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INSTITUTIONAL DESIGN OF VOLUNTARY SUSTAINABILITY STANDARDS SYSTEMS: EVIDENCE FROM A NEW DATABASE

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Abstract

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JEL Classification: F13, L15, O10, Q01

Keywords: voluntary standards, sustainability, SMEs, certification

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1. Introduction

Voluntary Sustainability Standards (VSS) have become an attribute of international production and trade. Between 2008 and 2014, areas certified by the Roundtable on Sustainable Palm Oil increased almost thirtyfold, while the Rainforest Alliance/Sustainable Agriculture Network's area of coverage expanded more than nine times. Similarly, the UTZ certified area grew by 6.5 times between 2010 and 2014 (ITC, 2016). Standards related to working conditions and the protection of basic human rights play an important role in supporting corporate social responsibility. The Ethical Trading Initiative (ETI) Base Code, Social Accountability 8000 (SA 8000) Standard, and the Business Social Compliance Initiative (BSCI) Code of Conduct are among the major social responsibility schemes currently applied worldwide.

A key driver behind the growth of VSS is internationalization of supply chains, or rise of global value chains (GVCs), as companies nowadays source products from all over the world. The rise of global value chains has facilitated efficiency gains and given consumers access to greater variety and lower-priced products. Supply chains have made production more complex. Lead firms need to be able to ensure that suppliers conform to quality and safety standards, and establish systems to monitor the production process, including the traceability of the origin and flow of inputs and processed products. Product and production process standards developed by the private sector are among several tools used to ensure that suppliers satisfy minimum quality, safety, social and environmental norms. VSS may become de facto mandatory as non-compliance can imply exclusion of producers from GVCs. Moreover, VSS are not a simple phenomenon: they are complex systems, whose status, defining components, and scope can vary significantly from one system to another. Some of these standards have been adopted by companies and others by consumer groups. Several initiatives overlap with each other and compete in the market. Producers may confront significant complexity and uncertainty over which standards to adopt. The same is true for consumers seeking to buy products that conform to environmental, social and quality standards.

Analyses of VSS have tended to take a micro-perspective focusing on the identification and definition of detailed typologies of VSS and their mechanics. This has generated a broad and interdisciplinary literature on the topic, populated by theoretical models and case studies. In this paper we complement this micro perspective literature with a more macro-perspective, providing an overview of the global VSS landscape. A macro perspective allows detecting common patterns across a representative population of standards system regarding the design and implementation of standards, their policy objectives and costs for producers. The analysis is based on a data collection project called

Standards Map, launched in 2011 by the International Trade Centre (ITC), a joint agency of the United Nations and the World Trade Organization (WTO). The Standards Map database covers more than 220 VSS systems and offers an unparalleled coverage of the various aspects of their institutional design.

VSS are often considered costly for producers. The database reveals there is great variability across VSS in activities to support producers and in the resulting costs producers have to bear. In this paper, we examine determinants of such costs in terms of the governance features and practices of VSS. The analysis shows that a more producer friendly design at the level of standards systems is significantly and robustly associated with participation in meta-standard frameworks such as the ISEAL alliance, which emerges as positively correlated with the likelihood of offering direct support activities to producers, transparent practices and shared implementation and certification cost schemes. A positive association is also found between producer friendliness and engagement of both producers and buyers in the management of VSS systems.

The paper is organized as follows. Section 2 starts with defining standards systems and some of the concepts that are the object of subsequent analysis. Section 3 offers a selective overview of the existing economics and political science literature on social and environmental standards. Section 4 describes the Standards Map project and general structure of the database. Section 5 analyses producers' support offered by different VSS. Section 6 concludes.

2. Terminology and concepts

The Standards Map spans a wide range of sustainability standards. Collectively, we refer to them as VSS – a term widely used in academic publications and policy circles. There is, however, no universally agreed definition of what exactly a VSS is. The definition used in this paper is that of International Social and Environmental Accreditation and Labelling (ISEAL) Alliance – a London-based umbrella organization—which denotes the term "standard system" to describe "the collective of organisations responsible for the activities involved in the implementation of a standard, including standard-setting, capacity building, assurance, labelling, and monitoring and evaluation".[1] Specifically, we distinguish three major attributes of the VSS systems included in Standards Map: (1) they are not compulsory or legally binding; (2) they focus on social and/or environmental aspects of sustainability (i.e. are not simply technical standards); and (3) they have a discernible governance structure (i.e. they are not just

[1] ISEAL Credibility Principles, 2013.
http://www.isealalliance.org/sites/default/files/Credibility%20Principles%20v1.0%20low%20res.pdf

a piece of paper but operational governance systems performing decision-making, standard-setting, verification, and dispute settlement functions).[2]

Most VSS systems are non-governmental and therefore fall in the category of private standards.[3] This does not mean they are unconnected to public standards. VSS frequently reference international conventions. For example, 56% of the VSS studied in this paper refer to core conventions of the International Labour Organization (ILO) (ITC, 2016). In addition to the public-private distinction, it is possible to distinguish between single-actor and multi-actor systems and between different sponsorship arrangements (private sector, civil society or collaborative sponsorship). Table 1 illustrates the different types of VSS, with examples of systems listed in the Standards Map.

Table 1. Types of VSS

Type of system/ sponsorship	Single-actor system	Multi-actor system
Private sector	Firm-level codes of conduct, e.g., McDonalds Supplier Workplace Accountability Audit System; Unilever Sustainable Agriculture Code	Standard systems created by industry consortia, e.g. Program for the Endorsement of Forest Certification (PEFC); GLOBALG.A.P.
Civil society	Standards developed and administered by a single non-governmental orgainzaton, e.g. Rainforest Alliance	Standard systems created by alliances of civil society actors, e.g., Clean Clothes Campaign (CCC)
Collaborative arrangement	Not applicable	Standard systems that are jointly governed by business and civil society actors, e.g., Forest Stewardship Council (FSC); Roundtable on Sustainable Palm Oil (RSPO)

3. VSS in the literature

The institutional design of VSS in a context of global governance has attracted attention from interdisciplinary perspectives. Much of the extant research focuses on the different public good dimensions of VSS systems. These across systems – some systems may seek to reduce the incidence of child labour, others aim to improve working conditions or to enhance access to credit for smallholder producers (Auriol & Schilizzi, 2015; Podhorsky, 2013).

[2] VSS are not regulated by a central body at international level, in contrast to, for example, the WTO and its agreements on sanitary and phytosanitary measures and technical barriers to trade. Thus, their governance mechanisms, standard-setting, and verification procedures can vary significantly. For instance, some VSS like the Fairtrade Labelling Organization or the Rainforest Alliance use labels on products, whereas others do not.

[3] A small number of systems in the Standards Map have a public sponsor. One example is the Chinese National Organic Products Certification Program.

Economic research has examined the question of what motivates standards (the rationale for voluntary standards), their economic effects and the governance structure of standards. One strand of the economic literature which speaks to the present paper is research on the use of labels to signal quality in a context of asymmetric information. The theoretical basis of work on this theme is the assumption that consumers have preferences for a number of so called `credence attributes' (Nelson, 1970), defined as quality attributes of a good or a service that cannot be assessed by consumers before or after purchase or consumption/use of the good or service. These attributes can be potentially assessed only through a verification process whose costs normally exceed the means of a single consumer. Concrete examples of credence attributes include the environmental/social sustainability of production processes, the ethical content of a business, and the impact of production/consumption on health or safety. In this literature, standards are typically modelled as intermediaries regulating the transmission of information from producers to consumers (or other interested parties such as players downstream the supply chain). Labelling is a prominent policy instrument to implement this transmission of information in practice.

The increasing role of private standards, and more generally, the presence of multiple standard setters, both public and private, has motivated research that draws on theoretical analysis of the private provision of public goods (e.g. Besley & Ghatak, 2001). When applied to standards systems, these conceptual frameworks identify conditions under which public sector certification is inefficient and where a profit maximizing private entity and/or a non-profit nongovernmental organization may be better placed to provide the public good (Baron, 2011; Auriol & Schilizzi, 2015).

Bonroy and Constantatos (2015) review the literature on policy interventions in a context of asymmetric information, identifying three sets of issues: i) the market structure effects of costless and fully revealing quality labels; ii) the implications of costly and or imperfectly trustworthy certification; and iii) the endogenous setting of labelling standards with multiple and heterogeneous regulators (public/private, for-profit/not-for-profit) and special interest groups.[4] They conclude that the interaction between standards systems and existing market distortions may result in second-best outcomes, and that standards systems can bring about distortions on their own as a result of an imperfect certification process, the preferences of the regulator/standard setter, and lobbying pressures.

[4] Dranove and Jin (2010) offer a comprehensive review of research on quality disclosure and certification without a specific focus on quality labels. A key issue discussed in their review is the role of competition in the market for certification intermediaries: imperfect competition can result in strategic manipulation of information by certifiers to maximize their share of the economic surplus (see Lizzeri, 1999).

The main strands of research in the political science tradition comprise work in the governance literature, the collective action literature, and the critical theory perspective. The literature on global and transnational governance regard standards systems as a form of private governance, i.e. institutionalized modes of social coordination to produce and implement collectively binding rules, or to provide collective goods (Falkner, 2003). Scholars working in this tradition have focused on a variety of topics, including the emergence and rapid diffusion of VSS since the early 1990s (Auld, 2014; Gulbrandsen, 2010; Pattberg, 2005; Schleifer, 2016), the effectiveness and legitimacy of this "new mode of governance" – business compliance with voluntary standards, their wider socio-economic consequences (Cashore, Auld, & Newsom, 2004; Kalfagianni & Pattberg, 2013), and the normative legitimacy of their rule-making activities (Bernstein, 2011; Dingwerth, 2007), and patterns of interactions (e.g., competition and coordination) between standards systems as well as private standards and public regulatory frameworks (Abbott & Snidal, 2009; Fransen & Conzelmann, 2014; Meidinger, 2006; Overdevest & Zeitlin, 2014; Schleifer, 2013).

Another analytical perspective draws on the collective action tradition in political science and economics (Buchanan, 1965; Ostrom, 1990). The so-called club theory approach posits that firms join voluntary standards because they produce club goods in form of reputational benefits. Members can use the club's "brand" to signal their environmental performance to relevant external audiences (e.g., consumers or regulators). In return, they are obliged to adopt and adhere to the club's rules, thus producing social and environmental benefits for the wider society. Scholars working in this vein have explored how firms create and join voluntary clubs in response to problems arising from collective action problems and related negative spillovers ("common reputations"; "common sanctions") (Barnett & Hoffman, 2008; King, Lenox, & Barnett, 2002). In addition, the collective action literature has focused on questions of institutional design and how this impacts on membership, reputation, compliance, and, ultimately, effectiveness of voluntary standards (Potoski & Prakash, 2009; Darnall, Potoski, & Prakash, 2010).

Finally, a third perspective adopts a more critical view on voluntary standards and private governance. Work taking a sociology perspective regard VSS as institutional settlements of political struggles and attempts of transnational elites to re-embed global production into a regulatory framework (Bartley, 2003, 2007; Guthman, 2007). Studies in the tradition of critical research in International Political Economy focus on multinational corporations and the role of corporate power in the construction and governance of voluntary standards. They also cast a critical light on the international distributional consequences and conflicts surrounding standard-setting (Fuchs & Kalfaggiani, 2010). This literature is relevant for our discussion of the incidence of compliance costs across actors of a standards system.

Notwithstanding the multi-faceted scholarly literature on VSS, there is relatively little research that comprehensively compares standards and their governance. Case study-based research abounds, but the few quantitative studies that permit generalization of findings are generally limited in scope (e.g., Darnall et al., 2010; van der Ven, 2015). This paper contributes to closing this gap. Using consistent information for a broad population of VSS, we focus on the practices of VSS that directly impact on costs for producers, and on more general features of the institutional design of VSS systems that are likely to favour producers.

4. The Standards Map Database

The ITC Standards Map database (SMD) covers more than 220 sustainability standards, audit protocols, codes of conduct and initiatives.[5] This makes it one of the most comprehensive data collection projects in this area. The VSS included in the database all satisfy the following minimum conditions: they cover at least one sustainability area (environment, social, economic and management, quality management system, or ethics and integrity), have a clear governance structure, and a credible audit procedure.

The SMD contains information on VSS covering more than 80 sectors ranging from agricultural products to textiles, electronics and services. Three quarters (77%) of standards cover extraction, primary production or conversion and manufacturing; 14% cover services and 9% are "generic standards". The latter are VSS that do not cover specific products but rather present a set of general requirements applicable in any sector or product, e.g. environmental standards during production process. The top three product groups are vegetable products (72 standards), foodstuffs, beverages and tobacco (66 standards), and live animals and animal products (61 standards). Voluntary standards are also frequently designed for textile and textile articles (36 standards) and chemical industries (35 standards).

The database captures two geographical dimensions for each standard: (i) the current scope of certified producers, i.e. the countries where VSS have producers who have gone through an audit and verification or certification[6] procedure and comply with the requirements of the VSS; and (ii)

[5] The wide array of voluntary sustainability standards, audit protocols, codes of conduct and frameworks will be referred to as "standards", "voluntary standards", "voluntary sustainability standards" or "standards systems".
[6] All VSS are based on audit, which is either conducted by a first-party (producer himself), second-party, a party related to a producer, e.g. retailer, or by a third-party, an independent body. If an audit process results in a certificate of compliance, the process is called "certification", in all other cases it is simply called "verification".

information on the location of the headquarters of each VSS system as well as local offices in the various countries of interest. In our sample, 73% of VSS were headquartered in OECD countries.

The database covers the common attributes of VSS, and allows referencing any type of standard, audit protocol or code of conduct. VSS data are divided into two main sections: (i) requirements; and (ii) processes. Requirements distinguish between the degree of obligation imposed across different five areas defined by Standards Map, including the environment, social factors and quality management. For each area, information on several topics is listed. In the case Global G.A.P. Crops, for example, a topic under environment is "soil." The database defines 10 indicators pertaining to soil. Global G.A.P. Crops requires 9 of these 10 criteria, including requirements for "Soil conservation" and "Soil health" that are "critical" and requirements for "Soil maintenance and enhancement by use of cover crops" that are "recommendations." The "Processes" section of the database covers aspects such as governance and transparency of each VSS; monitoring and evaluation procedures; the standard setting process; conformity assessment and audits; traceability and chain of custody; claims and labelling; support, target groups and costs. The analysis in this paper uses the second section of the database.

5. How 'producer friendly' are VSS systems?

What follows assesses the extent to which the institutional design of VSS systems is 'producer-friendly' using data in the Standards Map on the systems' organization, practices and governance features. We focus on three dimensions: (i) the extent of direct support for producers; (ii) disclosure of relevant information on their operations; and (iii) the allocation of certification costs among different agents (producers, supply chain actors and the standards system itself). These three dimensions constitute our dependent variables of interest in the empirical analysis below. The extent to which standards systems' impose all of the certification costs on producers or share these costs is a dimension of institutional design that is of obvious salience to smallholders. Disclosure practices are important in understanding the economic role of standards system as transparency allows small producers to select the system that is more appropriate to their business and needs and contributes to the establishment of the reputation of a system with buyers (actors downstream the supply chain), and the associated trust in its application procedures, certification process, and dispute settlement procedures.

Support for producers

The SMD contains many variables capturing different dimensions of support activities. Table 2 lists five variables related to support for producers and six indicators related to transparency that are used in the subsequent empirical analysis. Most standards (92%) provide support through guidance tools

and other documents. In addition, 58% of the systems in the sample offer technical assistance to meet the requirements. However, significantly fewer systems – 28% – provide technical assistance to improve productivity, efficiency or market access. Moreover, while 47% of standards facilitate learning, only 14% offer financial assistance.

Transparency of VSS systems

Six areas of information disclosure or transparency that are of most relevance to developing-country producers are free and unrestricted access to information on: (i) standards and national adaptation documents; (ii) certification and verification process; (iii) standards development procedures and policies; (iv) the application process for obtaining certification; (v) complaints and dispute resolution policies; and (vi) assessment methodologies (Table 2). Only 36% of standards in the sample have publicly available assurance methodologies; less than half (48%) make complaints and dispute resolution policies publicly accessible. About 50% publicly disclose certification applications and forms as well as standard development procedures and policies. Three-fifths (61%) make information on certified operations accessible to stakeholders. Finally, 88% of the standards provide public access to its standard documents.

Costs

Our third dependent variable of interest is the incidence of implementation and certification costs. Implementation costs include all the expenses on implementing the requirements of a VSS and may include improvements in agricultural practices, social practices, establishing management systems as per VSS requirements etc. Certification costs include direct costs of audits, i.e. costs of first-time and surveillance audits, VSS membership fees etc. The SMD reports information on these dimensions of VSS systems and the allocation of costs, i.e., whether they are borne fully by producers or are shared with other actors.

Producers often pay for 100% of implementation (64% of cases) and certification costs (55%). Slightly more than one-quarter of all VSS systems adopts a cost sharing scheme that involves both producers and supply chain actors paying for implementation (27% of VSS) and certification (26%). In a few cases – 4% for implementation and 11% for certification – supply chain players cover the costs. In 3% and 5% of cases, respectively, the VSS systems fully cover these costs. Finally, in less than 5% of cases do all three types of actors (producers, supply chain players and the VSS systems) or producers and VSS systems share these costs. Note that these figures reflect the number of VSS systems offering cost sharing schemes. Information on the actual uptake of cost sharing or cost incidence are not available. Our interest, however, is in the institutional design features on VSS systems.

Table 2. Support and Transparency Indicators

Variable: Support	Definition
Supporting documents	Assistance through guidance tools and other documents
Technical assistance to meet standards' requirements	System provides technical assistance to help applicants get verified/certified (workshops, trainings, provision of equipment).
Technical assistance beyond the standards' requirements	Includes providing resources, coordinating conferences or other peer learning activities aimed at efficiency or accessing markets.
Financial assistance	Advance payments for purchase of produce from farmers/suppliers, a support fund, or the payment of fees via purchasing companies.
Learning assistance	Organizing learning forums, networking activities
Variable: Transparency	**Definition**
Standards and national adaptation documents	The standard system provides public access to its standard documents.
Certification/ verification operations (names, sizes and locations of all certified units, including expiry dates, etc.)	Information on certified operations is made accessible to stakeholders.
Standard development procedures and policies	Policies for standard setting and standard review procedures are documented.
Standard's certification application instructions and forms	Certification instructions and forms are made publicly available.
Complaints and dispute resolution policies	Complaints and dispute resolution policies on e.g. certification/verification decisions, work of auditors etc. are made publicly accessible.
Standard's assessment methodologies	Indication on the presence of publicly available assurance methodology

Relevant characteristics of VSS systems—potential explanatory variables

We identify seven dimensions of VSS that can be directly operationalized using variables contained in the SMD that are expected to have some impact on support to producers, transparency and the allocation of certification costs. These constitute our explanatory variables in the analysis that follows.

The first dimension pertains to whether a VSS is established as a public entity by a ministry, a governmental agency or any other branch of the public sector. Such direct connection with the public sector - embedded in the VSS' legal status – may affect a system's incentives regarding the three variables of interest. Under the assumption that higher support and transparency as well as cost sharing schemes result in higher welfare for most stakeholders, welfare maximization could result in higher friendliness. On the contrary, political economy motives (such as visibility of government's action for electoral purposes) could be satisfied simply with the establishment of a VSS, without justifying additional costs to make the system effective in reaching out to producers. Therefore, the

assessment of the sign of this relationship between public status and producer friendliness is ultimately an empirical question.

The second characteristic of a VSS is whether it is for-profit. The literature in this area as well as simple economic reasoning suggests there may be a trade-off between profit maximization and offering support, losing private information through more transparent practices and implementing cost sharing schemes. At the same time, such practices may enhance the uptake of the VSS, the success of certified producers and thus its credibility. This may raise revenues and may increase profits.

A third characteristic is the age of a system. An older VSS may have different incentives than a younger one or a new entrant reflecting differences in resources and experience, and in general one expects that new VSS systems will try to differentiate themselves from incumbents, including on the three dimensions of interest.

A fourth dimension is the role of meta-governance – the integration of VSS into meta-standard organizations such as the ISEAL Alliance. Essentially, ISEAL is a meta-standard setter, creating standards of good practice for VSS systems. All organizations aiming at becoming a member of ISEAL need to go through an accreditation procedure in which their compliance with best practices – such as ISEAL's standard-setting code, assurance code, and impact code[7] – is verified. Compliant standard systems can then use their ISEAL membership as a signal of credibility. Given the best practice-orientation of meta-governance, we expect a positive effect of ISEAL membership.

Another dimension is the involvement of relevant stakeholders in the management of VSS. We look at involvement of producers as well as consumers. Producers' engagement in VSS' management with decision making powers can be expected to enhance 'producer friendliness' of the system. Similar considerations hold for buyers that, assuming a certain degree of competition in producers' market, would indirectly benefit from lower costs for producers. These two characteristics of VSS' governance are directly captured by two variables in the SMD, both with a binary structure and taking value one whenever producers or consumers respectively are involved into the management of the system.

Finally, we consider whether the system is headquartered only in an OECD country. This variable can be seen as a proxy for the capacity or resources of a system, with an OECD HQ reflecting greater capacity. Higher resources have a direct positive effect on the ability to implement costly activities such as support and the adoption of cost sharing schemes. Therefore, we expect a positive sign for the relationship between this variable and producer friendliness.

[7] ISEAL Alliance, Our Codes of Good Practice, http://www.isealalliance.org/our-work/defining-credibility/codes-of-good-practice

6. Analysis

Direct support

The five support indicators described above (see Table 2) were coded into five dummy variables, taking value one whenever the corresponding type of support is offered by the system. We denote these support variables as s^d where d is an indicator for the specific dimension of support. These variables represent the dependent variables in our first empirical exercise. Support dependent variables are merged with the seven regressors described in Section 5. Summary statistics for the estimation sample are reported in Appendix Table A1. We omit from the analysis the dependent variable capturing support through provision of documents as we observe no variation along this dimension of support (all systems offer support though documentation) within our estimation sample of 155 observations.

We use the data to fit four binary probit models, one for each dimension d of support. These models are based on the assumption that, for each d, there exists an underlying unobservable (latent) variable capturing VSS' utility from offering support, $U(s^d)$ as a function of the seven explanatory variables discussed above. Formally:

$$U(s^d) = \boldsymbol{\beta}'\boldsymbol{x} + u$$

with u being an error term following a normal distribution with mean 0. Whenever utility $U(s^d)$ is greater than 0, we observe $s^d = 1$, when instead the utility is negative we observe $s^d = 0$.

Table 3 reports the point estimates and robust standard errors for the four probit models. The estimated parameters can be interpreted as marginal effects (only) for the unobservable utility $U(s^d)$. Given the scope of our analysis, which consists in assessing the sign of the relationship between several relevant features of VSS and their support practices toward producers (rather than quantifying the causal effect of a treatment on the probability of observing a certain outcome), the marginal effects (at the median) with respect to the utility from offering support, $U(s^d)$, are directly relevant to our analysis rather than just statistical artefact. The estimates in Table 4 capture a tangential relationship between the variables of interest.[8]

Estimated marginal or discrete change effects computed at the median value of covariates (no public status, no private and for-profit status, 14 years old, not ISEAL member, no engagement of producers in decision-making, no engagement of buyers on board, headquarters located in OECD countries) are reported in Table 6. These estimates reflect the variation in the probability of observing support when

[8] Beyond the sign and their relative importance, these estimates are not informative on the marginal effects with respect to the probability of observing support.

the relevant covariate is increased by one unit – or, if the relevant covariate is a dummy, when it goes from 0 to 1 – while keeping all the other explanatory variables fixed at their median level. Take, for instance, the estimated coefficient of the public status dummy regressor in model (2). The implied marginal effect of -0.203 means that when considering the median VSS, the probability of observing technical assistance beyond meeting the requirements decreases by approximately 20% if the system changes its status from private to public. This result is also statistically significant at the 5% level. The patterns that emerge from the signs and relative importance of the estimates in Table 3 are confirmed in Table 4.

Table 3. Support to producers (estimated parameters of the probit models)

Dimension of support:	Technical assistance for requirements	Technical assistance beyond requirements	Financial assistance	Learning forums
	(1)	(2)	(3)	(4)
Public status	-0.404	-0.732*	0.378	-0.579
	(0.330)	(0.433)	(0.364)	(0.357)
For profit and private status	0.0577	0.148	0.384	0.400
	(0.382)	(0.414)	(0.480)	(0.391)
Age	0.0244*	0.0269**	0.0209	0.0136
	(0.0144)	(0.0137)	(0.0134)	(0.0140)
ISEAL full membership	0.348	0.545	0.810**	0.843**
	(0.361)	(0.345)	(0.354)	(0.351)
Producers in management	-0.0338	-0.142	0.426	0.554**
	(0.259)	(0.267)	(0.279)	(0.257)
Buyers in management	0.452*	-0.150	-0.164	0.385
	(0.270)	(0.278)	(0.297)	(0.273)
Headquarter(s) in OECD	0.441*	0.496	0.196	0.319
	(0.252)	(0.306)	(0.348)	(0.265)
Constant	-0.635**	-1.350***	-1.896***	-0.840***
	(0.314)	(0.353)	(0.418)	(0.314)
Observations	155	155	155	155
Pseudo R-squared	0.075	0.092	0.082	0.127

Note: Robust standard errors reported between brackets. * p<0.1, ** p<0.05, *** p<0.01.

Public status tends to be negatively associated with support that goes beyond VSS requirements. The only positive point estimate for the public status coefficient is model (3), looking at support through financial assistance. Even though positive the point estimate is statistically insignificant suggesting the lack of any relationship between public status and this dimension of support or, alternatively, the absence of a prevailing direction within a number of conflicting forces. Lack of statistical significance

characterizes the relationship between all dimensions of support and the private, for-profit regressor. Age seems to be positively associated with higher support according to the first two dimensions, suggesting that older systems might have higher incentives and resources than younger ones to invest in support activities. Similarly, ISEAL full membership is positively associated with higher support, with the relationship being statistically significant for support in the form of financial assistance and learning forums. As regards the engagement of producers or buyers the signs of the point estimates are not consistent across the various dimensions of support suggesting that different incentive schemes might be in place for each specific type of support. The only statistically significant relationships have a positive sign and link producers' engagement with higher support via learning forums and buyers' engagement with higher support for meeting requirements. Location of the headquarters in an OECD country is significantly associated with higher support to meet requirements. The estimated coefficient for this regressor is also positive across all other models but fails to reach standard levels of statistical significance.

Table 4. Support to producers (effects on the probability of observing support)

Dimension of support:	Technical assistance for requirements	Technical assistance beyond requirements	Financial assistance	Learning forums
	(1)	(2)	(3)	(4)
Public status	-0.160	-0.203**	0.0720	-0.189*
	(0.128)	(0.0902)	(0.0823)	(0.0997)
For profit and private status	0.0227	0.0544	0.0734	0.157
	(0.149)	(0.155)	(0.105)	(0.154)
Age	0.0096*	0.0095**	0.00310	0.00514
	(0.0057)	(0.0046)	(0.0018)	(0.0052)
ISEAL full membership	0.131	0.210	0.196*	0.325***
	(0.130)	(0.135)	(0.104)	(0.124)
Producers in management	-0.0134	-0.0486	0.0835	0.218**
	(0.103)	(0.0897)	(0.0624)	(0.0994)
Buyers in management	0.167*	-0.0514	-0.0216	0.151
	(0.0940)	(0.0932)	(0.0379)	(0.108)
Headquarter(s) in OECD	0.174*	0.151*	0.0253	0.112
	(0.0973)	(0.0869)	(0.0427)	(0.0898)

Note: Robust standard errors reported between brackets. * p<0.1, ** p<0.05, *** p<0.01.

The strongest relationship is between support and ISEAL full membership. With respect to the baseline context of the median system, becoming an ISEAL full member significantly increases the probability of offering financial support by almost 20%, that of offering capacity building forums by 32%. The only feature which is significantly associated with lower support is public status, suggesting that political economy forces against higher support might be in place. Finally, being an incumbent, being

headquartered in an OECD economy, and engaging producers or buyers in the management are all features positively and significantly associated with at least one dimension of support.

Transparency practices

For each of the six dimensions of transparency described above (see Table 2) we code a dummy variable that takes value one if information is publicly available and zero otherwise.[9] We then fit six binomial probit models with the same vector of covariates used in the support specifications above. The underlying unobservable latent variable here is the utility that VSS derive from the adoption of more transparent practices, $U(t^d)$ where t^d denotes transparency of type/dimension d.

Contrary to the case of the support specifications, the size of the estimation sample varies 3 times across the 6 models for transparency dependent variables. For the sake of space we do not report summary statistics for each estimation sample.[10] The median standard is not public, not private and for-profit, is 14 years old, is not an ISEAL member, has no engagement of producers or buyers in decision-making and is headquartered in the OECD. Table 5 reports the estimates from the 6 probit regressions. The respective marginal effects are given in Table A2 of the Appendix.

No statistically significant relationship emerges between public status and transparency: the signs of the point estimates are mostly positive but they are not significant. We obtain negative estimated coefficients across all models for the private and for-profit dummy; these are statistically significant when transparency concerns certification applications and verification (models (3) and (5)). This suggests a negative relationship between private and for profit incentive schemes and at least some dimensions of transparency practices. Age and involvement of buyers in management are not associated with any stance in transparency practices. Conversely, ISEAL membership and engagement of producers are often significantly related with higher transparency. Finally, being headquartered in an OECD economy appears to be associated with higher transparency only according to model (1), i.e. more accessible information on standards and national adaptation documents.

Turning to some of the marginal effects for a more intuitive quantitative interpretation, we note the following results (Table A2). Becoming ISEAL full member (and keeping all other covariates at their median level) is associated with a 44% higher probability of publicly disclosing information on standard development procedures and policies, with a 34% higher probability of being fully transparent on verification and certification as well as with a 52% higher probability of publicly disclosing complaints

[9] The zero category includes cases where information is made available only to board members or internal stakeholders. The Standards Map database indeed allows to distinguish among different levels of disclosure.
[10] These tables are available upon request.

and dispute resolution policies. Allowing producers to have influence in decision making is instead significantly associated with a 29% higher probability of being fully transparent regarding both assessment methodologies and standard development procedures and policies.

Table 5. Standards transparency (estimated parameters of the probit models)

Dimension of transparency:	Info on standards & national adaptation	Info on assessment methodologies	Info on standards' certification applications	Info on standards' development procedures	Info on verification/ certification	Info on complaints/ dispute resolution
	(1)	(2)	(3)	(4)	(5)	(6)
Public status	-0.283	0.509	0.499	0.0670	0.120	0.0086
	(0.382)	(0.409)	(0.467)	(0.336)	(0.345)	(0.335)
For profit and private status	-0.697	-0.216	-0.998**	-0.113	-0.702*	-0.153
	(0.500)	(0.466)	(0.440)	(0.411)	(0.409)	(0.392)
Age	0.0380	0.0171	-0.0109	0.0083	0.0044	-0.0202
	(0.0279)	(0.0151)	(0.0152)	(0.0133)	(0.0137)	(0.0126)
ISEAL full membership	Omitted as perfect predictor	-0.158	0.101	1.215***	1.261**	1.751***
		(0.339)	(0.376)	(0.430)	(0.514)	(0.483)
Producers in management	0.529	0.786***	-0.123	0.753***	0.280	0.254
	(0.526)	(0.288)	(0.283)	(0.260)	(0.264)	(0.254)
Buyers in management	0.137	-0.0377	-0.204	0.0743	0.388	0.0154
	(0.531)	(0.319)	(0.310)	(0.270)	(0.280)	(0.262)
Headquarter(s) in OECD	0.608*	0.490	0.181	-0.0597	0.00292	-0.0229
	(0.325)	(0.298)	(0.292)	(0.248)	(0.255)	(0.255)
Constant	0.381	-0.900***	0.625*	-0.350	0.0766	0.0709
	(0.484)	(0.336)	(0.366)	(0.304)	(0.325)	(0.299)
Observations	138	121	121	155	155	155
Pseudo R-squared	0.153	0.090	0.053	0.108	0.102	0.105

Note: Robust standard errors reported between brackets. * p<0.1, ** p<0.05, *** p<0.01.

Cost sharing schemes

Finally, we assess the linkages between cost sharing schemes and our vector of regressors. For this exercise the cost variables are recoded to take only two values: “0” when producers do not bear the cost alone (because supply chain players or the standards systems (SS) itself are bearing the cost, or at least part of it); and “1” when only producers bear the cost. The data are then used to estimate two binomial probit specifications, one for certification costs and the other for implementation costs. Tables A3 and A4 in the Appendix report summary statistics for the two estimation samples respectively. In the estimation sample for both specifications, the median standards system in terms of values of covariates is private, not private and for-profit, existing since 15 years, not ISEAL member, with no engagement of producers in decision-making, nor engagement of buyers on board,

and with headquarters located in OECD countries. Table 6 reports estimates from the 2 probit regressions; Table A5 in the Appendix the respective marginal effects.

Table 6. Cost sharing in VSS (estimated parameters of the probit models)

	Producers alone bearing certification costs	Producers alone bearing implementation costs
	(1)	(2)
Public status	-0.624	-0.951**
	(0.446)	(0.470)
For profit and private status	-1.049**	-0.780
	(0.495)	(0.532)
Age	0.0126	0.0245
	(0.0176)	(0.0177)
ISEAL full membership	-0.954**	-1.444***
	(0.405)	(0.453)
Producers in management	0.519*	0.465
	(0.312)	(0.316)
Buyers in management	-0.603*	-0.587*
	(0.318)	(0.321)
Headquarter(s) in OECD	-0.687*	-1.038**
	(0.368)	(0.423)
Constant	0.638	1.083**
	(0.455)	(0.535)
Observations	108	107
Pseudo R-squared	0.120	0.180

Note: Robust standard errors reported between brackets. * p<0.1, ** p<0.05, *** p<0.01.

The utility from adopting a sharing scheme that involves other stakeholders beyond producers seems to be significantly increasing with for-profit and private status, ISEAL full membership, engagement of buyers and OECD location of headquarter. Counterintuitively, involvement of producers in management is positively associated with producers themselves bearing alone the costs of certification. Compared with the results above, this suggests producers might use their bargaining power in the VSS management to obtain more transparency and direct support rather than the adoption of cost sharing schemes. Alternative explanation implies a reverse causality, i.e. producers are more likely to be invited to participate in the management of the standards the more they contribute to the implementation and certification costs.

Looking at the marginal effects in Table A5, ISEAL full membership is the feature that significantly appears as more linked to the adoption of cost sharing schemes that do not leave producers alone. In particular, acquiring ISEAL full membership from the baseline context of a median standards system

is associated with a 35% (51%) lower probability of having producers alone bearing certification (implementation) costs. A similar but weaker relationship is observed for engagement of buyers in the board and OECD location of headquarters.

The empirical patterns emerging from these three analyses can be summarized as follows. ISEAL full membership is strongly associated with producer friendly practices across the measures of direct support, transparency and cost sharing schemes. This finding is in line with arguments made in the political science literature about meta-governance. In this regard, several scholars have described the norm entrepreneurship of organizations like ISEAL (Dingwerth & Pattberg, 2009; Loconto & Fouilleux, 2014). Other features of the institutional design of VSS are also positively associated with our measures of producer friendliness, although they are found to be less robust. These features are the location of headquarters in OECD countries, the engagement of buyers in the board or management of the scheme and the influence of producers in decision making. These findings as well link to current discussions in the academic literature about the importance of the domestic context and stakeholder participation in VSS (Darnall et al., 2010; van der Ven, 2015).

7. Concluding remarks

The increase in consumer demand for sustainable trade has given rise to a growing array of social and environmental standards. The lack of a comprehensive source of comparable information on standards systems has to date impeded a comprehensive broad-based cross-country analysis of different VSS. In this paper we use a new database that collects comparable information on more than 220 VSS and their governance structure across a wide range of products and countries. We find that there is substantial variability in the support offered to producers, but that certain factors are associated with greater support to producers, notably participation of standards systems in meta-standards frameworks such as full membership in the ISEAL alliance.

The dimension of VSS we have focused on is just one element of the information contained in the SMD. Other relevant dimension of standards systems such as the structure of requirements, their product scope, and other aspects of institutional design such as verification procedures, stakeholder engagement, harmonization or convergence vs. competition between different schemes can all be analysed using the database. We hope the descriptive analysis undertaken in this paper will help mobilize greater use by the research community of this source of information.

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Appendix

Table A1. Support models: summary statistics

Variable	N	mean	p50	sd	min	max
Technical assistance for meeting requirements	155	0.568	1	0.497	0	1
Technical assistance beyond meeting requirements	155	0.265	0	0.443	0	1
Financial assistance	155	0.142	0	0.35	0	1
Learning forums	155	0.497	0	0.502	0	1
Public status	155	0.135	0	0.343	0	1
For profit and private status	155	0.084	0	0.278	0	1
Age	155	15.394	14	8.176	3	49
ISEAL full membership	155	0.11	0	0.314	0	1
Producers in management	155	0.387	0	0.489	0	1
Buyers in management	155	0.323	0	0.469	0	1
Headquarter(s) in OECD	155	0.735	1	0.443	0	1

Table A2. Transparency: marginal and discrete change effects

	Info on standards and national adaptation documents	Info is made accessible on assessment methodologies	Info on standard's certification applications	Info on standard development procedures and policies	Info on verification/ certification	Info on complaints/ dispute resolution policies
	(1)	(2)	(3)	(4)	(5)	(6)
Public status	0.0014 (0.0462)	-0.128 (0.156)	-0.0720 (0.113)	-0.0920 (0.126)	0.0242 (0.127)	0.0776 (0.112)
For profit and private status	0.0014 (0.0462)	-0.128 (0.156)	-0.0720 (0.113)	-0.0920 (0.126)	0.0242 (0.127)	0.0776 (0.112)
Age	0.136 (0.114)	0.132 (0.157)	0.371** (0.158)	0.0324 (0.140)	0.200 (0.140)	0.0204 (0.140)
ISEAL full membership	Omitted as perfect predictor	-0.0447 (0.131)	0.0344 (0.112)	0.438*** (0.116)	0.343*** (0.0892)	0.521*** (0.0843)
Producers in management	0.0381 (0.0318)	0.286*** (0.101)	-0.0512 (0.0967)	0.294*** (0.0947)	0.0799 (0.0980)	0.0927 (0.100)
Buyers in management	0.0149 (0.0537)	-0.0295 (0.124)	-0.0911 (0.112)	0.0353 (0.105)	0.121 (0.0988)	-0.0065 (0.101)
Headquarter(s) in OECD	0.145* (0.0831)	0.164* (0.0994)	0.0357 (0.0963)	-0.001 (.)	-0.0043 (0.0969)	-0.0344 (0.0955)

Note: Robust standard errors reported between brackets. * p<0.1, ** p<0.05, *** p<0.01.

Table A3. Certification costs model: summary statistics

Variable	N	mean	p50	sd	min	max
Producers alone bearing certification costs	108	0.528	1	0.502	0	1
Public status	108	0.12	0	0.327	0	1
For profit and private status	108	0.074	0	0.263	0	1
Age	108	15.787	15	7.496	3	49
ISEAL full membership	108	0.139	0	0.347	0	1
Producers in management	108	0.463	0	0.501	0	1
Buyers in management	108	0.324	0	0.47	0	1
Headquarter(s) in OECD	108	0.769	1	0.424	0	1

Table A4. Implementation costs model: summary statistics

Variable	N	mean	p50	sd	min	max
Producers alone bearing certification costs	107	0.617	1	0.488	0	1
Public status	107	0.121	0	0.328	0	1
For profit and private status	107	0.065	0	0.248	0	1
Age	107	15.991	15	7.739	3	49
ISEAL full membership	107	0.131	0	0.339	0	1
Producers in management	107	0.467	0	0.501	0	1
Buyers in management	107	0.327	0	0.471	0	1
Headquarter(s) in OECD	107	0.766	1	0.425	0	1

Table A5. Costs and institutional design: marginal and discrete change effects

	Producers bear all certification costs	Producers bear all implementation costs
Public status	-0.241 (0.161)	-0.365** (0.164)
For profit and private status	-0.374** (0.145)	-0.304 (0.198)
Age	0.0049 (0.0069)	0.0089 (0.0066)
ISEAL full membership	-0.348*** (0.125)	-0.509*** (0.118)
Producers in management	0.189* (0.112)	0.150 (0.0844)
Buyers in management	-0.234** (0.116)	-0.229* (0.125)
Headquarter(s) in OECD	-0.240** (0.112)	-0.266*** (0.0844)
Observations	108	107

Note: Robust standard errors reported between brackets. * p<0.1, ** p<0.05, *** p<0.01.