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Citation for final published version:

Alonso, Jose M. and Andrews, Rhys 2019. Governance by targets and the performance of cross-sector partnerships: do partner diversity and partnership capabilities matter? *Strategic Management Journal* 40 (4), pp. 556-579. 10.1002/smj.2959

Publishers page: <https://doi.org/10.1002/smj.2959>

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GOVERNANCE BY TARGETS AND THE PERFORMANCE OF CROSS-SECTOR PARTNERSHIPS: DO PARTNER DIVERSITY AND PARTNERSHIP CAPABILITIES MATTER?

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Research summary: This study examines the effectiveness of targets as a tool for the contractual governance of cross-sector partnerships. Applying a difference-in-differences methodology, we find that the use of explicit targets within performance contracts is an effective means for improving partnership outcomes, especially where partner diversity and partnership capabilities are high. Furthermore, we find evidence that target intensity is associated with stronger partnership performance. These findings suggest that contractual forms with explicit targets may be a particularly successful approach for enhancing the public value created by cross-sector partnerships. A downward turn in performance following the removal of targets lends further support to this conclusion.

Managerial summary: Cross-sector partnerships have become a vital means for creating value in pursuit of the public interest. In particular, the effective management of these partnerships is regarded as holding the key to addressing the strategic and organizational challenges posed by major social and environmental issues, such as big data and climate change. In this article, we combine data on waste recycling from 2003-2014 with information on performance contracts between local cross-sector partnerships and higher levels of government in England to quantify the impact of governance by targets on the performance of those partnerships. The benefits of target-setting for partnership performance that we identify are even stronger when partner diversity is high and partnership capabilities are strong. We discuss the managerial and policy implications of our findings.

Forthcoming in: *Strategic Management Journal*

INTRODUCTION

Strategic management scholars increasingly recognise that collaboration between business, government and civil society is vital for creating value and achieving important social goals (George *et al.*, 2016; Koschmann *et al.*, 2012). Defined as ‘multi-actor collaborative arrangements’ to achieve a common objective (Quélin *et al.*, 2017; Selsky and Parker, 2005), cross-sector partnerships (CSPs) promise enhanced value creation because when organizations from different sectors work together they create new collaborative capabilities (Kivleniece and Quélin, 2012; Mahoney *et al.*, 2009). Despite growing interest in the governance of these ‘hybrid’ inter-organizational forms (Quélin *et al.*, 2017), surprisingly little research investigates the specific contractual forms and partnership capabilities likely to make them a success.

To date, scholarship dealing with the performance of CSPs has largely sought to identify capabilities that compensate for incomplete contracts (Cabral, 2017; Cabral *et al.*, 2013). This research casts valuable light on collaborative strategic management, but focuses on public-private interactions and is less applicable to the multi-actor CSPs unable to rely on equity-based structures for value appropriation (Gulati *et al.*, 2012). CSPs often entail ‘relationships much broader than its legal definition’ (Hamlin and Lyons 1996, p.3). For this reason, the creation of value by CSPs may benefit most from contractual forms of governance that utilise tools for inducing positive behaviour change, such as performance goals and targets (de Man and Roijakkers, 2009). Drawing on transaction costs and capabilities theories, we analyze the efficacy of contractual forms with explicit targets for the governance of CSPs, along with the partnership capabilities that shape the effectiveness of ‘governance by targets’. Our main contribution is to identify the key role that partner diversity and partnership capabilities play in ensuring contractual governance enhances the value created by CSPs.

Transaction cost theory suggests clear and transparent objectives hold the key to achieving goal commitment in inter-organizational relationships (Williamson, 1979). Performance targets may therefore be especially applicable to the governance of CSPs because they lessen the costs of co-ordinating complex systems (de Man and Roijakkers, 2009; Grant, 2003). Moreover, partner diversity may enhance the benefits of target-setting for value creation by CSPs, because it nurtures the collaborative capabilities required to achieve partnership goals (Quélin *et al.*, 2017). Likewise, partnership capabilities may strengthen positive target effects, as the costs of synchronising collective effort will be lower in CSPs with more administrative capacity and experience of partnership-working (Cabral, 2017). Target intensity too may make partners more motivated to achieve shared goals.

To understand whether targets are effective tools for the contractual governance of CSPs, we analyse their relationship with the performance of Local Strategic Partnerships (LSPs) across England between 2003 and 2014. These partnerships brought together representatives of the peak public, private and non-profit sector organizations¹ within each local area of the country to develop a co-ordinated cross-sector approach to the creation of social and environmental value, particularly through the delivery of key public services, such as education, social care and waste management. In 2008, LSPs

¹ All of the LSP executive boards included representatives from the local government responsible for the jurisdictions in which the LSP operated, with most being chaired by the chief executive or the political leader of that government. Other sub-national public sector organizations represented on the LSP boards included police forces, fire brigades, local hospitals and universities. In addition, some boards included local representatives of national level agencies, such as the Environment Agency, and regional level agencies, such as the Government Offices of the Regions. From the private sector, the majority of the LSP executive boards included representatives from the local Chambers of Commerce, with some including representatives from large employers, such as Rolls Royce in Derby and BT in South Tyneside. Groundwork contractors, were also represented on some boards. Nonprofit representatives on the executive boards largely came from the local Community and Volunteer Services (CVS) and the Council of Voluntary Organisations (CVO), but housing associations were often represented on the boards. Although constrained to include certain key public sector partners (e.g. local governments and police forces), the structure of LSPs is an endogenous product of the diverse economic and political histories of local areas of England. A fuller list of the organizations on LSP boards is available on request.

negotiated Local Area Agreements (LAAs) with the UK government specifying targets for selected key performance indicators and offering reward payments for target attainment. The indicators targeted in LAAs varied depending on the priorities agreed by LSP boards, with some LAAs focused on environmental performance and others on public health or social welfare. This variation in the content of the performance contracts enables us to examine whether ‘governance by targets’ is an effective strategy for enhancing value creation by CSPs. Moreover, we can shed light on the partnership capabilities likely to enhance the use of targets by exploiting heterogeneity in the composition of the LSP boards, the age, administrative capacity and management of each LSP and the target intensity within LAAs.

To analyse the potential for governance by targets to enhance value creation by CSPs, we use a difference-in-differences-style approach. Such approaches can approximate causal treatment effects using observational data, providing the method assumptions hold (Angrist and Pischke, 2008; Antonakis *et al.*, 2010). Here, we focus on LSPs’ environmental performance by analysing variations in waste recycling rates for those LSPs with and without a recycling target. Climate change is widely regarded as the paradigmatic societal challenge requiring a cross-sectoral collaborative approach (George *et al.*, 2016), and so evidence on the governance arrangements associated with the creation of environmental value can cast valuable light on the dynamics of strategic management in the public interest.² To establish whether partnership capabilities influence the effectiveness of governance by targets, we then examine the moderating effects of several key variables: the share of public, private and non-profit sector organizations on the board of each LSP; the age of each LSP; the volume of administrative

² Of the small pool of performance indicators included within LAAs that are suitable for our longitudinal difference-in-differences research design, waste recycling rates were the most strongly related to the societal grand challenges that presently confront humanity.

support available to each LSP; and, the experience of the senior manager responsible for the performance of the LSP. Following that, we evaluate whether the relative intensity of the recycling target matters.

Our analysis suggests that the use of contractual forms with explicit targets results in performance improvement – an effect especially pronounced for CSPs with high partner diversity and strong partnership capabilities. We also find that CSPs with more challenging performance targets perform better than those with less demanding ones. Further analysis reveals a downward trend in performance when the targets were removed. These results all provide support for the target-based governance of CSPs.

THEORY AND HYPOTHESES

Transaction costs theories highlight that contractual governance structures are required to mitigate opportunistic behaviour whenever organizations work closely together (Oxley, 1997; Williamson, 1979). Contractual-based governance arrangements centre on the development of formal legal agreements that specify the rights and obligations of the various organizations involved in a collaboration (Argyres and Mayer, 2007; Wuyts and Geyskens, 2005). The primary advantage of contractual-based governance is that it reduces the transaction costs associated with co-ordinating and managing the diverse activities undertaken by different partners (Faems *et al.*, 2008). Explicit contracts provide assurance that opportunistic behaviour and shirking are minimised, as the terms on which partners agree to work together are legally enforceable (Ring and Van de Ven, 1992). For this reason, contract completeness is regarded as critical to effective contractual-based governance (Cheung, 1969; Williamson, 1991).

The challenges associated with making inter-organizational collaborations a success may be especially acute for CSPs, due to the distinctive value creation logics that

characterise different sectors (Vurro *et al.*, 2010; Le Ber and Branzei, 2010). In particular, whereas partnerships between private firms can usually rely on equity-based value appropriation to align partners' interests (Hennart, 1988), this option is rarely open to public or nonprofit organizations, because of the accountability mechanisms to which they are subject (Bryson *et al.*, 2006). Moreover, CSPs vary considerably in authority, 'incentives, property rights, coordination mechanisms, and agency relationships' (Quélin *et al.*, 2017, p.767). CSPs may even be 'meta-organizations' consisting of multiple legally autonomous actors that share a common system-wide goal (Gulati *et al.*, 2012). As a result, CSPs often rely on nonequity governance mechanisms to minimize partner opportunism (Rufin and Rivera-Santos, 2012).

Among the alternative nonequity-based governance structures available to CSPs, contracts stipulating partners' roles and responsibilities are likely to be attractive (Wang and Bunn, 2004). Because such contracts inevitably entail a degree of incompleteness (Brown *et al.*, 2010), it may also be necessary to utilise nonequity-based financial "hostages" to mitigate opportunism, such as penalties for poor performance or rewards for exemplary performance (Daniels and Trebilcock, 1996). Nevertheless, strategic management research has yet to systematically address non-equity strategies for the governance of cross-sector collaboration, especially the use of performance targets intended to positively influence the decisions and behaviour of partners.

Contractual governance forms with explicit targets and the performance of CSPs

From a transaction cost perspective, targets may be especially attractive for the governance of CSPs because they can circumscribe shirking and opportunistic behaviour (Rufin and Rivera-Santos, 2012). The strategic alliance literature indicates that in addition

to reducing the transaction costs associated with securing goal alignment, explicit targets furnish the goal clarity required for the pursuit of shared objectives (Shenkar and Zeira, 1992; Killing, 2012). As a reference-point for partners and a check on goal divergence, targets may help partnerships to resolve conflict and differences as they arise (Hoffmann and Schlosser, 2001; Poppo and Zenger, 2002).

The high degree of specificity implied in the use of targets may be especially important for the effective governance of CSPs, as it can signal a credible commitment to shared objectives (Beuve *et al.*, 2018). Public partners, in particular, may value governance tools that insulate cross-sectoral collaborations from the risks posed by political turnover and contestability (Moszoro *et al.*, 2016). In a similar vein, private partners prefer mechanisms that reduce uncertainty due to public policy changes or rent-seeking by government agencies (Mazouz *et al.*, 2008; Spiller, 2008). Furthermore, target-setting can surmount the difficulties associated with measuring and monitoring value creation through cross-sectoral collaboration (Page *et al.*, 2015; Selsky and Parker, 2005). CSPs agreeing targets within contractual-based governance arrangements may therefore outperform those that do not for several reasons.

Firstly, the use of a performance contract based on targets widens the range of tools that can be brought to bear on the strategic management of CSPs. This is especially important for multi-sector collaborations, because of the need to develop flexible structures capable of harnessing partners' diverse but complementary capabilities (Clarke and Fuller, 2010; Selsky and Parker, 2005). Secondly, the strategic management challenge posed by partners' sectoral differences may be best met through governance mechanisms, which enable higher levels of government to monitor and guide CSPs (Koch and Buser, 2006). Indeed, targets have become a popular policy prescription for institutions aiming to develop cross-sectoral and multi-level governance structures to deal

with complex societal challenges, such as climate change and sustainable development (Jordan *et al.*, 2015; Owens, 2010; Stern, 2008). Thirdly, in addition to widening the portfolio of governance mechanisms available for the strategic management of CSPs, performance targets may be essential for preserving the purpose of CSPs, which can be vulnerable to changes in policy and personnel within partner organizations (Babiak and Thibault, 2009). We therefore propose:

Hypothesis 1: Contractual governance forms with explicit targets will have a positive effect on the performance of CSPs

The role of partner diversity in contractual governance forms with explicit targets

The co-ordination challenges posed by partner differences within inter-organizational relationships may intensify as the number of partners grows and the salience of organizational ‘faultlines’ expands (Li and Hambrick, 2005). Nevertheless, such partner diversity may be a vital source of collaborative advantage. The behavioural theory of the firm suggests that heterogeneous groups foster more innovative solutions to achieve organizational objectives, because they are able to draw on a wider range of ideas, knowledge and information (Miller and Triana, 2009). Moreover, by expanding the breadth of human and social capital available to a collaborative enterprise, partner diversity may reduce the dependence of joint ventures on resources from external actors (Pfeffer and Salancik, 1978). Because it widens the scope for mutual interdependence within collaborations (Ashraf *et al.*, 2017), partner diversity may also decrease the transaction costs associated with achieving shared goals – something that is especially important for effective governance of CSPs.

Partner diversity within CSPs requires careful management due to the competing institutional logics associated with different sectors (Vurri *et al.*, 2010), especially the market logic of private partners and the public good logic of public and non-profit partners (Ashraf *et al.*, 2017). However, it is only by encouraging the participation of a wide a range of partners that CSPs can muster the array of organizational capabilities necessary for comprehensive action in pursuit of the public interest (Lasker *et al.*, 2001). Sectoral diversity within CSPs facilitates access to vital resources and unique capabilities, and encourages the combination of the complementary capabilities required for blended value creation (Klein *et al.*, 2010; Ashraf *et al.*, 2017; Quélin *et al.*, 2017). As a critical source of collaborative advantage, partner diversity may therefore reduce the transaction costs associated with orchestrating the achievement of targets that have been agreed in advance by the partners within a CSP. For all of the above reasons, partner diversity seems likely to enhance the positive effects of contractual forms with explicit targets. Hence, we advance:

Hypothesis 2: The positive performance effects of contractual governance forms with explicit targets will be stronger for CSPs with higher partner diversity

The role of partnership capabilities in contractual governance forms with explicit targets

Researchers increasingly draw on capabilities theories to examine the dynamics of inter-organizational relationships (Cabral, 2017). Capabilities are the high-level practices used to coordinate the productive activities of organizations (Winter, 2003). As such, they represent a distinctive set of ‘problem-solving patterns’, routines or competencies that can be deployed in pursuit of key goals (Feldman and Pentland, 2003). The strategic

alliances literature indicates that alliance experience may be a first precondition for the development of the relational capability required for collaborative success (Anand and Lhanna, 2000; Dyer and Singh, 1998; Kale *et al.*, 2002). In addition, strategy scholars have pointed toward the value of a dedicated alliance function as the source of the administrative capabilities required for effective alliance management (Kale *et al.*, 2002; Kale and Singh, 2007). Likewise, skilled and experienced managers responsible for the management of strategic alliances represent a vital source of relational capability (Kale and Singh, 2007).

CSPs promise enhanced value creation through the creation of new collaborative capabilities (Cabral *et al.*, 2013; Klein *et al.*, 2010; Mahoney *et al.* 2009). Those with a longer history of collaboration are therefore likely to have stronger capability for addressing the challenges posed by sectoral differences and for harnessing the distinctive sectoral advantages that are present (Bryson *et al.*, 2006; Lasker *et al.*, 2001). Accumulated capabilities in managing CSPs reduce the transaction costs associated with achieving goal alignment and commitment, as partners do not need to build the trust and understanding required to underpin collective action (Quélin *et al.*, 2016). As a result, established CSPs may be especially well-placed to reap the benefits of target-setting for partnership performance because they already have routines for bringing together different partners in pursuit of shared objectives (Caldwell *et al.*, 2017).

Within CSPs, public organizations have a distinctive advantage over their private and non-profit partners in terms of their capability for authoritative decision-making (Rufin and Rivera-Santos, 2012). As such, the administrative support and managerial expertise available to the lead public sector organizations within CSPs are likely to be key sources of collaborative capability (Cabral, 2017). For many CSPs, the administrative capacity present within public organizations is the main back office support that can be

deployed in pursuit of partnership goals. Likewise, the democratic mandate of public organizations means that senior public managers often bear the responsibility for the management and performance of CSPs (Rufin and Rivera-Santos, 2012). The transaction costs associated with getting commitment to shared goals therefore seem likely to be lower in CSPs with more administrative capacity and managerial experience. Hence, the use of targets within the contractual governance of CSPs may be a more effective strategy for creating social and environmental value where those partnerships are better able to draw on public sector management capabilities. Following the above arguments, we postulate:

Hypothesis 3: The positive performance effects of contractual governance forms with explicit targets will be stronger for CSPs with more partnership capabilities

The role of target intensity in contractual governance forms with explicit targets

Strategic alliance research highlights that a key component of effective contractual-based governance is the agreement of performance objectives which can guide partners' efforts and ensure that the goals of partners are aligned (de Man and Roijakkers, 2009; Killing, 2012). Such agreements centre on the adoption of performance indicators that partners believe can effectively measure fundamental partnership goals. In addition to reducing the transaction costs around securing goal alignment, the formulation and articulation of performance standards can have positive attentional and motivational effects. Goals and targets are mechanisms that enable decision-makers to cope with bounded rationality (Ocasio, 1998) – something that is particularly acute within the management of CSPs, given the limited capacity for monitoring all of the activities of disparate partners

(Reeves, 2008). These benefits may be even stronger where targets are set that “stretch” organizations (Hamel and Prahalad, 1993).

“Stretch targets” inspire organizations to search for new and innovative ways to improve performance (Sitkin *et al.*, 2011; Thompson *et al.*, 1997). Prior empirical research indicates that high levels of target stretch or intensity, defined as the degree of improvement from a given baseline required to attain a specific target, are associated with performance improvement (see, for example, Boyne and Chen, 2007). A greater degree of target intensity amplifies the attentional effects of target-setting, lowering the transaction costs of achieving goal alignment and commitment even further (Grant, 2003). Hence, there is good reason to anticipate that performance clauses that incorporate a higher degree of target intensity may enhance the effectiveness of contractual governance forms with explicit targets as tools for enhancing value creation. This seems particularly apt for the co-ordination of CSPs, which may be more likely to create social and environmental value when authoritative communications are proffered that can galvanize partners’ efforts (Koschmann *et al.*, 2012). Although little systematic scholarship has addressed the impact of target intensity on the performance of CSPs, case studies point towards the attentional benefits of more challenging goals for cross-sector collaboration (Andrews *et al.*, 2014; Manning *et al.*, 2006). This leads us to posit:

Hypothesis 4: The positive performance effects of contractual governance forms with explicit targets will be stronger for CSPs with higher levels of target intensity

METHODOLOGY

Sample and data

The sample for this study comprises 146 of the 150 Local Strategic Partnerships (LSPs) extant across England, for the period 2003 to 2014. Four LSPs are excluded as they only

came into being in 2009 after a local government reorganization. All LSPs negotiated and signed performance contracts (LAAs) with UK central government, but each of the LSPs' contracts comprised a different set of statutory performance indicators that were targeted as local priorities by the LSP boards. In 2007, sixty-eight of our sample of LSPs negotiated LAAs with UK central government that included waste recycling targets for 2010. These performance contracts came into force in 2008, with the baseline rate of waste recycling taken in 2007.

Financial rewards were available for target attainment, and were calculated on the basis of average target achievement across all targeted indicators (Department of Communities and Local Government, 2009). There was no financial penalty for failure to achieve the agreed targets. While the environmental performance of LSPs without a recycling LAA was not subject to a performance contract, it was still monitored by UK central government, with LSPs having recycling rates in the bottom quartile for England potentially vulnerable to regulatory intervention (Audit Commission, 2005). The form of intervention this could take varied from the imposition of new interim management by central government to the transferring of service decision-making to another LSP. Although such extreme interventions did not occur within environmental services during the study period, the threat of such interventions was very real. For instance, the co-ordination of social care services in some areas was transferred to neighbouring LSPs. We are therefore well-placed to investigate the effectiveness of contractual forms with explicit targets because we are able to exploit variations in the content of the LAAs signed between LSPs and UK central government. Detailed information on these was provided by the Department for Communities and Local Government, and has been used in prior research (Andrews *et al.*, 2014).

Dependent variable

The dependent variable in this study is the percentage of household waste re-used, recycled or composted in each LSP. Information on LSPs' waste recycling rate comes from the UK Department for Environment, Food and Rural Affairs (DEFRA), which publishes a range of environmental policy statistics. The recycling and re-use of household waste is a critical component of the European Union's climate change mitigation strategy (European Environment Agency, 2013), and therefore a key indicator of the environmental value created by LSPs. UK recycling statistics are verified by government auditors.

Independent variables

The first independent variable (D) reflects whether a LSP signed a LAA for waste recycling. It is a binary indicator equal to one for LSPs with a LAA for waste recycling after year 2007, and zero otherwise; in mathematical notation, $D = (treatment * d)$, where *treatment* is a dichotomous variable which equals one for the "treated" group (LSPs with a recycling LAA) and zero for the control group (LSPs without an LAA), and d is a time dummy switched on for post 2007 observations, i.e., after LAAs came into force.

To test whether CSPs' heterogeneity influences the effectiveness of contractual forms with explicit targets (H2), we include in our models a moderator variable measuring the degree of *partner diversity*. This is gauged by means of a Blau index denoting the relative share of organizations from the public, private and non-profit sectors on the executive board of each LSP. Information on board composition was drawn from the Sustainable Community Strategies that LSPs were required to produce in 2008 and from

executive board meeting minutes from the same period available online.³ To accurately capture sectoral differences in capability, a coding frame was developed to assign board representatives to a particular sector of the economy (available on request). The frame was guided by the assumption that ownership status provides the best approximation of sectoral origin, but we also followed Bozeman (1987) in recognising that some organizations (e.g. UK universities, which are registered charities) are public because they are financially dependent upon and controlled by government.⁴

To investigate the role of capabilities as performance-enablers of contractual forms with explicit targets (H3), three different measures are used as moderator covariates. First, the variable, *lsp age*, gauges the years that have passed since either the present LSP itself was set up or a predecessor area-wide CSP was in place. This variable capturing accumulated partnership capabilities, is akin to those used in the strategic alliances literature (Kale and Singh, 2007; Kale et al., 2002). Information on the history of CSPs in each area served by an LSP was gathered by searching documentary evidence available online, including LSP and local government webpages and minutes, central government reports, and local newspaper articles. To exclude cross-sectoral activity specific to certain neighbourhoods or policy areas, we drew only on information identifying the inauguration date of an area-wide strategic CSP.

Second, an index of *administrative capacity* captures the resources devoted by local governments (the public organizations principally responsible for leading LSPs) to central services (e.g., finance, internal audit) and management and support services (e.g.,

³ Unfortunately, information on the executive boards of 14 LSPs was not publicly available, so our analysis including the partner diversity measure was carried out on a sample of 132 LSPs (65 with a waste recycling target, 67 without such a target).

⁴ To establish the validity of the coding frame, the sectoral composition of a sample of the LSP boards was coded independently by the authors. This process resulted in an inter-rater reliability correlation of over 0.90. Divergent codings were then examined in more detail and the coding frame was adapted following discussion about the appropriate assignment of organizations of complex sectoral origin, such as housing associations (nonprofit) and local government-owned companies (public).

human resources, IT). This indicator gauges the volume of administrative support potentially available to LSPs, and is constructed by normalizing the expenditure on central administration in a 0,1 range for each year in our sample, with a higher score indicating higher capacity. Formally, $admin\ capacity = [cs - \min(cs)] / [\max(cs) - \min(cs)]$, where cs represents expenditure on central administration per capita.⁵ Prior research indicates that central administrative resources hold the key to organizational capability in the public sector (see Andrews *et al.*, 2016).

Third, the variable *CEO tenure* captures the experience of the senior manager principally responsible for the performance of the CSP by measuring the length of tenure (in years) of the chief executive of the lead local government for each LSP. According to the related literature, the accumulated experience of a chief executive can be considered a proxy for managerial capability (see, e.g. Cabral, 2017; Fabrizio, 2012). Data on tenure length came from the following sources: Boyne *et al.* (2017), Municipal Year Books, local governments' webpages and local newspaper articles.

Finally, in order to test the impact of target intensity on recycling performance (H4), we include in our models a measure of target heterogeneity. Now, instead of a dummy treatment variable (D), we investigate the treatment intensity, TI (or, in other words, the LAA target stretch). TI is hence a variable with different treatment intensity across LSPs, and is defined as the improvement required from the baseline 2007 recycling figure to hit the 2010 target. Formally,

⁵ Data on central administration costs are collected annually in accordance with the Chartered Institute for Public Finance and Accounting (CIPFA)'s Financial Reporting Standard 17. Due to a small number of missing observations, our analysis including the administrative capacity measure is carried out on a slightly reduced sample of LSPs.

$$TI = \left\{ \begin{array}{ll} 0 & \text{if } Treated = 0 \\ \frac{(target - baseline)}{(baseline)} * 100 & \text{if } Treated = 1 \end{array} \right\}$$

Control variables

Following the literature on municipal waste management performance, three control variables are added to our models.⁶ First, we include the Index of Multiple Deprivation score for each area served by an LSP. Higher social needs, lower co-production capacity and recruitment and retention issues may have a negative effect on the performance of LSPs working in deprived communities (Romero *et al.*, 2010). Second, we include population density figures to capture the relative geographic concentration of the households that produce the waste that is collected and disposed by LSPs. Partnerships operating in densely populated areas could generate economies of scope, which can be reinvested in process and product innovations (Grosskopf and Yaisawamg, 1990).

Third, the potentially positive effects of investment in environmental services in each area served by LSPs are controlled by including local government environmental expenditures per capita. Unfortunately, it is not possible to access information on the environmental expenditures of all the public, private and non-profit partners involved in waste recycling. Nevertheless, since local governments have a statutory responsibility to manage the waste produced within the areas served by LSPs, their expenditure is a good proxy for a general commitment to improve recycling rates.

Data sources for all the variables used in our analysis are reported in Table 1, along with descriptive statistics and variable definitions. Correlation analysis suggests there are no severe multicollinearity issues in our data. Although there are two cases

⁶ Other exogenous factors not included in our models may account for differences in recycling performance, such as population demography and public attitudes towards recycling, but the available data to account for those factors are time-invariant, and therefore not suitable for our analysis.

where correlations appear relatively high (see Table 2), the individual Variance Inflation Factor (VIF) is well below 2 for all explanatory variables (Belsley *et al.* 1980).

[Table 1 about here]

[Table 2 about here]

Empirical strategy

Difference-in-Differences analysis

To examine whether the presence of an explicit target within a contract is related to improvements in CSP performance, and to assess the influence of partner diversity and partnership capabilities, we compare the percentage of waste recycled in the communities served by the 68 LSPs agreeing recycling LAAs with that of the communities served by the 78 LSPs without recycling LAAs. We begin by estimating a generalized Difference-in-Differences (DiD) model to approximate the impact of targets. This model estimates the effect of an LAA on an LSP's waste recycling rate:

$$y_{it} = \alpha_{1i} + \delta_{1t} + \beta_1 D_{it} + \gamma_1 X_{it} + \varepsilon_{1it} \quad (1)$$

where the “1” subscript denotes the equation number. The term y_{it} represents the log of the recycling rate for year t in LSP i , α_i denotes LSP fixed effects, and δ_t represents time (yearly) effects. The X matrix in Equation 1 includes our time-varying explanatory variables, and ε_{it} is the remainder stochastic disturbance term. Although generalized DiD models without control variables can provide a ‘clean’ estimate of the impact of contractual-based governance on partnership performance, the inclusion of control variables can increase the precision of our estimates. Hence, to test the consistency of the results, we estimate our baseline models with and without explanatory variables.

Initial specification

In the first model specification, the fixed effects control for time-invariant differences in waste recycling performance due to unobserved factors that differ across LSPs (e.g. population demography), while time effects control for common time shocks affecting all LSPs (e.g. changes in national government). The estimate of β is our coefficient of interest, which represents the approximate impact of target setting on the environmental value created by LSPs. This coefficient signifies the difference between the change in recycling performance before and after LAA implementation compared with the difference in recycling performance for those LSPs without a waste recycling LAA.

The key identifying assumption in DiD settings is that in the absence of “treatment” the difference between the two groups would have remained stable over time – the parallel trends assumption (Angrist and Pischke, 2008). Hence, a deviation from the parallel trend as a result of the LAA implementation can be interpreted as the approximate impact of target-setting. To investigate the parallel trends assumption, we include in our model lead time effects to test for potential anticipatory effects (Autor, 2003). Thereafter, we undertake Mora and Reggio’s (2015) parallel-trends test to establish if there are systematic pre-treatment trend differences between both groups.

Treatment dynamics

To evaluate the dynamics of the potential effects of including explicit targets in formal contracts, along with testing our key identifying assumption, we estimate a model including lead and lag effects of recycling LAAs on recycling performance. Formally:

$$y_{it} = \sum_{j=-3}^0 \beta_{2j}(\text{treated}_i * d_j) + \sum_{n=1}^7 \rho_{2n}(\text{treated}_i * d_n) + \alpha_{2i} + \delta_{2t} + \gamma_2 X_{it} + \varepsilon_{2it} \quad (2)$$

Leads and lags in Equation 2 are a series of dichotomous variables, where each lead is set to one if the LSP concludes a LAA j years in the future and zero otherwise. Hence, β_{2j} measures potential lead effects, capturing non-parallel trends in recycling

performance between treated and non-treated LSPs before LAA implementation. If the common trend assumption holds, the coefficients associated with all leads should be zero. Lags are dichotomous variables for each year n following LAA implementation, where ρ_{2n} measures the lagged effects of a LAA and tests whether the policy effects increased, decreased or stayed the same. Since LAAs were abolished in 2011, we can assess whether target removal has undesired consequences.

Moderator covariates

To analyse whether LSPs with high levels of partner diversity strengthen the impact of the inclusion of an explicit target within their performance contract, we estimate the following interactive statistical model:

$$y_{it} = \alpha_{3i} + \delta_{3t} + \beta_3 D_{it} + \pi_3(D_{it} * partner\ diversity_i) + \gamma_3 X_{it} + \varepsilon_{3it} \quad (3)$$

where *partner diversity_i* measures the executive board heterogeneity of each LSP.⁷

To establish whether LSPs with more partnership capabilities enhance the effectiveness of contracts with explicit targets, we estimate the following multiplicative interaction model:

$$y_{it} = \alpha_{4i} + \delta_{4t} + \beta_4 D_{it} + \pi_4(D_{it} * PC_{it}) + \rho_5 PC_{it} + \gamma_4 X_{it} + \varepsilon_{4it} \quad (4)$$

where PC_{it} refers to each of the three capability proxies described in the data subsection. To avoid potential multicollinearity issues, we fit one separate model for each moderator variable. The results when including all three multiplicative interactions at the same time remain basically unchanged (see Appendix: Table 1A).

⁷ It should be noted that the multiplicative interaction model shown in Equation (3) omits the constitutive term for *partner diversity*. This indicator is time invariant and therefore cannot be separately estimated by means of a fixed effects model. Nonetheless, it is controlled through the individual fixed effects.

Finally, to test how target intensity affects subsequent performance, we deploy a model accounting for different treatment intensities across our units of study. Specifically, we estimate the following model:

$$y_{it} = \alpha_{5i} + \delta_{5t} + \beta_5(TI_i * d_t) + \gamma_5 X_{it} + \varepsilon_{5it} \quad (5)$$

Because target intensity was agreed through negotiations between central government and LSPs, treatment intensity is, to a certain extent, endogenous. This raises the possibility of reverse causality, especially as the government and the LSPs may have asymmetric information about past or expected waste recycling (see Boyne and Chen, 2007). Since the common trend tests described above are not sufficient to discount reverse causality in this model specification, we also estimate Equation 5 with an instrumental variable approach, using fixed-effects two-stage least squares (FE-2SLS). The first-stage regression is given by:

$$TI_{it} = \alpha_{6i} + \delta_{6t} + \theta_6 Z_{it} + \gamma_6 X_{it} + \varepsilon_{6it} \quad (6)$$

where we obtain the fitted values \widehat{TI} . The second stage of our FE-2SLS procedure therefore estimates Equation 5 using \widehat{TI} instead of TI . Our instrument (Z_{it}) is the weighted average of observations on the target intensity variable over neighbouring LSPs.

Formally, this spatial variable is given by $\sum_{j=1}^N w_{ij} TI_j$, where w_{ij} is an element of the spatial matrix (W) reflecting the relative connectivity between LSPs.⁸

During target negotiations with central government, LSPs might be affected by negotiations in neighbouring LSPs. Geographical proximity often influences local policy decisions (Brueckner, 1998; Rincke, 2006). For that reason, target intensity in LSP i may

⁸ The spatial matrix W is a normalized contiguity $N \times N$ matrix specifying the ‘neighbourhood relation’ between LSPs, where an element w_{ij} has a value greater than 0 if LSPs i and j share borders, and 0 otherwise (since LSPs are not connected with themselves, the diagonal elements of W are equal to 0).

be correlated with that in neighbouring LSPs'. The first-stage relationship between our instrument and target intensity, F-test of excluded instruments, and Kleibergen-Paap's (KP's) under-identification test indicate that spatial dependence is a *relevant* instrument, i.e. correlated with target stretch (see Appendix: Table 2A). We also have strong theoretical reasons for assuming that our instrument is not correlated with recycling performance residuals after controlling for other covariates. Spatial dependence in local policy decisions is often driven by isomorphic pressures to adopt practices regarded as legitimate, rather than by efficiency-related considerations (Alonso *et al.*, 2016; Bivand and Szymansky, 2000).

RESULTS

We begin our discussion of the results by assessing the impact of introducing an LAA for waste recycling, before evaluating the impact of partner diversity and partnership capability. Robust standard errors are clustered by LSP to deal with concerns about serial correlation in DiD specifications (see Bertrand *et al.*, 2004).⁹

Table 3 presents point estimates and robust standard errors (SEs) for the regression model described in Equation 1 (Model 1), with and without the control variables. The results are consistent with our first hypothesis: the waste recycling performance of LSPs with a recycling LAA improved at a faster rate than that of LSPs without such an LAA. This effect is present even when controlling for the negative relationship between socio-economic deprivation and waste recycling. Null expenditure effects, such as those we find here, have been identified in prior research on recycling rates (e.g. Lakhan, 2016; Tsai, 2008), and have been attributed to challenges associated

⁹ Wooldridge's (2002) test for serial correlation in panel data clearly rejects the null hypothesis of no first-order autocorrelation in our models, with p-values equal to 0.000 for both baseline model specifications, i.e. equation 1 with and without control variables.

with predicting and controlling waste collection costs (Lakhan, 2016).¹⁰ More specifically, the coefficient estimates for our first model, both with and without controls, suggest that LSPs with an LAA increased their recycling performance by about 11 percent (95% CI [0.045,0.175] and [0.057,0.173], respectively). This is a non-trivial effect size and one that points towards relatively strong benefits of ‘governance by targets’ for the value created by CSPs.

[Table 3 about here]

The initial specification does not indicate whether the positive effects of target-setting are sustained over time. Nor does it illustrate anticipatory effects, which may threaten the validity of our identification strategy. Analysis of these treatment dynamics can assuage endogeneity concerns, and uncover performance in the three “post-treatment” years when LAAs were abolished (2012, 2013, and 2014).

Figures 1a and 1b depict the pre-treatment patterns along with post-treatment patterns for the leads and lags models, excluding and including control variables (full results are reported in Appendix A: Table 3A). These figures, along with table 3A, confirm the absence of anticipatory effects and illustrate the treatment dynamics in this case. First, in the years before the introduction of LAAs, there is no evidence of anticipatory effects as there is no statistically significant difference between the recycling performance of the treated and control groups. This absence of anticipatory effects is also observed when estimating our preferred model specification, which includes control variables. In addition, Mora and Reggio’s (2015) common trend test indicates that for both models, with and without control variables, we cannot reject the null hypothesis of common pre-treatment dynamics (p-values equal to 0.98 and 0.95).

¹⁰ To test for the possibility that the relationship between environmental expenditures and recycling is nonlinear, we estimated equation 1 with squared and non-squared versions of the expenditure variable, but this added no further explanatory power to the model.

Second, the positive impact of performance targets is most likely to be observed once they have bedded in. Our estimates suggest that recycling performance increased substantially two years after the introduction of an LAA for waste recycling, with the positive effect peaking in 2011, where the estimated impact is about a 17.4 percent improvement (95% CI [0.071, 0.280]). Hence, our findings suggest that the benefits of target-setting are stronger in the medium rather than the short-term.

Third, the positive effect of targets on recycling performance seems to persist even after LAAs were abolished in 2011. The clear downward trend following 2012, though, suggests that non-renewal of the performance contracts may have had negative consequences for waste recycling performance. A *Guardian* newspaper report highlighted that in 2015 waste recycling rate England dropped for the first time ever <https://www.theguardian.com/environment/2016/dec/15/recycling-rates-england-drop-first-time>.

[Figure 1 about here]

Turning our attention to the impact of explicit targets on recycling performance contingent on partner diversity, Table 3 also reports estimates of the interactive statistical model shown in Equation 3 (Model 2). First, the inclusion of the variables interacting the *treatment* dummy with partner diversity re-affirms our previous conclusions regarding the effectiveness of an LAA for waste recycling: the average marginal effects¹¹ of having an LAA in the multiplicative interaction models are positive and exhibit similar point estimates and standard errors to those reported in Model 1.

Focusing on the combined effect of the *treatment* dummy and partner diversity, the coefficient for the interaction term is positive, but robust standard errors do not permit

¹¹ In multiplicative interaction models, the coefficient for the moderated variables show their relationship with the dependent variable when the moderator variable is set to zero. For this reason, it is necessary to compute marginal effects (see Brambor et al., 2006)

us to definitively conclude that this moderating effect is not statistically different from zero. To fully explore the possibility of a combined effect, it is more informative to examine the marginal effect of an LAA for waste recycling across different levels of partner diversity. Following Brambor *et al.* (2006), the most effective way to present this information is plotting the slope and confidence intervals of the marginal effects. Hence, Figure 2 illustrates the effect of being *treated* contingent on LSPs' board diversity.¹² The solid sloping line plots the marginal effect of having an LAA as the Blau index measuring board diversity varies, while the shaded bands represent the 95% confidence interval. The figure suggests that the positive effect of target-setting is strengthened when the Blau index is above 0.3. LSP boards with an index of lower than 0.3 are likely to be dominated by public sector representatives, and therefore less able to realise the benefits for goal achievement from bringing together a wide range of complementary capabilities than their more sectorally diverse counterparts. Due to the predominance of public organizations, they may also be less willing to consider innovative and non-hierarchical approaches to pursuing partnership objectives.

Figure 2 also reports the percentage of observations falling within the region of statistical significance via a histogram showing the frequency distribution for partner diversity. The figure highlights that a high percentage of observations have values of the Blau index at which the marginal effect of the treatment is positive and significant. This evidence and the substantial magnitude of the coefficient of the interactive term (about 0.14), lead us to interpret our results as confirming the second hypothesis, even though the coefficient itself is not statistically significant (see Brambor *et al.*, 2006).

[Figure 2 about here]

¹² To save space, we present only marginal effect plots for the interactive statistical models including control variables. The results from the specifications without controls are similar (available on request).

Focusing now on the effect of partnership capabilities, we report in Table 3 the regression results of the multiplicative interaction models including each of our capability measures. In line with Hypothesis 3, the positive effect of signing an LAA for waste recycling is higher in those CSPs with greater partnership experience (Model 3a) and higher administrative capacity (Model 3b): the coefficient for the interaction terms being positive (about 0.013 and 0.19, respectively), and robust standard errors suggest that these point estimates are statistically different from zero. These findings are confirmed when we plot the marginal effects. Figure 2 illustrates that LSPs' experience is likely to have a substantive positive effect on the impact of contractual forms with explicit targets when the number of years since the LSP was formed is above eight, while the effect of administrative capacity is positive (and substantial) over the whole distribution of the capacity index. On the other hand, the results show that the local government chief executive's experience does not influence the effectiveness of having a recycling LAA (Model 3c).¹³

The tenure of the local government CEO may be a less important source of partnership capabilities than other qualities that these organizational leaders possess, such as a business management education or past experience working for or with private and non-profit partners. It is also conceivable that CEOs who have been longer in post may be more resistant to new collaborative styles of working than their less-experienced counterparts. Unfortunately, detailed information of this kind on the background and

¹³ It should be noted that the variable *CEO tenure* is highly right-skewed (see Figure 2), which may affect our estimates. To deal with this potential concern, we constructed two alternative indicators to account for CEO experience. First, we followed a similar approach to that used to construct the administrative capacity index, i.e. we normalized the chief executive's length of tenure in a 0,1 range for each year in our sample, using a max-min approach. Second, we created an ordinal variable (*CEO exp*) using four quantiles, where 1=low experienced CEO (tenure<=2 years); 2=middle-low experienced CEO (tenure<=4 years); 3=middle-high experienced CEO (tenure<=7 years); 4= high experienced CEO (tenure> 7 years). The results using these alternative indicators, however, remain the same (see Appendix: Table 4A).

attitudes of these CEOs is not currently available, but would undoubtedly enable researchers to cast valuable light on all of these intriguing possibilities in the future.

Finally, Table 4 reports estimates of the fixed-effects regression model shown in Equation 5 (Model 4a). The results support our fourth hypothesis: LSPs with tougher waste recycling targets achieved stronger improvements in performance. The size of the point estimates for treatment (or target) intensity in both models, with and without controls, indicate that for every percentage point increase in target toughness, there is, on average, a corresponding improvement in recycling performance of about 0.4 percent (95% CI [0.0028, 0.0046] and [0.0027, 0.0045], respectively).

Our results for target intensity could be biased, however, if target-setting is endogenous. Hence, in Table 4 we also report estimates using the discussed FE-2SLS approach utilising spatial dependence as an instrumental variable (Model 4b). These estimates are in line with the non-instrumental variable approach, though point estimates and standard errors are slightly larger. Nevertheless, to add further confidence in our approach, we tested whether the non-instrumented target intensity variable can be treated as exogenous using the tests described in Baum *et al.* (2007) and Davidson and MacKinnon (1993). The results of these tests suggest that we cannot reject the null hypothesis that a non-instrumental estimator of the same equation would yield consistent estimates.

[Table 4 about here]

In sum, our findings support the argument that the use of explicit targets within contractual forms has a positive effect on the performance of CSPs, especially when partner diversity and partnership capabilities are high. Furthermore, tougher performance targets can result in stronger performance improvements. Hence, our empirical evidence

indicates that target-setting within contractual governance arrangements may be an effective approach to the strategic management of CSPs.

Robustness checks

The use of generalized DiD models (or fixed effect models) is based on the assumption that unobserved characteristics of units or individuals are constant over time. In our case, however, it is conceivable that LSPs with a LAA to improve waste recycling performance may have been struggling to achieve acceptable waste recycling rates. UK government could, in such circumstances, have prioritised negotiating recycling LAAs for under-performing partnerships. Past performance may, therefore, be a time-variant confounder that is not adequately controlled using fixed effects alone. To check our results' robustness, we therefore estimate the models described in Equations 1, 3, 4 and 5, respectively, including lagged dependent variables.

Dynamic fixed effects estimates, the Least Squares Dummy Variable Corrected (LSDVC) estimator derived by Kiviet (1995), and system generalized methods of moments (GMM) estimators (e.g. Arellano and Bond, 1991; Arellano and Bover, 1995) confirm our previous findings. So too, do estimates from a bootstrapped bias correction for the fixed effects estimator in dynamic panels derived by Everaert and Pozzi (2007) (see Appendix: Tables 5A-10A).¹⁴ While the effect sizes are somewhat smaller when past performance is included within the models, this is not surprising, since lagged dependent variables capture much of the variability in data, biasing the coefficients for other independent variables downwards (Angrist and Pischke, 2008).

¹⁴ Unlike Kiviet's (1995) procedure, Everaert and Pozzi's (2007) bootstrapping procedure avoids relying on a strict set of assumptions, such as homoscedasticity (De Vos et al., 2015).

DISCUSSION

Consistent with the arguments that we develop in support of contractual forms with explicit targets for cross-sector collaboration, we find that CSPs that agreed performance targets with higher levels of government were more effective than those that did not. In addition, among partnerships that agreed recycling targets those with high levels of partner diversity, stronger partnership capabilities and tougher performance targets performed better. Further analysis affirms these insights for value creation in the context of CSPs: when performance targets were removed, partnership performance declined. These findings have implications for theory and practice.

Implications for the strategic management literature

This study advances strategic management research in the public interest by extending transaction cost perspectives on the contractual governance of inter-organizational relationships to the value created by CSPs. While relational capabilities may be essential for making cross-sector collaborations work (Caldwell *et al.*, 2017), our analysis indicates that contractual forms of governance with explicit targets have a non-trivial positive effect on their performance. Based on a quantifiable measure of the social value CSPs create, the findings suggest performance targets may be an effective means for successfully combining public, private and non-profit capabilities. Although econometric analyses suggest targets can improve the performance of public organizations (e.g. Boyne and Chen, 2007; Kelman and Friedman, 2009), comparatively little systematic research has addressed the effectiveness of contractual forms with explicit targets as tools for improving the performance of CSPs. Furthermore, in adopting a DiD-style analysis we deploy a more rigorous methodology than has been utilised in previous research dealing with the issue of governance by targets.

We also contribute to capabilities theories by clarifying the role that partnership capabilities play in shaping the potential for contractual governance of CSPs to result in enhanced value creation. Our findings suggest that the benefits of contractual forms with explicit targets are especially strong for CSPs with high levels of sectoral diversity and for those with more partnership capability. Partner diversity is a key source of unique resources and complementary capabilities (Quélin *et al.*, 2017). Our results imply that a more balanced representation of partners from different sectors reduces the transaction costs associated with achieving comprehensive action in pursuit of social goals (Lasker *et al.*, 2001). Partnership experience and administrative capacity too may reduce those costs, suggesting accumulated capabilities enhance the potential for explicit targets to create value in CSPs by minimizing opportunism and encouraging goal commitment (Quélin *et al.*, 2016).

In addition to the literature on strategic management in the public interest, our findings can inform extant scholarship on private-private partnerships by highlighting that partner diversity and partnership capabilities play key roles in shaping the effectiveness of contractual forms of governance. Future research dealing with strategic alliances between private firms should therefore seek to incorporate these variables within their models predicting the relationship between different governance forms and performance. Our study also contributes to debates among management scholars about the value of tough targets for organizational improvement (Sitkin *et al.*, 2011). Prior research finds that target intensity can have performance-enhancing effects for public organizations tasked with creating public value (Boyne and Chen, 2007). Our findings provide support for the application of stretch targets within the more complex and managerially challenging setting of CSPs. The increases in waste recycling rates that we identify illustrate that tangible progress on social goals may be associated with the introduction of

tough targets for CSPs tasked with their improvement. As such, the study affirms the vital role that strategic management of cross-sector collaboration can play in addressing grand societal challenges (George *et al.*, 2016).

Implications for practitioners and policy-makers

The results of our study demonstrate to practitioners that the tools used for the contractual governance of CSPs matter. In particular, contractual forms with explicit targets may be essential for ensuring that cross-sector collaboration fulfils its promise as a vehicle for value creation. Politicians and policy-makers concerned with promoting and encouraging collaborative strategic management should therefore consider supporting target-setting within the contractual governance arrangements for managing CSPs. In doing so, they should pay close attention to the role that tough “stretch” targets can play in motivating partners to work more closely together, and to the rewards that can be made available to partnerships for meeting those targets.

The research also provides valuable lessons for the leaders and managers of the partner organizations within CSPs. While partner diversity may be difficult to manage, it is a source of collaborative advantage and value creation when partnership goals are clear and transparent. Time and resources spent eliciting and supporting comparable levels of involvement from each sector of the economy may therefore pay dividends. Likewise, although the challenges of sustaining CSPs in the long-term are considerable, a history of successful collaboration has a performance pay-off. More specifically, for public sector partners, retention of a healthy stock of administrative capacity can ensure they meet the public accountability requirements to which they are subject when participating in CSPs. Government policies and initiatives could be developed to support partner investments in each of these partnership capabilities.

CONCLUSION

Our study contributes to the growing literature on strategic management in the public interest by providing robust statistical evidence of the effectiveness of contractual forms with explicit targets for the creation of value by CSPs. To date, research investigating partnership performance, focused on the use of explicit targets, in a multi-actor cross-sector setting incorporating the crucial moderating effects of partner diversity and partnership capabilities has been lacking. We hope that our study provides a foundation for further theoretical development and empirical tests in such settings.

Although our findings are consistent with a transaction cost perspective on cross-sector collaboration, the available data do not permit us to determine whether targets motivate partners to share knowledge and other resources more intensively. More research is therefore needed to pinpoint the processes through which contractual forms with explicit targets shape managerial and organizational behaviour within CSPs. Furthermore, performance reward payments notwithstanding, the contracts we analyse made no provision for the distribution of the value created by the partnership, the mutual rights and obligations of different partners or for any future contingencies that may affect the operation of the partnerships. Hence, it is conceivable that value creation would be stronger still where CSPs utilise contractual governance structures that are more comprehensive in scope and detail.

ACKNOWLEDGEMENTS: We would like to thank the editors of the Special Issue for their guidance throughout the review process, and two anonymous reviewers for their constructive and helpful comments. We are also grateful to Sebastian Jilke and Jose Luis Zafra for their valuable comments on earlier versions. José M. Alonso acknowledges support from the European Community's Horizon 2020 Programme under grant agreement No. 726755 (Project CITADEL: H2020-SC6-CULT-COOP-2016-2017)

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Table 1. Description of variables and summary statistics

	Description	Mean	S.D.	Min.	Max.
1. Log waste recycling	Household waste re-used, recycled or composted.	3.42	0.42	0.69	4.16
2. D (treated*d)	Dummy coded 1 for LSPs with a LAA for waste recycling after year 2007, and coded 0 otherwise.	0.27	0.44	0	1
3. Partner diversity	Blau index denoting the relative share of organizations from the public, private and non-profit sectors represented on the executive board of each LSP	0.46	0.14	0	0.67
4. LSP age	Number of years since an LSP was set up.	7.53	4.2	0	24
5. Admin capacity	Expenditure on central administration per capita, standardized in a 0,1 range for each year in our sample.	0.25	0.17	0	1
6. CEO tenure	Chief executive's length of tenure in years, including the present year if the CEO was appointed during the first half of the year (before July).	5.25	4.11	1	24
7. Treatment intensity (TI*d)	Variable measuring different target intensities across LSPs, defined as the improvement required from the baseline 2007 recycling figure to hit the 2010 target.	9.84	21.25	0	145.4
8. Deprivation	Average ward score in each local government area of the English Index of Multiple Deprivation (IMD)*.	23.87	9.46	4.89	61.34
9. Population density	Persons per km ²	2514.76	2779.62	61.12	13741.67
10. Environmental spending per capita	British Pounds per person	78.89	35.68	14.05	361.95

Notes: (*) The IMD combines multiple neighbourhood-level indicators, indexed across different domains (income, employment, health and disability, education, housing, living environment and crime), into a single deprivation score. The average ward (neighbourhood) score is the standard measure of relative deprivation for each local government area used by UK central government.

Data sources: 1. UK Department for Environment, Food and Rural Affairs (DEFRA). 3. Sustainable Community Strategies that LSPs were required to produce in 2008 and executive board meeting minutes available online. 4. LSPs documentary evidence available online. 5/10. Chartered Institute for Public Finance and Accountancy. CIPFA Finance and General Statistics. 6. Boyne et al. (2017), Municipal Year Books, local authorities' webpages and local news available online. 7. Authors' calculations. 8. Office of the Deputy Prime Minister (ODPM), Various years, The English Indices of Deprivation. 9. Office for National Statistics, Various years, Census, National Report for England and Wales (ONS, London).

Table 2. Correlation matrix

<i>Variables</i>	1	2	3	4	5	6	7	8	9	10
1. Log waste recycling	1									
2. D (treated*d)	0.26	1								
3. Partner diversity	-0.17	0	1							
4. LSP age	0.46	0.39	0.13	1						
5. Admin capacity	-0.24	0.06	0.28	0.12	1					
6. CEO tenure	-0.01	0.04	0.08	0.03	-0.06	1				
7. Treatment intensity	0.14	0.76	0.04	0.33	0.18	0.02	1			
8. Deprivation	-0.49	0.11	0.24	0.11	0.46	-0.06	0.21	1		
9. Population density	-0.34	0.13	0.31	0.08	0.45	0.02	0.19	0.45	1	
10. Environmental spending per capita	-0.04	0.18	0.32	0.19	0.35	-0.08	0.21	0.27	0.51	1

Table 3. Estimated impact of explicit targets on waste recycling performance

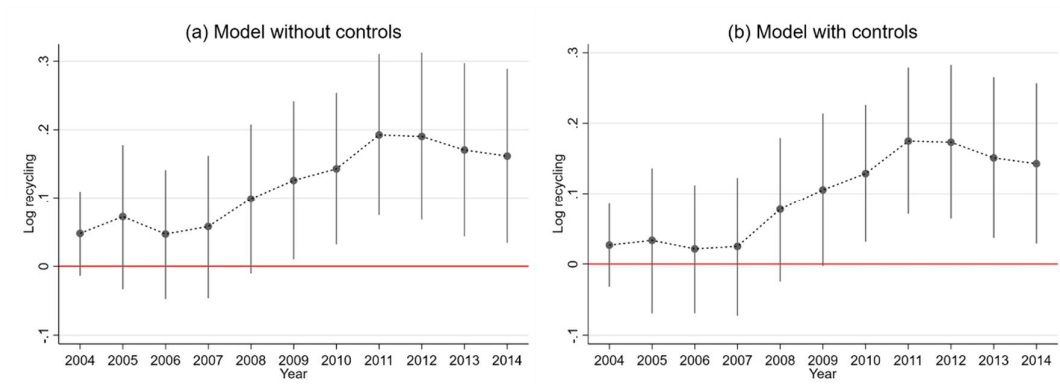
	Model 1		Model 2		Model 3a		Model 3b		Model 3c	
D (treated*d) ^a	0.1097 (0.0330)	0.1149 (0.0295)	0.1078 (0.0336)	0.1092 (0.0305)	0.0645 (0.0320)	0.0806 (0.0301)	0.1116 (0.0315)	0.1123 (0.0290)	0.1101 (0.0332)	0.1151 (0.0295)
D * partner diversity			0.1418 (0.1801)	0.1434 (0.1715)						
D * LSP age					0.0163 (0.0035)	0.0129 (0.0042)				
D * admin capacity							0.2754 (0.0995)	0.1928 (0.0885)		
D* CEO tenure									-0.0015 (0.0032)	-0.0012 (0.0030)
LSP age		0.0853 (0.0149)		0.0877 (0.0142)	0.0960 (0.0136)	0.0836 (0.0136)		0.0867 (0.0149)		0.0855 (0.0149)
Admin capacity		0.0725 (0.0441)		0.0538 (0.0507)		0.0654 (0.0437)	0.0134 (0.0567)	0.0101 (0.0506)		0.0722 (0.0441)
CEO tenure		-0.0018 (0.0018)		-0.0006 (0.0018)		-0.0014 (0.0018)		-0.0017 (0.0018)	-0.0016 (0.0023)	-0.0014 (0.0021)
Deprivation		-0.0215 (0.0043)		-0.0225 (0.0050)		-0.0213 (0.0043)		-0.0203 (0.0042)		-0.0215 (0.0043)
Population density		0.0000 (0.0000)		0.0000 (0.0000)		0.0000 (0.0000)		0.0000 (0.0000)		0.0000 (0.0000)
Environmental spending		-0.0008 (0.0006)		-0.0011 (0.0006)		-0.0007 (0.0006)		-0.0009 (0.0006)		-0.0008 (0.0006)
Observations	1752	1700	1620	1573	1752	1700	1710	1700	1742	1700
R-squared (within)	0.81	0.83	0.82	0.84	0.82	0.83	0.82	0.83	0.81	0.83
p-F test on fixed effects	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
p-Robust Hausman test	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: Unit and time effects included in all models. Robust standard errors clustered at the partnership level (in parentheses). (a) Treatment Average Marginal Effects reported in multiplicative models.

Table 4. Estimated impact of target intensity on waste recycling performance

	Model 4a (FE)		Model 4b (FE-2SLS)	
Treatment intensity	0.0037 (0.0005)	0.0036 (0.0005)	0.0046 (0.0022)	0.0050 (0.0025)
LSP age		0.0822 (0.0122)		0.0758 (0.0170)
Admin capacity		0.0515 (0.0413)		0.0417 (0.0417)
CEO tenure		-0.002 (0.0017)		-0.0022 (0.0017)
Deprivation		-0.0199 (0.0040)		-0.0191 (0.0039)
Population density		-0.0001 (0.0000)		-0.0001 (0.0000)
Environmental spending		-0.0006 (0.0005)		-0.0007 (0.0005)
Observations	1752	1700	1752	1700
R-squared (within)	0.82	0.84	0.82	0.84
p-F test on fixed effects	0.000	0.000	0.000	0.000
p- Robust Hausman test	0.000	0.000		
p-Exogeneity test A			0.658	0.547
p-Exogeneity test B			0.451	0.338

Notes: Unit and time effects included in all models. Robust standard errors clustered at the partnership level (in parentheses). Exogeneity tests A and B refer to those tests described in Baum et al. (2007) and Davidson and MacKinnon (1993), respectively.



Note: Black dots represent point estimates while vertical bars show 95% Confidence Intervals.

Figure 1. Estimated impact of explicit targets on waste recycling performance for years before, during, and after implementation

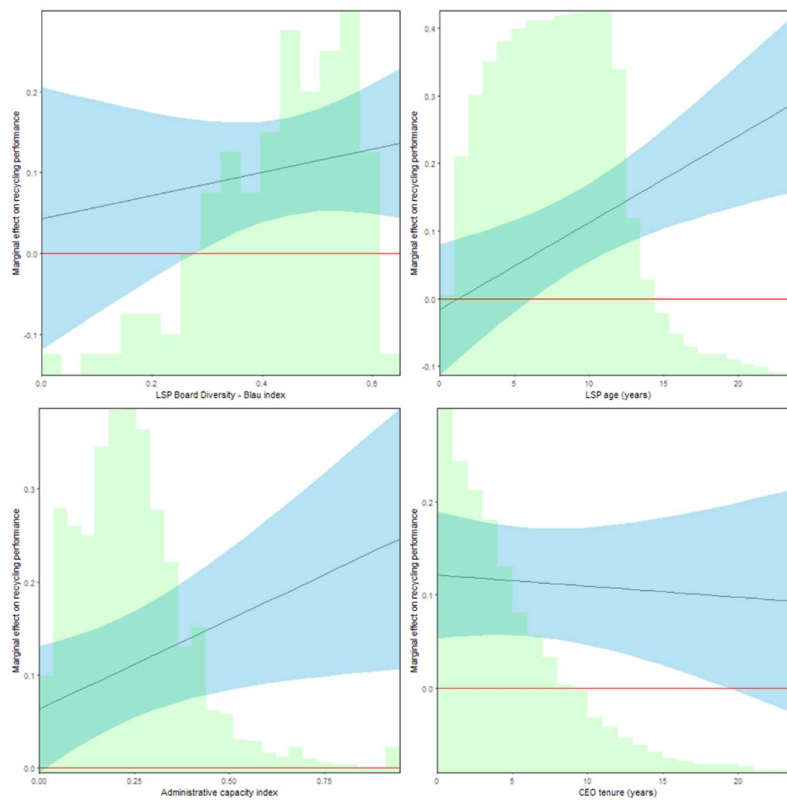


Figure 2. Marginal effects of explicit targets on waste recycling performance contingent on partner diversity and partnership capabilities