

The Effectiveness of Regulatory Disclosure Policies

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ABSTRACT

Regulatory transparency—mandatory disclosure of information by private or public institutions with a regulatory intent—has become an important frontier of government innovation. This paper assesses the effectiveness of such transparency systems by examining the design and impact of financial disclosure, nutritional labeling, workplace hazard communication, and five other diverse systems in the United States. We argue that transparency policies are effective only when the information they produce becomes “embedded” in the everyday decision-making routines of information users and information disclosers. This double-sided embeddedness is the most important condition for transparency systems’ effectiveness. Based on detailed case analyses, we evaluate the user and discloser embeddedness of the eight major transparency policies. We then draw on a comprehensive inventory of prior studies of regulatory effectiveness to assess whether predictions about effectiveness based on characteristics of embeddedness are consistent with those evaluations. © 2006 by the Association for Public Policy Analysis and Management

INTRODUCTION

Regulation by transparency has become an important frontier of regulatory innovation. In the United States, the European Union, and developing countries, governments have designed disclosure systems to reduce financial, health, and safety risks; minimize corruption; protect civil rights; and improve public services. Consider the central role of transparency in responses to recent crises in the United States. In 1999, when an expert panel reported that medical mistakes killed at least 44,000 patients a year; recommendations for reforms focused not on mandatory standards or on market mechanisms, but on new transparency systems disclosing serious medical errors to the public. In 2000, when investigators found that the combination of tire failures and the top-heavy designs of popular sport utility vehicles triggered rollover accidents that killed hundreds of motorists, Congress required that the public be informed of the likelihood that each new model would roll over. When accounting scandals brought down companies like Enron and WorldCom in 2001 and 2002, Congress required that corporate finances be made more transparent to investors and analysts.

“Regulatory transparency” is the mandatory disclosure of structured factual information by private or public institutions in order to advance a clear regulatory goal.

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In the United States, nutritional labeling, public school report cards, restaurant grading systems, campaign finance disclosure, toxic pollution reporting, auto safety and fuel economy ratings, and corporate financial reporting are among scores of transparency systems created by federal and state legislators. Internationally, infectious disease reporting, food and tobacco labeling, and multi-national financial accounting are some of the disclosure systems designed to advance international regulatory goals.

The same policy justification underlies all of these systems. Government intervention that requires the disclosure of information by companies, government agencies, and other organizations can create economic and political incentives that advance specific public objectives. The rationale for government intervention starts with the premise that information asymmetries in market or political processes obstruct progress toward specific policy objectives. Asymmetries arise because manufacturers, service providers, and government agencies have exclusive access to information about products and practices and they often have compelling reasons to keep that information confidential. Private parties—journalists, representatives of consumer groups, or business competitors—can ferret out some of these secrets and make them widely available in news stories, rating systems, and advertising. But such efforts frequently fail to fully correct information asymmetries. When participants cannot themselves restore imbalances and when public disclosure of information can further a compelling policy objective, governments have increasingly chosen to intervene.

This article assesses the effectiveness of regulatory transparency systems. We begin with a framework for analyzing how new information can result in behavior changes by users that in turn lead to changes in the actions of disclosers through the operation of an “action cycle.” Regulatory transparency systems seek to introduce information into existing decision-making processes of buyers and sellers, community residents and institutions, voters and candidates, or other participants in markets or collective action. We characterize that decision-making as an action cycle involving *information users* and *information disclosers*. Transparency policies are effective only when information becomes embedded in this action cycle, becoming an intrinsic part of the decision-making routines of users and disclosers.

Based on detailed case analyses, we evaluate the user- and discloser-embeddedness of eight major transparency policies. We then draw on a comprehensive inventory of previous studies to assess whether predictions about effectiveness based on characteristics of embeddedness are consistent with those program evaluations. We conclude with a discussion of implications for policy makers and public managers seeking to use regulatory transparency policies in the future.

FRAMEWORK FOR ANALYZING TRANSPARENCY POLICY EFFECTIVENESS

Under regulatory transparency policies, government collects information from public and private organizations or from individuals about their organizational processes, services, or products and transmits that information to the general public to advance specific public priorities. Regulatory transparency therefore differs from related policies such as warnings and other forms of “signposting” in that it does not simply require the provision of notice about potential hazards to users; it requires the provision of factual information and seeks to change users’ and / or disclosers’ behaviors in specific ways (Zeckhauser & Marks, 1996; Magat & Viscusi, 1992). It differs from government-mandated “sunshine laws” such as the Freedom of Information Act that impose transparency upon decision-making processes but do not seek specific regulatory aims (O’Reilly, 2000).

Regulatory transparency also differs from, but overlaps with, organizational report cards (Weiss & Gruber, 1984; Gormley & Weimer, 1999). Gormley and Weimer (p. 3) define organizational report cards as “a regular effort by an organization to collect data on two or more other organizations, transform the data into information relevant to assessing performance, and transmit the information to some audience external to the organizations themselves.” Some (but not all) regulatory transparency systems—such as school report cards—are also organizational report cards. Mandatory performance-related disclosure systems that do not have clear regulatory objectives are not, in our account, transparency systems.¹ In addition, report cards focus on organizational-level performance, while our definition of regulatory transparency also includes the provision of information on products and services (for example, nutritional labels on food products and rollover ratings on automobiles) and individual behavior (for example, registries of convicted sexual offenders and records of contributions to political campaigns and candidates).

Transparency Policies and the Action Cycle

Proponents of transparency contend that making information widely available in the public domain will inherently generate social benefits. In practice, however, information cannot be separated from its social context (Kahneman, Slovic, & Tversky, 1982). Individuals and organizations may simply ignore information that is costly to acquire or that lacks salience for decisions. They may also inadvertently use information in ways that fail to advance their own aims due to difficulties in processing new information or other sources of misunderstanding (Kahneman & Tversky, 2000). Providing usable information that can reduce risks and improve services is, therefore, anything but automatic. Whether and how new information is used to further public objectives depends upon its incorporation into complex chains of comprehension, action, and response.

In regulatory transparency systems, chains of action and response principally involve those who potentially use information produced by transparency policies to improve their choices; and those who are compelled by public policies to provide that information and whose behavior policy makers hope to change. These information *users* and *disclosers* are typically connected in a general action cycle with multiple steps. A transparency policy compels corporations, government agencies, or other organizations to provide information about their practices or products to the public at large. If this information is useful to individual users or groups they may incorporate it into their ordinary decision-making processes in ways that alter their actions. The original disclosers of information, in turn, may recognize in the changed choices of information users opportunities to defend or advance their interests.

The action cycle relates to research on the impact of organizational report cards (Gormley & Weimer, 1999) as well as related research on regulation through information disclosure (for example, Sunstein, 1993; Kleindorfer & Orts, 1998; Mitchell, 1998; Tietenberg, 1998; Sage, 1999). Gormley and Weimer focus on the validity of report card metrics and the accessibility of that information to users. Their evaluative criteria pertain to the utility of report cards to users (based upon characteris-

¹The mandatory nature of regulatory transparency policies also delineate it from voluntary systems evaluated in that literature. Although voluntary disclosure systems share some characteristics, the disparate incentives for parties to self-disclose under voluntary systems create different dynamics from those analyzed here.

tics such as relevance and comprehensibility) and disclosers (particularly regarding report card functionality). By contrast, our approach focuses on users and disclosers (rather than information itself) and how disclosed information and resulting behavioral responses fit into their decision-making processes. We therefore place a greater emphasis on the context—for example, what does the user want, what are his/her choices and options, what are the costs of gaining the information—than upon the construction of the report card *per se*.

User and Discloser Embeddedness

User embeddedness: Because of limited time and cognitive energy, information users acting rationally to advance their various, usually self-interested, ends may not seek out all of the information necessary to make optimal decisions. Instead, they seek information to make decisions that are good enough, using time-tested rules of thumb or “satisficing” behavior (Simon, 1997; Gigerenzer & Selten, 2001). Only information that penetrates these sometimes severe economies of decision-making affects the calculations and actions of information users. Transparency systems alter decisions only when they take into account these demanding constraints by providing pertinent information that enables users to substantially improve their decisions with acceptable costs. When new information becomes part of users’ decision-making routines despite the challenges of bounded rationality, we say that it becomes *embedded* in user decisions.

Discloser embeddedness: Transparency systems, like other kinds of economic and social regulation, aim to change the practices of targeted organizations in order to achieve specified policy aims. Standards-based regulatory systems send unambiguous signals to regulated parties concerning whether, when, and how to change their practices. Although market-based systems using taxes, subsidies, or trading regimes provide greater latitude in the *responses* chosen by regulated organizations, those systems also send unambiguous signals (for example, under SO₂ trading, utilities must reduce emissions—whether by investing in scrubbers or purchasing “rights to pollute” from other utilities—to specified levels set by the EPA). Transparency systems, by contrast, do not specify whether, when, or how organizations should change practices. Instead, they rely on responses to new information by users whose subsequent actions create market or political incentives for disclosers. When information produced by transparency systems causes users to systematically incorporate new responses into their decision making that in turn change disclosers’ decision calculations, we say that new information has become *embedded in user and discloser decision-making processes*. Highly effective transparency policies, then, are doubly embedded. Though the context of discloser decisions differs from that of users, they can be understood using analytic concepts that parallel our account of user embeddedness.

CASE SELECTION

In order to identify common features of regulatory transparency systems that affect their embeddedness and effectiveness, we analyze eight systems that vary widely in their regulatory objectives. These cases do not constitute a random sample. Out of all of the policies that fit our specific definition of regulatory transparency, we chose a set of policies that was relatively mature, distributed across substantive issue areas, featured good empirical studies, and varied in effectiveness outcomes. Evaluating the resulting literature was difficult given the variation across policy

studies in methodology, empirical rigor, and comprehensiveness (that is, the scope of policy outcomes studied). Because of this variation, we could not undertake a meta-analysis. Instead, our review illustrates and refines our theory of embeddedness. This effort is a first step in the development of an empirically testable theory of the effectiveness of transparency regulations. We do not attempt to verify or disprove a mature theory. This step in theory development is necessary to lay the ground for other evaluations of individual transparency systems as well as additional comparative analyses.

The eight policies are:

- *Corporate financial disclosure*: Initially adopted in the 1933 and 1934 Securities and Exchange Acts, this system requires detailed financial disclosure in order to protect investors from hidden risks and to increase capital market pressure for responsible corporate governance.
- *Restaurant hygiene quality cards*: By requiring restaurants to post in their front windows government-determined letter grades reflecting health inspection findings, this 1997 Los Angeles County system (also used in St. Louis and North Carolina) seeks to reduce public health risks related to restaurant hygiene.
- *Mortgage lending reporting*: The 1975 Home Mortgage Disclosure Act (HMDA) requires banks to disclose information on mortgage lending practices by race, gender, and income level in order to reduce discrimination in lending.
- *Nutritional labeling*: The federal nutritional labeling law, enacted in 1990, seeks to reduce heart disease, cancer, and other chronic diseases both by changing shoppers' habits and by encouraging companies to market healthier products.
- *Toxics release reporting*: The federal Toxics Release Inventory (TRI) of 1986 requires manufacturers to disclose annually how many pounds of toxic chemicals they release in air, water, or land in order to spur reductions of these emissions.
- *Workplace hazards disclosure*: This 1983 OSHA standard requires chemical manufacturers and employers to disclose risks to manufacturer users and workers to reduce dangerous exposures and encourage substitution to less hazardous chemicals.
- *Patient safety disclosure in health care*: Two states—New York and Pennsylvania—adopted hospital and physician report cards in the 1990s as a means of reducing medical errors.
- *Workers notification of plant closing*: This 1988 federal law requires employers to provide notice of impending plant closures to affected workers and communities in order to improve the reemployment prospects of displaced workers and economic recovery of affected communities.

Table 1 provides a brief description of each policy, its objective, the nature of information disclosed, and the primary disclosers and users.

INFORMATION EMBEDDEDNESS AND USER DECISIONS

Central Elements of User Embeddedness

User embeddedness describes the degree to which information that is mandated in a disclosure system is integrated into the decision-making processes of a policy's intended users. We posit that three factors influence the likelihood that information

Table 1. Overview of eight transparency policies.

Disclosure System	Initial Enactment	Public Policy Objective	Information Disclosed	Primary Disclosers	Primary Users
Corporate finances	1933, 1934	Reduce investor risks	Corporate financial information	Public companies	Investors and analysts
Restaurant hygiene	1997	Reduce public health risk	Inspection-based hygiene grades	Restaurants	Consumers
Mortgage lending	1975	Reduce lending discrimination	Demographic lending patterns	Banks	Community orgs., regulators
Nutritional labeling	1990	Reduce risks of chronic disease	Nutrients in most processed foods	Food producers	Consumers
Toxic releases	1986	Reduce toxic pollution	Factory toxic releases	Manufacturers	Regulators, advocacy orgs.
Workplace hazards	1983	Reduce hazards exposure	Information on hazardous chemicals	Manufacturers, employers	Workers and employers
Patient safety	1990 (NY), 1992 (PA)	Improve surgery performance	Risk-adjusted mortality rates, etc.	Hospitals	Patients and health care purchasers
Plant closing notification	1988	Lower employee dislocation costs	Large scale termination/facility closings	Large companies	Workers and communities

will become embedded in users' decision-making: the information's perceived value in achieving users' goals; its compatibility with decision-making routines; and its comprehensibility.²

Relevance of information to users' decisions: Many transparency policies provide facts that can substantially reduce health and safety risks or otherwise improve important choices. Nutritional labeling, patient safety disclosure, and restaurant hygiene rankings, for example, enable consumers to better act on existing preferences for healthy food, safe medical procedures, and clean restaurants. However, if consumers do not believe there is anything they need to know about nutrition, auto safety, or restaurant food safety, or believe they have few real choices, they are likely to ignore new information.³

Compatibility with user decision-making processes: For information to affect user decisions, it must be provided in a useful format, a timely manner, and in a location where users can find it. Format relates to the manner of information presentation—is it provided as detailed “raw data,” is it summarized at some more general level (or by third-party intermediaries), or does the government collapse information into simplified ratings, such as the five-star auto rollover rating system?

Availability of information at a time and place where users are accustomed to making decisions also increases chances that information will become embedded in routines (for example, fuel economy ratings on new car stickers are more accessible than rollover ratings on a government Web site). When choice and action coincide, information at that time and place is vital. When choice occurs in advance of action, information needs to be available prior to final commitments, for example, well in advance of home purchase closings or when employment contracts are executed.

Comprehensibility of information to users' decisions: Even if valuable and compatible with users' routines, information is unlikely to become embedded in everyday choices unless it can be readily understood (see, for example, Kristal, Levy, Patterson, Li, & White, 1998, for nutritional labels). Comprehensibility is a product of the congruence of the character of new information with the ability of users to take advantage of it. Here again, social context is critical. Incongruities in vocabulary, math skills, or interpretations of risk information can reduce the likelihood that information will become embedded in choices (for example, Kolp, Sattler, Blayney, & Sherwood, 1993, for workplace hazards). Research suggests that people have difficulty linking low probability risks with everyday decisions such as labor market or product choices (Viscusi & Magat, 1987; Viscusi & Moore, 1990; Hammit & Graham, 1999).

Cost of information collection: Acquiring and processing new information can be costly, although recent advances in information technology have reduced such costs substantially in some situations. Users may be more willing to invest time and effort in integrating new information into their choices when they perceive significant gain (Kleindorfer & Orts, 1998). Investors making important financial decisions, for example, may be willing to seek information about corporate financial risks even if

² The minimum number of users required for a policy to become embedded varies. Under systems operating through market mechanisms (for example, financial disclosure), information acting on the marginal user (investors) may be sufficient to elicit discloser responses. Transparency systems that operate via user actions in political realms may require a greater percentage of all users to tip the behavior of disclosers (for example, under the Home Mortgage Disclosure Act where a community or its representatives must be mobilized).

³ We assume that underlying preferences of users are not altered by most transparency systems. There are cases, however, where intensive education, training, or widely publicized crises change preferences, and an accompanying transparency system can help users act on those modified preferences.

that means paying experts or wading through technical data. In general, though, if users must incur substantial costs in terms of either time or material resources to acquire information, they are unlikely to embed that information into their everyday choices (Weil, 2002).

Role of user intermediaries: Under several of the regulatory transparency policies we review—corporate financial disclosure, mortgage lending disclosure, toxic release reporting, and worker notification of plant closing—third-party intermediaries act as agents for individual users. Intermediaries can help collect and interpret information, thereby reducing its cost. If systems disclose information in technical formats, parties may simplify it. For example, environmental groups use disclosed government data concerning toxic pollution to create factory rankings and risk profiles that are electronically searchable by zip code. Third parties may also help package or simplify otherwise complex data, for example by enabling comparison between disclosers.

Evaluation of User Embeddedness

Table 2 evaluates the degree of user embeddedness for the eight transparency policies given the above components that drive user embeddedness. Two of the eight policies produce information that becomes highly embedded in user decisions: corporate financial disclosure and restaurant hygiene grades. In both cases, the information is highly relevant to users (for example, financial information provides potential investors with the data necessary to assess risk and return), is provided at the right time, place, and location (for example, restaurant ratings are available in the window of the restaurant using a simple, graded format) is provided in a way that is readily understood and at relatively low cost. Note that in one of these cases—financial disclosure—third parties (investment institutions) play a key role as intermediaries.⁴

Information is moderately embedded in the nutritional labeling and mortgage lending disclosure for differing reasons. Nutritional labels provide information to consumers at the right time and place and at a low cost. However, many shoppers have a difficult time using that information to improve food choices. In the case of mortgage lending, few applicants seek data on bank lending practices by demographic characteristics when searching for mortgages. However, community organizations that champion access to home credit actively use the data to evaluate the lending practices of banks and present their findings to federal regulators who use fair lending as one criterion in their approval of bank mergers.

Finally, a number of the policies—toxic release reporting, workplace hazard communication, patient safety disclosure, and worker notification of plant closing—have not become embedded into most users' decisions. For example, information on factories' toxic releases is seldom available to home buyers or renters at the time and place where it might have its greatest impact on behavior, at the time of searching for a home to purchase or an apartment to rent. A major problem of workplace hazards disclosure is that information is provided to workers in a highly technical format and after they have already made employment decisions. Unions or other agents do not provide, or are not present in most workplaces to provide, simplified

⁴ The literature also indicates that socio-economic and educational factors affect user embeddedness in regard to all three factors mentioned above. Education and income seem to be particularly important in affecting embeddedness across users for nutritional labeling (Derby & Levy, 2001; Mathios, 2000), workplace hazards (Kolp, Sattler, Blayney, & Sherwood, 1993), and patient safety (Mukamel, Weimer, Zwanziger, Huang Gorthy, & Mushlin, 2004).

Table 2. User embeddedness.

Disclosure System	Relevance	Compatibility: Format, Timeliness, & Location	Comprehensibility	Information Cost	Embeddedness
Corporate finances	High: investment risk	Detailed & disaggregated; updated frequently; Web and print reports	Complex data, relies on intermediaries	Moderate cost to obtain, high cost to process	High
Restaurant hygiene	High: customer health risk	Letter grades (A-C); updated frequently; posted at point of purchase	Data easily interpreted	Low cost to obtain, process	High
Mortgage lending	Low: applicants High: advocates	Disaggregated lending data; updated annually; Web and print reports	Complex data, relies on intermediaries	Moderate cost to obtain, high cost to process	Moderate to high
Nutritional labeling	High: chronic disease risks	Simplified; infrequently updated; available at point of purchase	Data, vocabulary complex	Low cost to obtain, moderate cost to process	Moderate; depends on education level
Toxic releases	Low: individuals Moderate: advocates	Detailed & disaggregated; updated annually; Web and print reports	Complex data, relies on intermediaries	Moderate cost to obtain, high cost to process	Low
Workplace hazards	Moderate: manufacturer and employee risk	Detailed & disaggregated; updated infrequently; Web and print reports (available only at worksite)	Complex data, relies on intermediaries	Moderate cost to obtain, high cost to process	Low: workers Moderate: firms
Patient safety	High: medical risk	Mortality rates; updated annually; Web and print reports	Complex data	Moderate to obtain, high cost to process	Low: patients Low: physicians
Plant closing notification	High: economic risk	Plant closure, layoff notice; late notification; public report / announcement	Simple information	Low cost to obtain, process	Low

metrics or advanced information about hazard conditions. Furthermore, many workers have very constrained workplace choices (exit) or limited abilities to translate concerns about exposure into changes in workplace practices or human resource policies (voice). Compounding these difficulties, cognitive biases may affect workers' ability to act on the information about low-level risks (Hammit & Graham, 1999).

INFORMATION EMBEDDEDNESS AND DISCLOSER DECISIONS

To become embedded in disclosers' decisions to limit risks to the public or improve performance, users' responses must be discernable through existing management tools and priorities. The degree of discloser embeddedness can also be evaluated along several key dimensions.

Impact of user decision on discloser goals: Disclosers change their practices only if they perceive that shifts in user behavior have an impact on core organizational goals. That is, to become embedded in disclosers' decisions, they must sense that user actions will substantially affect their interests or be likely to do so in the near future. For private sector managers, core objectives often include improving profitability, market-share, and reputation. For public officials, objectives may include gaining constituency support, legitimacy, and trust. For example, factories required for the first time to disclose specifics of toxic pollution made commitments to reduce pollution in response to anticipated employee dissatisfaction and other reputational damage, but would have been unlikely to respond to residents' relocation decisions.

Compatibility of response with ongoing discloser decisions: User responses, even if they affect core discloser goals, are likely to become embedded only if such responses are *compatible* with the way in which managers receive, process, and act on new information. Compatibility mismatches are sometimes process-oriented. Hospitals may have no way to discern the character and degree of patients' concerns about medical errors when no error-tracking system or patient-response mechanism exists. Compatibility mismatches may also be temporal. Auto manufacturers were slow to respond to poor rollover ratings in part because of long design cycles (often three to four years). Disclosure requirements may also alter disclosers' decision processes as well as their decision outcomes. When legislated disclosure of toxic chemicals required chief executives to sign off on companies' pollution reports, for example, some executives became aware of their company's total toxic pollution for the first time and thereafter reviewed total pollution each year (Graham & Miller, 2001). Similarly, requirements that CEOs sign off on companies' accounting reports, enacted after Enron and WorldCom bankruptcies, created new incentives for executives to scrutinize internal controls.

Ability to discern changes in user behavior: Disclosers can make changes only if they can discern user signals (behavior change) from the noise. Chemical companies may not be able to discern whether negative publicity about toxic releases stems from concerns about general releases or about carcinogens specifically. Studies have shown that many retailers analyze point-of-sale data in rudimentary ways (Fisher, Raman, & McClelland, 2000). As a result, food manufacturers may believe that declining sales of high-sugar cereals indicate that a competitor's advertising is more effective, whereas shoppers may actually be responding to nutritional data.

Cost of collecting information regarding changes in user behavior: Disclosers, like users, face a benefit/cost choice in investing in information about user behavior. The cost to disclosers of integrating information about user responses into man-

agement decisions must be sufficiently low to justify their efforts in relation to expected private benefits. Disclosers may be more willing to invest time and effort when they perceive clear opportunities to beat the competition or avoid damage to their reputations.

Disclosers' changes in practices sometimes anticipate rather than respond to user actions. Where reputation is especially important to an organization (for example, in branded consumer product cases), disclosers often respond preemptively to a disclosure requirement. Corporate managers concerned with protecting market share or reputation often do so by attempting to predict the behavior of their customers, employees, or investors, for example by introducing lines of healthy products, reducing toxic pollution, or tightening corporate governance before the public responds (Graham, 2002).⁵

Evaluation of Discloser Embeddedness

Table 3 evaluates the eight policies with respect to the key dimensions of discloser embeddedness. Only two of these policies—corporate financial disclosure and restaurant hygiene quality standards—have become highly embedded in discloser decisions. In these cases, disclosers have much at stake and a refined ability to discern changes in user behavior in response to disclosed information.

The other policies under review exhibited only moderate or low levels of discloser embeddedness. With regard to the mortgage disclosure system, banks and other financial institutions are unlikely to be actively aware of disparate lending practices in their day-to-day activities. Only at times of potential mergers—because of the synergistic effects of the Community Reinvestment Act—does this information become salient to the discloser. For several of the other transparency policies—nutritional labeling and patient safety, for instance—the difficulty of discerning the causes of user behavior change from other factors impedes discloser embeddedness. Finally, in the case of plant closing notification, the fact that closure decisions are made so far in advance of disclosure and for reasons that are usually not affected by users makes discloser behavior essentially disconnected from user responses.

EVALUATING THE EFFECTIVENESS OF TRANSPARENCY SYSTEMS

We have shown that the degree of user and discloser embeddedness varies significantly across the eight policies. We now compare this appraisal of embeddedness to an evaluation of each policy's effectiveness based on a comprehensive review of the relevant research literature. We have grouped transparency systems in three broad groups according to their overall effectiveness:

- *Highly effective:* Research indicates that the transparency policy has changed behavior of most users and disclosers in a significant way and in the direction intended by policy makers;
- *Moderately effective:* Research indicates that the transparency policy has changed behavior of a substantial portion of users and disclosers in the

⁵ Preemptory responses of this kind are comparable to deterrence-related responses by parties under other forms of regulation (for example, Polinsky & Shavell, 2000). In both cases, the regulated actors' behavioral change arises from anticipated actions by government inspectors (traditional regulation) or users (regulatory transparency). In the latter case, we still regard this as an instance of an embedded discloser response to anticipated user actions.

Table 3. Discloser embeddedness.

Disclosure System	Impact on Discloser Goals	Compatibility	Ability to Discern User Action	Information Cost	Embeddedness
Corporate finances	High: investor decisions affect disclosers' access to capital High: customer decisions affect restaurant revenues	High: disclosers attuned to investor choices High: restaurants attuned to customer choices	High: firms, investment advisors attuned to relevant behavior changes Moderate: direct observation possible, but imperfect	Moderate, but dispersed across capital markets Low-moderate	High High
Restaurant hygiene	Low: bank management High: bank mergers	Low: ongoing lending High: Merger approval	High: advocacy groups challenge banks with data	Low: advocacy groups, regulators convey concerns Moderate-high: market analysis	Low: ongoing lending High: mergers Moderate
Mortgage lending	Moderate: consumers also respond to price, taste	Moderate: multi-attribute basis of making product decisions	Moderate: difficult to discern nutrition prefs. from purchasing data		
Nutritional labeling	Moderate: reactions to toxic release data indirect Low: wages affected by risks and other factors Moderate: manufacturer reactions affect profit	Low-moderate: releases related to multiple objectives Low: worker responses diffuse Moderate: supplier choice	Low-moderate: firms less sensitive to reactions, except from regulators Moderate: direct information for current workforce; supplier responses	Moderate: no regular mechanisms to convey concerns Moderate: workers and suppliers directly convey concerns	Low - moderate Low - moderate
Workplace hazards	Moderate: patient choice driven by multiple factors Low: plant closing / lay-off decisions made before notice	Low-moderate: disclosers want to maintain patient base Low: closure a result of other core decisions of firm	Low: difficult to discern sources of patient decision High: reaction by users easy to perceive	High: few mechanisms to convey patient concern Low: workers, communities directly convey concerns	Low - moderate Low
Patient safety					
Plant closing notification					

intended direction but has also left gaps in behavior change and produced unintended consequences;

- *Ineffective*: Research indicates that the transparency policy has failed to appreciably change the behavior of users and disclosers or has changed behavior in directions other than those intended.

One important caveat to evaluating effectiveness should be noted. Transparency policies that embed information in user and discloser decisions may lead to changes in behavior but not necessarily in ways that *advance intended policy objectives*. In these cases, policies may have an *effect* on user and discloser behaviors yet not be *effective* in terms of desired policy outcomes. Three main obstacles potentially stand between user/discloser behavioral changes and achieving policy objectives. First, there may be differences between user goals and public policy goals so that disclosed information leads users to pursue objectives not intended by policy makers (for example, using nutritional information to pursue weight loss rather than improving nutrition). Second, discloser responses may be different than the policy intended, particularly where loopholes in transparency laws lead to paperwork responses rather than meaningful changes in discloser behavior. Finally, the same kind of user decision-making heuristics that justify transparency policies may also be associated with user misinterpretation and cognitive biases. Economists and psychologists have found that common shortcuts used to process new information about risk can lead to systematic cognitive distortions. For example, most people tend to overestimate risks due to rare cataclysmic events while underestimating risks associated with familiar events such as auto accidents and heart disease (Kahneman & Tversky, 1996; Kahneman, 2003). Disclosed information may not adequately account for—and in fact might play into—these biases.

In Table 4, we provide our assessment of the extent to which information provided by each policy is embedded in the decision processes of users and disclosers. We then provide our assessment of the overall effectiveness of each policy, based on an evaluation of available studies, indicating whether those studies show the presence of an effect on user and discloser behaviors, and if so, the degree of effectiveness (moderate or high) revealed by them. A more detailed discussion of the literature cited in Table 4 is available from the authors.

Highly Effective Transparency Systems

Based on our review of available research, three of the eight transparency systems have contributed to significant, long-term behavior changes by users and disclosers in the direction intended by policy makers. Although these systems have encountered problems and required major adjustments over time, evidence suggests that they share core strengths.

Corporate Financial Disclosure

The system of financial disclosure deeply embeds information into the decision processes of both users and corporations. Institutional and individual investors use key indicators from quarterly and annual reports to inform stock purchases and sales. Securities' analysts, brokers, financial advisors, and other intermediaries translate these reports into user-friendly data for clients. Internet-based systems customize information to suit the needs of investors and search-facilitating technologies improve its readability. Comparable formats are assured by government

Table 4. Summary evaluation of effectiveness^a.

Disclosure System	User / Discloser Embedded	Effectiveness	Key studies: No Effect, Effect, Moderately Effective, Highly Effective
Corporate finances	High / High	High	No effect: Stigler (1964); Benston (1973) Effect: Gomes et al. (2004) Highly effective: Simon C. (1989); Lang & Lundholm (1996); Botosan (1997); Bushman & Smith (2001); Ferrell (2003); Greenstone et al. (2004) Highly effective: Jin & Leslie (2003); Simon et al. (2005)
Restaurant hygiene	High / High	High	Effect: Munnell et al. (1996)
Mortgage lending	Moderate / Moderate	High	Moderately effective: Bostic & Surette (2001) Highly effective: Harvard University's Joint Center for Housing Studies (2002); Bostic et al. (2002)
Nutritional labeling	Moderate / Moderate	Moderate	Effect: Kristal et al. (1998); Derby & Levy (2001) Moderately effective: Moorman (1998); Mathios (2000)
Toxic releases	Low / Moderate	Moderate	No effect: Bui & Mayer (2003) Effect: Hamilton (1995); Konar & Cohen (1997); Khanna et al. (1998); EPA (2000); Patten (2002); Bui (2002) Moderately effective: Graham & Miller (2001); Oberholzer-Gee & Mitsuari (2003)
Workplace hazards	Low – Moderate / Low - Moderate	Moderate	Effect: OSHA (1991); Kolp et al. (1993); OSHA (1997) Moderately effective: GAO (1992); Phillip et al. (1999)
Patient safety	NY: Low / Moderate PA: Low/ Low	NY: Moderate PA: Ineffective	No effect: Schneider & Epstein (PA, 1996), (PA, 1998); Mukamel & Mushlin (NY, PA, 2001) Effect: Hannan et al. (NY, 1997); Mukamel et al. (NY, 2002); Dranove et al. (NY, PA, 2003); Mukamel et al. (NY, 2004) Moderately effective: Mukamel & Mushlin (NY, 1998) Highly effective: Hannan et al. (NY, 1994); Peterson et al. (NY, 1998); Cutler et al. (NY, 2004)
Plant closing notification	Low / Low	Ineffective	No effect: Addison & Blackburn (1994); Addison & Blackburn (1997); Levin-Waldman (1998); GAO (2003)

^a A more detailed evaluation of studies of each policy is available from the authors upon request.

requirements and by evolving conventions of highly trained accountants and analysts. Company managers, in turn, track investor responses to their financial disclosures as a routine practice and respond to perceived investor concerns.

While some economists have questioned the need for mandated financial transparency systems and their effectiveness (Stigler, 1964; Benston, 1973), a growing literature suggests that financial reporting has been effective both in reducing investor risks and in improving corporate governance. Research suggests that financial reporting limits investors' risks by reducing investment errors and reducing costs of identifying appropriate opportunities (Simon, 1989; Botosan, 1997), as well as by generally reducing information asymmetries between more and less sophisticated investors (Bushman & Smith, 2001; Greenstone, Oyer, & Vissing-Jorgensen, 2004; Ferrell, 2003). Public reporting reduces firms' cost of capital (Botosan, 1997) and attracts the attention of analysts who may then recommend the stocks for purchase (Lang & Lundholm, 1996).

Reporting improves corporate governance by reducing information asymmetries between shareholders and managers, encouraging managerial discipline, reducing agency costs, supporting enforceable contracts, and disciplining corporate compensation (Bushman & Smith, 2001; Healy & Palepu, 2001; Ball, 2001). Researchers have also found that foreign companies that switch to using more rigorous U.S. disclosure rules experience market benefits. Newly disclosed information reduces investor errors in achieving their investment goals and improves companies' stock liquidity and access to capital, explaining why some foreign companies decide to adopt more transparent accounting standards (Leuz & Verrecchia, 2000). Comparative studies also have concluded that investors are less likely to buy stocks during financial crises in companies with relatively low transparency and that investors leave less transparent markets for more transparent ones (Gelos & Wei, 2002).

Restaurant Hygiene Quality Cards

Publicly posted hygiene scores reduce search costs for consumers and provide restaurants with competitive incentives to improve. In Los Angeles, grades have become highly embedded in customers' and restaurant managers' existing decision processes. A restaurant's grade is available *when* users need it, at the time when they make a decision about entering the establishment; *where* they need it, at the location where purchase of a meal will take place; and in a *format* that makes complex information quickly comprehensible (Fielding, Aguirre, Spear, & Frias, 1999). Grades promote comparison-shopping in situations where most consumers have real choices. Most important, the information tells consumers something that they want to know but did not know before—the comparative cleanliness of restaurants. Restaurant managers, accustomed to local health regulations, have both market and regulatory incentives to discern customers' perceptions of food safety.

A comprehensive study of the Los Angeles transparency system suggests that the restaurant grading system has been highly effective (Jin & Leslie, 2003). Researchers found significant effects in the form of revenue increases for restaurants with high grades and revenue decreases for C-graded restaurants. More important, they found measurable increases in hygiene quality and a consequent significant drop in hospitalizations due to food-related illnesses. Overall, more informed choices by consumers appear to have improved hygiene practices, rewarded restaurants with good grades, and generated economic incentives that stimulated competition among restaurants. A more recent study similarly con-

cludes that the restaurant grading system successfully reduced the number of food-borne disease hospitalizations in Los Angeles County (Simon, Leslie, Run, Jin, Reporter, Aguirre, & Fielding, 2005).

Mortgage Lending Reporting

Under the Home Mortgage Disclosure Act, mandated information has become embedded in the decision processes of both information users and banks. National and local advocacy groups have used the information to advance their long-standing goal of reducing discrimination by financial institutions. They have compiled public cases against particular banks in specific communities and negotiated with those banks to improve their practices. Bank regulators, another significant group of users, have used their information to promote new rules to fight discrimination in credit access, monitor improvements in lending, and tighten enforcement.

It is important to note that this transparency system works synergistically with conventional regulations to promote fair lending. Under the Community Reinvestment Act, federal regulators use disclosed data as one factor in approving requests for bank mergers. This regulatory requirement creates added incentives for banks to respond to the demands of advocacy groups. It is interesting that some banks have employed government-mandated lending data to identify important new market opportunities in inner-city communities and now specialize in financial products specifically targeted at low-income clients.

Researchers have found that this transparency system contributed to increasing access to mortgage loans for blacks and minority groups during the 1990s (Joint Center for Housing Studies, 2002). Disclosures demonstrated that discrimination was a common practice and information helped spur regulatory action (Schafer & Ladd, 1981; Munnell, Tootell, Browne, & McEneaney, 1996). Financial institutions tended to improve their lending to meet communities' needs prior to merger applications (Bostic, Mehran, Paulson, & Saidenberg, 2002). Furthermore, mandated transparency contributed to an increase in home ownership for all racial groups (Joint Center for Housing Studies, 2002; Bostic & Surette, 2001).

Moderately Effective Transparency Systems

Three of the transparency policies—nutritional labeling, toxic pollution reporting, and disclosure of workplace hazards—have proven moderately effective. They are characterized by more limited changes in discloser behavior or by mixed responses that sometimes advance regulatory aims but sometimes frustrate them as well.

Nutritional Labeling

Medical research has established that over-consumption of saturated fats, sugar, and salt increases risks of chronic illnesses, including heart disease, diabetes, and cancer. The new law required that nutritional labels be displayed on packaged foods, using standardized formats, metrics, and recommended consumption levels in order to promote comparability. However, this transparency system, available on every can of soup, candy bar, and box of cereal, is only moderately embedded in consumers' decisions for several reasons. Many consumers do not consider nutritional information relevant to their purchasing goals. The scope of nutritional disclosure also excludes large areas of food (for example, there are no mandatory labeling requirements on fast food or restaurant meals, even though they make up

roughly one-half of household food expenditures). Finally, although information on packaged foods is available when and where consumers need it, the label has not proven *comprehensible* to many consumers.

Research on the effectiveness of nutritional labeling also reveals the complexities of shoppers' and food companies' responses to this transparency system. Researchers have found that some consumers, especially those who are well educated and interested in health, have understood and responded to new information by changing purchasing habits while other groups, such as older consumers, have not changed their behavior in response to labels (Derby & Levy, 2001; Mathios, 2000). Consumers tend to over-emphasize fat content relative to total caloric intake when dieting (Derby & Levy, 2001; Garretson & Burton, 2000). Analyses suggest that food companies tried to anticipate consumers' responses to nutritional labels and reacted strategically. Yet the responses of companies are only partially congruent with the aims of nutritional labeling policy. Most companies have continued to market traditional high-fat, high-sodium, high-sugar products, sometimes adding more healthy ingredients such as fiber or introducing brand extensions of low-fat or low-sodium products, resulting at least in increased product choices (Moorman, 1998). But positive effects on public health are less clear. Americans reduced their fat consumption during the early 1990s but did not reduce total calorie consumption, leading to concerns about obesity (Derby & Levy, 2001). Per capita fat consumption increased markedly between 1997 and 2000 and sugar and calorie consumption continued to rise.

Toxics Release Reporting

Initially enacted as a public "right to know" measure in 1986, the Toxics Release Inventory (TRI) requirement soon became viewed by regulators as one of the federal government's most effective pollution-control measures. As soon as disclosure was required, executives of some major companies announced plans to reduce toxic pollution radically. Reported releases declined substantially during the next decade.

Nonetheless, data produced by the TRI remain minimally embedded in the decisions of most potential users of such information. Most homebuyers, renters, job seekers, consumers, and investors do not consider toxic chemical releases when they decide what neighborhood to live in, where to send children to school, where to work, or in what companies to buy stock. In contrast to experience with the transparency system for home-mortgage lending, advocacy groups have not for the most part incorporated toxic release data into their core strategies.

However, while information has remained relatively un-embedded in market transactions and community action, it did become quickly and strongly embedded in important regulatory and administrative processes, particularly in actions by Congress and federal regulators. Existing goals and decision processes made these officials highly responsive to the new information. Some had been urging stricter regulation of toxic chemicals for more than a decade and had been struggling with the lack of reliable information to support their efforts. Enforcement officials sought a basis for their actions. As a result, *anticipated* reputational and regulatory threats quickly embedded newly disclosed information into manufacturers' routine decision processes. Some companies sought to reduce their emissions by engaging in pollution prevention strategies while others substituted chemicals or changed accounting practices in ways that improved reports without necessarily improving public health.

Researchers have suggested that the effectiveness of this transparency system has been more limited than it appears. National news coverage created time-limited investor responses (company stock prices declined) to the first round of disclosures

of surprisingly high levels of toxic releases by many publicly traded companies (Hamilton, 1995; Konar & Cohen, 1997). In addition, firms with large amounts of toxic releases became more forthcoming in disclosing environmental data in their 10K SEC reports (Patten, 2002). There is, however, little evidence of long-term market response by potential users of the information. Data have had no apparent effect on housing prices and have not stimulated the expected community response to pressure polluters (Bui & Mayer, 2003).

On the other hand, initial responses by those involved in making new pollution rules—especially legislators, regulators, environmental groups, lobbyists—did help to strengthen incentives for companies to reduce toxic releases, in the form of stricter laws and regulations (Graham, 2002; Graham & Miller, 2001). Many targeted companies, especially those with national reputations to protect, made commitments for long-term reduction of toxic releases in response to the first disclosures of shocking information and took some specific actions to minimize releases. But the effectiveness of these actions in reducing toxic pollution remains uncertain. Researchers have found that some reported decreases reflected only changes in reporting procedures, substituted chemicals were not necessarily less toxic, and reported decreases and increases of releases varied widely by state, industry, and year (Bui, 2002; Graham & Miller, 2001).

Workplace Hazards Disclosure

Researchers have found contradictory evidence that OSHA workplace hazardous disclosure standard, which imposed substantial new reporting burdens on employers and manufacturers, has improved worker safety. Despite its compatibility with workers' goals of limiting their own risks or seeking higher wages to compensate for them, new information about chemical hazards has not become embedded in most employees' routine decision-making. Accessible only within the workplace and in disaggregated form, information is not available at a time, place, and format to inform job seekers' decisions. For workers already on the job, data sheets are often too complex to be comprehensible. In addition, the quality of required safety training has varied widely from workplace to workplace, with small workplaces in particular often lacking the capacity to provide employees with sufficient risk information and training (General Accounting Office, 1992).

Exercising broad discretion permitted by regulators, employers have produced information sheets that vary widely in quality, detail, and technical vocabulary. Research on the quality of data sheets has shown that only 51 percent of analyzed sheets were partially accurate in all their sections (Kolp, Williams, & Burtan, 1995). Workers were generally able to understand only around 60% of the information on such sheets (Occupational Safety and Health Administration, 1997; Kolp, Sattler, Blayney, & Sherwood, 1993). The high cost of understanding information has discouraged workers from using it to change work habits. Even in cases where workers seemed to comprehend safety information, they used it only in limited fashion (Phillips, Wallace, Hamilton, Pursley, Petty, & Bayne, 1999). It should be noted that all of the documented cases of the impact of training and disclosure on information occurred within unionized establishments where unions can play a key third-party role as user intermediary (Weil, 2004; Fagotto & Fung, 2003). The absence of unions in more than 90 percent of private sector workplaces raises questions about the applicability of these results to nonunion workplaces.

Nonetheless, chemical hazard information has become embedded in some employers' decision-making processes. Limited evidence suggests that the aware-

ness of risks associated with certain chemicals has led some employers to switch to safer substances. One early analysis of the standard found that 30% of surveyed employers had adopted safer chemicals (GAO, 1992). Concerns about potential liability claims brought against employers from customers and/or workers also may have fueled substitution (Arnett, 1992). In addition, material safety data sheets have become such a useful tool for the exchange of information between manufacturers and corporate users of hazardous chemicals that some have extended their use to non-hazardous chemicals. Overall, the hazard communication system functions more as a tool to exchange information among chemical producers and chemical users than as a device to help employees reduce their risk exposure.

Ineffective Transparency Systems

Ineffective transparency systems lead to little or no change in the behavior of users or disclosers and so no advance of policy objectives. Two of the transparency systems—patient safety disclosure (Pennsylvania)⁶ and workers' notification of plant closing—prove ineffective because the pre-existing decision processes of would-be information users resist the incorporation of new information, because those users face a very limited set of choices and so cannot act on new information, or because users' goals differ from those of policy makers. They also are ineffective because disclosers respond to user demands in ways that actually exacerbate the public problem that the system seeks to address.

Patient Safety Disclosure

Research results to date suggest that Pennsylvania's Guide to Coronary Artery Bypass Graft Surgery may be ineffective while the New York's Cardiac Surgery Reporting System may be moderately effective, although researchers remain divided about the specific effects and effectiveness findings of both state reporting systems. Metrics have proven particularly problematic. Patient safety report cards may have low predictive accuracy and may be based on data with internal inconsistencies (Green & Wintfeld, 1995). Their narrow focus on mortality rates, as well as the complexities of risk adjustment, may undermine their credibility. In addition, hospital managers and physicians, focused on liability issues and often unaccustomed to aggregating patient safety data to address systemic problems, often resist information-sharing because of their own incentives and traditionally have had limited institutional mechanisms for learning from past mistakes (Graham, 2002). In Pennsylvania, one survey suggested that the state's report card had little or no influence on the referrals of most (87 percent) cardiologists. Respondents expressed concern about the narrow focus of reporting on mortality, inadequate risk adjustment, and questionable reliability of data. More than half of cardiac surgeons also reported that they were less willing to operate on severely ill patients after the report card was introduced (Schneider & Epstein, 1996). Survey data also suggested that coronary bypass patients had limited knowledge of the state-mandated report card, both before and after surgery (Schneider & Epstein, 1998).

By contrast, early research in New York state found that the introduction of the state's reporting system was associated with significant declines in risk-adjusted

⁶ For reasons we describe, some studies suggest that New York is moderately effective.

mortality rates in the first three years (Hannan, Kilburn, Racz, Shields, & Chassin, 1994), giving New York the lowest risk-adjusted bypass mortality rate of any state in 1992 (Peterson, DeLong, Jollis, Muhlbaier, & Mark, 1998). A later evaluation of the first 10 years of reporting found that both patient volume and mortality rates declined in relatively high-mortality hospitals (Cutler, Huckman, & Landrum, 2004). In both New York and Pennsylvania, analysis of Medicare claims data suggested that the introduction of report cards was associated with a decline in the illness severity of bypass surgery patients, suggesting a possible selection bias by doctors and/or hospitals (Dranove, Kessler, McClellan, & Satterthwaite, 2003). Another analysis of Medicare data suggested that more highly educated patients made greater use of reported information (Mukamel, Weimer, Zwanziger, & Mushlin, 2002). On the whole, these limited research findings underscore the need for more systematic evaluation of regulatory transparency systems aimed at reducing deaths and serious injuries from medical errors. Such evaluation would help lay the groundwork for design of more effective reporting systems.

Workers' Notification of Plant Closing

The Worker Adjustment and Retraining Notification Act (WARN) aims in part to enable workers to respond to economic dislocation by providing information about plant closings. However, evidence suggests that the advance notice generated by this transparency system has failed to materially affect the decision-making processes of workers who face layoffs. Advanced notice provides little assistance to affected workers in how to seek new employment, and certainly has no effect on the availability of other options. Further, the 60-day notice required by WARN starts running when workers are still employed, limiting the amount of time available for job search. Thus the capacity of the individual to engage in a full job search upon notification is highly constrained.

The required information may also come too late for unions, community groups, or other intermediaries to change the decision to close. Third parties often lack capacity and /or experience to facilitate job search (GAO, 2003). Finally, the objectives of users, third parties, and disclosers may prove quite diverse in the face of closures, leading them to pursue different strategies in the face of information about the imminent event. Not surprisingly, there are few documented cases of employers' changing closure or mass layoff decisions in the wake of community- and/or union-notification of the impending closure (Gerhart, 1987; U.S. Department of Labor, 1986).

Studies of WARN's impact on reemployment prospects of displaced workers consistently show limited effects. Several studies have found that WARN has only modest impact on the provision of advanced notice information beyond what had been voluntarily provided prior to the Act (Addison & Blackburn, 1994, 1997; Levin-Waldman, 1998). In those cases where new information is provided, workers have done somewhat better in finding new employment in the immediate wake of displacement. However, for those who do not find jobs immediately following closures or layoffs, their spells of unemployment tend to be longer than workers who were not notified. Thus, if there are effects on reemployment, they are modest and restricted to a subset of workers.

IMPLICATIONS FOR POLICY MAKERS AND PUBLIC MANAGERS

Regulating by means of mandatory disclosure has gained prominence as policy makers have perceived the shortcomings of more conventional regulation, searched

for approaches to problems that do not lend themselves to standardized rules, and recognized the potential of information technology to make complex data accessible to broad audiences. Accordingly, understanding when and how regulatory transparency can be effective is important because transparency will likely be applied more widely in the future. Its potential increases further as continuing advances in information technology make it easier for public managers or intermediaries to customize information, for disclosing organizations to understand and respond to users' choices, and for users to specify the information they want. At best, transparency systems inform individual choice and organizational decision-making in ways that serve public goals. In short, the use of government authority to mandate the disclosure of information has taken a legitimate place beside the use of such authority to mandate minimum standards and to impose taxes, trading regimes, or other financial incentives.

However, unlike many proponents who view transparency as automatically producing public benefits, we suggest a more measured analysis. Conditions for effectiveness are quite demanding and therefore are not easily met. Regulatory transparency should be chosen as a remedy for only a subset of policy problems. Even where mandatory disclosure might prove useful, it must be carefully crafted with a clear understanding of user and discloser decision-making routines and cognitive processes. This suggests a three-tiered framework for understanding which kinds of policy problems are appropriate for regulation via mandatory information disclosure.

In the first category of policy problems, new information could be easily embedded into the routines of users and those users would be likely to act in ways that spurred reactions from information disclosers that, in turn, advanced public aims. Such situations exhibit three characteristics. First, would-be information users systematically make sub-optimal choices from a social perspective because they lack certain salient information. Second, if they had this information, users would have the will and capacity to change their behavior accordingly. Third, their new choices would cause information disclosers to alter their behavior in ways that make it more congruent with policy intentions. These three conditions define situations that are ripe for intervention through transparency systems. Corporate financial disclosure and restaurant hygiene grading provide examples of such transparency systems. Despite the overall ineffectiveness to date, hospitals' disclosure of medical mistakes or of broader quality measures may represent another promising area.

In the second category, transparency is, by itself, insufficient to generate effective policy outcomes but can be designed to work in tandem with other government actions to embed information in action cycles that produce congruent behaviors by disclosers. Here, transparency requirements can generate relevant information but that information may not be easily embedded into the pre-existing cycles of user choice and discloser response. In mortgage-lending reporting, for example, bank transparency generated highly salient information that allowed community organizations to identify the ways in which local banks discriminated against certain groups of borrowers or against particular neighborhoods. Those organizations, however, may have lacked the power to successfully demand that such banks alter their behavior. An appropriate background of regulatory rules against discrimination by financial institutions, embodied in the CRA, however, altered the action cycle in ways that embedded information into the strategies of users and disclosers. Similar synergistic regulatory provisions might improve the effectiveness of many other transparency systems.

For a third category of policy problems, even well-designed and supported transparency systems are unlikely to be effective. It may be difficult to embed policy-rel-

evant information into users' routines due to lack of choice or other insurmountable obstacles. The goals and actions of users may be incongruous with those of policy makers. Or it may be difficult to bring discloser actions in line with policy goals. In the case of plant-closing disclosure, for example, the need to keep impending closure decisions confidential because of the negative business ramifications of early release of that information and the significant period of time many communities need to prepare for plant closings almost preclude finding an advance disclosure period compatible with the inherent needs of both disclosers and users. In product markets where consumers emphasize price or styling over health or safety concerns, transparency systems are likely to waste time and resources with little regulatory gain, at least without related educational efforts.

Even when transparency systems are promising, however, there are daunting challenges to making such policies effective. Policy makers and public managers can do much to meet these challenges through careful system design and maintenance. First of all, they can tailor transparency requirements to users' and disclosers' decision routines. Once transparency is chosen as the best regulatory "fit" to address a public policy problem, the next step is for system designers to understand as much as possible about how diverse groups of users and disclosers make decisions. Designers can then make informed judgments about what information users and disclosers have the interest and capacity to use and in what time, place, and format their use will be maximized.

Second, government officials can strengthen transparency systems by selecting accurate metrics and choosing a scope of disclosure that matches their regulatory goals. Corporate accounting standards, restaurant hygiene grades, and nutritional labeling endure in part because they feature appropriate metrics well matched to the policy objective. Disclosure of workplace hazards disclosure and toxic releases feature more problematic metrics and an overly narrow scope that weaken their use and skew incentives for behavior change.

Third, policy makers and managers can design for effective communication. If cognitive shortcuts lead users to ignore probabilities, over-estimate rare catastrophic risks, or tune out when confronted with information overload, policy makers can design transparency systems that build in probabilities, limit information search costs, and expressly counter other cognitive problems.

Finally, and perhaps most important, transparency systems need to be designed for improvement. Built-in analysis and feedback requirements can reduce the effects of initial shortcomings as well as disclosers' discoveries of loopholes in disclosure rules. Such requirements can also keep systems up-to-date as science and technology, markets, and political priorities change.

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