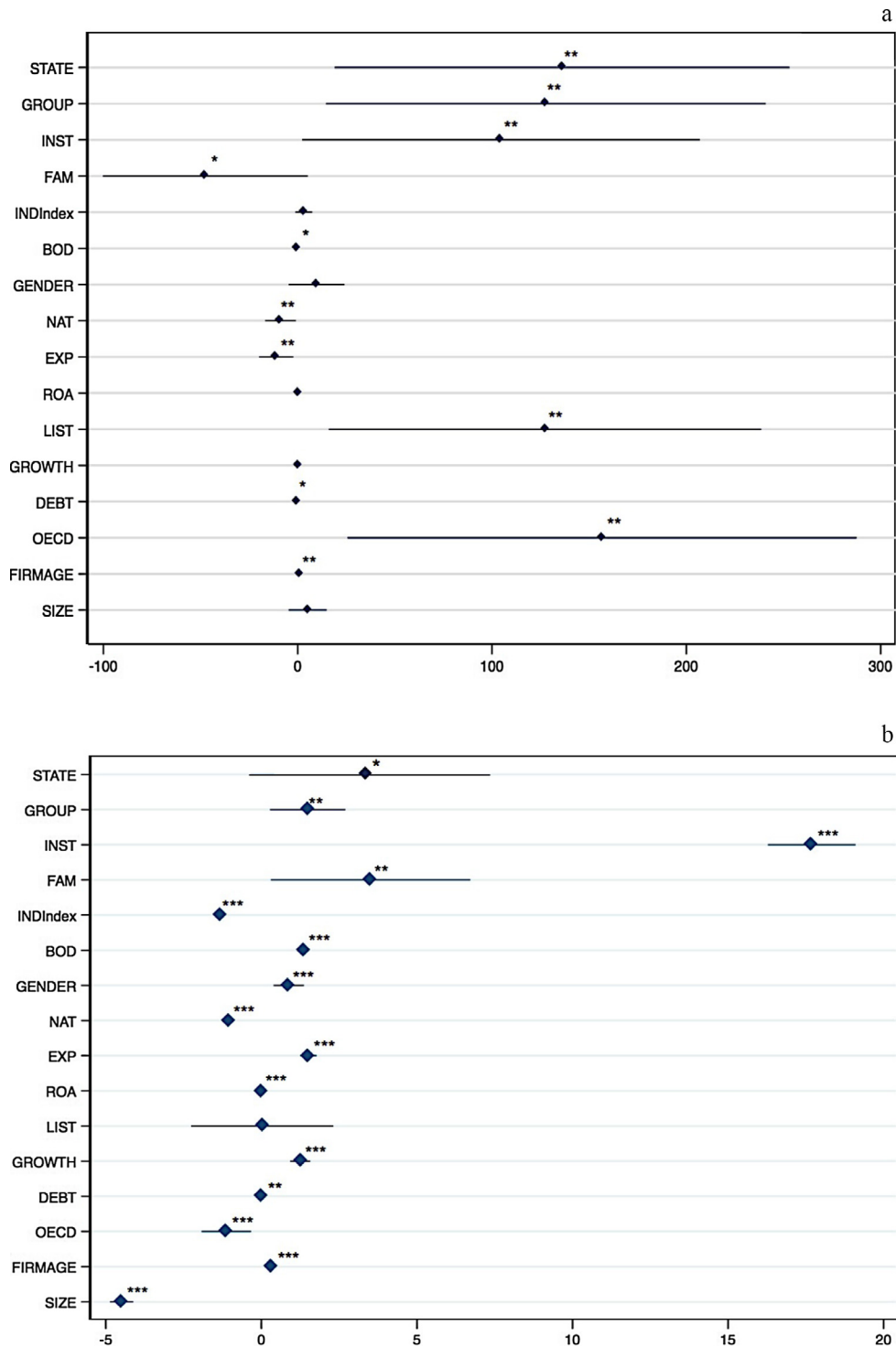
Overall, these findings add to the literature about diversity on boards in certain industries and specifically in the waste management industry, which is characterized by multiplicity in terms of stakeholders, countries, and regulators. The results confirm that in the waste management industry board composition is also associated with the likelihood that a firm will manage its earnings management (Xie et al., 2003).

## 5. Robustness

This study carries out several variants of the regressions performed in the main analysis. First, it repeated the test using another measure of accruals magnitude as dependent variable. This measure is derived from the model Dechow et al. (1995), also known as the modified Jones model, where accruals are estimated as follows:

$$ACCRUALS_{i,t} = \beta_0 + \beta_1(\Delta REV_t - \Delta REC_t)/TA_{i,t-1} + \beta_2 PPE_t/TA_{i,t-1} + \varepsilon \quad (3)$$

where  $ACCRUALS_{i,t}$  are the total accruals at time  $t$ , derived from the difference between earnings before extraordinary items (E) and cash flow from operations (OCF) at time  $t$ ;  $REV$  is the total revenue;  $REC$  is accounts receivables;  $TA$  is the total assets;  $PPE$  is the net book value of property, plant, and equipment; and  $\varepsilon$  is the residual value. As above, the residuals from Eq. (3) capture the magnitude of discretionary accruals (DA).

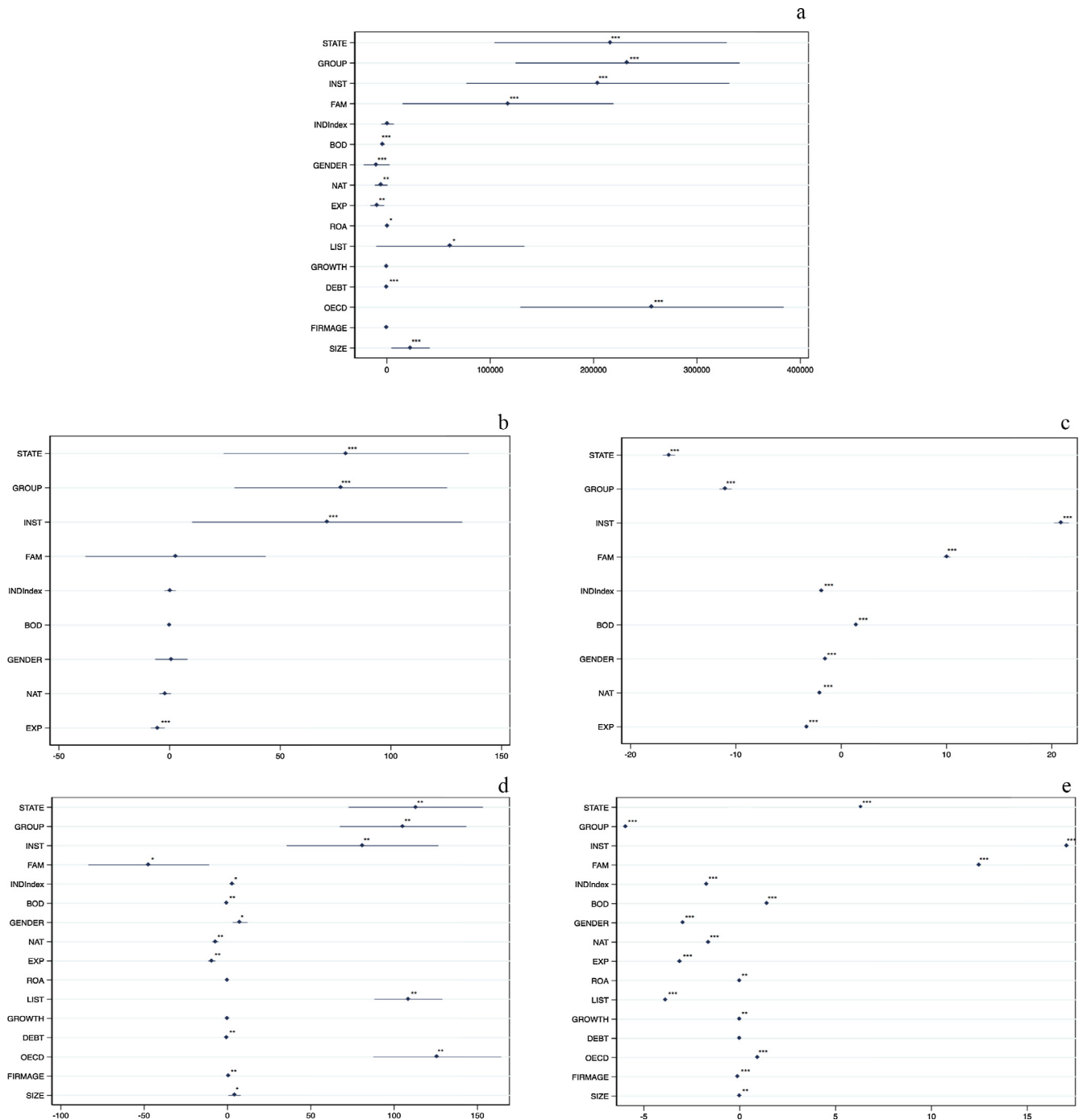


**Graph 2.** Results of regression models. Graph 2a and Graph 2b plot markers for coefficients and horizontal spikes for confidence intervals, respectively on discretionary accruals estimated with the Jones model (DA) (Model A) and the ratio of earnings smoothness (ES) (Model B). Country and year fixed effects are included in both models. \*\*\*, \*\*, and \* indicate significance levels at the 0.01, 0.05, and 0.10 levels, respectively.

Compared to the main analysis, the results were almost consistent across the models, using the alternative measure of discretionary accruals (Graph 3a).

Second, it assessed the robustness of the results for both models without taking into account the control variables and found that the influence of the explanatory variables continued to be significant and in the same direction in both models for most variables (Graph 3b–c).

Finally, to further verify whether the results were robust, the paper carried out the analysis on the panel data as well by using the feasible generalized least squares model in which modeling proceeds in two steps. In the first step, the model is estimated by OLS and the residuals are used to generate a consistent estimator of the errors covariance matrix. In the second step, the model implements the generalized least squares by using the estimator of the covariance matrix (Baltagi, 2008). Considering that this



**Graph 3.** Results of robustness analyses. Graph 3a–Graph 3e plot markers for coefficients and horizontal spikes for confidence intervals, respectively on discretionary accruals estimated with the Modified Jones model (DA') (Graph 3a); on discretionary accruals estimated with the Jones model (DA) and on the earnings smoothness (ES) without the control variables (Graph 3b and Graph 3c); and on discretionary accruals estimated with the Jones model (DA) and on the earnings smoothness (ES) using feasible generalized least squares (Graph 3d and Graph 3e). Country and year fixed effects are included in both models. \*\*\*, \*\*, and \* indicate significance levels at the 0.01, 0.05, and 0.10 levels, respectively.

procedure detects heteroscedasticity, the results are fully consistent when the dependent variable is the discretionary accruals (Model A) (Graph 3d), while they are partially consistent when the dependent variable is the earnings smoothness ratio (Model B) (Graph 3e).

### 6. Discussion

Stakeholder theory prompts several arguments about the relationship between ownership structures and corporate governance

in waste management firms, and their earnings management preferences. A substantial stream of literature, not limited to the waste management industry, argues that ownership structures and board diversity either positively or negatively affect financial reporting reliability (Hambrick, 2007). The significance of including different governance structures and industry specifics can increase the impactful of the results (e.g. Hermalin and Weisbach, 1991; Vafeas and Theodorou, 1998). Building on this research gap, this study empirically shows the effect of ownership structures and board diversity on financial reporting reliability in the waste

management industry that ultimately reflects these firms' sustainability.

The overarching reasoning is that the more ethical firms' behave in terms of fair financial information, the more it benefits from sustainable higher performance, ultimately satisfying the wide range of stakeholders who are interested in the economic feasibility and environmental viability of waste management firms (Bartolacci et al., 2018; Burnley and Coleman, 2018).

It appears to be a breakthrough to understand which are the corporate structures that enable waste management firms to achieve such a result. To this end, this study included state, corporate group, institutional investors, family ownership and independent ownership as variables concerning ownership structure. It used gender, nationality, and experience as consistent constructs for board diversity that may represent differences in background, behavior, skills, mindsets, and know-how. These types of diversity may stimulate problem-solving, enhancing financial reporting reliability and facilitating the adoption of sustainable approaches.

The outcomes of the study indicate that waste management firms may benefit from family ownership and from larger boards of directors which involve directors who are expert and have diverse nationalities.

## 7. Concluding remarks

Overall, the study reveals that proper corporate governance characteristics encourage the responsible provision of financial information. It provides evidence on how corporate governance characteristics constrain managerial incentives to use earnings management either in the form of discretionary accruals or of earnings smoothness.

In detail, the study has practical implications for:

- Managers and shareholders to arrange the more effective corporate governance structure able to provide not only pioneering strategies and technologies for waste management but also effective and reliable disclosure;
- Stakeholders to pre-plan waste management firms' sustainable decisions;
- Policy-makers to tighten the regulatory system regarding waste management firms in line with the European Commission's (2011, 2015, 2018) and Parliament's (2017) addresses about the importance of a recycling and circular economy in terms of potential wealth and job creation which cannot discard the importance of corporate governance and reporting practices;
- Regulators to assess the effects of stricter regulations on corporate structures. In this sense, the findings recommend enriching board diversity to enforce financial reporting which will in time make waste management firms sustainable. Financial information constitutes an important part of the disclosure that improves understanding waste usage as an economic resource;
- Public sector entities by encouraging the enforcement of the transparent and correct use of financial information in waste management firms.

This study contributes to the scientific literature on waste management, corporate governance, and financial reporting, increasing awareness and dialogue among various fields. The subject has so far mainly been investigated from a technological or economic perspective. Little research has been dedicated to accounting and corporate governance-related issues, which are crucial to develop more efficient, effective, and sustainably developed waste management.

Future research might explore whether and under which corporate governance and ownership structures do waste management

firms behavior in terms of earnings management differs with that of firms operating in other industries. This comparison can help at better understanding industry specific behaviours.

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**Silvia Ferramosca**, PhD, CPA, is an Assistant Professor at the Department of Economics and Management at the University of Pisa. Her research interests are financial accounting, IAS/IFRS, internal and external auditing, family business, corporate governance, corporate social responsibility and intellectual capital. She is the author of recent studies on these topics, which were published in the *Family Business Review*, the *Journal of Intellectual Capital*, the *Journal of Family Business Strategy*, the *International Journal of Business Governance and Ethics*, the *Journal of Management and Governance*, and the *Journal of Learning and Intellectual Capital*.