Hauser Globalization Colloquium Fall 2010

Professors Ryan Goodman & Robert Keohane

Furman Hall 900, Pollack Colloquium Room
Wednesdays 2:00 pm-3:50pm
(unless otherwise noted)

Schedule of Sessions (subject to modification)

September 15	**Professor Eric Posner** *Human Rights, the Laws of War, and Reciprocity*
September 22	**Professor Michael Doyle** *A Global Constitution? The Struggle over the UN Charter*
October 6	**Professor Mary Dudziak** *Law, War, and the History of Time*
October 13	**Professor Tim Buthe** *Standards for global markets: domestic and international institutions for setting international product standards*
October 20	**Professor Kal Raustiala** *Information and International Institutions*
October 22 (Friday)	**Professor Peter Katzenstein** *The Transnational Spread of American Law: Legalization as Soft Power*
November 10	**Professors Oona Hathaway & Scott Shapiro** *Outcasting: Enforcement in Domestic and International Law*
November 17	**Professors Ann Marie Clark & Kathryn Sikkink** "Information Effects and Human Rights Data: Is the Good News about Increased Human Rights Information Bad News for Human Rights Measures?" **Background Reading:** Emilie M. Hafner-Burton, & James Ron, Seeing Double: Human Rights Impact Through Qualitative and Quantitative Eyes, World Politics, 2009.
December 1	**Professor Benedict Kingsbury** *Obligations Overload for Fragile States*
December 3 (Friday)	**Professor Beth Simmons** *Subjective Frames and Rational Choice: Transnational Crime and the Case of Human Trafficking*

30 Standards for global markets: domestic and international institutions for setting international product standards

*Tim Büthe and Walter Mattli**

30.1 INTRODUCTION: STANDARDS AS INSTRUMENTS OF GOVERNANCE

Standards prescribe behavior or characteristics of people or inanimate objects, often in technical terms. There are many kinds of standards locally, nationally and internationally, including standards of academic excellence (for example, Reeves 2004) or corporate social responsibility (Stewart and Spille 1998; Vogel 2005; Auld et al. 2008), health and safety standards (Cheit 1990; Büthe 2008b), capital adequacy standards for banks (Oatley and Nabors 1998; Singer 2007), standards for data privacy (Schaffer 2000; Farrell 2003; Bignami 2005; Newman 2008), labor rights standards (Mosley 2010) and accounting standards (Mattli and Büthe 2005a, 2005b; Nölke 2005; Véron et al. 2006).

Like norms and regulations, standards are instruments of governance. But standards differ from most social norms in that they are more explicit.[1] At the same time, standards differ from governmental regulations in that the use of, or compliance with, a standard is not mandatory. Only if a standard becomes the technical basis for a law or regulation – which often and increasingly occurs – does it become legally binding (for example, Hamilton 1978; Salter 1988; Egan 2001).

We focus here on product standards, which are among the most important standards in the international political economy. Product standards specify design or performance characteristics of manufactured goods, such as their sizes, shapes or functions, 'or the way [they are] labeled or packaged before [being] put on sale' (WTO 1998, E3-2).[2]

Why do firms seek to make their products comply with certain standards? Even if there is no legal obligation, there may be social or political pressures or economic incentives to comply (Brunsson and Jacobsson 2000). A consumer buying a gas stove, for instance, might want to know whether it complies with a standard that specifies how the oven must be designed to ensure that heating the oven will not cause parts to expand and cause a gas leak. High-quality product standards can thus make government regulation (for public safety or consumer protection) leaner or even unnecessary (see also Newman and Bach 2004).[3] Purchasing managers for firms, who buy inputs such as intermediate goods in large quantities, similarly often pay close attention to whether the goods they purchase comply with certain product standards. Large-scale consumers, including government agencies, may even demand compliance as a condition of placing an order, using standards to communicate specifications and ensure consistent quality. Which technical specifications get written into a product standard therefore often matters to producers, consumers and policy-makers.

How then are these standards set? There are four basic ways in which product standards come about. (1) A public governmental agency with exclusive authority for a given issue may develop a technical specification internally, with rule-based opportunities for input from external stakeholders such a specification may then be imposed as a regulatory or public procurement standard. (2) Multiple public agencies, each of which develops a technical specification internally but none of which has exclusive standard-setting authority, may compete for acceptance by users. If one succeeds in gaining widespread acceptance, for example, because it controls access to the most desirable market but producers want to use a single standard for their global production, its technical specification becomes a de facto standard. (3) Private actors develop technical specifications separately or in small groups, which then compete. One specification may then become a dominant de facto standard through market selection, such as the Microsoft Windows operating system or the Blu-ray optical disc formatting standard. (4) A broad range of stakeholders may cooperate voluntarily in a private non-governmental organization (NGO) that effectively has exclusive authority by being recognized as the legitimate forum for setting standards in the issue area in question, leading to what are often called consensus standards. These four ideal-typical ways of establishing technical standards differ in their main advantages and disadvantages and in who the key actors are, which we have discussed in greater detail elsewhere (for example, Mattli 2003, pp. 201–10; Büthe and Mattli 2010, 2011).[4]

Since institutionalized voluntary cooperation of private actors is for most industries in most countries the most important approach to setting product standards (for example, Hemenway 1975; Toth 1996), we focus here on this approach to standardization. In principle, the process is open to anyone who has a stake in the technical specifications of the products in question – subject to the rules and procedures of the standards developing organization (SDO) that undertakes the standardization work. For product standards, these 'stakeholders' tend to be first and foremost the firms that manufacture the product and, if it is an intermediate good, the firms that buy it as an input. Stakeholders, however, may also include consumer groups, representatives of labor, government regulatory agencies, environmental groups, as well as other civil society organizations and sometimes academic researchers, though non-commercial interests tend to be under-represented in SDOs.[5]

Common characteristics of institutionalized standards-setting at the domestic and international levels include that the SDO is comprised of specialized working groups or committees, in which technical experts cooperate in developing the standard. To increase the legitimacy of the resulting standards, SDOs usually have a multi-stage standard-setting process with consensus procedures, and the final adoption of a technical specification as an official standard of the organization requires super-majorities in a voting procedure. The particular institutional structure above the working groups differs across SDOs, especially by country and region, as discussed below. At the international level, two SDOs account between themselves for about 80 percent of all international product standards: the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).[6] Little known until the 1980s to anyone who was not an engineer or standards manager, they have become prominent in recent years, in part due to a stipulation in the Agreement on Technical Barrier to Trade (TBT) of the World Trade Organization (WTO). The TBT Agreement obliges all WTO

member states to use international standards whenever possible as the technical basis of laws and regulations that affect market access. It has accelerated the internationalization of standard-setting, that is, a shift from the domestic to the international level and above all to ISO and IEC.

Why does a particular technical specification become the ISO or IEC standard for a given product? How are conflicts of interest over these technical specifications decided in these private SDOs? And who gains and who loses when standards governance shifts from the domestic to the international level? Our chapter seeks to address these questions, as well as offer some more general insights into institutionalized multi-level governance, since the internationalization of standard-setting changes the role but does not diminish the importance of domestic (and regional) institutions for each country's stakeholders.

In the next section, we discuss the importance of product standards domestically and internationally. The increasing shift of standards-setting from the domestic to the international level over the course of the last two to three decades leads us to note a puzzling observation from interviews with standards experts in manufacturing firms in the USA and Europe: they mostly agree that standard-setting has shifted to the international level and will continue to do so, but they disagree in their normative assessments of this change in global governance. We present an explanation for this puzzle, which emphasizes the fit – or what we call 'complementarity' – between domestic and international institutions. We then draw on a five-country, multi-industry business survey, which we conducted in 2001/02, to examine various observable implications of this argument about institutional complementarity.

30.2 DOMESTIC AND INTERNATIONAL IMPORTANCE OF PRODUCT STANDARDS

Product standards are ubiquitous. Length, width and thickness of credit and bank cards, as well as the location of the magnetic strip on such cards, are standardized, which allows the use of the cards in any automatic card reader, not just the automatic teller machines of one's own bank. Wheels and tires for cars and bicycles are manufactured to one of a limited number of standard sizes to ensure a tight fit and safe ride (under specified conditions that may also be written into the standards) – without the need to fit each tire individually to each wheel like horseshoes to a horse's hooves. The symbols used for warning lights on the dashboard of cars (such as the engine overheating symbol) or on medical devices (such as the laser radiation symbol) are usually drawn from lists of 'standard' symbols, which are independent of any particular language, culture or manufacturer (though cf. Liu et al. 2005). Wooden boards at a lumber yard or fine cabinetry made from wood or 'forest products' may carry a label indicating that the raw material has been harvested in ecologically sustainable ways (for example, Bartley 2003; Meidinger et al. 2003; Cashore et al. 2004). Other widely – if not always consciously – used standards include ISBN numbers, which assign a unique identifying number to books, and screw thread standards, which may specify the mechanical force that can be reliably sustained by parts held together by nuts and bolts, thus allowing the replacement of worn-out parts without loss. Similarly, the character-set identified in the non-visible encoding of web

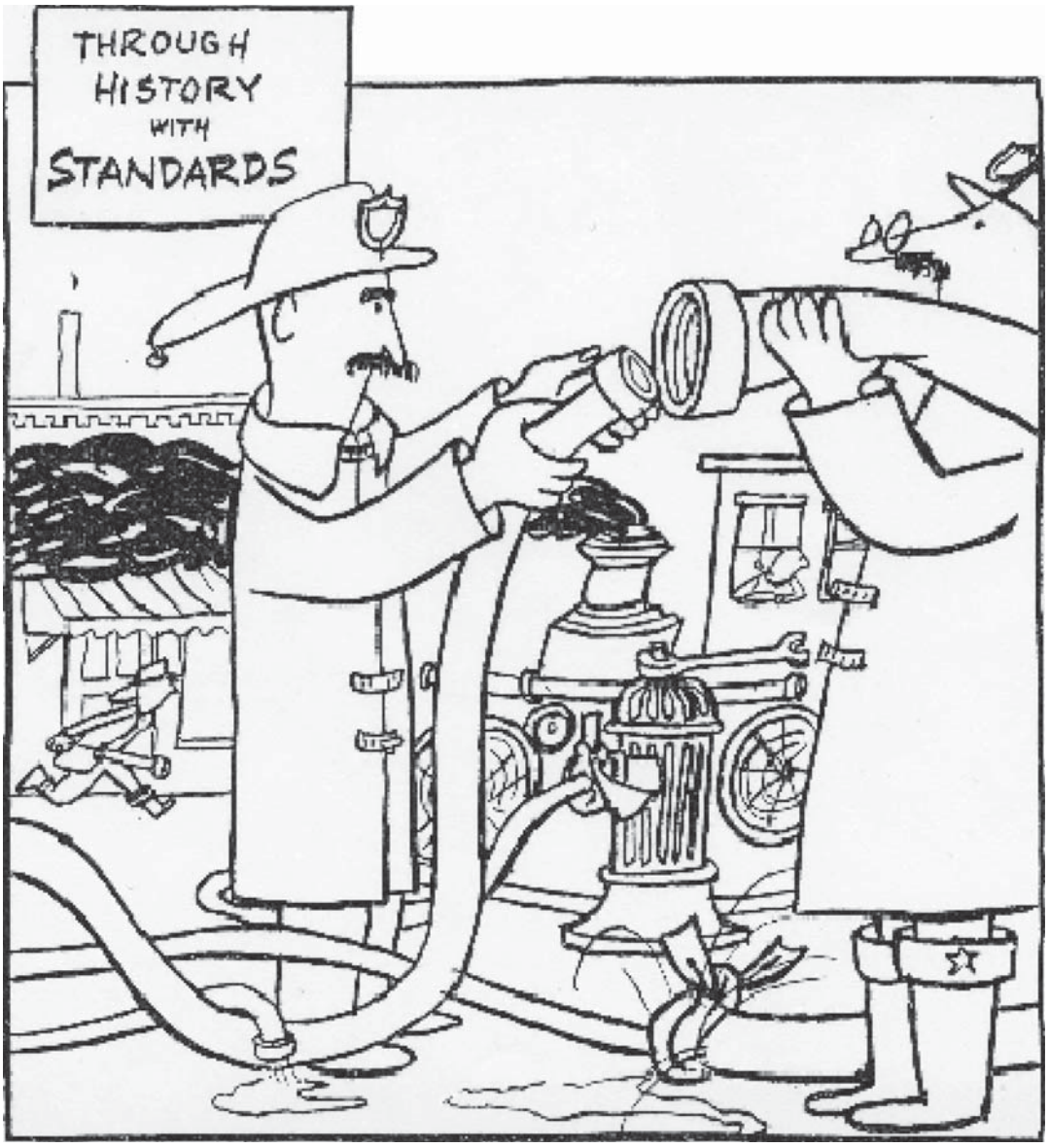
pages is just a reference to a standard, which tells the browser to display the characters on the web page in, for instance, Roman/Western script rather than in Chinese, Japanese or Arabic.

An individual firm may use product standards for a number of reasons. It may, for instance, use standards to specify characteristics of inputs that it purchases. To measure and improve internal processes and conduct quality control, a firm may specify standards that its own products must meet; the products can then be tested for compliance with this standard, before later stages of production or final sale.[7] It may also use standards to specify characteristics of its outputs, for instance, through classifications or quality grades of the goods produced.[8] Product standards thus provide information shortcuts or enable the interoperability or interconnectivity of different devices or parts.

Standardization has important implications for economic development and innovation. Industrialization is inconceivable without standardization. Even the production of 'customized' products often depends on precise standardization of the various parts to retain the economic benefits of economies of scale and ensure timely assembly and delivery. Product standards also increase the efficiency of markets to the benefit of consumers by reducing consumers' exclusive reliance on a particular producer (a problem well known to users of cell phones whose manufacturers tend to change the non-standardized battery shapes and connectors with every model, so as to make them incompatible with any other brand or model and thereby force consumers to buy same-brand replacements). At the same time, standardization allows competitive producers to achieve greater economies of scale by selling the same product to many customers. And by allowing engineers to build on established solutions to basic technical problems, product standards also facilitate cumulative technological development and can spur innovation.[9]

Standards, especially international standards, also facilitate trade (for example, Holzinger 2003, pp. 190ff.). The development of an international standard for freight containers, for instance, has played a major role in the spectacular reduction in international long distance shipping costs of the past 30 years, since the standardization of container dimensions made it possible to stack and move entire containers between ships, railroad cars, trucks and storage, rather than load and unload their content multiple times (Levinson 2006; Hummels 2007, especially p. 141).

Finally, standardization can be important for public safety. The 'Big Fire of Baltimore' of 1906, which destroyed much of the historic city, provides a good illustration. When news of the fire spread even faster than the fire itself, fire companies from nearby towns and the cities of Philadelphia, Washington and even New York came to Baltimore to help. But since the connectors between fire hoses and hydrants were not standardized, the out-of-town firemen were largely forced to idly stand by, since they could not connect their equipment to Baltimore's hydrants nor each other's hoses (Figure 30.1). To be sure, Baltimore fire crews could connect their equipment, at least within any given neighborhood: There were local standards, but not national and certainly not international ones.



Source: American Standards Association (1965), *Through History with Standards: An Illustrated Textbook,* New York: ASA. Reproduced with permission.

Figure 30.1

30.3 SHIFT IN GOVERNANCE

30.3.1 Patterns of Change

Fire hoses and hydrants were no exception. For many products, standards were originally developed in response to local needs, which were usually considered only in the local

context. Indeed, local standardization was usually appropriate and efficient, and until the late twentieth century, standardization remained a local or at most national affair. More recently, however, the globalization of product markets has greatly increased the economic and political salience of cross-national differences in standards.

By the 1980s, cross-national differences in standards came to be recognized as an important non-tariff barrier to trade (NTB, for example, Ray 1987; Grieco 1990). By 1998, cross-nationally divergent standards were estimated to result in $20–40 billion in lost sales of goods and services for the USA alone (Mallett 1998–99). The increased prominence of standards as NTBs had multiple reasons. The reduction of tariffs in successive rounds of trade negotiations under the General Agreement on Tariffs and Trade (GATT) raised the visibility of non-tariff measures that had always been there but had mattered little when tariffs were high. More generally, the rapid international integration of product markets (for instance, due to the decrease in transportation costs) raised the economic importance of factors that perpetuated the fragmentation of markets. This development put the spotlight on differences in standards that often reflected differences in taste or accidents of history: US 'letter' size paper, for instance, is slightly shorter and wider than the 'A4' standard paper, which is common in most of the rest of the world – a divergence of standards that today is a familiar nuisance to all who have tried to print a document encoded in the other format and have been asked by their printers to load paper of a size they did not have. Yet, until it became common to send files to colleagues or business partners around the globe, this lack of compatibility in paper sizes was unknown to most (Büthe and Mattli 2011). Generally, when there are multiple possible solutions to a technical problem, such as connecting hoses and fire hydrants, separately developed technical standards often differ despite a common understanding of the underlying science and engineering.

Standards, however, did not just become more visible, they became more numerous and more specific when standards became more popular as instruments of public and private market governance – first in advanced industrialized countries, then also in developing countries.[10] Many of the new standards were introduced in order to protect domestic producers. A Japanese standard, for example, adopted in 1986 by the Consumer Product Safety Association at the request of the nascent Japanese ski manufacturing industry, required skis sold in Japan to comply with particular product design specifications (not met by any foreign manufacturers) in order to get a consumer safety seal, ostensibly because Japanese snow was 'different,' so that imported skis would be unsafe.[11] In summary, regardless of intention, divergent standards become NTBs when government regulations or local markets require compliance as a prerequisite for import or sale of the good, impeding trade or increasing the cost of production for the foreign producer.

In addition, when divergent standards require the duplication of product testing and certification, they also increase the costs of entry into foreign markets. US and European regulatory agencies that are responsible for traffic/motor vehicle safety, for instance, use different crash-test dummy standards (specifying height, weight and locations of required sensors) despite the June 2004 introduction of a 'World Side Impact Dummy' agreed with US and European participation. Manufacturers of cars and car parts such as air bags therefore have to undergo (at least) two sets of tests to get regulatory approval for their products. Testing procedures for pharmaceuticals and many other products similarly differ.

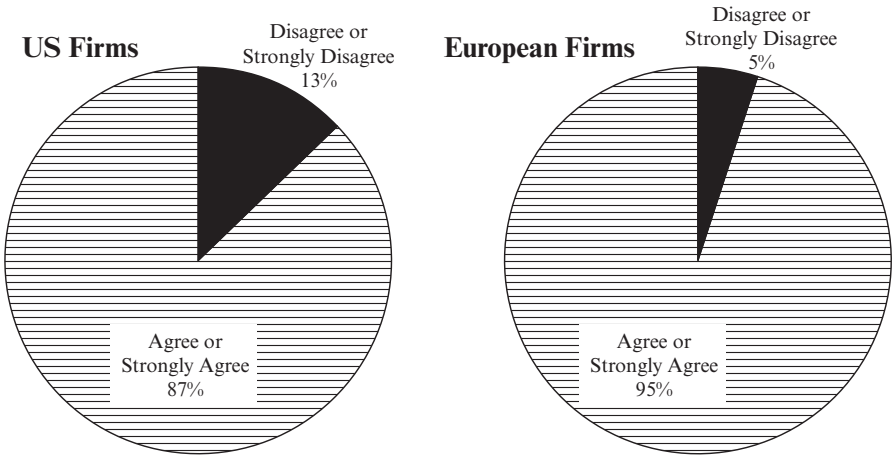


Figure 30.2 Expected trend toward globalization of standard-setting

Standards are not just NTBs, however. They often fulfill multiple purposes, including non-trade related and legitimate public policy purposes (see Section 30.2 above). Lowering or abolishing standards therefore may be neither socially nor even economically optimal. The increasing prominence of standards as NTBs has therefore only rarely led to demands for their abolition or 'tariffication' (replacing them with tariffs that result in equivalent reductions in trade). Instead, it has led to increasing demands for the international harmonization of standards – and a spectacular shift of standardization activity from the domestic to the regional and international levels (Mattli 2003, p. 200).

As recently as the mid-1980s, the vast majority of new product standards were domestic standards, developed within each country separately for primary use in the domestic market. Today, for most advanced industrialized and developing countries alike, the overwhelming majority of new product standards are essentially international standards – sometimes adopted as national standards with slight modifications, but substantively developed in the technical committees of an international SDO, such as ISO or IEC.

30.3.2 The Puzzle

In a series of interviews in the USA and Europe, we found that most experts expected the international harmonization of product standards in organizations like ISO to continue or even increase. We confirmed these findings in a subsequent international survey (described in more detail below), where we asked a large number of standards managers and technical experts from manufacturing firms to indicate whether (and how strongly) they agreed or disagreed with the statement: 'Standards will increasingly be developed at the international level.' The overwhelming majority of survey participants on both sides of the Atlantic agreed that the trend toward international standards-setting would continue (Figure 30.2, $N = 1195$).

But when we asked interviewees and survey respondents for their normative assessments of this shift in governance, responses diverged strongly. In Europe, the vast

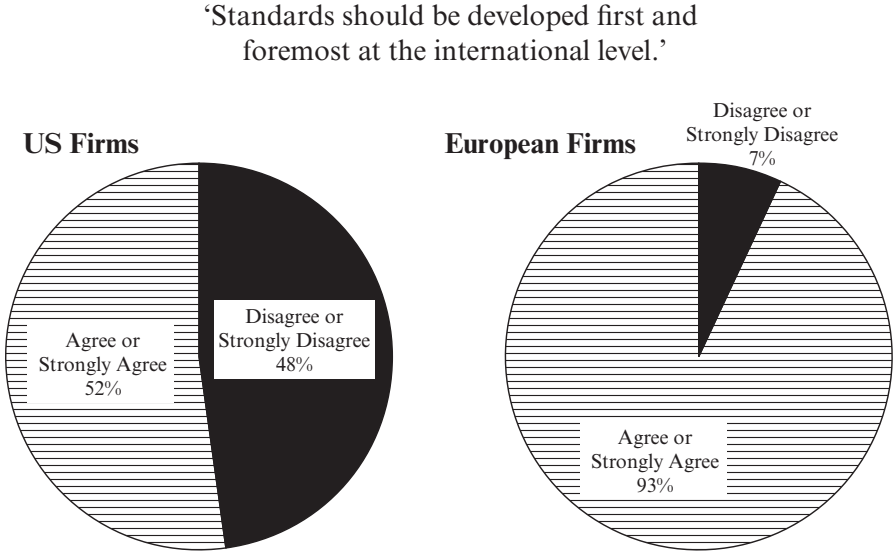


Figure 30.3 Normative assessment of the globalization of standard-setting

majority considered the shift to the international level desirable, whereas experts from US firms were almost evenly split between those who favored and those who opposed the internationalization of standards-setting, as again captured most clearly by the survey response to the statement: 'Standards *should* be developed first and foremost at the international level' (Figure 30.3, *N = 1116*; emphasis in the original).

30.3.3 Deficiencies of Existing Theories of International Cooperation

Why would US and European firms differ so much in their normative assessments of this aspect of globalization even while they largely agree on what will happen? This divergence of positive and normative assessments is particularly puzzling because major theories of international cooperation would lead us to expect otherwise.

Scholars in the 'Realist' tradition of international relations emphasize the distribution of power among states as the key determinant of international cooperation, even in non-governmental institutional settings such as ISO (for example, Drezner 2004, 2007). As Krasner (1991) pointed out, international cooperation may bring benefits to all states (a 'Pareto-improvement'), but the distribution of those benefits is often skewed in favor of (stakeholders from) more powerful countries. Specifically, in the realm of technical standards, international standardization may bring benefits such as the reduction of NTBs and thus a more efficient allocation of resources. Yet, since standardization usually involves the harmonization of previously differing products or practices, it also creates adjustment costs and conflicts of interest over the distribution of those costs (ibid.). Electrical plugs and socket-outlets, for instance, remain strikingly non-standardized even among countries using the same voltage for their household electricity supply. Since the different plug and socket-outlets designs constitute a NTB – and some countries' current designs deliver sub-optimal electrical safety – there are good reasons for international standardization. But switching to a common standard would require

the use of hundreds of millions of adapters and ultimately the replacement of every outlet in many countries, since it has proven technically impossible to find a plug design that is compatible with more than a few countries' outlets and still achieves current or better levels of electrical safety (see Büthe 2008a).

If the distribution of switching costs is a function of the distribution of power among states, stakeholders from internationally weak states might oppose international standardization normatively since they will disproportionately pay those costs. But by almost any 'Realist' measure of the distribution of power, the USA and Europe are very evenly matched in political and economic resources that can be used in non-coercive international cooperation (see, for example, Drezner 2007). This theoretical logic therefore leads us to expect that the particular technical specification that becomes the international standard for a given product should, on balance, be equally beneficial to US firms as to European firms – that is, their normative assessments should not differ (contrary to what is captured in Figure 30.3).[12] Our empirical findings thus directly contradict the expectations derived from this major theoretical tradition in international relations.

An alternative set of expectations can be derived explicitly in Loya and Boli's original study of institutionalized international standardization (Loya and Boli 1999). Drawing on sociological ideal-types of science and engineering, they see standard-setting essentially as a scientific optimization problem: a search for the objectively best standard, given a clearly defined technical problem or objective. They argue that neither 'the competitive struggle between states' (ibid., p. 196) nor the commercial interests of individual firms affect the process of international standard-setting in organizations like ISO and IEC, since the specialized technical expertise of the participants in ISO/IEC standardization and their joint/shared social status as scientists grants them a high degree of autonomy (see also Schofer 1999). Moreover, due to the universal nature of scientific method and rationality, Loya and Boli argue, everyone can agree on what the optimal solution is, as long as the institutional setting of the SDO is conducive to (a) making the scientific effort to arrive at that 'solution' and (b) exchanging information about the measurements and scientific procedures used.

Since this theoretical approach sees no distributional conflict, it leads us to expect that there should be no systematic differences in firms' experience with international standardization. But we find empirically that US firms on balance consider the shift from domestic to international standardization to be much less advantageous to them than European firms in the same industries (see Figure 30.3). Why?

30.4 INSTITUTIONAL COMPLEMENTARITY THEORY

Institutional Complementarity Theory (Mattli Büthe 2003; Büthe and Mattli 2011) provides an answer to this specific question, but also suggest a general theory of international institutionalized cooperation. It focuses on the complementarity of domestic and international institutions. An abstract illustration best conveys the basic idea: assume that two countries differ in their domestic institutions, D_1 and D_2. Assume further that achieving a given objective (shared by country 1 and country 2) requires coordinating policies or practices at the international level, where a single international institution I0 exists.[13] If the 'fit' between D_1 and I_0 differs from the fit between D_2 and I_0, thereby

Table 30.1 ISO/IEC organizational structure

	ISO	IEC
central secretariat	1	1
technical committees (TCs)	210	96
subcommittees (SCs)	519	108
working groups (IEC: + project/maintenance teams)	2443	1118
individual participants (ISO/IEC estimates)	*c*. 50 000	*c*. 10 000

Note: Information as of 31 December 2009, (*from ISO in Figures*), *IEC in figures*; 'List of [IEC] Technical Committees and Subcommittes', IEC TC/SC figures includes ISO IEC joint TC1 and its subcommittees.

conferring upon actors from country 1 a strategic advantage over actors from country 2 for influencing the coordinated solution at the international level, we would say that the institutional complementarity between the domestic institutions in country 1, D_1, and the international institution, I_0, is greater than between D2 and I_0. Note that the pertinent differences between D_1 and D_2 may have their origins in each country's history long prior to the rise of the international institution to political-economic importance; the differences in institutional complementarity may thus be accidental (ibid.; see also Hall and Soskice 2001, p. 17; Höpner 2005).

Institutional Complementary Theory leads us to focus on institutional differences. Only if domestic institutions differ in how useful they are to domestic actors who seek to influence international outcomes can institutional complementarities explain why actors may differ across countries in their normative assessment of the shift of governance to the international level (or why a particular technical specification becomes the international standard for a given product). Developing specific theoretical expectations therefore requires contextual knowledge about the pertinent institutions. What is the structure of the international institution for standards-setting and how does it operate?

ISO and IEC are the two central SDOs at the international level, covering among them standardization in almost all major domains of economic life. Both are NGOs, though they are organized on the basis of national representation and employ a one-country-one-vote system in the final stages of standards adoption – reflecting the role of domestic-level SDOs in founding the organizations in 1947 and 1906, respectively (Verman 1973, pp. 1–13; Raeburn 2006; Büthe 2010). Membership in ISO is open to the body 'most broadly representative of standardization' in each country.[14] As of January 2010, ISO has 105 members; IEC 57.[15] For most advanced industrialized countries, the national member bodies are also non-governmental.[16]

The actual standardization work in ISO and IEC takes place in numerous specialized technical committees, subcommittees and working groups (Table 30.1). National member organizations often constitute mirror committees or working groups at the domestic level to provide input via the individuals who directly participate in ISO/IEC standardization as representatives of their member body. Given the technical expertise required, most of those individual participants come from industry, and their firms cover the costs of participation, but some also come from academic and not-for-profit research

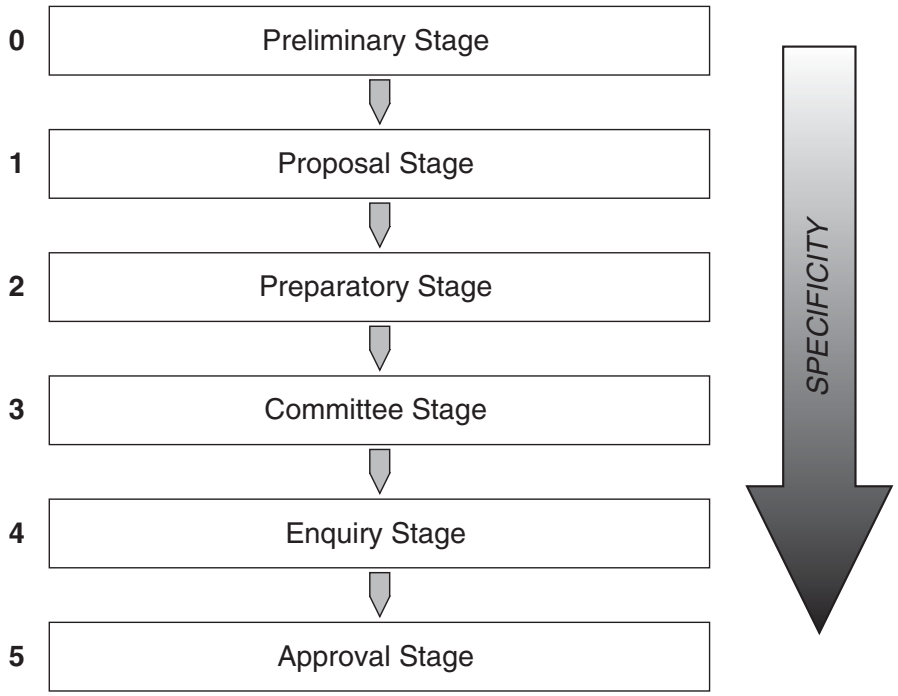


Figure 30.4 ISO/IEC standardization: a multi-stage process

institutes, public regulatory agencies, consumer organizations and other NGOs. The decentralized standardization work is coordinated by the organizations' relatively small secretariats in Geneva, which also coordinate the work among the two organizations. This coordination ensures consistency and the creation of only a single ISO or IEC standard for any given product or technical issue. The international institution thus is characterized by a high degree of coordination and organizational hierarchy, albeit with most of the initiatives coming from the bottom up rather than from the top down.

Standardization takes place in five distinct stages, preceded by an informal preliminary stage (Figure 30.4).17 As discussed in greater detail elsewhere (for example, Mattli and Büthe 2003; Büthe 2010; Büthe and Mattli 2011),[17] the scope and fundamental principles of a new standard are decided during the early stages; the details during the later stages, with increasing specificity. More generally, standardization in ISO and IEC is an iterative process of proposals, discussions and approval of successively more specific drafts in specialized working groups and committees, until the Draft International Standard and then the Final Draft International Standard are drawn up, which are subjected to a formal vote by all member bodies. Interviews with participants have confirmed that these stages describe not only the *de jure* but also the de facto standardization process. Throughout the process, there is a strong emphasis on achieving broad consensus among the participants. At the same time, in the interest of efficiency, the procedures do not allow returning to a previous stage – and the technical issues already settled then – unless the draft standard is outright rejected at a later stage.

These characteristics of the international standards-setting institution(s) have important implications for the actions and resources required to influence the content of

international standards. The decentralized nature of ISO/IEC standards-setting suggests that involvement is crucial. To put it bluntly: you have to play to win. Those who actively participate in the technical work – directly or indirectly – have many more opportunities to shape the scope and the specific content of the standard than those who only comment at the enquiry stage or later. Effective participation in turn should require early and good information, so as to allow stakeholders to determine the implications of a proposed new standard for their products (that is, to determine what their interests are) and to influence the technical specification accordingly.[18]

Having a voice in the standardization process from its beginning through the adoption of the final standard also requires economic resources to cover travel and accommodations for meetings. Participants also must be able to afford the time to follow and/or take part in the substantive discussions. Consequently, we would expect representatives of firms and member bodies from advanced industrialized countries to outnumber and play a much greater role in international standardization than representatives from developing countries. Representatives from industry are likely to vastly outnumber other stakeholders for the same reason.[19]

Consensus does not imply unanimity, but is defined by ISO/IEC Guide 2 as 'the absence of sustained opposition,' that is, opposition for which a technical rationale is provided by one or more member bodies. Therefore, technical expertise is also required to have any significant impact on the specific content of a standard. Objections that are not supported by technical reasons can be (and empirically have been) overruled as impermissible, which also should limit the potential for intervention in the process by governments/states to extraordinary cases.[20]

Finally, successful participation requires cohesiveness among the participants from a given national member body: consensus procedures combine with national representation to create a strong norm of trying to accommodate all technical objections from member bodies. Yet, if a country is unable to speak with a single voice, it undermines the credibility of its stakeholders' claims that accommodating the preferences expressed by any of them constitutes an accommodation of the national member body's consensus preference. Effective participation thus requires effective mechanisms for preference aggregation at the domestic level.

Economic resources and technical expertise mainly differ as a function of a country's level of economic development. The quality and speed of information flows and the effectiveness of preference aggregation, by contrast, may differ even among advanced industrialized countries. We therefore focus on these aspects. If domestic institutions differ significantly in how well they convey information and aggregate preferences, then the resulting differences in institutional complementarity may explain the cross-national/regional differences in normative assessments of international standardization.

There is indeed a substantial difference between the domestic institutional structure for setting product standards in the USA and the institutional structure in Europe. In the USA, there are several dozen large general SDOs and several hundred specialized ones, including some 300 trade and industry associations and about 130 professional and scientific societies that develop product standards (for example, Toth 1996; Büthe and Witte 2004, pp. 27ff.). These autonomous SDOs are fiercely independent. They compete, often vigorously, not least because selling their own standards provides much of the revenue that sustains each of these SDOs as an organization. US product

standards-setting is thus characterized by extreme fragmentation, with no overarching institutional structure. In European countries, in contrast, there is usually a single national SDO, whose hierarchical organizational structure is similar to the structure of ISO and IEC. These basic institutional characteristics are common to all European countries, notwithstanding some differences among them (Tate 2001). In addition, there are two European regional standards-setting bodies, CEN and CENELEC, through which the European national bodies set regional standards (and thus may achieve a common position before standardization in ISO or IEC takes place). In summary, the US domestic institutions for product standardization are characterized by extreme fragmentation and competition among specialized standards-setters, whereas the decentralized technical standard-setting work in European countries is characterized by a high degree of coordination under the umbrella of a single domestic institution with a hierarchical structure, supplemented by European-wide private sector organizations of standardization.

These differences in institutional constellations have important implications for information flow and preference aggregation. The competing SDOs in the USA treat information that they may have about international standardization as a commercial asset: a private benefit that they share only with their members. While a given firm may be a member of several such organizations (directly or via its employees), the institutional fragmentation should be expected to impede efficient information flows about new standards developments at the international level – information which may originate from any number of different sources. Moreover, US firms frequently complain about the costliness of participating and paying fees in all the various domestic organizations that set standards for their industry (a cost they are often not willing to pay).

Hierarchical organizations, in contrast, have every incentive to build strong, institutionalized lines of communication between the different levels of the hierarchy. They should therefore be much better at disseminating information about new standards proposals to firms potentially affected by the new standard. Their entire institutional structure also is geared toward preference aggregation, since they exist to produce a single national standard. When standardization moves to the international level, this institutional structure can still be used to ensure that there will be a single national position that can be represented unambiguously at the international level, whereas institutional fragmentation provides no mechanism for speaking with a single voice internationally. This should put US firms at a persistent disadvantage vis-à-vis their European competitors, without giving them any way to prevent the shift of standardization to the international level since launching new standards projects in ISO and IEC is easy – and the increasing use of international standards for regulatory purposes by developing countries, including large ones like India and Brazil, effectively forces US firms to produce to these standards if they do not want to forego access to these fast-growing markets.

Institutional complementarity theory thus provides an explanation for the puzzle why US firms are much more ambiguous in their normative assessment of international standardization than European firms, even though both groups largely agree that the shift of standardization to the international level is occurring and will continue. But how do we know whether this explanation is right? Following King et al. (1994; see also Brady and Collier 2004), we look for additional 'observable implications' of the theory. We thus look beyond the puzzle that motivated our inquiry above to identify things that

we should find empirically if the logic of the theory holds, but have no reason to expect otherwise, that is, which cannot be derived from alternative theoretical approaches.

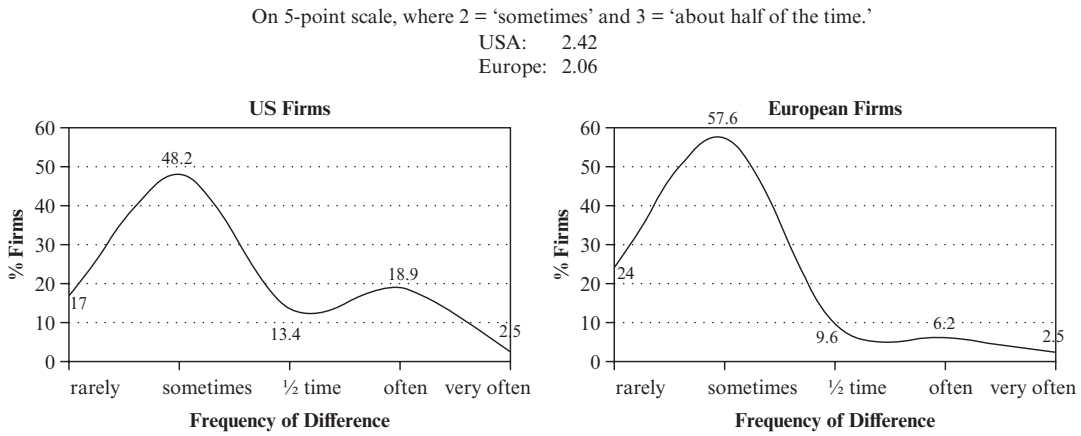
30.5 FURTHER OBSERVABLE IMPLICATIONS OF DOMESTIC INSTITUTIONAL DIFFERENCES FOR INTERNATIONAL STANDARDIZATION

To put our theoretical argument to systematic tests, we conducted a business survey among standards managers and experts in firms from five industries (chemicals, rubber and plastic products, medical devices, petroleum products, and iron and steel products) in the USA and four European countries (Germany, Spain, Sweden and the UK).[21] A response rate of 32 per cent, about twice as high as typical business surveys, yielded 1385 individual observations for quantitative (statistical) analysis.[22] Open-ended questions allowed respondents to provide additional free-text information for qualitative analysis.

Preliminarily, one might wonder whether US firms cannot simply reap the benefit of the large US market without having to get involved much in the international standardization process. It is conceivable that international standardization is simply the codification of current practice in the largest market or by the biggest multinational firms, which are still disproportionately American. This is what 'Realist' international relations scholars might expect. Alternatively, if Institutional Complementarity Theory is right, then even the initial proposals for new international standards should be closer to European firms' prior practice because the better fit between European domestic institutions and the international institution should make European firms better informed and more effective from the start of the international standardization process, when the scope of a new standard and its basic contours are defined in the first stage. So we asked firms to tell us how frequently the initial proposals for new ISO or IEC standards differ from their current practice – on a scale from 'rarely' to 'very often.' The responses are revealing. Not only are US firms not doing better, they are on average doing worse than European firms as shown in Figure 30.5, and the difference is statistically significant.

Given this baseline in favor of European firms, it would seem crucial for US firms (as well as European ones) to ensure that their technical preferences are taken into account when the initial proposal is modified during the standardization process before the final international standard is adopted and published. To discern what determines success in the international standardization process, we asked respondents: 'When you try [and] succeed, how important are the following reasons for being able to influence the technical specification of the proposed standard before it is finalized?' On both sides of the Atlantic, the great majority of firms considered being involved, and being involved early, important or even very important to their ability to influence the technical specification of a new or revised international standard (Table 30.2).

This was by far the most highly rated reason for success. In addition, the central importance of involvement was further corroborated by a statistical analysis of the frequency with which firms succeed in getting their technical preferences taken into account, which showed a high correlation with the frequency of involvement. Numerous



Note: *t* of Difference of Means test ($N = 1273$); 5.69***; *** statistically significant at $p < 0.01$.

Figure 30.5 Frequency of divergence of new standards proposals from current practice

responses to the open-ended questions suggested that this correlation was indicative of involvement causing success.

What, then, explains involvement? To get at this question, we conducted a statistical analysis (ordered logit) of firms' involvement in international standardization, which controlled for each firm's export orientation, the above-mentioned frequency of divergence between initial proposals for new international standards and the firm's current practice, the switching costs if the initial proposals were adopted without change, and previous participation of any of the firm's employees on a committee or working group of a SDO – each of which increased the likelihood of involvement in international standardization. We also controlled for firm size, although our findings indicated that, after controlling for the other factors, it has no effect on whether or how frequently a firm gets involved in international standardization, and for having European subsidiaries in the case of US firms, which makes US firms more like European firms.

Institutional Complementarity Theory suggests that, after taking all of these factors into account, European firms should be more involved in ISO and IEC standardization than US firms, in part because they have better and more timely information about international standards proposals. It also suggests generally that firms with more timely information should be more involved. Our statistical findings strongly support all of these hypotheses, as illustrated by the change in probabilities of firm involvement in Table 30.3. For instance, a European firm is almost 7 percent more likely to be 'often'

Table 30.2 Reasons for being able to influence ISO/IEC technical specification

	US Firms	European Firms
Involvement (early) important or very important	73%	79%

Note: $N = 1004$.

Table 30.3 Change in the probability of firm involvement in the technical specification of proposed international standards at a given level of frequency

	Rarely or Never	Sometimes	Half of the Time	Often	Very Often or Always
European firms (vis-a-vis US firms)	–11.5%***	–1.2%*	+2.4%***	+6.9%***	+3.3%***

Note: $N = 1167$. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 30.4 Frequency of use of different influence methods

	Frequency	US Firms	European Firms
We contact our representatives in Congress and ask them to take action on our behalf	rarely	63.8%	N/A
	sometimes	11.5%	
	often	1.5%	
We ask the Department of Commerce [Europe: our government agency/ ministry] . . . to take action on our behalf	rarely	66.7%	59.6%
	sometimes	8.5%	12.3%
	often	0.2%	1.6%
We ask [our national standards organization] to get involved on our behalf	rarely	64.6%	41.4%
	sometimes	10.3%	21.7%
	often	3.1%	16.0%

Note: Difference between the sum of percentages in each cell and 100 is the percentage of respondents who did not make a frequency-of-use selection. $N = 1011$ for Congress question; $N = 1385$ otherwise. 'ANSI' was specified for last statement in US survey.

involved in international standardization than an otherwise identical US firm, and European firms are 11.5 percent less likely than US firms to be rarely or never involved (for detailed results, see Büthe and Mattli 2011, chapter 7).

There may, of course, be alternative ways of influencing the technical content of an international standard. If governments intervened in the non-governmental international standards development process and were successful in doing so in proportion to state power, as 'Realists' suggest, then we should observe firms resorting quite often to asking the government for help – especially US firms, if their non-governmental domestic standards-setting institutions are less conducive to exerting influence internationally. So we asked firms how frequently they request intervention by their respective governments. As shown in the first two rows of Table 30.4, US firms resort to asking their members of Congress quite rarely and actually ask the Department of Commerce more rarely than European firms ask their respective government agencies/ministries. We thus find little support for governments serving as channels of influence.

Relatedly, the core argument of Institutional Complementarity Theory, namely that differences in domestic institutional structures lead to differences in institutional complementarities when it comes to international standardization, suggests that ANSI (the US member body of ISO) should be less effective than its European counterparts in allowing

its domestic firms to influence the technical specifications of a proposed standard. This yields another observable implication of the theory, namely that US firms should rarely ask ANSI for help. And indeed we find that US firms rely on ANSI much less frequently than European firms rely on their respective domestic – and non-governmental – SDO (last row of Table 30.4).

Finally, recall that international standardization is a multi-stage process, where the final stage involves approval and publication of the already finalized standard (see Figure 30.4). At each prior stage, the specificity increases, so that firms' ability to shape the technical details declines as the draft standard moves through the stages – which is why early involvement is so important. But to get involved, firms must know that a new international standard that affects them is being discussed in ISO or IEC, and Institutional Complementarity Theory suggests that European firms will tend to have this information at an earlier stage. So we asked firms about the stage of the standardization process at which they typically hear about such forthcoming standards. Their responses clearly indicate that, at each stage prior to the final stage, a greater share of European than US firms already knows about the forthcoming standard. More than 11 percent of European firms but less than 7 percent of US firms, for instance, typically hear about such a standard already during the preliminary planning stage. By the time of the public enquiry stage, which is the last stage during which firms can exert any influence over the technical specification, 83 percent of European firms but not even 70 percent of US firms know about it.

30.6 CONCLUSION

As a consequence of the globalization of product markets, international standards have become economically and politically ever more important as instruments of governance. Our analysis of international standardization as a political process has focused on Institutional Complementarity Theory, which draws our analytical attention to the structure and decision-making procedures of the domestic and international organizations in which institutionalized voluntary standardization takes place. It suggests theoretically, and our analysis has shown empirically, that power matters in international technical standardization and is unevenly distributed internationally. But rather than being simply derivative of the international distribution of the political and economic resources of states, influence in international standardization is largely a function of the differential fit between domestic rule-making institutions, on the one hand, and the pertinent organizations at the international level, on the other. Put another way, global governance involves institutions at multiple levels. Since structure and procedures of ISO or IEC require efficient information dissemination and effective aggregation of preferences, domestic (and regional) institutions that are geared toward fulfilling these functions allow economic interests from countries with such institutions to exert great influence in international standardization. Traditional state power is at best a poor substitute for greater institutional complementarity.

In closing, we want to emphasize four broader implications of these findings. First, power – unevenly distributed across countries – matters when technical standards for global markets are developed. Standard-setting in transnational expert organizations

such as ISO and IEC therefore should be analysed and understood as a political (not just as a technical) process. Second, the central importance of power makes international standard-setting in private (non-governmental) organizations analytically comparable to traditional international politics where states provide global governance. But global private governance also is distinctive. Institutions and institutional complementarities are a key source of power in private governance, whereas in traditional intergovernmental politics military and/or economic resources of states arguably determine global outcomes. Third, our analysis suggests broader insights for global governance: even as governance shifts from the domestic to the international level, domestic institutions can remain very important, and institutional analysis at multiple levels may be required to understand global outcomes. Finally, Institutional Complementarity Theory offers to the literature on multi-level governance an analytical framework for developing specific hypotheses about the interaction between political institutions at different levels of aggregation and thus a way to go beyond emphasizing the general importance of actors and institutions at multiple levels.

NOTES

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1. Unwritten rules may be considered to be nonetheless explicit (and thus a standard) if they have sufficient specificity and there is a widely shared, consistent understanding of what they entail. The rules of grammar and spelling of any language (and when and how they became standardized) are a most interesting example of such standards, but that example is beyond the scope of this chapter (see, for example, Weber 1976; de Swaan 1988, pp. 52–117; Laitin 1988; Vincent 1992; Fouse 2000; Poggeschi 2003).
2. Product standards are thus distinctive from 'management' process standards (such as ISO 9000- and ISO 14000-series standards (see Guler et al. 2002; Tamm Hallström 2004; Prakash and Potoski 2006), which specify aspects of the process used to produce certain outputs, rather than characteristics of the output itself.
3. Even if the individual consumer does not pay attention to the symbols printed on the box or stickers attached to the back of the appliance, through which the manufacturer seeks to convey the gas stove's compliance with this standard, the retail store who sells the consumer a gas stove that does not have such a common 'best practice' safety feature, or the certified technician who installs it, opens themself up to legal liability. Retailers and service professionals such as electricians and plumbers thus ensure the importance of product standards for household appliances and many other consumer products, even while ironically diminishing the need of the consumer to be attentive to standards intended to advance their safety (see, for example, Vogel 1990).
4. In practice, hybrid forms also exist, such as standards consortia and hybrid public-private bodies. See also Büthe and Witte (2004, pp. 32ff.) and Salter (1999).
5. Earlier concerns about the secretiveness of many standards-setting organizations and the resulting neglect of consumer interests (Nader 1965; Opala 1969) have largely subsided, though SDOs continue to differ in how transparent they are and to what extent real participation by non-commercial stakeholders is feasible.
6. As of January 2010, the ISO had produced more than 18 000 standards; the IEC more than 6000.

7. For companies concerned with maintaining a good reputation or stimulating brand loyalty, this is an especially important reason for using standards. Such companies may even explicitly advertise adherence to a specific standard as a marketing strategy.
8. An individual firm may also strategically set and disseminate standards in the early stages of the development of a new technology to capture a market, though this concern arises more prominently in market-driven standardization than in institutionalized standardization (for example, Grindley 1995).
9. Standardization brings not only benefits – by reducing diversity, it can stifle innovation – but on balance, economic historians consider standardization to have been overwhelmingly beneficial (for example, Glie 1972; Hawkins et al. 1995; Swann 2000; Russell 2007; Egyedi and Blind 2008; Yates and Murphy 2008). Moreover, product standards that yield health and safety benefits are generally credited with having contributed to the greatly increased life expectancy, especially in advanced industrialized countries.
10. The reasons for the increase in standards and regulations is beyond the scope of this chapter; see, for example, Grewal (2008), Vogel (1995, 2003) and Vogel (1996).
11. Foreign ski manufacturers had been excluded from the meetings of the committee that developed the standard. The standard was withdrawn during the preliminary consultation phase of a GATT Standards Code dispute, launched by the US and European governments on behalf of their ski manufacturers, but not until the 1986/87 ski sales season was effectively over; see Rappoport (1986a, 1986b), Rodger (1986) and Sykes (1995, pp. 76ff.); see also Lecraw (1987).
12. Alternatively, if international standards were for some extraneous reason more beneficial to European firms, the USA should be able to halt or even reverse the move to international standards (and we therefore should not see the expectation of a continuing trend toward international standardization in Figure 30.2).
13. D_1 or D_2 may be non-governmental domestic SDOs, but could also, for instance, be institutions for making (government) foreign economic policy, such as trade policy. I_0 might be the ISO for the realm of product standards; for the realm of trade policy, for instance, it may be the WTO.
14. Quote from ISO Statutes, Article 3.1.1; IEC membership is governed by Article 4 of the IEC Statutes, which requires national member bodies to be 'fully representative of national interests in the fields of activity of the [IEC].' A country's IEC and ISO member bodies may differ or be the same.
15. In addition, ISO has 47 'corresponding members' and 10 'subscriber members'; IEC has 19 'associate members' and 83 'affiliates.' These corresponding, associate, and so on members are mostly from developing or very small countries, which lack full SDOs at the domestic level. They have more limited participation rights in exchange for lower or no membership fees.
16. For many developing countries, the national ISO member bodies are governmental or hybrid public-private organizations.
17. ISO officially distinguishes a final 'publication' stage, but no further changes can occur after approval.
18. We assume that participants in international standardization pursue their self-interest strategically. For representatives of firms, most of which face intense competition in international markets, self-interest is primarily materially defined. Interviews and numerous responses to open-ended questions on our survey support this assumption.
19. OECD countries also staff the great majority of committee chairmanships and secretariats, which provide administrative support but also provide opportunities for agenda-setting.
20. In addition, ISO, IEC and their private sector participants jealously guard their non-governmental status.
21. The industries were selected to include both traditional and fast-changing, high-tech industries, all of which have a large number of export-oriented firms in all five countries. Moreover 66 percent of US firms and 64 percent of European firms indicated that standards affect their export opportunities, suggesting well-balanced groups of actual respondents.
22. Not all survey participants answered all questions.

REFERENCES

ASA (American Standards Association) (1965), 'Through history with standards: an illustrated textbook for young and old', reprinted in Rowen Glie (ed.) (1972), *Speaking of Standards*, Boston: Cahner Books, pp. 37–71.

Auld, Graeme, Steven Bernstein and Benjamin Cashore (2008), 'The new corporate social responsibility', *Annual Review of Environment and Resources*, **33**, 413–35.

Bartley, Tim (2003), 'Certifying forests and factories: states, social movements, and the rise of private regulation in the apparel and forest products field', *Politics and Society*, **31** (3), 433–64.

Bignami, Francesca E. (2005), 'Transgovernmental networks vs. democracy: the case of the European Information Privacy Network', *Michigan Journal of International Law*, **26** (3), 807–68.
Brady, Henry E. and David Collier (eds) (2004), *Rethinking Social Inquiry: Diverse Tools, Shared Standards*, Lanham, MD: Roman and Littlefield.
Brunsson, Nils and Bengt Jacobsson (2000), 'Following standards', in Nils Brunsson and Bengt Jacobsson (eds), *A World of Standards*, New York: Oxford University Press, pp. 127–37.
Büthe, Tim (2008a), 'Power plays: why the plug for an international electrical outlet failed', Paper presented at the Annual Meeting of the International Studies Association, San Francisco, March 2008.
Büthe, Tim (2008b), 'The globalization of health and safety standards: delegation of regulatory authority in the SPS-Agreement of 1994 agreement establishing the World Trade Organization', *Law and Contemporary Problems*, **71** (1), 219–55.
Büthe, Tim (2010), 'The Power of norms; the norms of power: who governs international electrical and electronic technology?', in Deborah D. Avant, Martha Finnemore and Susan K. Sell (eds), *Who Governs the Globe?*, New York: Cambridge University Press, pp. 292–332.
Büthe, Tim and Walter Mattli (2010), 'International standards-setting bodies', in David Coen, Graham Wilson and Wyn Grant Oxford (eds), *Handbook on Business and Government*, New York: Oxford University Press, pp. 440–71.
Büthe, Tim and Walter Mattli (2011), *Global Private Governance: The Politics of Rule-making for Product and Financial Markets*, Princeton, NJ: Princeton University Press.
Büthe, Tim and Jan Martin Witte (2004), *Product Standards in Transatlantic Trade and Investment: Domestic and International Practices and Institutions*, Washington, DC: American Institute for Contemporary German Studies.
Cashore, Benjamin, Graeme Auld and Deanna Newsom (2004), *Governing Through Markets: Forest Certification and the Emergence of Non-state Authority*, New Haven, CT: Yale University Press.
Cheit, Ross E. (1990), *Setting Safety Standards: Regulation in the Public and Private Sectors*, Berkeley, CA: University of California Press.
de Swaan, Abram (1988), *In Care of the State: Health Care, Education and Welfare in Europe and the USA in the Modern Era*, New York: Oxford University Press.
Drezner, Daniel W. (2004), 'The global governance of the internet: bringing the state back', *Political Science Quarterly*, **119** (3), 477–98.
Drezner, Daniel W. (2007), *All Politics Is Global: Explaining International Regulatory Regimes*, Princeton, NJ: Princeton University Press.
Egan, Michelle (2001), *Constructing a European Market: Standards, Regulation, and Governance*, New York: Oxford University Press.
Egyedi, Tineke M. and Knut Blind (eds) (2008), *The Dynamics of Standards*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing.
Farrell, Henry (2003), 'Constructing the international foundations of e-commerce: the EU-US safe harbor arrangement', *International Organization*, **57** (2), 277–306.
Fouse, Gary C. (2000), *The Languages of the Former Soviet Union: Their History and Development*, Lanham, MD: University Press of America.
Glie, Rowen (ed.) (1972), *Speaking of Standards*, Boston, MA: Cahner Books.
Grewal, David Singh (2008), *Network Power: The Social Dynamics of Globalization*, New Haven, CT: Yale University Press.
Grieco, Joseph M. (1990), *Cooperation Among Nations: Europe, America, and Non-tariff Barriers to Trade*, Ithaca, NY: Cornell University Press.
Grindley, Peter (1995), *Standards, Strategy, and Policy: Cases and Stories*, Oxford: Oxford University Press.
Guler, Isin, Mauro F. Guillén and John Muir MacPherson (2002), 'Global competition, institutions and the diffusion of organization practices: the international spread of ISO 9000 quality certificates', *Administrative Science Quarterly*, **47** (2), 207–32.
Hall, Peter A. and David Soskice (eds) (2001), *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, New York: Oxford University Press.
Hamilton, Robert W. (1978), 'The role of nongovernmental standards in the development of mandatory federal standards affecting safety or health', *Texas Law Review*, **56** (8), 1329–484.
Hawkins, Richard W., Robin Mansell and Jim Skea (eds) (1995), *Standards, Innovation and Competitiveness: The Politics and Economics of Standards in Natural and Technical Environments*, Aldershot, UK and Brooksfield, VT, USA: Edward Elgar Publishing.
Hemenway, David (1975), *Industrywide Voluntary Product Standards*, Cambridge, MA: Ballinger Publishing.
Holzinger, Katharin (2003), 'Common goods, matrix games and institutional response', *European Journal of International Relations*, **9** (2), 173–212.
Höpner, Martin (2005), 'What connects industrial relations with corporate governance? Explaining Complementarity', *Socio-Economic Review*, **3** (2), May, 331–58.

Hummels, David (2007), 'Transportation costs and international trade in the second era of globalization', *Journal of Economic Perspectives*, **21** (3), 131–54.
King, Gary, Robert O. Keohane and Sidney Verba (1994), *Designing Social Inquiry: Scientific Inference in Qualitative Research*, Princeton, NJ: Princeton University Press.
Krasner, Stephen D. (1991), 'Global communications and national power: life on the Pareto frontier', *World Politics*, **43** (3), 336–66.
Laitin, David D. (1988), 'Language games', *Comparative Politics*, **20** (3), 289–302.
Lecraw, Donald J. (1987), 'Japanese standards: a barrier to trade?', in H. Landis Gabel (ed.) *Product Standardization and Competitive Strategy*, Amsterdam: Elsevier Science Publishers, pp. 29–46.
Levinson, Mark (2006), *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger*, Princeton, NJ: Princeton University Press.
Liu, Long, Uvo Hoelscher and Torsten Gruchmann (2005), 'Symbol comprehension in different countries: experience gained from medical devices', in *Workshop-Proceedings der 5. fachübergreifenden Konferenz Mensch und Computer*, Wien: Österreichische Computer Gesellschaft, pp. 81–7.
Loya, Thomas and John Boli (1999), 'Standardization in the world polity: technical rationality over power', in John Boli and George Thomas (eds), *Constructing World Culture: International Non-governmental Organizations Since 1875*, Stanford, CA: Stanford University Press, pp. 169–97.
Mallett, Robert L. (1998–99), 'Why standards matter', *Issues in Science and Technology*, **15** (2), 63–6.
Mattli, Walter (2003), 'Public and private governance in setting international standards', in Miles Kahler and David A. Lake (eds), *Governance in a Global Economy: Political Authority in Transition*, Princeton, NJ: Princeton University Press, pp. 197–229.
Mattli, Walter and Tim Büthe (2003), 'Setting international standards: technological rationality or primacy of power?', *World Politics*, **56** (1), 1–42.
Mattli, Walter and Tim Büthe (2005a), 'Accountability in accounting? The politics of private rule-making in the public interest', *Governance*, **18** (3), 399–429.
Mattli, Walter and Tim Büthe (2005b), 'Global private governance: lessons from a national model of setting standards in accounting', *Law and Contemporary Problems*, **68** (3/4), 225–62.
Meidinger, Errol, Chris Elliott and Gerhard Oesten (eds.) (2003), *Social and Political Dimensions of Forest Certification*, Remagen-Oberwinter: Forstbuch Verlag.
Mosley, Layna (2010), *Working Globally? Multinational Production and Labor Rights*, New York: Cambridge University Press.
Nader, Ralph (1965), *Unsafe At Any Speed: The Designed-in Dangers of the American Automobile*, New York: Grossman.
Newman, Abraham L. (2008), 'Building transnational civil liberties: transgovernmental entrepreneurs and the European Data Privacy Directive', *International Organization*, **62** (1), 103–30.
Newman, Abraham L. and David Bach (2004), 'Self-regulatory trajectories in the shadow of public power: resolving digital dilemmas in Europe and the United States', *Governance*, **17** (3), 387–413.
Nölke, Andreas (2005), 'Introduction to the Special Issue: the globalization of accounting standards', *Business and Politics*, **7** (3), 1–7.
Oatley, Thomas and Robert Nabors (1998), 'Redistributive cooperation: market failure, wealth transfers, and the Basle Accord', *International Organization*, **52** (1), 35–54.
Opala (1969), 'The anatomy of private standards-making process: the operating procedures of the USA Standards Institute', *Oklahoma Law Review*, **22** (1), 45–68.
Poggeschi, Giovanni (2003), 'Language rights and duties in domestic and European courts', *Journal of European Integration*, **25** (3), 207–24.
Prakash, Aseem and Matthew Potoski (2006), *The Voluntary Environmentalists: Green Clubs, ISO 14001, and Voluntary Environmental Regulations*, New York: Cambridge University Press.
Raeburn, Anthony (2006), 'IEC history IEC Central Secretariat, Geneva: Overview, 1906–1949 and 1950–2006', available at http://www.iec.ch/about/history/history_entry.htm (accessed 15 July 2008).
Rappoport, Carla (1986a), 'Japanese ski makers freeze out the opposition', *Financial Times*, 4 September, p. 1.
Rappoport, Carla (1986b), 'Skiing dispute goes to GATT', *Financial Times*, 14 September, p. 8.
Ray, Edward John (1987), 'Changing patterns of protectionism: the fall of tariffs and the rise in non-tariff barriers', *Northwestern Journal of International Law and Business*, **8** (2), 285–327.
Reeves, Douglas B. (2004), *Accountability for Learning: How Teachers and School Leaders Can Take Charge*, Alexandria, VA: Association for Supervision and Curriculum Development.
Rodger, Ian (1986), 'Japanese in flurry over ski standards protest', *Financial Times*, 23 September, p. 6.
Russell, Andrew L. (2007), 'Industrial legislatures: consensus standardization in the second and third industrial revolutions', PhD dissertation, History, Johns Hopkins University, Baltimore.
Salter, Liora (1988), *Mandated Science: Science and Scientists in the Making of Standards*, Dordrecht: Kluwer Academic Publishers.

Salter, Liora (1999), 'The standards regime for communication and information technologies', in A. Claire Cutler, Virginia Haufler and Tony Porter (eds), *Private Authority and International Affairs*, Albany, NY: State University of New York Press, pp. 97–127.
Schofer, Evan (1999), 'Science associations in the international sphere, 1875–1990: the rationalization of science and the scientization of society', in John Boli and George Thomas (eds), *Constructing World Culture: International Non-governmental Organizations since 1875*, Stanford, CA: Stanford University Press, pp. 249–66.
Schaffer, Gregory C. (2000), 'Globalization and social protection: the impact of EU and international rules in the ratcheting up of US data privacy standards', *Yale Journal Of International Law*, **25** (1), Winter, 1–88.
Singer, David Andrew (2007), *Regulating Capital: Setting Standards for the International Financial System*, Ithaca, NY: Cornell University Press.
Stewart, David W. and Henry A. Spille (1998), *Diploma Mills: Degrees of Fraud*, New York: Macmillan.
Swann, G M. Peter (2000), *The Economics of Standardization: Final Report for Standards and Technical Regulations Directorate, Department of Trade and Industry*, Manchester: Manchester Business School Report.
Sykes, Alan (1995), *Product Standards for Internationally Integrated Goods Markets*, Washington, DC: Brookings Institution.
Tamm Hallström, Kristina (2004), *Organizing International Standardization: ISO and the IASC in Quest of Authority*, New York: Oxford University Press.
Tate, Jay (2001) 'National varieties of standardization', in Peter A. Hall and David Soskice (eds), *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, New York: Oxford University Press, pp. 442–73.
Toth, Robert B. (ed.) (1996), *Standards Activities of Organizations in the United States*, Washington, DC: US Government Printing Office for the US Deptartment of Commerce, Technology Administration, National Institute of Standards and Technology.
Verman, Lal C. (1973), *Standardization: A New Discipline*, Hamdon, CT: Archon Books.
Véron, Nicolas, Matthieu Autret and Alfred Galichon (2006), *Smoke & Mirrors, Inc.: Accounting for Capitalism*, Ithaca, NY: Cornell University Press.
Vincent, Bernard (1992), *Das Jahr der Wunder: Spanien 1492, Die Vertreibung der Juden und Mauren und die Einführung der Grammatik*, translated by Una Pfau, Berlin: Wagenbach Verlag.
Vogel, David (1990), 'When consumers oppose consumer protection: the politics of Regulatory Backlash', *Journal of Public Policy*, **10** (4), 449–70.
Vogel, David (1995), *Trading Up: Consumer and Environmental Regulation in a Global Economy*, Cambridge, MA: Harvard University Press.
Vogel, David (2003), 'The hare and the tortoise revisited: the new politics of consumer and environmental regulation in Europe', *British Journal of Political Science*, **33** (4), 557–80.
Vogel, David (2005), *The Market for Virtue: The Potential and Limits of Corporate Social Responsibility*, Washington, DC: Brookings Institution.
Vogel, Steven K. (1996), *Freer Markets, More Rules: Regulatory Reform in Advanced Industrial Countries*, Ithaca, NY: Cornell University Press.
Weber, Eugen J. (1976), *Peasants Into Frenchmen: The Modernization of Rural France*, *1870–1914*, Stanford, CA: Stanford University Press.
WTO (World Trade Organization) (1998), *WTO Training Package, Module 3, Goods: Rules on Non-trade Measures*, Geneva: WTO Secretariat.
Yates, JoAnne and Craig N. Murphy (2008), 'Charles Le Maistre: entrepreneur in international standardization', *Entreprises et Histoire*, **51** June, 10–27.