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# Dumping the Rules: Governance Failures in Commercial Waste Market in Sweden

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## Abstract

Illegal waste management has become a serious and growing problem in Sweden, imposing substantial environmental and fiscal costs. The Think Pink scandal, where around 200,000 tonnes of waste were illegally dumped across 15 municipalities, illustrates both the scale and the systemic nature of this problem. This paper examines how governance failures enable non-compliance in Sweden's commercial waste market. Drawing on market governance theory and Howlett and Ramesh's (2014) distinction between design mismatches and capacity deficits, it argues that both are present and mutually reinforcing. Waste utilization services share key characteristics with credence goods, generating information asymmetries that, combined with negative externalities and weak enforcement, create incentives for non-compliance. The analysis is based on semi-structured interviews with regulatory and enforcement officials. The results show that high compliance costs, both fiscal and organizational, imposed by the regulatory framework, generate demand for non-compliant services, while inconsistent sanctioning and fragmented oversight facilitate their supply. The paper concludes that non-compliant and illegal waste management reflects systemic vulnerabilities in market governance rather than isolated enforcement failures.

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## Introduction

*Market governance* (Howlett & Ramesh 2014) is a complex and distinctive form of governance at the intersection of public administration, economics and law. Unlike traditional command-and-control regulation – where government directly mandate behavior and enforce compliance – market governance operates through indirect, incentive-based and informational mechanisms. Market-based instruments shape behavior by altering the costs and benefits associated with different activities, for example through taxes, sanctions, subsidies, or tradable permit schemes (Meckling & Jenner 2016). Complementing these, information-based instruments aim to steer behavior by increasing transparency and enabling firms and individuals to make more informed choices (Hobman & Ashworth 2013).

This governance approach is characterized by arm's-length, relatively passive steering. While state intervention is typically limited and episodic, the state much act decisively when market distortions, environmental harm, or illicit activities arise. This combination of indirect, continuous steering and punctuated, forceful intervention creates a distinct set of governance challenges that remain insufficiently theorized and empirically understood.

Waste markets constitute a case where these challenges are particularly pronounced. Market imperfections – such as information asymmetries and negative externalities –commonly result in governance failures, including environmental crime, thereby necessitating extensive regulation and oversight. A salient example is "negative-value waste", which offers little or no recycling potential while imposing substantial handling and disposal costs. Such conditions create strong incentives for non-compliance (Baird et al. 2014; Szasz 1986): rather than adhere to complex and costly regulatory requirements, some actors resort to illegal practices such as dumping or concealment (e.g. Swedish Police Authority 2017). These activities impose significant environmental and financial costs and undermine fair competition by disadvantaging compliant firms. The persistence of these dynamics helps to explain why waste markets have long been associated with organized criminal activity (e.g. D'Amato et al. 2015).

This paper advances understanding of the governance of waste markets and the risks and challenges it entails. Focusing on the commercial waste market in Sweden, we examine how the interaction of market failures, regulatory design, and enforcement capacity generates systematic vulnerabilities in market governance. We show that illegal waste handling emerges as a consequence of these vulnerabilities, rather than as a series of discrete incidents. By developing this argument, the paper advances broader debates on the limits of market governance and provides a fine-grained account of the regulatory and enforcement challenges associated with waste markets.

Sweden provides a particularly informative case, reflecting a broader trend observed across many countries over recent decades: the transition from municipally controlled systems to increasingly market-oriented waste management. Following substantial marketization reforms during the 1990s and 2000s, Sweden offers insights into the long-term governance consequences of such transitions, which are directly relevant for countries currently pursuing similar reforms.

This paper investigates the drivers of governance failure in the context of illegal commercial waste management in Sweden, focusing on how shortcomings in both regulatory design and

enforcement sustain non-compliance. Accordingly, we address the following research question:

> How do governance failures, in terms of both regulatory design and enforcement capacity, contribute to the persistence of illegal waste handling?

Theoretically, the paper adopts a market governance perspective (Howlett and Ramesh, 2014), conceptualizing illegal waste handling as a consequence of misaligned incentives and weak oversight in a marketized regulatory environment. While existing research has examined waste crime from criminological, governance, and economic perspectives separately, these strands have largely developed in isolation. This study integrates these literatures to show how market characteristics and regulatory arrangements interact to produce governance failures. Empirically, the analysis draws on interviews with enforcement officials to trace how these theoretical vulnerabilities manifest in practice.

## Theoretical framework and previous research

### Market governance: capacities and design challenges

Markets do not operate autonomously; they are embedded in institutional contexts and require governance to align market outcomes with broader societal objectives (Levi-Faur 2005). Public authorities shape market behavior by designing rules, monitoring compliance, and intervening when markets fail. These tasks are particularly demanding in contexts where market incentives misalign with policy objectives, requiring governance arrangements that can compensate for structural market imperfections (Baldwin et al. 2012).

*Market governance* constitutes a distinct type of governance where the state exercises limited direct control and instead steers indirectly through the design of institutions and incentive structures. As Howlett & Ramesh (2014) argue, this approach requires high policy analytical capacity: regulators must anticipate both the sources of market failure and the potential outcomes of interventions (see also Rayner et al. 2013).

A prior and often underexamined question, however, concerns whether market governance is an appropriate mode of intervention in the first place. Following Howlett & Ramesh (2014), governance systems can fail in two analytically distinct ways: through *design mismatches* and *capacity deficits*. Design mismatches arise when policy tools or institutional arrangements are ill-suited to the underlying problem—for example, when market-based approaches are applied in contexts characterized by structural inefficiencies such as information asymmetries or weak competition. In such cases, even well-executed policies may fail to achieve their objectives. By contrast, capacity deficits occur when governance institutions lack the analytical, managerial, or political capacity required to implement otherwise appropriate policy designs effectively.

While the distinction is conceptually clear, design mismatch and capacity deficit are often conflated in practice. Governance failures are often attributed to inadequate implementation, without questioning whether the underlying governance model is appropriate. Ideological preferences for particular governance approaches, combined with institutional path dependencies that favor familiar solutions, can foreclose consideration of alternative designs and obscure whether failure stems from flawed design or insufficient capacity.

**Credence goods and the governance challenge of marketized waste**

Waste collection and disposal have been increasingly marketized across a wide range of countries (Baird et al. 2014). In these systems, private firms compete to provide disposal services to waste producers. While certain waste streams may generate value when properly sorted and recycled, waste is typically a cost for producers, who have limited interest in the quality of downstream processing. As a result, competition in waste markets tends to be price-driven rather than quality-driven.

At the same time, these markets are characterized by highly complex organizational structures, involving multiple actors – including waste producers, management companies, transporters, treatment facilities, and brokers – linked through extended and often opaque value chains (Baird et al. 2014, p. 99). This fragmentation complicates both coordination and oversight.

Waste markets pose particularly severe governance challenges because waste services constitute an extreme form of "credence goods": services whose quality cannot be readily assessed by buyers, even after consumption (Darby & Karni 1973; see also Akerlof 1970). Unlike more typical credence goods, such as medical treatment or car repairs – where outcomes provide at least some feedback – waste producers have no meaningful way to verify whether disposal has been conducted properly once waste leaves their control. This means that verifying disposal quality would require active ex post monitoring by waste producers, a costly undertaking. Yet waste producers have little incentive to bear these costs: since the consequences of improper disposal are largely externalized, they derive no direct benefit from ensuring compliance, generating a classic moral hazard problem.

This credence goods problem is compounded by two reinforcing market failures. First, negative externalities mean that improper disposal imposes diffuse costs on society rather than on the producer or service provider who cuts corners (Baumol & Oates 1988). The resulting harms are often delayed and dispersed, complicating detection and enforcement (Baird et al. 2014; Comte 2006; Friedrichs 2004). Second, these conditions generate adverse selection, as firms engaging in illegal practices may obtain cost advantages over compliant competitors, thereby distorting competition (Baird et al. 2014).

Taken together, these structural features create strong incentives for non-compliance in the absence of effective governance. Disposal operators face economic pressures to reduce costs through illegal practices, while buyers lack both the information and incentives to ensure quality (proper disposal). The result is a heightened risk of environmental crime: acts that harm ecological systems in pursuit of economic gain (Clifford & Edwards 1998, p. 26).

The governance implications are significant. Unlike markets where consumer self-interest drives quality monitoring, waste markets require extensive public intervention to compensate for failures of information, incentives, and accountability (Baldwin et al. 2012). Effective governance demands continuous monitoring of disposal chains, coordination across multiple actors, and enforcement against firms operating under strong incentives to cut corners. Yet these tasks are organizationally demanding and costly, involving substantial transaction costs and coordination requirements. Moreover, much environmental crime likely remains both hidden and understudied (Sahramäki et al. 2015), suggesting that waste markets represent a particularly demanding test case for the limits of market governance.

**Governing waste markets: institutional responses and persistent vulnerabilities**

As the previous section demonstrates, waste markets are inherently difficult to govern due to the credence good nature of disposal services and negative externalities – conditions that generate moral hazard and create strong pressures toward adverse selection. Governments have responded with a range of institutional arrangements. At the international level, frameworks such as the Basel Convention regulate transboundary waste flows (Hossain et al. 2025), while domestic authorities rely on licensing regimes, technical standards, and economic instruments to shape market behavior.

A common regulatory strategy is to assign a "duty of care" on waste producers, holding them responsible for ensuring proper downstream handling (Baird et al. 2014). This design implicitly assumes that producers will monitor waste contractors and enforce compliance through market discipline. However, this assumption faces two practical obstacles. First, the low probability of detection means that the expected cost of non-compliance remains limited even when sanctions are formally severe. Second, producers face a fundamental verification problem: once waste leaves their control, there is no straightforward mechanism by which they can confirm legal compliance, making meaningful oversight costly and difficult even for producers who wish to comply (Baird et al. 2014). The result is a misalignment between regulatory design and underlying incentive structures.

More broadly, waste markets are prone to systematic governance failure (Howlett & Ramesh 2014; Howlett 2009). Norgaard & Liu (2007) argue that markets characterized by significant externalities tend to generate governance deficits because the costs of regulation are underestimated or ignored at the design stage. Marketization often precedes the development of adequate governance capacity, producing institutional arrangements that are poorly matched to the problems they are intended to address.

Even where regulatory designs are appropriate, enforcement capacity is frequently insufficient. Empirical studies across contexts point to persistent gaps in monitoring, coordination, and legal authority. For instance, implementation of the Basel Convention is uneven, with significant enforcement deficits across signatory countries (Hossain et al. 2025). Studies from such diverse settings as Finland and Japan also show that weak enforcement, limited coordination among authorities, and high compliance costs facilitate illegal dumping (Sahramäki & Kankaanranta 2017; Matsumoto & Takeuchi 2011). In some cases, informal mechanisms such as community monitoring can partially compensate for administrative weaknesses (Matsumoto & Takeuchi 2011), but these are uneven and difficult to scale.

Inadequate enforcement capacity has direct consequences for market behavior. When the expected costs of non-compliance are low relative to the gains – the cost differential between legal and illegal disposal is in the range of 200-300% (Baird et al. 2014, pp. 98-99) – waste producers have strong incentives to engage in illegal practices. Furthermore, as producers seek the lowest price, this creates the opportunity for non-compliant waste handlers to undercut compliant firms, thereby undermining fair competition (Baird et al. 2014). Moreover, extensive regulation without sufficient enforcement capacity may exacerbate these dynamics by increasing compliance costs and thereby widening the gap between legal and illegal options (Szasz 1986; Baird et al. 2014), and ultimately incentivizing regulatory evasion (Troisi et al 2024).

The introduction of market-based instruments can produce similar distortionary effects when enforcement capacity is limited. D'Amato et al. (2015) show that the introduction of full-cost pricing for household waste disposal in Italy increased recycling rates but also led to higher levels of illegal dumping as legal disposal became more expensive. The study also highlights the adaptive capacity of illicit actors: organized crime groups responded to increased enforcement by lowering prices for illegal disposal, thereby maintaining demand. These dynamics illustrate a central challenge of market governance: pricing mechanisms can change behavior, but without effective oversight, they may also displace undesirable activities into informal or illegal channels.

Despite a growing body of research, existing scholarship remains theoretically fragmented and analytically incomplete. Criminological literature focuses on criminal actors and enforcement, management research examines firm-level decision-making, and economic analyses emphasize incentives and policy instruments. Yet these perspectives largely operate in isolation, obscuring how the interaction between market structure, regulatory design, and enforcement capacity jointly shapes outcomes. What remains underdeveloped is a unified governance perspective that conceptualizes waste handling not as a residual anomaly, but as a systemic outcome of misaligned institutions and incentives. This paper addresses this gap by integrating these literatures to theorize how the structural characteristics of waste markets interact with regulatory design and enforcement capacity to produce persistent and endogenous governance failures.

## Commercial waste in Sweden

### Description of market

The Swedish market for commercial waste constitutes a service sector encompassing the collection, sorting, and transportation of waste generated by business activities. Following the gradual dismantling of municipal monopoly during the 1990s and 2000s, a sophisticated and competitive market has emerged in which private waste management companies offer comprehensive waste-handling solutions to enterprises seeking to manage their waste efficiently and in compliance with environmental regulations.

Companies operating in this market function as intermediaries, contracted by waste-producing firms to ensure that a complex mix of waste streams is correctly sorted, categorized, and transported to appropriate recycling facilities. These facilities are predominantly managed by municipally owned companies, which process waste in exchange for fees, in accordance with the polluter pays principle. Consequently, the market logic implies that waste-generating firms compensate waste management firms not only for sorting and logistical services, but also—indirectly—for treatment fees charged by the treatment facilities.

The Swedish Environmental Code provides the legal definition of waste as “any substance or object which the holder discards, intends to discard, or is required to discard” (SFS 1998:808). Waste is classified as either municipal or commercial, with the former primarily comprising household waste and other waste similar in nature and composition, such as waste from restaurants, shops, offices, etc. (Chapter 15, Sections 20 and 20a). By contrast, the concept of commercial waste lacks a formal legal definition. Avfall Sverige (2023), an

association of municipalities, their waste management companies, as well as the private waste management sector, defines it as waste generated through business processes, noting that such waste may include both municipal-like waste and other distinct waste types.

Several features of the Swedish market for commercial waste give rise to regulatory challenges. First, improper waste management generates negative externalities in the form of environmental degradation and health risks to humans and animals. These costs are borne by society at large rather than by waste-generating or intermediary firms. In cases of illegal disposals, municipalities and taxpayers often bear substantial remediation costs. For instance, by the end of 2024, Botkyrka Municipality had incurred SEK 91 million in cleanup costs related to illegal dumping by Think Pink and had allocated an additional sum of SEK 185 million for future remediation, together amount to approximately 4% of the municipality's annual revenues (Botkyrka kommun 2025).

Second, the market is characterized by significant information asymmetries. Waste disposal typically occurs off-site and after transactions have been completed, limiting the ability of buyers to verify whether services are performed in accordance with legal and environmental standards. In line with Akerlof (1970), such information problems can give rise to adverse selection and moral hazard. Intermediary firms may have incentives to cut costs through non-compliance or illegal practices while shifting the associated risks and costs onto third parties. At the same time, waste producers have incentives to hire intermediaries at the lowest possible cost and limited incentives to undertake costly screening processes, as they do not fully internalize the risk of environmental damage.

The market for commercial waste is characterized by the presence of information asymmetry, moral hazard and externalized costs, which together shape the incentives of both waste-generating and intermediary service providers. According to a standard economic account, such conditions are likely to generate persistent inefficiencies, as quality is difficult to verify, cost-cutting behavior is rewarded, and significant costs are externalized onto society. As a result, market outcomes may deviate systematically from socially optimal levels of environmental protection and legal compliance.

In light of these characteristics, it is unlikely that the market can, “on its own”, ensure efficient or socially desirable outcomes. This creates a need for institutional arrangements—including regulation, monitoring, and enforcement—to mitigate incentive problems and align private behavior with public objectives. The extent to which such governance mechanisms are effective in the Swedish context is examined in the following section.

**Historical development of the Swedish market for commercial waste**

Swedish municipalities have traditionally exercised substantial control over the waste management sector, including the commercial waste market. While private actors have long been active in waste collection and treatment, municipal monopolies often excluded or severely restricted their participation. Legislative reforms in the late twentieth century, and particularly in the 2000s, gradually weakened this municipal dominance and opened new opportunities for private involvement.

Since the 1990s, Sweden’s waste management has shifted toward a more market-based model, with a gradual reduction in municipal involvements and an expansion of producer responsibility. A first major shift occurred in 1993-1994 with the introduction of producer

responsibility within the Sanitation Act (SFS 1994:1235; SFS 1993:1154). This reform transferred both the physical and financial responsibility for the collection and treatment of end-of-life products to producers and was subsequently extended to include packaging, tyres, vehicles, and electronic products.

The Environmental Code (1998:808) came into force on 1 January 1999, replacing the Refuse Collection Act and several other environmental laws. It established a comprehensive framework for environmental governance, including waste regulation, and clarified the division of responsibilities among municipalities, producers, and private individuals. Under the Code, municipalities retained responsibility for the collection and treatment of household waste not covered by producer responsibility schemes. Furthermore, from 1 January 2000, responsibility for non-hazardous industrial and commercial waste outside such schemes was assigned to the waste producers themselves.

In 2004, the Swedish Environmental Protection Agency found that municipalities and municipally owned enterprises continued to retain substantial market power (Naturvårdsverket 2004). The report argued for further liberalization to ensure that privately owned companies could compete on equal terms with municipal operators. At the same time, it concluded that the existing regulatory framework was sufficient to ensure the proper management of hazardous waste flows, emphasizing the need for improved enforcement rather than changes to the underlying market design — a pattern that, as this paper argues, continues to characterize responses to governance failure in the sector. Following these recommendations, the government prohibited municipalities from extending their monopoly to hazardous waste outside the household waste category (*Municipalities' Role in Waste Management* 2005/06:176), thereby ending the municipal monopoly over industrial and commercial waste management.

However, the transition from predominantly municipal control to a more competitive market created new challenges. Market entry requirements for private providers remained low: firms can begin operations within six weeks of registration, with minimal capital requirements and limited ex-ante oversight. This has created opportunities for opportunistic actors lacking both the capacity and the intention to manage waste in accordance with regulatory standards (Naturvårdsverket et al. 2022).

The expansion of the market has been accompanied by a corresponding rise in non-compliant and outright illegal waste handling. The most common forms are illegal dumping and illegal waste transportation (Naturvårdsverket 2024). The former involves disposing of waste in unauthorized locations, while illegal transportation concerns moving regulated waste, such as hazardous materials, without the required permit, often crossing municipal borders. Other forms of illegal waste handling include burying, burning, using waste in construction, or mixing toxic waste that requires special sorting with non-toxic waste (Naturvårdsverket et al. 2022). Illegal waste handling leads to distorted competition by conferring cost advantages on non-compliant actors, enabling them to undercut legitimate firms and, in some cases, displace them from the market (Swedish Police Authority 2017, Naturvårdsverket et al. 2022).

**Regulations and oversight**

The regulatory framework and oversight of waste management are primarily governed by the Environmental Code (Miljöbalken 1998:808) and the Waste Ordinance (2020:614, previously 2001:1063).

The Environmental Code states that "Anyone who handles waste must ensure that the handling does not cause harm or risk of harm to human health or the environment. Special consideration must be given to:

1. the risk that the handling may pose to water, air, soil, plants, or animals,
2. the nuisances that the handling may cause through noise or odor, and
3. the negative impact that the handling may have on specially protected areas referred to in Chapter 7, on other areas of special environmental significance, or on the landscape in general." (Chapter 15, Section 11).

Professional waste handling is subject to permit and notification requirements. Depending on the type of waste and activity, businesses required to notify or obtain authorization from relevant authorities, including County Administrative Boards, the Swedish Environmental Protection Agency, the Swedish Transport Agency, and municipal authorities (Section 17 Chapter 15). Compliance with the Environmental Code is ensured through a combination of inspections, guidance, and information provision (Chapter 16). For example, enforcement authorities assess whether permit conditions are met, take corrective actions where needed, including imposing sanctions, and report suspected violations to the police or public prosecutor (Naturvårdsverket 2023a).

The Swedish system distinguishes between *regulatory guidance* at the national level and *operational oversight* at the national, regional and local levels (see Table 1). In practice, municipalities bear primary responsibility for the collection, transport, and treatment of municipal waste, that is, household waste and waste from businesses such as restaurants, offices, and schools that is comparable in nature and composition to waste from households (Chapter 15, § 20 of the Code). They also interact with manufacturers, importers and sellers, who are legally required to recycle specific materials, to ensure their compliance with relevant legislation. At the regional level, the County Administrative Boards (Länsstyrelserna) combine permitting, supervisory, and coordination functions. They authorize waste management operations and transport, including for hazardous waste, and supervise compliance among larger and cross-municipal waste operations. They also coordinate and participate in joint enforcement efforts targeting illegal waste activities. Oversight of waste transportation across municipal boundaries involves many agencies and spans the entire waste chain, from generation to final treatment. The Environmental Protection Agency coordinates national efforts, while County Administrative Boards are responsible for monitoring waste transports (Naturvårdsverket 2023a).

At the national level, several agencies issue regulations, as well as provide guidance to support enforcement. The Environmental Protection Agency has the overall coordinating role for waste policy and enforcement guidance. Together with the Swedish Agency for Marine and Water Management, the National Board of Health and Welfare, and the Swedish Board of Agriculture, it provides national guidance to ensure legally sound, consistent, and effective oversight (Naturvårdsverket 2023a). These agencies are not responsible for day-to-day inspections, but for developing rules, enforcement strategies, and technical advice. While the Environmental Protection Agency considers the legal framework adequate, it has repeatedly emphasized the need for stronger implementation, improved inter-agency coordination, and more consistent enforcement to prevent illegal waste handling (Naturvårdsverket 2023a, 2024).

**Table 1**. Public authority responsibilities in commercial waste management

| Level | Authority | Core responsibility | Legal/institutional basis |
|---|---|---|---|
| **National** | Environmental Protection Agency (EPA) | National coordination, enforcement guidance, EU reporting, and strategy development against illegal waste handling | Environmental Code, Ordinance on Environmental Supervision (2011:13) |
| **National** | Agency for Marine and Water Management | Oversight of waste affecting marine and aquatic environments | Environmental Code |
| **National** | National Board of Health and Welfare | Regulation of health-related waste, including infectious medical waste | Health and Medical Services Act |
| **National** | Board of Agriculture | Regulation of biological waste and animal by-products | EU Regulation 1069/2009, national ordinances |
| **National/ Operational enforcement** | Police Authority; Prosecution Authority; Customs; Tax; Transport Agency | Investigation and prosecution of environmental crimes, including illegal storage, dumping, and export of waste | Environmental Code (Ch. 29), Criminal Code |
| **Regional** | County Administrative Boards | Authorization of waste management facilities and operations, cross-municipal and cross-agency coordination and enforcement | Environmental Code, Waste Ordinance |
| **Local** | Municipalities | Operational supervision of waste storage and handling by commercial actors, within municipal boundaries. | Environmental Code (Ch. 15 § 24) |

When suspected environmental crimes are identified – such as illegal waste storage, dumping, or export – the Police Authority, the Prosecution Authority, and the Customs Service are responsible for investigation and criminal enforcement (Chapter 29 of the Code). The Tax Agency and the Transport Agency play complementary roles in monitoring financial and transport-related irregularities associated with waste crime.

In sum, although waste management in Sweden is governed by a comprehensive regulatory and oversight framework, challenges related to illegal waste management continue to persist, raising questions about potential shortcomings in the legislation and enforcement.

## Illegal waste handling in Sweden: Evidence of a Systemic Problem

In December 2023, eleven individuals associated with the waste management company NMT Think Pink were charged with illegally dumping or burying some 200,000 tonnes of waste at 21 sites across 15 municipalities around Sweden (Avfall Sverige 2024; Bryant 2023; RFI 2025). The case led to several prison sentences in June 2025 (Domstolsverket 2025) and attracted considerable public attention both in Sweden and internationally, being described as “the largest environmental crime in Sweden in terms of scope and organization” (Bryant 2023). The immediate economic costs are substantial: Botkyrka municipality, one of the affected areas, faces total estimated cleanup costs equivalent to around 4% of the municipality's annual revenue base (Botkyrka kommun 2025).

The Think Pink scandal is not an isolated incident. Illegal waste dumping appears to be systemic in Sweden: in Södertälje municipality alone, as many as 50 cases of illegal dumping are reported each month (Sveriges Radio 2025). More broadly, irregularities in the management of commercial waste are a persistent and growing problem in Sweden (SOU

2021: 24; Söderenergi 2023). Moreover, the waste sector has become an increasingly lucrative arena for organized crime which exploits weaknesses in the current regulatory and enforcement framework and imposes substantial costs on society (Swedish Police Authority 2021; Gunnarsson 2023).

## Method

To examine whether and how market governance failures manifest in practice, we conducted semi-structured interviews with key informants (Marshall 1996) across the commercial waste management sector, including representatives from central government agencies as well as regional and municipal authorities. These informants were selected for their professional expertise and direct involvement in regulatory and enforcement activities, making their insights particularly valuable for understanding practical challenges in the sector. The purpose was to draw on their professional knowledge and experience of regulatory and enforcement challenges in commercial waste management. The study followed the Swedish Research Council's (Vetenskapsrådet 2024) ethical recommendations, including the requirements related to informed consent, confidentiality, and data usage.

Participants were selected through purposive sampling (Patton 2015) to capture perspectives from actors with direct involvement in regulatory and enforcement matters related to commercial waste management. To ensure variation across governance levels and institutional functions, we deliberately sought respondents from county administrative boards, municipalities, and the police. Potential participants were identified through official agency websites. In total, 21 individuals were contacted, of whom eight agreed to participate (Table 2). Non-participation was primarily due to time constraints.

All interviewees were public officials working in positions related to the commercial waste market, with professional experience of investigating or enforcing against illegal waste handling. Interviewees from County Administrative Boards and municipalities were pseudonymized with respect to name, organization, and job title to reduce identification risk. Job titles for officials from County Administrative Boards included environmental officers or similar positions, as well as specialized roles focused on waste crime. Officials from municipalities held positions equivalent to environmental inspector, though with some variation in formal titles. The study also includes an interviewee from the Police Authority, an organization with a distinct mandate in relation to waste crime. Given that the Police Authority is a large organization with many officials knowledgeable on waste crime matters, identification risk is limited, and the interviewee is therefore pseudonymized only with respect to job title.

We employed a semi-structured interview format to balance analytical consistency with flexibility. An interview guide (see Appendix A) provided a structured framework that ensured systematic coverage of key topics across cases (Bryman 2012), while leaving room for respondents to introduce unanticipated topics (Alvesson 2011). The interviews were conducted in Swedish.

All interviews were conducted online via Teams and Skype during weeks 14–16 in 2024, and lasted approximately 45 minutes each. Four interviews were conducted individually. One group interview was held with representatives of four County Administrative Boards, who proposed a joint session in light of their close cooperation. Their shared professional

experience enriched the discussion, and all participants were given the opportunity to contribute. No issues of dominance or conformity were observed during the session.

Interviews were transcribed and analyzed using a thematic approach. Relevant segments were systematically coded and organized into broader themes, which were iteratively refined through comparison across interviews to ensure coherence and consistency (Braun & Clarke 2006). The analysis was primarily inductive, allowing patterns to emerge from respondents' accounts, while remaining informed by theoretical perspectives on market regulation and enforcement.

**Table 2.** Interviewees by authority and interview characteristics

| **Authority** | **Interview type** |
|---|---|
| Police | Individual |
| County Administrative Board (CAB) 1 | Group |
| County Administrative Board (CAB) 2 | Group |
| County Administrative Board (CAB) 3 | Group |
| County Administrative Board (CAB) 4 | Group |
| County Administrative Board (CAB) 5 | Individual |
| Municipality East | Individual |
| Municipality South | Individual |

Note: The job titles are translated.

## Analysis

Three main themes have emerged from the data: the drivers of illegal waste management, its consequences, and the effectiveness of enforcement responses.

### *Drivers of illegal waste management*

The drivers of illegal waste management can be analytically divided into demand- and supply-side factors, reflecting the incentives facing both waste-generating firms and service providers. On the demand side, respondents identify three main drivers of non-compliant waste handling: high compliance costs, regulatory complexity, and a misalignment between regulatory ambition and implementation capacity.

The high costs of compliant waste handling – particularly for waste streams with negative value – create strong incentives for waste producers to seek lower-cost alternatives (CAB 5, Municipality South, Police, Municipality East). As one respondent noted, "it's so expensive

and complicated to do it right […] that if someone comes and offers a comprehensive solution it feels like 'oh, great, here you go'" (CAB 5). This dynamic is especially pronounced for firms producing small waste volumes, for whom compliance costs are relatively burdensome (Municipality South, CAB 4).

These incentives are reinforced by regulatory complexity. Respondents emphasized that waste producers often lack clarity regarding their legal obligations (Police, CAB 5). For example, the transport of hazardous waste requires not only a permit, but also the maintenance of documentation specifying the waste's origin, type, quantity, and destination. Such requirements are frequently poorly understood, making waste producers vulnerable to seemingly convenient alternatives: "an illegal transporter says: 'just give it to me, and I'll take care of it'" (CAB 5). In this sense, non-compliance is not only opportunistic but also facilitated by limited knowledge.

In addition, respondents point to a misalignment between regulatory ambition and implementation capacity. While environmental regulations impose stringent requirements, the technical and organizational conditions necessary for compliance are not always in place. Although Swedish environmental law prohibits the landfilling of most types of waste, the technologies and organizational arrangements required for the proper treatment of certain materials are not fully developed or scaled (CAB 5). For example, while producer responsibility was expanded for textiles in 2025, its implementation has faced delays due to overwhelming pressure on municipal collection infrastructure and the absence of large-scale, nationwide recycling facilities. When adequate treatment options are unavailable or difficult to access, compliant disposal becomes less feasible, while low-cost non-compliant providers become more attractive.

On the supply side, respondents highlight regulatory complexity, legal loopholes, lenient penalties, and limited enforcement as key drivers of non-compliant service provision. Increasing regulatory complexity raises compliance costs, expanding the supply of non-compliant lower-cost alternatives: "the more waste management legislation in general, the more it, unfortunately, fuels the illegal side [the supply of non-compliant services – authors]" (CAB 4, see also Municipality South).

At the same time, gaps in the legal framework and relatively low sanctions reduce the expected costs of non-compliance, weakening deterrence. The Environmental Code contains multiple gaps, the most notable of which, according to the respondents, is the absence of sanctions for certain stipulated violations.

> *[...] it is prohibited to transport [hazardous – authors] waste without notification [...] but no penalty linked to it […] the provision becomes quite toothless, it becomes merely [a recommendation – the authors] 'don't do that', and there are quite a few such gaps. (Municipality South)*

When sanctions are stipulated in law, they are, according to most interviewees, too low relative to potential profits to function as an effective deterrent: "if you make four million [SEK] a year and have to pay a fine of 100,000, well, you've still made a pretty good profit" (Municipality South). While some respondents argued for stronger sanctions (CAB 2, CAB 3, CAB 5), others questioned their effectiveness (Police), echoing broader debates on the importance of detection and enforcement certainty over sanction severity (Chalfin & McCrary, 2017).

This dynamic is further reinforced by limited enforcement capacity, which reduces the perceived risk of detection and allows non-compliant providers to operate with relatively low probability of sanction. Respondents pointed to limited financial and human resources as a central constraint on effective oversight, reducing both the frequency and quality of inspections: “time and resources are not available to [match – authors] the scale of the problem” (CAB 4). Furthermore, new rules are often introduced without timely guidance, reducing their practical enforceability: “the legislation may take effect on November 1, but the guidance is not issued until April […] until then you have to reinvent the wheel” (Municipality East). Many respondents noted a combination of an increasing regulatory complexity without a corresponding increase in enforcement capacity as a potential driver for increased supply of non-compliant services – a pattern mirroring findings from other national contexts (D’Amato et al. 2015; Baird et al. 2014).

Finally, interviewees highlighted shortcomings in inter-agency coordination. Effective enforcement requires collaboration across municipalities, regions, and national authorities, as well as across different areas of expertise, yet such coordination was widely described as insufficient (CAB 2, CAB 4, Police). One official noted that 'a regular police officer knows very little about environmental crimes […] they don't know what to do' (Municipality South). Given that waste flows often span administrative boundaries, these coordination failures further constrain enforcement effectiveness.

Several respondents noted that complex regulation, weak enforcement, high compliance costs, and low penalties for non-compliance make the sector attractive to organized crime (Police, CAB 1). It is notable that the respondent’s accounts, however, largely treats illegal waste management as an ordinary cost-benefit reasoning. However, organized criminal networks differ from opportunistic non-compliant firms in that they actively seek out sectors where they can operate below the radar of state authorities. The commercial waste market, with its low entry barriers and fragmented enforcement landscape, offers precisely this. As Szasz (1986) argued, regulatory structures that combine high compliance costs with weak enforcement do not merely tolerate criminal activity but actively generate it, a dynamic further illustrated by the Italian evidence reviewed earlier in this paper (D'Amato et al. 2015).

Taken together, these findings point to a mutually reinforcing interaction between demand- and supply-side incentives. On the demand side, high compliance costs, regulatory complexity, and capacity constraints increase waste producers’ reliance on low-cost intermediaries. On the supply side, regulatory complexity, weak sanctions, and limited enforcement reduce the expected costs of non-compliance and increase its profitability.

The result is a structural environment characterized by high potential returns, low risks, and limited oversight, in which illegal waste management is not an anomaly but an expected outcome. In this context, regulatory arrangements that combine ambitious environmental goals with insufficient implementation and enforcement capacity do not merely fail to prevent non-compliance but actively generate it. This dynamic helps explain why the sector has become attractive to organized crime, which is particularly well positioned to exploit fragmented oversight and operate across jurisdictional boundaries.

More broadly, the findings suggest that illegal waste management is best understood not as isolated deviant behavior, but as a systemic feature of market governance under conditions of regulatory complexity and implementation capacity constraints, including weak enforcement.

### *Consequences of illegal waste management*

Respondents consistently emphasized that illegal waste management generates substantial environmental damage, economic costs, and market distortions.

Environmentally, improper waste handling leads to both local and transboundary harm. Within Sweden, illegal dumping and burial contaminate soil and groundwater and can have long-lasting effects on ecosystems. As one respondent noted, "when you bury [waste], it often contributes […] to contamination in the soil […] which can spread into the water and ecosystem" (Municipality East). At the same time, respondents highlighted that waste exports shift environmental risks abroad, often to contexts with weaker regulatory capacity: "we send a lot of our waste abroad and that can severely affect other countries and endanger ecosystems" (CAB 1).

These environmental harms translate into significant economic costs. Because remediation and proper treatment of illegally handled waste are highly expensive, the burden is often shifted onto municipalities and, ultimately, taxpayers. Respondents described cases in which firms accepted large volumes of waste and subsequently declared bankruptcy, leaving authorities responsible for cleanup: "the state had to take care of all the waste and clean up the land […] tens of millions of kronor ultimately borne by society" (Municipality South). In some cases, these costs are substantial relative to local budgets, as for Botkyrka Municipality which faces cleanup costs equivalent to approximately 4% of its annual revenues following the Think Pink case (Botkyrka kommun 2025). One respondent emphasized the importance of communicating these costs to politicians at the municipal level: "I also think it is important to talk about how much this costs and bring it to their attention […]. The sums that municipalities need to spend on cleaning streets, parks, and illegal dumps at recycling stations are enormous" (CAB 3).

Beyond environmental and fiscal impacts, illegal waste management also distorts market competition. By avoiding compliance costs, non-compliant firms can undercut legitimate operators, weakening incentives for lawful behavior and discouraging investment in compliant waste management (Baird et al. 2014; Swedish Police Authority 2017; Naturvårdsverket 2022). Over time, this can crowd out compliant firms and reshape local markets. Respondents pointed to cases where legitimate businesses, such as car scrapyards, have declined as waste is diverted to non-compliant channels, reducing local processing capacity and generating broader economic losses.

Taken together, these consequences illustrate how illegal waste management externalizes environmental and economic costs while undermining market functioning. In doing so, it reinforces the systemic vulnerabilities identified above, linking governance failures not only to the emergence of non-compliance but also to its broader societal impacts.

### *Measures for strengthening compliance and combating illegal waste management*

Respondents' proposed measures can be grouped into two broad categories: those targeting the incentive structure of market actors and those aimed at strengthening oversight. A clear pattern, however, is that proposals are heavily skewed toward enforcement, with comparatively limited attention given to underlying incentive structures.

With regards to incentives, respondents stressed the need to lower the costs of compliance, both in financial terms and in organizational effort. Reducing regulatory complexity and closing the gap between regulations and technical and organizational capacity (such as, enabling the non-landfill treatment of waste currently prohibited from landfill) were seen as essential to reducing demand for non-compliant service. However, proposals in this domain were generally vague and underspecified. A notable exception was a proposal from the police to reduce disposal fees and finance waste treatment through taxation rather than charging waste producers directly, thereby eliminating the cost advantage of illegal alternatives.

> "[…]*if fees are lowered to the point where turning to illegal waste handlers is simply not worthwhile, the problem could perhaps be eliminated entirely*" (Police).

In contrast, proposals related to enforcement were both more numerous and more concrete. A central concern was the limited visibility of actors operating in the sector, particularly smaller firms that fall outside existing permitting and reporting requirements. Expanding mandatory licensing and reporting obligations was therefore widely seen as a prerequisite for effective enforcement. As one respondent noted, "many companies […] are so small that they are not required to obtain permits […] we often don't even know about their existence" (Municipality East). Respondents further emphasized the need for more proactive and adaptive enforcement strategies. Given that non-compliant actors continuously adjust their practices, effective oversight requires increased use of unannounced inspections and earlier intervention in the waste management chain. As one interviewee put it, intervening upstream—before waste enters broader distribution channels—is both more effective and efficient than attempting to intercept illegal flows at later stages (Municipality South).

Improving information flows across authorities was identified as another critical priority. Current oversight is fragmented, with no single authority maintaining a comprehensive overview of waste generation, transport, and treatment. As a result, discrepancies in waste flows often go undetected. A coordinated system for information-sharing would enable authorities to track waste throughout the management chain and identify irregularities more effectively: "no authority has a complete picture of the process" (CAB 5).

Relatedly, respondents identified strengthening inter-agency coordination as a key priority for effective enforcement. Effective enforcement requires cooperation across municipalities, regions, and national authorities, as well as across regulatory domains. However, such collaboration remains limited, considerably constraining the ability of authorities to respond to increasingly mobile and adaptive forms of illegal activity.

Several respondents also pointed to structural weaknesses in the financing of oversight. Because enforcement activities are largely funded through fees paid by compliant firms, actors operating outside the formal system do not contribute to the costs of monitoring. This creates a resource gap that further weakens enforcement capacity. As one respondent observed, "because these actors don't pay […] there are no funds available for their monitoring" (Municipality South). Public investment in proactive enforcement was therefore seen as necessary both to strengthen oversight and to level the playing field for compliant firms.

Finally, respondents emphasized the role of awareness among policymakers, businesses, and the public. Limited political attention to illegal waste management was seen as a barrier to resource allocation, with funding often increasing only after major incidents. However,

awareness-raising was primarily framed as a means of securing greater resources for enforcement, rather than as a tool for reshaping underlying incentives.

Taken together, respondents' proposals suggest that practitioners recognize the role of market incentives in driving non-compliance, but focus predominantly on strengthening enforcement as the primary solution, underprioritizing the importance of finding a more appropriate regulatory framework design.

## Discussion

The interview data can be interpreted through the two types of governance failure identified by Howlett & Ramesh (2014): design mismatches and capacity deficits. The findings indicate that both are present in the Swedish commercial waste market, and, importantly, that they reinforce one another in ways that are not always recognized by the officials responsible for addressing them.

An analytically important pattern in the data is that respondents tend to frame governance failure primarily in terms of capacity deficits. While they recognize that market incentives contribute to non-compliance, their proposed remedies focus overwhelmingly on strengthening enforcement through additional resources, improved cooperation, and more proactive monitoring. In contrast, comparatively little attention is given to reforming the underlying market incentives. This is consistent with Howlett & Ramesh's (2014) observation that practitioners often interpret governance failure as an implementation problem rather than questioning the suitability of the chosen governance mode. The result is a systematic bias toward enforcement-based solutions, even in cases where the underlying drivers of non-compliance are rooted in structural features of the market. One notable exception in our study is the proposal by the national police to lower legal disposal costs and finance them through taxation, which implicitly recognizes that enforcement alone cannot resolve the problem and that the incentive structure embedded in the market itself may require adjustment.

Indeed, several factors identified as problematic by the respondents point more directly to structural design mismatches than to implementation shortcomings. A central pattern is that high compliance costs create incentives for waste producers to seek lower-cost alternatives, with limited incentives, ability or both, to verify whether intermediaries comply with existing regulations. These costs are not merely a function of market dynamics but are also partly produced by the regulatory framework itself. Regulatory complexity increases compliance costs, as new rules are often introduced without timely guidance, leaving actors to navigate uncertainty. In addition, regulatory ambition at times exceeds available implementation capacity, as disposal methods mandated by law are not yet supported by adequate technical and organizational infrastructure.

Regulatory complexity also generates information asymmetries. Many waste producers lack clarity about what compliance entails, leading many to rely on external providers without the ability to assess whether these operate within the law. Even waste-producing companies that intend to comply face difficulties in identifying trustworthy, compliant operators. This creates opportunities for unscrupulous actors to compete in price by cutting regulatory corners, thereby placing compliant service providers at a disadvantage. In this sense, the problem is not only weak enforcement but a regulatory design that fails to account for the credence-good character of waste services and the moral hazard it creates.

A further design issue concerns the institutional design of oversight. The current financing model, which relies on fees from registered companies, excludes non-compliant actors from contributing to the costs of monitoring, thereby weakening enforcement capacity. Similarly, the absence of sanctions for certain violations, such as the transport of hazardous waste without required notification, reflects gaps in the legal framework that reduce deterrence independently of enforcement effort.

At the same time, the findings point to capacity deficits that systematically constrain the effectiveness of oversight. Resource constraints and fragmented institutional responsibilities reduce the ability of authorities to detect and sanction non-compliant behavior. These constraints are particularly salient in a sector where waste flows routinely cross administrative boundaries, allowing actors to exploit fragmentation in the allocation of authority between national, regional and municipal governments. Even when violations are identified, enforcement outcomes are not always effective. This is a clear instance of a capacity deficit (Howlett & Ramesh 2014): governance arrangements that are appropriate in principle fail due to insufficient resources and coordination.

## Conclusion

This paper examines how market structure and institutional design interact to enable non-compliant waste management within Sweden's commercial waste market. Drawing on market governance theory and interviews with enforcement officials across multiple levels of governance, the analysis shows how the interaction between regulatory design and enforcement capacity creates systematic vulnerabilities to illegal waste handling.

The central finding is that governance failure in the sector reflects the joint presence of design mismatches and capacity deficits, which reinforce one another. While respondents predominantly frame the problem in terms of insufficient enforcement, there is clear evidence that weaknesses are also embedded in the design of the regulatory framework. This pattern is consistent with Howlett & Ramesh's (2014) observation that practitioners often overlook the shortcomings of the chosen governance mode. The implication is that reforms focused solely on strengthening enforcement are unlikely to succeed if the underlying incentive structure remains unchanged. Features such as low barriers to entry, incomplete sanctioning regimes, and a financing model that exclude non-compliant actors from contributing to oversight reflect design choices that systematically undermine regulatory effectiveness.

The findings also speak to broader debates on market-based governance. Sweden's transition from municipal monopoly to a competitive waste market mirrors developments in other countries, suggesting that the identified challenges are not case-specific. In sectors characterized by information asymmetries and externalized costs, market liberalization may generate governance problems that are difficult to correct ex post. The Swedish case thus underscores the importance of treating institutional design as a precondition for marketization, rather than as a subsequent adjustment.

While this paper offers insights into the understudied topic of market governance failure in waste management, its empirical focus is limited to Sweden. Comparative analysis could assess the extent to which variation in market design and enforcement capacity shapes the prevalence of illegal waste handling across contexts. In addition, the demand side of illegal waste services remains insufficiently understood: more research is needed on how firms

select waste management providers under conditions of uncertainty and how policy interventions might influence these decisions. Finally, the role of organized crime warrants further investigation, particularly how criminal networks adapt to regulatory change and exploit governance weaknesses.

More broadly, the findings suggest that illegal waste management is not merely a problem of enforcement failure, but a predictable outcome of market governance under conditions of high compliance costs, informational opacity, and weak deterrence. Addressing the problem therefore requires not only stronger oversight, but a reconsideration of the institutional arrangements through which waste markets are organized.

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**Appendix A: Interview guide**

**Background Questions**

1. What is your job and what is your role?
2. Can you describe your experience with waste management?
3. How would you describe the problem of illegal waste management from your professional perspective?

**Causes**

4. Which factors do you believe contribute most to the problem of illegal waste management?
5. How do you think the current legislation/regulations affect the occurrence of illegal waste management?

**Consequences**

6. What are the most serious negative effects of illegal waste management?
7. How do you think illegal waste management impacts society and why?

**Measures and Solutions**

8. Have you observed any measures taken to combat illegal waste management, and if so, how effective do you think they have been?
9. Can you think of any potential solutions/strategies that could reduce or eliminate illegal waste management? What would be required to enable such solutions/strategies?

**Future Outlook**

10. What trends do you see in waste management that could affect the problem of illegal waste management in the future?
11. How do you view the future of waste management and the fight against illegal waste management?

**Closing Questions**

12. Is there anything else you would like to add regarding illegal waste management?
13. Are there any areas or aspects you think we have missed concerning illegal waste management specifically or the waste market in general?
14. Is there any researcher or expert you think we should contact and invite for an interview for this study?