

One Proxy at a Time: Pursuing Social Change through Shareholder Proposals

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Don't be evil. This directive is Google's corporate motto and perhaps the most succinct proclamation of the notion of corporate social responsibility (CSR). While it seems that no one could argue with the desire for a corporation not to "do evil," the related conviction, that corporations should take positive steps in order to "do good," is controversial. According to economics and finance textbooks, the sole goal of a corporation is to maximize shareholder wealth. But some investors believe that corporations have the power and responsibility to act to benefit others: workers, the local community, the environment, and even humanity as a whole. These activists, both individuals and institutions, alone and in organized groups, seek to reduce pollution, increase workplace diversity, safeguard human rights around the world, eliminate animal testing, or improve third world access to medicine, among other goals. Activist investors operate from within the corporation, using their legal rights as shareholders to place socially responsible resolutions on corporate proxy statements, to be voted on by all shareholders at an annual meeting.¹

CSR shareholder activism is a little-studied area in modern financial markets.² This article uses a comprehensive data set to shed some economic light on several questions, including, Why is CSR controversial? Who are these activist investors? What firms do they target? What do they ask for, and how successful are they?

Should Corporations Engage in Socially Responsible Business Activities?

Socially responsible investors and activists answer this question with a resounding yes and follow up with one of two reasons: because being socially responsible is good business practice or because the world will be a better place with socially responsible corporate behavior. To better understand the motivations, requests, and actions of social resolution sponsors, let us look at each rationale in turn.

When a business case can be made for CSR, it is in both the firm's and society's best interests for the firm to engage in the recommended behavior, whether it be

increasing the proportion of environmental packaging or strengthening international labor standards. Socially responsible actions will lead to higher profits, benefiting shareholders as well as overall social welfare. Occasionally activists argue that there is a direct link between a change in corporate operations and cost reductions. More typically, however, the channels through which an increase in profitability is claimed to occur are only indirectly related to a firm's financial performance: building goodwill and trust, increasing exposure (advertising, in effect), and improved employee satisfaction.

In these indirect business-case justifications, consumers' and employees' positive feelings are claimed to increase sales and profits. Underlying this business case for CSR

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is a fundamental assumption that at least some consumers prefer buying products that allow them to “do good” and may even be willing to pay a little more for products or services that claim to help solve the world's problems.³ Whole Foods Market Inc. and the Body Shop are examples of businesses built on this model. Their customers are not only

buying environmentally friendly, premium products but also, perhaps, experiencing some satisfaction from participating in the stores' social mission.⁴

Many firms that do not sell their socially responsible reputation as explicitly as Whole Foods does also use a business case as a rationale for decisions to have a climate change policy, to strengthen labor standards, or to make charitable donations. Even if no direct or easily measurable relation links these actions and firm revenues, the firm may perceive that being a good corporate citizen results in positive publicity and the potential for greater customer goodwill and loyalty.

In all of these cases, socially responsible corporate actions are good business that benefits shareholders. Given the right incentives to maximize profits, corporate management should actively seek out and implement such strategies. Therefore, while some activist investors will cite a business case for their proposals, such opportunities are likely to be exploited even without a formal shareholder proposal.

Instead, most proxy proposals implicitly rely on the second rationale for responsible corporate behavior: a corporation has a responsibility to society and the community. CSR advocates believe the world will be a better place if corporations undertake socially motivated policies and actions. One prominent and definitive statement of this philosophy was stated in a letter by Google's founders, Larry Page and Sergey Brin, to prospective shareholders prior to the initial public stock offering in 2004: “We believe strongly that in the long term we will be better served—as shareholders and in all other ways—by a company that does good things for the world even if we forgo some short term gains.” CSR activists see corporations as powerful tools for social change because of their economic power and public visibility, and some activists are quite willing to sacrifice some financial gains in order to achieve these goals.

Not everyone agrees that a CSR agenda benefits society. A notable example of this viewpoint is Milton Friedman's well-known 1970 *New York Times Magazine* editorial titled “The Social Responsibility of Business Is to Increase Its Profits.”⁵ At its heart, the argument is not one over the desirability of doing good deeds but over the role of corporations in the provision of such services. Opponents argue that charitable services—for instance, improving the living standard of laborers in Southeast Asia—are best provided by individuals through other organizations such as charitable organizations and churches. Firms, it is argued, are organized to provide goods and services,

and everyone is better off if firms limit themselves to pursuing maximizing profits as their sole objective.

The concern here is not that firm shareholders are necessarily worse off if the firm pursues a costly socially responsible agenda but rather that the economy as a whole will suffer.⁶ If firms have dual objectives, capital will not be allocated according to its most productive use given the general legal and social environment. This efficiency loss can be translated into a welfare loss for the economy as a whole—a drag on the level and possibly the growth rate of the standard of living. Often proponents of CSR draw a distinction between what’s good for a corporation (maximizing profits) and what’s good for society (less pollution, higher wages, etc.) with little or no regard for the costs of such policies in terms of less production of goods and services. With an efficient capital market to optimize the production of goods and services and return maximal profits to shareholders, social goals are in a better position to be met by other means, including private donations (out of the corporate profits) and non-governmental organizations.

The conflict between these two opposing views on the social responsibility of corporations is personified by social activists who would like corporations to maintain a dual objective and firm management who are compensated, both implicitly (in the labor market for CEOs) and explicitly via their pay packages (such as options, performance-based pay, etc.), for the financial performance of the firm. CSR activists have a large toolbox of potential strategies to attempt to influence corporations even if they are not stockholders. For example, People for the Ethical Treatment of Animals (PETA) uses advertising, public outreach and education campaigns, and demonstrations to raise awareness of its concerns and promote change. An important complement to these strategies, for those activists who are or become stockholders, is the shareholder proposal (also known as a shareholder-sponsored resolution). Activists can use these proposals to lobby the management at individual firms to undertake CSR reform such as tightening environmental controls and implementing antidiscrimination policies, among others.

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1. Many activist investors use shareholder proposals as part of a larger campaign to effect social change. Some activists use additional strategies such as media campaigns, consumer boycotts, and divestment programs in which stock is not held in firms that are pursuing socially undesirable policies or activities.
 2. Most studies of shareholder activism in the financial research literature focus on shareholder proposals relating to issues of corporate governance. For a survey of such papers see Karpoff (1998), Black (1997), and Gillan and Starks (1998). Chidambaran and Woitke (1999) and Thomas and Cotter (2005) are examples of studies that include statistics on social proposals as well. Other literatures have focused on shareholder activism more from a sociological, rather than an economic, perspective. Examples include Profitt (2002) and Graves, Waddock, and Rehbein (2001).
 3. The 2001 Corporate Citizen Watch Survey (Hill&Knowlton/Harris Interactive) found that 36 percent of consumers consider corporate citizenship an important factor in their purchasing decisions.
 4. Whole Foods’ “Declaration of Interdependence” (www.wholefoodsmarket.com/company/declaration.html) emphasizes sustainability, stewardship of the environment, and community involvement. The Body Shop’s values include promoting human rights, eliminating animal testing, and environmental protection (www.thebodyshopinternational.com/web/tbsgl/values.jsp).
 5. *New York Times Magazine*, September 13, 1970. See also “Rethinking the Social Responsibility of Business,” www.reason.com/0510/fe.mf.rethinking.shtml, October 2005.
 6. If firm shareholders know of the CSR agenda of firm management, they can make their own decision as to whether to own stock, thus relegating investor “harm” to the cases in which management takes unobservable or unexpected actions that meet social goals, while decreasing profits, but are not valued by some shareholders.

The Basics of Shareholder Proposals

The process of submitting a shareholder proposal to be included on a proxy statement is regulated by Securities and Exchange Commission (SEC) Rule 14a-8. Any shareholder who has continuously held shares for one year worth at least \$2,000, or 1 percent of firm value, may submit at most one proposal of 500 words or less per annual meeting. The costs to the submitting shareholder are not large—the firm pays for the printing of proxy statements and mailings to shareholders.⁷ However, the submitting shareholder is required to be present at the annual meeting to present the proposal to shareholders.

Activist investors use their legal rights as shareholders to place socially responsible resolutions on corporate proxy statements, to be voted on by all shareholders at an annual meeting.

A shareholder cannot submit just any proposal, however, and be assured that it will be included on the proxy and put to a shareholder vote. The firm's management can petition the SEC to exclude a proposal

on several grounds, including cases in which the proposal (1) reflects a personal grievance, (2) requires the firm to violate state, federal, or international law, (3) relates to operations accounting for less than 5 percent of the firm's assets, sales, and revenue, or (4) deals with a "matter relating to the company's ordinary business operations."⁸

This last rationale is the one that most firms cite when seeking to exclude social activists' proposals. The pivotal term here is "ordinary business operations," which includes day-to-day management of the firm, production, and the workforce as well as those issues on which stockholders "would not be in a position to make an informed judgment." Each exclusion needs to be approved by the SEC and is requested at the discretion of firm management. This discretion means that some firms will request permission to exclude proposals that other firms allow to go on the proxy statements. Proposals that are excluded are said to be "omitted"; examples include a call for NBC to fire Tom Brokaw and a request for Shoney's to report on their equal opportunity employment practices.

Shareholders may resubmit proposals each year, but firms are allowed to exclude proposals that previously did not receive more than 3 to 10 percent of the vote, depending on how many times the proposal was voted on previously and the amount of time between submissions. These exclusionary criteria and resubmission requirements are in place to deter repetitive frivolous proposals and their associated costs to the firm and ultimately to shareholders in general.

Shareholder proposals, even if they receive a majority vote of the shareholders, are precatory, or nonbinding, on corporate management. Therefore, shepherding a proposal through to a vote and even garnering widespread shareholder support are not guarantees of corporate action or even a response in the form of an open dialogue. This feature reduces the level of shareholder proposals. Were majority-supported proposals binding, there would likely be more proposals, more petitioning of the SEC for omission, more public campaigns to woo shareholder votes, and more firms going private to avoid this cost of being publicly owned.

Data on Shareholder Proposals

The data used here to study socially responsible shareholder activism are from the Investor Responsibility Research Center (IRRC) and include all social shareholder proposals monitored by the IRRC over the 1992–2002 period. IRRC is an independent corporation providing research and analysis on corporate proxy activity to a variety of institutional investors and organizations. This particular data set does not include

any corporate governance proposals related to issues such as board structure, CEO compensation, and poison pills.⁹ The raw data contain information on the proposal topic (an IRRC code), a more precise statement of the resolution, the proponent/ sponsor, the corporation targeted, year, status (withdrawn/voted on/omitted), and percentage vote, if applicable. In total, during this period there were 2,829 social shareholder proposals.

To better organize the analysis, each proposal was assigned an additional topic code (see the sidebar on page 16). For example, proposals calling for the restriction of gene-engineered food sales by Procter and Gamble and actions to reduce nuclear accidents at PG&E power plants were both categorized by IRRC as “energy and environment” proposals. The new topic code in this article places the former proposal in the “food/agriculture” category while the latter is categorized as an “energy” proposal. Similarly, I aggregate the IRRC data on proposals concerning withdrawal from South Africa, maquiladora operations, and human rights for workers in Burma into a topic titled “international operations.” In addition, a categorization was created to sort the resolution proponents into the six types described below: Individual shareholders, pension funds, unions, religious organizations, social organizations, and socially responsible mutual funds. Finally, the data were expanded via extensive research to determine the final outcomes of the proposals that were withdrawn by proponents before the annual meeting. Using Internet searches, proponent and company Web sites, annual reports, and personal contacts, information was found on 298 of the 859 withdrawn proposals and coded to indicate the type of corporate-proponent interaction (for example, action by the firm, dialogue, no action) that prompted the withdrawal.

Who Engages in Social Activism via Shareholder Proposals?

The shareholders who sponsor social resolutions can be categorized into several distinct groups according to their goals, motivation, and level of organization.

1. Individuals—Investors who meet the ownership requirements with their individual stockholdings in a particular firm. These investors typically do not act in a coordinated fashion. A few, such as Evelyn Davis, have risen to the level of “corporate gadfly” because of their persistent sponsorship and vocal participation at annual meetings (see Trigaux 2002). Among these activists, the motivation to pursue shareholder activism stems from personal preferences.
2. Pension funds and endowments—Large institutional investors consisting mostly of defined benefit public pension funds (NYC, CalPers, etc). While a pension fund should arguably be motivated to pursue financial returns on behalf of beneficiaries, some papers have argued that these public pension funds are pursuing political goals.¹⁰

7. The SEC reports that the average estimated cost to the firm of including a shareholder proposal is \$87,000—\$50,000 for printing distribution and tabulation of the votes and \$37,000 to determine if the proposal should be included. This cost has fallen more recently because of the SEC’s approval of the Internet as a means of distributing proxies and shareholder information.

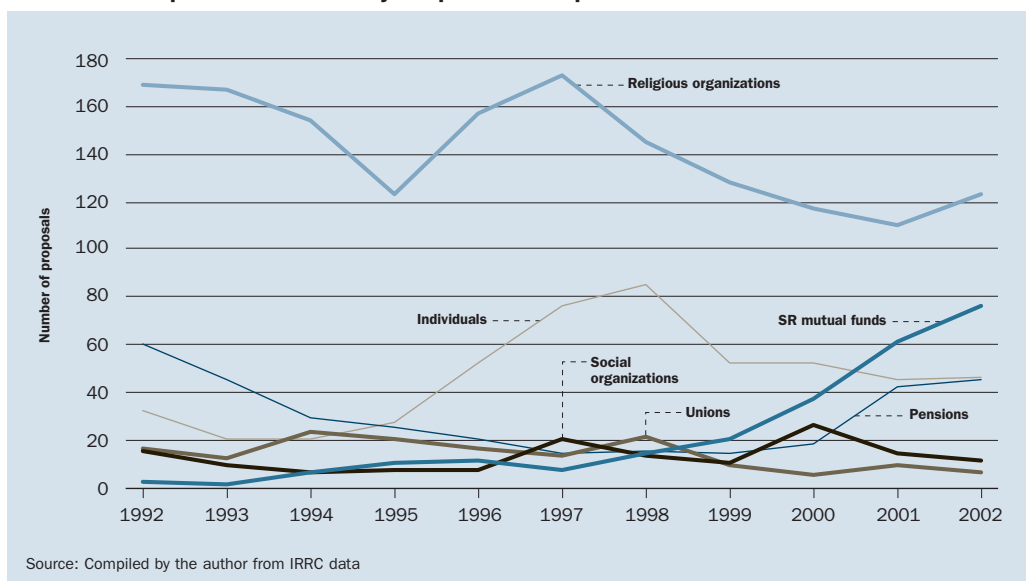
8. Other permissible reasons for exclusion of a proposal include duplication of another proposal, issues relating to board membership elections, cases where the firm has already implemented the proposal or the action is not within the power of the firm to implement, and proposals dealing with specific amounts of cash or dividends. For a full discussion, see SEC Rule 14a-8.

9. The data set does include proposals to increase the ethnic and gender diversity of corporate boards.

10. See Romano (2001) and, for a more detailed study of the activism programs of several public pensions, Del Guercio and Hawkins (1999).

3. Unions—Labor unions such as the AFL-CIO and the UBCJWA (carpenters and joiners) that manage multiemployer defined benefit pension funds. While the data include proposals from eighteen different unions, only a few sponsored more than one proposal from 1992 to 2002. In the years since 2002 the unions have withdrawn from social advocacy and focused entirely on corporate governance proposals. Unions have engaged in the political process through donations, endorsements, and policy advocacy since their inception, so their interest in social shareholder activism is not surprising. While union pensions have the same goal as public and private pensions (to meet beneficiary obligations), unions also have another well-defined motive—benefiting union workers, particularly the members of their union. Union pension funds pursue social shareholder activism most strongly among the firms that employ their members. For example the Communication Workers of America submitted proposals at GTE, AT&T, and Ameritech.
4. Religious organizations—The Interfaith Center on Corporate Responsibility (ICCR) is the primary coordinator of shareholder proposals by religious organizations. ICCR is a coalition of 275 faith-based institutional investors; members (and examples) include churches (the Episcopal Church), pensions (the United Methodist Church pension), orders (the Sisters of Charity), faith-based health care corporations (the Advocate Health Care System), and religious foundations (the Catholic Foundation/Aquinas Funds). As evidenced by this list, ICCR member organizations are largely though not exclusively Christian. In their own words, ICCR members “utilize religious investments and other resources to change unjust or harmful corporate policies, working for peace, economic justice and stewardship of the Earth.” The motivations of this group draw on common religious values, and the goals center on social and economic justice.
5. Social organizations—Thirty-six different nonreligious organizations, each founded to promote social change of a relatively limited scope. For example, the mission of the Jessie Smith Noyes Foundation is to “protect and restore Earth’s natural systems and promote a sustainable society,” and it sponsors proposals seeking to restrict gene-modified products and limit environmental hazards. PETA, on the other hand, is solely interested in issues related to animal rights. Shareholder activism is a slightly less natural strategy for these groups, compared to religious organizations, since they may not have a natural pool of invested assets, such as a pension, on which to base their stockholder activism. Also in contrast to religious organizations is the individual, noncollective nature of their activism.
6. Socially responsible mutual funds—Firms such as Calvert, Domini, and Pax that manage mutual funds for investors who want to invest their money according to ethical guidelines. Effectively, these firms engage in shareholder activism as a business, and this motivation distinguishes this group from the others described here. These funds typically follow a two-part strategy: screening out investments that are not, by their definition, socially responsible, and investing in some such stocks while targeting them with proposals to change their behavior. These mutual funds strive to provide both the performance and social criteria that their investors demand. This goal may lead socially responsible mutual funds to be more strategic than other activist investors. Specifically, fund managers likely weigh costs and benefits, in terms of return performance, to decide which stocks to screen out and which to pursue with shareholder resolutions. Not surprisingly, since their shareholder activism is part of the service being sold by these funds, mutual funds report more information on investment policies, activities, and results than other socially responsible investor groups.

Figure 1
Number of Proposals over Time by Proponent Group



Socially Responsible Shareholder Activism over Time

On average, 257 different proposals were submitted each year between 1992 and 2002. While the yearly number of proposals has remained relatively stable over time, ranging from 212 in 1995 to 303 in 1997, this stability masks some interesting comparisons and trends across the various proponent groups.

Figure 1 provides a look at the number of proposals made by each type of proponent over the years 1992–2002. A few features of the data stand out. During each year, religious organizations made the largest number of proposals. This pattern may reflect the fact that religious organization proponents are predominantly members of the umbrella organization ICCR and agree on many social issues. The existence of ICCR therefore facilitates proposals via economies of scale in organization and implementation. The social organizations group, in contrast, is made up of many distinct groups with no common agenda (for example, PETA and Friends of the Earth). Thus each group must mount its own campaign to address the issue(s) in which it is interested. Individuals, like social organizations, are also a diverse group but post a large number of proposals in aggregate because of the presence of a few very active investors; for example, Evelyn Davis accounts for 69 (14 percent) of the 507 proposals submitted by individuals.

The second feature that stands out is the recent rise in shareholder activism by socially responsible mutual funds. In 2001 and 2002 these mutual funds submitted more proposals than individuals did and nearly two-thirds the number sponsored by religious organizations. It is unclear what motivated this growth in activism, but it coincides with the bear market of 2000–02. Socially responsible mutual funds may have turned to activism as a way to add value for investors when the return performance on the portfolios suffered. The relative inactivity of unions in the social proposal arena is evident as well. In recent years the unions have become much more active in corporate governance–related proposals rather than the social proposals analyzed here.

Table
Top Fifty Targeted Corporations, 1992–2002

Company	Number of Shareholder Proposals
General Electric	86
Chevron/Texaco	64
Exxon/Exxon Mobil	60
Philip Morris	54
AT&T	46
General Motors	42
JPMorgan Chase	38
RJR Nabisco	38
DuPont (E.I.) de Nemours	37
Citicorp/Citigroup	35
PepsiCo	35
United Technologies	30
Wal-Mart Stores	29
Loews	28
Unocal	26
Bristol-Myers Squibb	25
IBM	25
Johnson & Johnson	25
GTE	24
Ford Motor Company	23
UST	23
Lockheed Martin	23
Boeing	22
Atlantic Richfield	21
Merck	19
Procter & Gamble	19
American Brands	18
Minnesota Mining & Manufacturing	18
Raytheon	18
American International Group	17
Baker Hughes	17
Kmart	17
McDonald's	17
Abbott Laboratories	16
Dillard's	16
Donnelley (R.R.) & Sons	16
American Express	15
Lilly (Eli)	15
Time Warner	15
Caterpillar	15
Cooper Industries	14
Disney (Walt)	14
Eastman Kodak	14
Aetna	13
American Home Products	13
Chrysler	13
Sears Roebuck	13
Allied Signal	13
Dayton Hudson	13
Anheuser-Busch	12

Source: Compiled by the author from IRRRC data

Thus, shareholder proposals are a non-trivial and consistent feature of the modern financial market. But what are these activists asking for? What firms are they targeting? And how successful are they in prompting a change in corporate behavior?

What Corporations Are Targeted by Social Activists?

During the period studied, 566 different corporations were targeted by social proposals. Two hundred one were targeted only once while seventy-three were targeted ten times or more (see the table). Recall that by SEC rules, multiple shareholders may not submit the same resolution in the same proxy season. Therefore, these numbers represent distinct proposals and involve no double counting.

What drives an activist's decision to target one corporation rather than another? Foremost among the targets are corporations that are pursuing policies or operations that activists wish to change. These targets include manufacturing firms producing pollution in their production process and firms operating in countries where labor is cheap and abundant. Target firms also may have market power that activists want to tap in order to economically force a change in other agents' behavior. Among these would be firms that buy inputs from suppliers that have vendors in cheap labor countries. Finally, high-profile target firms are likely to value consumer goodwill and may undertake actions for this reason; these firms are not engaging in explicitly irresponsible behavior but have the "name" to aid in social change. Therefore, it is not surprising that manufacturing firms are targeted more than service or technology firms, which are much less likely to pollute and employ outsourced labor. Larger firms are targeted more than smaller firms with less economic power and less name recognition.¹¹

For the socially responsible mutual funds, there may also be an unstated relation between the expected return on a corporation's stock and its likelihood of being screened out of the portfolio. The

fund manager's desire to post good fund performance implies that the higher the expected return on the stock of a firm, or the lower its correlation with the remainder of the portfolio, the more likely a stock is not to be screened out but rather to be held by the fund and targeted.

This list shows that activists are actively and directly targeting only a small fraction of public corporations. While General Electric, the most targeted firm in this period, faced an average of eight proposals per year, the fiftieth-ranked firm received only an average of one per year. Indeed, most publicly traded corporations in the U.S. market did not experience even one proposal in this time period. It is important to note, however, that there may well be a larger, indirect effect on firms that are economically similar to the targeted firms. Successful activism may alter the actions of some corporations, thereby putting pressure on their competitors to follow suit because they do not want to be a target in the future. These positive byproducts of shareholder activism may also guide an activist's choice of targets. Firms that attract more media attention and at which success is more likely will strengthen these indirect effects and are more likely to be targeted.

One measure of whether success is more likely is if a corporation has a reputation of being a good corporate citizen. If so, the company's top management may be more willing to listen and to act on the concerns of socially activist investors. To assess whether this type of company is targeted, the data on all proposal targets are matched with a list of the 100 Best Corporate Citizens, compiled each year by *Business Ethics* magazine. To be on the list, a firm must score well in its service to four stakeholder groups: stockholders, employees, customers, and community. In 2000–02, the years for which *Business Ethics* created its list, 14.5 percent of the proposals submitted were targeted at firms that are good corporate citizens. This result suggests that activists also include the likelihood of success in their calculus when choosing proposal targets rather than targeting only poor corporate citizens.¹²

Shepherding a proposal through to a vote and even garnering widespread shareholder support are not guarantees of corporate action or even an open dialogue.

What Are the Activists Asking For?

The answer to this question comes in two parts. First, on what topics or social issues are the activists submitting resolutions? Second, what type of action is being requested? For example, does the resolution ask for a report to be issued or for a substantive change in operations?

A full list of all resolution topic categories can be found in the sidebar on page 16. Overall, the three most common topics for shareholder proposals are international conduct, environmental issues, and antidiscrimination; the least common topics are media/TV and animal rights. One way to understand this ranking is to recall that shareholder activism is a tool to effect social change, a tool that is complementary to other methods such as political action, publicity campaigns, and boycotts. Important issues of the day that a large fraction of the population is concerned about are more likely to be pursued by all methods, including shareholder activism. This reasoning might explain the prevalence of resolutions involving international conduct during a

11. See Romano (2001), Thomas and Cotter (2005), and Del Guercio and Hawkins (1999) for studies of the targeting decisions of activist investors in the case of governance proposals.

12. The targeting of these corporations may also reflect some disagreement among activists as to what constitutes good citizenship.

period that included the passage of NAFTA and rising concerns over globalization. The level of public support or awareness is not the only driver of shareholder activism. The relatively small number of proposals on animal rights, for example, may reflect both a relative lack of widespread support along with a preference among these activists for other methods such as reducing consumer demand for animal products.

The characteristics and motivations of the various proponent groups are also helpful for understanding the distribution of social issues pursued (see Figure 2). As a group, social organizations have the least concentrated activism strategy, submitting proposals in fifteen of the sixteen topics. This pattern is not surprising considering that social organizations are a very diverse group, each with their own issue of concern. A similar observation holds for activism by individuals. In some issues, such

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as energy, animal rights, or reproductive issues, social organizations and individuals are responsible for all, or very nearly all, of the proposed resolutions.

In contrast, pension funds have the most concentrated proposal strategy, with almost 70 percent of their proposals within

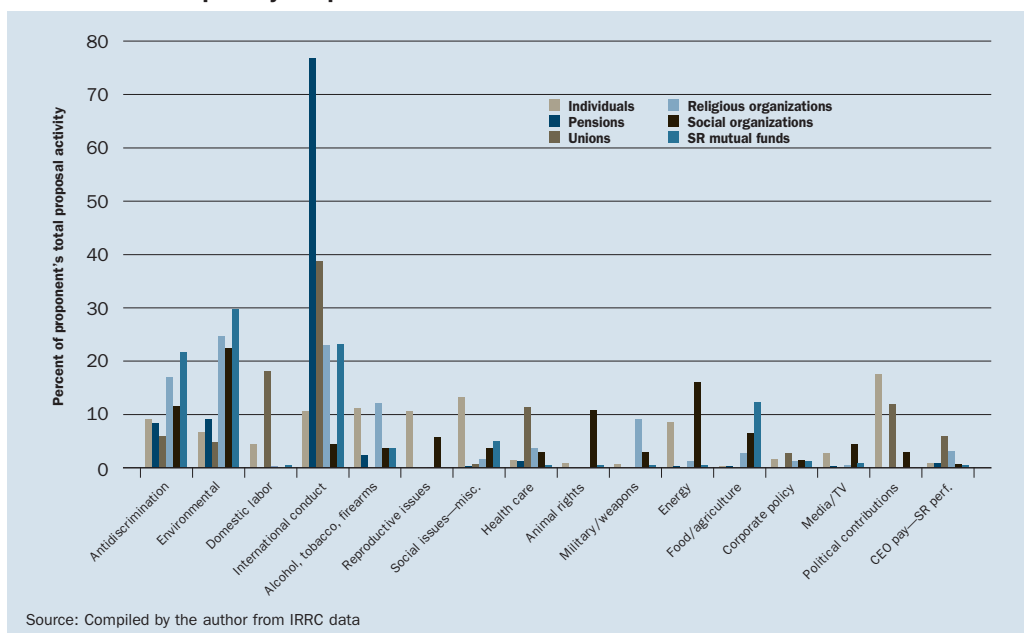
the topic of international conduct, predominantly related to labor issues and antidiscrimination policies overseas. This concentration aligns with another significant area of pension fund proposals, domestic antidiscrimination issues. What explains the activism of pension funds in these areas and not others? These topics are in some ways the least controversial in the socially responsible universe. It is difficult to find a person who would mount an argument in favor of discrimination based on age, race, gender, or other personal characteristics. Since the pension funds pursuing activism are public funds representing government workers in their states, they are subject to the scrutiny of a diverse group of constituents, including state legislatures. It is plausible that this scrutiny would lead pension funds to pursue issues on which there is the most consensus.

Unions sponsor a large number of employment-related proposals (for example, international conduct and domestic labor). Some of these proposals, such as those asking for higher wages in nonunion jobs or better working conditions overseas, can be seen both as a concern for economic justice and as a way to benefit union employment. When the nonunion workers are direct substitutes for union labor, a higher wage for nonunion workers makes the union workers relatively more attractive. In addition, the labor movement began as a social movement and has long included political activism; issues like economic justice and the need for workers to unite to put pressure on corporations to act ethically are part of union history and culture. Thus shareholder activism can be seen as a modern tool in a long history of union activism.¹³

Like pension funds, socially responsible mutual funds serve a heterogeneous group of investors or beneficiaries. Mutual fund investors, however, can directly guide their investments to funds that they prefer—in this case, where their individual preferences include a desire for high performance and some shareholder activism activity. These mutual funds then would be expected to engage in proposals that match the priorities of a range of socially responsible investors. Socially responsible mutual funds do indeed have a diverse strategy, splitting their proposal activity more evenly than pension funds across environmental issues, antidiscrimination, international conduct, and food/agriculture. Implicit in their choice of activism issues and targets is, of course, the motivation to invest in firms that are likely to perform well.

On the question of the type of action requested by activists, recall that shareholder proposals are, for many activists, only one step in a long campaign to effect a change in

Figure 2
Distribution of Topics by Proponent



corporate policies or actions. Therefore, what activists ask for and what they want may be two different things. The design of a shareholder resolution is a strategic one: Ask for too much and you may get nothing, ask for too little and risk leaving your objective unmet. Often activists claim to adopt the latter strategy as a way to open the door to future proposals or dialogue. Given these considerations, it is plausible that activists are asking for some corporate action in their proposals that is less than or equal to their final goal.

With this observation in mind, what are activists asking for? Figure 3 displays the content of shareholder resolutions coded by the requested action. In principle, activists could ask for any of the following actions in their specific proposal:¹⁴

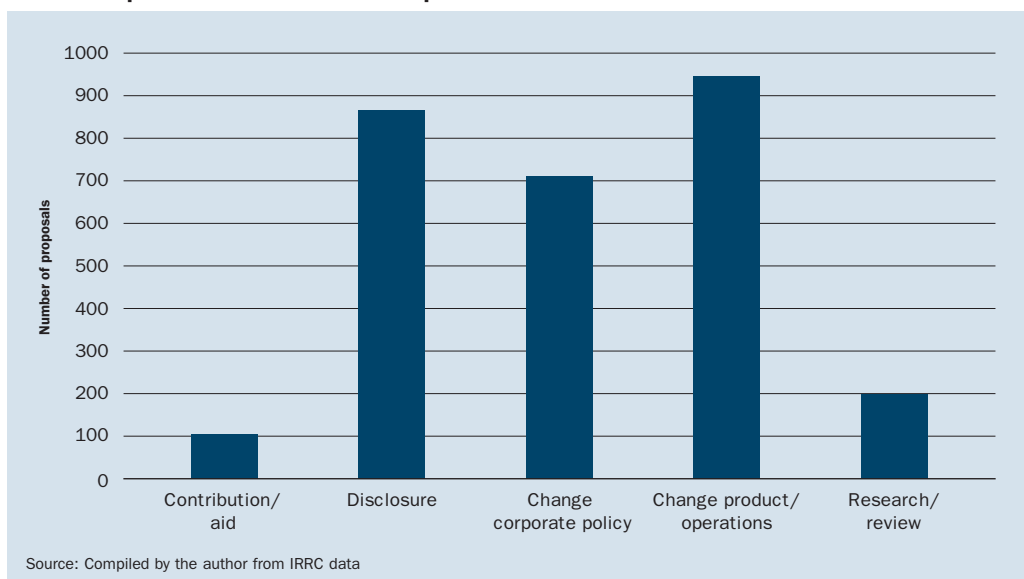
1. make a contribution or extend financial aid;
2. disclose information or issue a report;
3. change a corporate policy unrelated to production or main business;
4. fundamentally change operations, production, or marketing practices, including price; or
5. research or review an issue.

The most common type of action requested is a well-defined change in corporate policy or a fundamental change in operations (items 3 and 4 above). Examples of a requested change in corporate policy are the endorsement of the MacBride Principles (nondiscrimination in Northern Ireland) or a call to increase board diversity. Policy

13. Interestingly, in more recent years (since the end of this data set in 2002), unions have switched their shareholder activism strategy to sponsor corporate governance proposals rather than call for socially responsible firm behavior. See Thomas and Cotter (2005).

14. This categorization was designed by the author and each proposal was assigned an action code based on the description of the resolution supplied by the IRRC.

Figure 3
Action Requested in Shareholder Proposals



changes like this are requests for solid action but do not relate directly to the firm's operations or the selling of its main product. In contrast, a proposal asking Philip Morris to stop selling tobacco products cuts to the core of the firm's business or profits. Other examples of these proposals are a request to reduce carbon dioxide emissions or to change pricing policy to make drugs cheaper in developing countries. Actions requiring a substantive change in production methods or those that fundamentally affect a firm's core business are the most likely to be eligible for omission by the SEC and are hence the least likely to be successful.¹⁵

The second most common proposal type is one requesting disclosure of information that the corporation already possesses, such as an equal employment opportunity report. One of the most common disclosure requests is for information on environmental impact and compliance with the Ceres Principles, a ten-point code of environmental corporate conduct formulated by the Ceres organization.¹⁶ The disclosure proposal typically serves one of two purposes: either as a first step in establishing an issue as worthy of corporate concern or to facilitate monitoring as a follow-up to corporate action.

Much less often, shareholders request that a firm conduct a review of a social issue (for example, gender pay equity or suppliers' labor standards). Implicit in these requests is the ultimate disclosure of information compiled as a result of the review or research process. Finally, about 4 percent of proposals (105 of 2,826) request that the corporation initiate or discontinue contributions to a particular social cause; the most common requests related to reproductive issues. Not surprisingly, perhaps, these requests come from individual investors and religious and social organizations. Pension funds, socially responsible mutual funds, and unions did not sponsor any such proposals during this period, perhaps reflecting a desire to pursue less specific and potentially controversial proposals.

With the exception of the requests for contributions, all shareholder groups proposed all types of proposals with respect to the actions desired on the part of the

corporation. Unions, in particular, focused on disclosure requests related to their interest in labor standards for overseas production operations and corporate political contributions. This information would not otherwise be available, and, without it, no further campaign to change corporate policy or operations could be attempted.

How Successful Are Activists?

It is difficult to observe the success of shareholder activism. True success occurs when the corporation takes the action desired by the shareholder. However, the ultimate goal of proposal sponsors is not always obvious and often is not confined to the action requested in the proposal. For example, an activist asking for a report on radiation emissions may be ultimately trying to get the firm to reduce emissions or perhaps even to close down a plant. In the analysis here, the focus is on the final disposition of shareholder proposals as indicators of activist success: Is the proposal omitted by the SEC? Is it withdrawn by the sponsoring organization? Or is it carried to a vote of shareholders? Finally, does the corporation actually meet the requests for action?

The design of a shareholder resolution is a strategic one: Ask for too much and you may get nothing, ask for too little and risk leaving your objective unmet.

A few more details regarding the resolution process will be helpful in interpreting the data on activist success. The actual filing of a social resolution depends largely on the shareholder or group sponsoring the resolution. Institutional shareholders such as socially responsible mutual funds, pension funds, and religious organizations often attempt a dialogue with the company prior to pursuing a resolution.¹⁷ It is not unreasonable to assume that individuals may e-mail or call to voice their opinions, but the likelihood of a corporate response to such an approach is relatively low versus dialogue with a larger, institutional investor. Thus the fact that a resolution is even sponsored may indicate that initial attempts to change corporate behavior or actions have failed. This possibility suggests that some shareholder activism occurs under the radar and that the analysis of resolution data may understate the success of activists' efforts.

Although neither omitted nor withdrawn resolutions result in a shareholder vote, these two outcomes are very different with respect to assessing activist success. An omitted resolution is one that has been actively challenged by the firm. Moreover, the firm's opinion that this resolution concerns matters that are not within the shareholders' purview is officially supported by the SEC. Effectively, omitted proposals are dead proposals and a clear instance of activist failure at using a proxy proposal to prompt social change. In contrast, a withdrawn resolution usually signals some type of action on the part of the corporation—dialogue, agreement to resolution, or some other compromise. Withdrawal can be viewed as indicating some level of success.¹⁸ Indeed, as shown below, the data support this association as well.

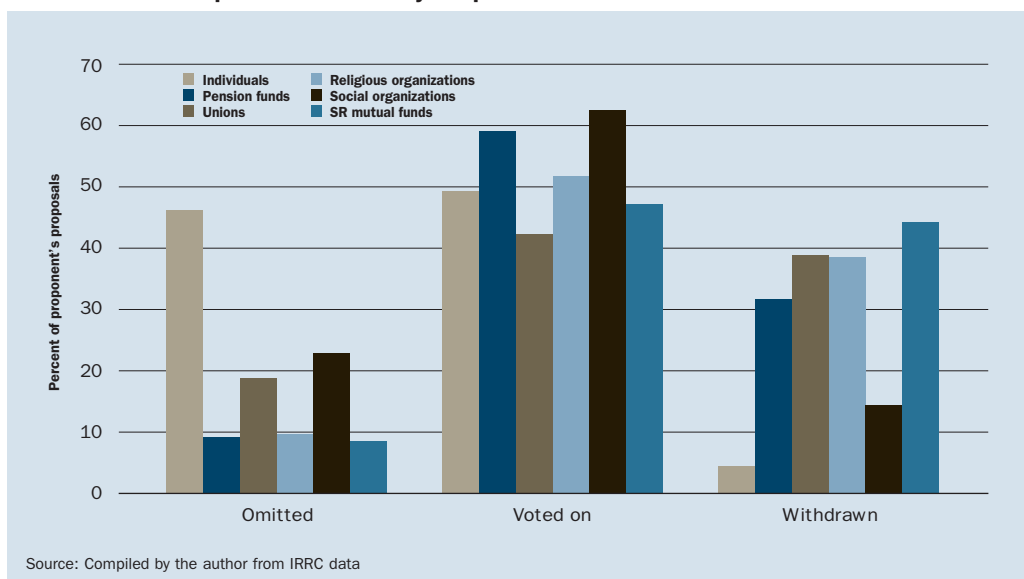
15. The next section includes a discussion of this issue.

16. See www.ceres.org for more information on the Ceres Principles and the Ceres coalition of institutional investors and corporations.

17. For an interesting case study of TIAA-CREF negotiations on corporate governance proposals, see Carleton, Nelson, and Weisbach (1998).

18. Further strengthening this view is the low cost of continuing a proposal through to a vote. The sponsoring shareholder needs only to show up at the annual meeting. Thus, there seems to be no obvious reason for an activist shareholder to withdraw a resolution other than to please firm management in return for some corporate action.

Figure 4
Distribution of Proposal Outcomes by Proponent



The interpretation of proposals that go to a shareholder vote is even less clear.¹⁹ Since a corporation is not bound to enact a shareholder resolution even if it receives a majority of the shareholder votes, there is no reason to think that a vote percentage gives much of an indication of the likelihood of corporate action. Vote percentages can, however, be seen as a measure of the depth of shareholder support, and in this sense higher totals may be an achievement for certain proposals sponsors, buttressing their other efforts for social change and allowing the campaign to continue with resubmission of the proposal in the future.

With these observations in mind, we turn to the data (see Figure 4). Overall, 17 percent of proposals are omitted via petitioning of the SEC. Across proponent groups, individual investors are the least successful when judged by the percentage of proposals omitted. Nearly 45 percent of proposals sponsored by individuals are omitted (as are roughly 20 percent of proposals by unions and social organizations). In contrast, less than 10 percent of proposals sponsored by socially responsible mutual funds, religious organizations, and pension funds are omitted. The low levels of omitted proposals by socially responsible mutual funds and religious organizations are likely the result of their expertise in submitting proposals and choosing targets. Via the ICCR, religious organizations have a great deal of experience running coordinated activism campaigns and thus can be expected to be selective and efficient in their proposal activity. Similarly, socially responsible mutual funds are selling their activism as a service to fund investors, implying that they have a strong profit incentive to be successful.

The higher omission rates partly reflect the topic of the proposals submitted by the sponsoring groups. For example, reproductive issues are sponsored by only individuals and a few social organizations, and 78 percent of these proposals are omitted, most on the grounds of a violation of proxy rules or the ordinary business exemption. And, as mentioned earlier, pension funds tend to sponsor proposals on less controversial social issues.

Interestingly, of the five types of action, proposals requesting a fundamental change in production or operations are the least likely to be omitted (12 percent). This fact might seem surprising given that matters relating to the company's ordinary business operations can be omitted under rule 14a-8. The low omission rate of these proposals may reflect a more nuanced interpretation of the rule via precedent from prior SEC decisions. Many proposals that directly relate to a firm's core business are allowed to continue to a shareholder vote. Examples of such proposals that went to a vote include a proposal to Gerber Foods to eliminate direct advertising of infant formula and a call for General Electric to withdraw from the weapons business.

Roughly half of all proposals (52 percent) are taken to a shareholder vote. Of these, the average level of shareholder support is 8.2 percent while the median is 7 percent. Indeed, only four of the 1,472 proposals in the data set that went to a shareholder vote won the support of more than 50 percent of the shareholders.²⁰ The low vote percentage may reflect little support among the larger group of shareholders or the withheld votes of large institutional investors. Conventional (non-socially responsible) mutual funds and many pension funds and endowments commonly withhold votes on social issues, but this abstention is effectively counted as a vote against the proposal.²¹

Withdrawn proposals account for almost a third of all social proposals. The relative rates of withdrawal across proponent groups are consistent with the supposition that withdrawal of a proposal indicates some dialogue, compromise, or action on the part of the corporations. Individual shareholders and social organizations hold smaller stock positions than organizations like socially responsible mutual funds, unions, or religious organizations. Thus their ability to gain the attention of corporate management is much lower. Indeed, individuals and social organizations have the lowest rates of withdrawal of their proposals, 3 percent and 15 percent, respectively, compared to withdrawal rates of 40 to 45 percent for unions, religious organizations, and socially responsible mutual funds.

A withdrawn resolution usually signals some type of action on the part of the corporation—dialogue, agreement to resolution, or some other compromise—and can be viewed as indicating some level of success.

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19. Voted-on proposals are often resubmitted in subsequent years, indicating a clear lack of action on the part of the corporation following the prior submission. These same proposals, however, disappear from the data at some point; this disappearance may reflect either a satisfactory corporate response or the termination of an activist campaign due to the lack of the potential for success. Thomas and Cotter (2005), using data from SEC filings and press releases, report a corporate response rate of 0.05 percent for voted-on social proposals.
20. Information regarding a corporate response was available for three of these four proposals that received a majority shareholder vote. CBRL Group Inc. (the publicly traded parent company of Cracker Barrel) explicitly adopted the antidiscrimination policy requested in the proposal while the other two firms appear to have substantively undertaken the actions requested. In one case, current JCPenney rules demand "strict compliance with all applicable laws and regulations of the countries of manufacture" after a 1996 proposal to report on labor standards for overseas suppliers. Additionally, while no definitive response of Chase Manhattan Bank (formerly Chemical Bank) was found following a proposal to "support new international financial safeguards" in 1996, the current environment initiatives for JPMorgan Chase include participation in several environmental lending standards.
21. For shareholder proposals related to corporate governance, rather than social responsibility, studies show that the vote totals and the support of institutional investors is much higher. This pattern is not surprising in that governance proposals are aimed at increasing firm value, an objective on which all shareholders are presumed to agree. See Karpoff (1998) for a survey and Thomas and Cotter (2005) for more recent vote totals.

Examples of Proposals by Topic**Diversity/nondiscrimination**

- EEO reports
- Board diversity
- Predatory lending
- Report on glass ceiling
- Domestic partner benefits (both pro and con)
- Sexual orientation nondiscrimination (both pro and con)

Environmental

- Adopt Valdez/Ceres Principles
- Radiation releases
- Greenhouse gases (CO₂ emissions)
- “Pure Profit” environment risks
- Alaska National Wildlife Refuge drilling

Domestic labor

- Workplace standards
- Health and safety policy
- Plant closings

International conduct

- World debt crisis (debt cancellation criteria/policy)
- Foreign operations in Northern Ireland, South Africa, Burma, China, Nigeria, and maquiladoras
- NAFTA
- Labor standards for overseas suppliers
- Child/slave labor
- ILO standards
- Implement MacBride Principles

Alcohol, tobacco, firearms

- Decrease youth smoking, tobacco sales
- Smokefree restaurants
- Gun sales

Reproductive issues

- Contributions to abortion providers
- Contraception warnings

Social issues—miscellaneous

- Matching shareholder gifts
- Charitable contributions (both pro and con)
- Social criteria for financial decisions

Health care

- Health care policy and reform
- Drug pricing/restraint
- Marketing of infant formula

Animal rights

- Animal research

Military

- Foreign military sales and contracts
- Star wars/space weapons
- Land mine production
- Economic conversion of military assets
- Criteria for military contracts

Energy

- Energy conservation
- Nuclear plants (information and closure)
- Sustainable energy policy
- Alternative power sources

Food

- Genetically modified food (label, report, phase out)
- Milk, dairy pricing

Corporate policy

- Implement ethical criteria for board outsiders
- Money laundering
- Corporate tax benefits and subsidies

Media

- Reduce television violence/raise broadcast standards
- Eliminate negative images in marketing ads

Political issues

- End or disclose political donations
- Affirm nonpartisanship
- Enact shareholder vote on political donations

Executive pay—tie executive pay to

- Social performance
- EEO record
- Health care quality
- Overseas labor standards
- Reduction in teen smoking

In an effort to obtain a clearer picture of the effects of corporate activists and the type of success that is represented by a withdrawn proposal, the interaction between firm and proposal sponsors was researched for the 859 withdrawn proposals. Web sites (of both proponents and firms), Google searches, newspaper databases, and direct contact with proposal sponsors yielded information on 298 (35 percent) of these withdrawn proposals. Given the tendency of proponents to trumpet successes and hide failures and the tendency of the media to find corporate action more newsworthy than proponents who back down from proposals, this sample of 298 proposals likely contains a high percentage of corporate response. This likelihood provides a lower bound on the number of withdrawn proposals that were successful (in the sense that corporations responded sufficiently to prompt a withdrawal) and an upper bound on the activists' success rate. With an appropriately broad definition of "successful," including any corporate response, dialogue, or action, the absolute number of successes is likely higher while the success rate overall is likely somewhat lower.

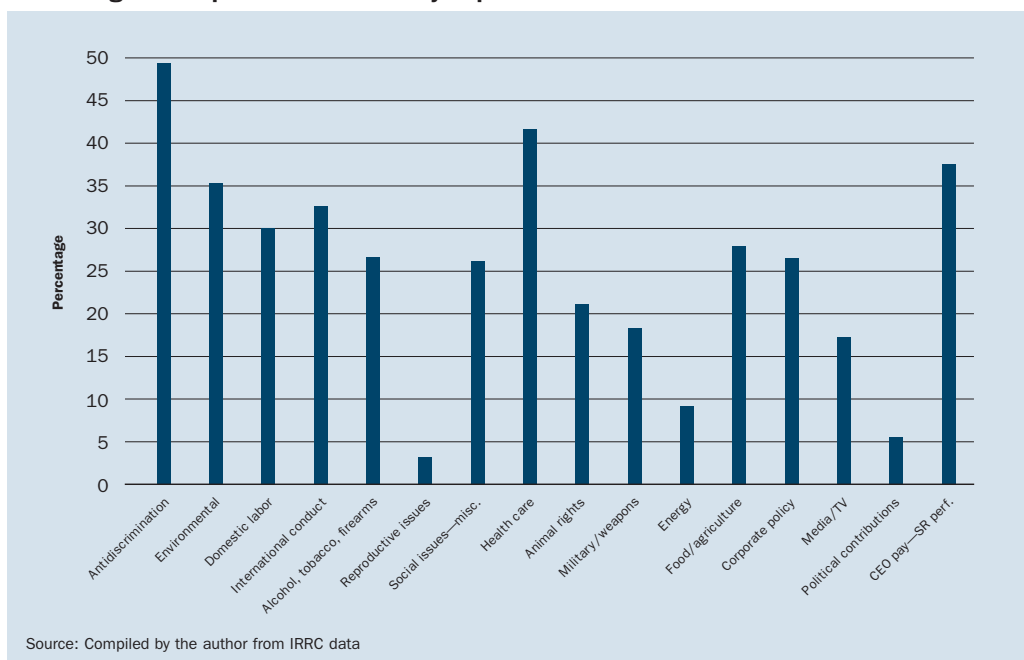
The total impact of CSR activism is quite difficult to measure but likely larger than the estimates provided here.

In 79 percent of the 298 withdrawn resolutions for which follow-up information was obtained, the final outcome was a concrete action on the part of the firm. In most of these cases the firms agreed to take the action requested by the shareholder, whether it was, for example, to implement the MacBride Principles, withdraw operations from Burma, or release U.S. Equal Employment Opportunity Commission (EEOC) data. Another 19 percent of the resolutions resulted in dialogue between activists and the firm without any commitment to action on the part of the firm. This outcome may be interpreted as a concession by activists in some sense since the firm did not change its behavior during the observation period. Activists, however, often argue that dialogue is a positive step and leads to future changes in corporate behavior. Indeed, the data reveal several cases in which prolonged dialogue resulted in eventual action on the part of the firm. In only three cases was there a report of no interaction between the activist and the firm after a proposal was withdrawn. These data support the idea that withdrawn proposals can be viewed as activist successes.

Therefore, 30 percent, the percentage of withdrawn proposals in the entire data set, is a reasonable lower bound on the rate of success of socially responsible shareholder activists. If the analysis is restricted to only the nonomitted proposals, this success rate increases to 36 percent of the proposals that might have gone or did go to a vote. Moreover, among the withdrawn proposals some evidence was uncovered of positive corporate responses (action) following shareholder votes even though these votes are not binding and did not reach majority status in any case. This finding further increases the estimate of activist success.

But how should we interpret this success rate? Is it high? One possible comparison is to shareholder proposals requesting corporate governance reforms. These proposals request changes in executive compensation, antitakeover measures, and board structures, among others. Chidambaran and Woitke (1999) analyze withdrawn corporate governance proposals and find that only 17.6 percent of governance proposals are withdrawn compared to 43.5 percent of social proposals in their sample period (1989–95). Used as a measure of firm response or action, these higher levels of withdrawals for social proposals are not surprising. Governance proposals directly relate to corporate control and, in some cases, the compensation of top management.

Figure 5
Percentage of Proposals Withdrawn by Topic



Firm management would plausibly be less likely to acquiesce on these issues that directly affect their status and livelihood.²²

Using the withdrawn status of a proposal as a measure of activist success, one can construct a rough measure of activists' success rate given the topic of their proposal.²³ Figure 5 illustrates the percentage of proposals withdrawn for each of the sixteen proposal topics. Antidiscrimination proposals are the most effective or successful. Roughly half of all these proposals are withdrawn likely because they often call for a relatively low-cost response, such as a statement of nondiscrimination policy or a release of information regarding EEOC practices (which is merely a public disclosure of information the firm is required to report to the EEOC). The figure clearly shows, however, that activists are successful and able to effect some corporate change in a wide variety of categories. The only topics in which activists have a success rate less than 10 percent are reproductive issues, energy, and political contributions.

Conclusion

Enticed by the economic power corporations wield, many social activists and organizations have embraced the potential for corporations to be agents for social change. Pursuing this goal through shareholder proposals and the corporate ballot box has often been a successful strategy, especially for religious organizations, unions, and socially responsible mutual funds. When sponsored by these organizations, 40 to 45 percent of proposals during the 1992–2002 period were withdrawn, likely indicating some type of corporate response. For the 35 percent of withdrawn proposals for which information on the activist-firm interaction could be located, almost 80 percent resulted in a concrete corporate response, including either an ongoing dialogue with the sponsoring group or the implementation of the proposal itself.

To maximize the impact of their campaigns, activists most commonly target large, well-known corporations. Achieving a corporate response from these firms increases publicity and puts pressure on competitor firms to follow suit in order to avoid negative publicity and yield a potential competitive advantage to their rivals. For example, in 2004 Bank of America and Citigroup, facilitated by the Rainforest Action Network, competed to formulate increasingly comprehensive and strict climate change policies. Thus the total impact of CSR activism is quite difficult to measure but likely larger than the estimates provided here.

As discussed, social responsibility is not universally accepted as a desirable objective for corporate decision making. Perhaps the most telling development regarding the increasing power of CSR activists is the new phenomenon of anti-CSR shareholder proposals.²⁴ What was once taken as a given—that the sole objective of corporate management was to maximize the profits of the firm—is now clearly in doubt.

22. Carleton, Nelson, and Weisbach (1998) find that TIAA-CREF, the pension fund for university faculty and administrators, was very successful in negotiating with firms to adopt governance changes during the period 1992–96. Seventy-one percent of firms they targeted with proposals took action prior to a shareholder vote; however, these proposals concerned the relatively less contentious issues of board diversity, the issuance of blank check preferred stock, and confidential voting.

23. This measure does not include the proposals that were voted on by shareholders, which cannot be confidently assessed as either successes or failures.

24. The Free Enterprise Action fund has targeted several corporations in an effort to eliminate CSR policies and programs. See www.freeenterpriseactionfund.com/advocacy.html.

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How Resilient Is the Modern Economy to Energy Price Shocks?

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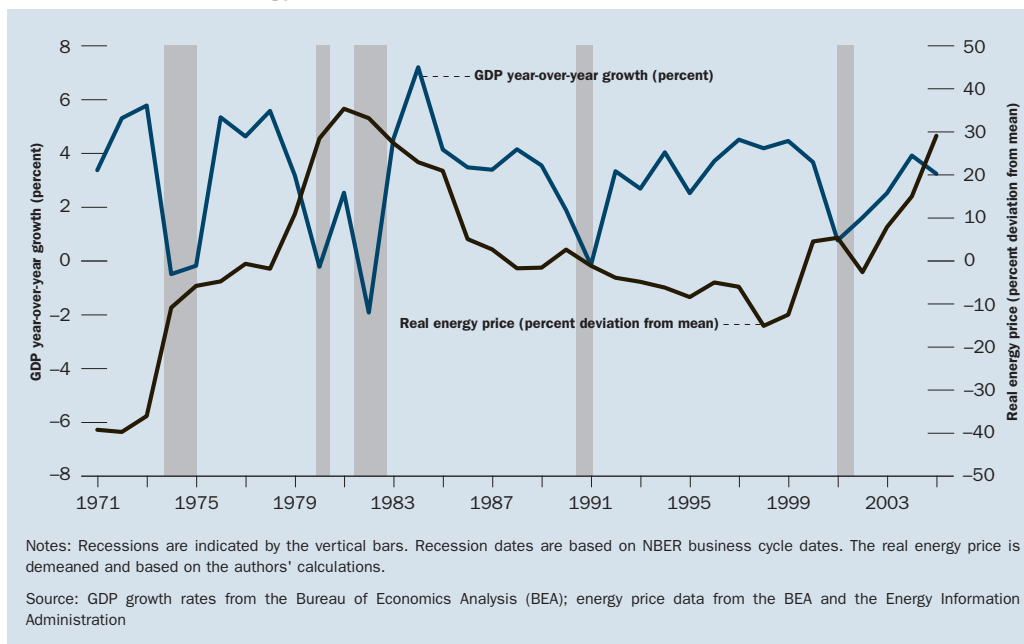
Economists and policymakers alike have noticed the striking correlation between energy prices and U.S. business cycles. Since 1973 every recession has been preceded by a rise in energy prices (see Figure 1). Conversely, almost every energy price hike has been followed by a recession. A large literature confirms this casual observation of energy prices driving business cycles with econometric methods, including Rasche and Tatom (1977), Hamilton (1983, 2003), Rotemberg and Woodford (1996), and Hamilton and Herrera (2004).¹

Despite the empirical link between energy prices and business cycles, the existing literature on dynamic stochastic general equilibrium (DSGE) models has either abstracted from modeling energy or found little effect of energy price shocks on the macroeconomy. Finn Kydland and Edward Prescott, who are the pioneers of studying business cycles in the DSGE framework, showed in their seminal paper (Kydland and Prescott 1982) that a large share of business cycle fluctuations is accounted for by using one single exogenous shock, total factor productivity. Given that they had abstracted from modeling energy use, Kim and Loungani (1992) add energy use on the firm side and a second exogenous shock, the energy price, to the Kydland and Prescott framework. They confirm the original finding that productivity shocks still explain a major portion of business cycle fluctuations.²

Both views—that of the DSGE-type researchers who claim that energy price shocks do not matter and that of the empiricists who claim that these shocks are the primary reason for business cycles in the United States—are not entirely convincing. On the one hand, it must have been a very unfortunate coincidence for theorists that the weak productivity observed in 1973–74 and 1979–82 occurred right after the energy price shock. On the other hand, the empiricists would have to address why in 1986, when energy prices declined sharply, we did not observe a major boom in the economy.

Mork (1989), who investigated the 1986 anomaly, shows that an asymmetric effect of energy price increases and decreases exists: The frictions in the economy

Figure 1
Growth Rates and Energy Prices



cause a negative effect on growth if energy prices go up but provide no benefit when energy prices decline.³ However, the empiricists still need to address why the recent run-up in energy prices has not caused a recession or even a slowdown so far. Real gross domestic product (GDP) has grown at a solid 3.5 percent rate since the end of 2002 whereas energy prices have risen by a magnitude similar to that observed in 1979.

One potential explanation for this lack of energy effects would be the low energy intensity of the modern economy. For example, energy use measured in British thermal units (BTU) per dollar of real GDP in 2005 is about half of the value observed in the 1970s. But this share argument is still unsatisfactory: If the impact of an energy price shock is proportional to the energy intensity, we should still have observed half of the drop observed in the 1970s, which certainly would have made for a severe growth slowdown, if not a recession. It is difficult to characterize growth of 3.5 percent over the past few years as being below trend by any metric.

Who is right—the empiricists who claim that energy price hikes have strong and significant effects on business cycles or the DSGE economists who claim that it is mostly productivity that matters? This article will reconcile the two competing views in the following manner. The DSGE-type explanation remains intact if we construct a “proper” series for productivity or Solow residuals by explicitly taking into account energy use in the production function, which has been absent from standard productivity accounting exercises done before. In particular, these productivity shocks continue to be the prominent force behind business cycles. However, during the years 1970 to 1985, productivity itself was negatively affected by energy price hikes. In the model constructed here, a Kim and Loungani-type economy, we allow for a negative correlation between energy price shocks and productivity based on our empirical evidence from 1970 to 1985. This simulation experiment confirms the findings of the econometric literature that energy price shocks reduced real output

growth prior to 1985. The correlation between energy price shocks and productivity disappeared completely after 1985. Our model simulation incorporating this lack of correlation explains why in 1986 there was no major increase in growth rates and, most important, why there was no recession in 2005. Therefore, we conclude that the modern economy, represented by the period after 1985, is very resilient to energy price increases.

Constructing the Model

The model used here is based on a version of the DSGE model in Kim and Loungani (1992) that incorporates energy use on the firm side as well as a stochastic process for energy prices.

Throughout the article, the term “energy price” refers to the price of energy relative to other goods. The process for the price of energy P varies exogenously over time. Specifically, we assume that energy prices follow an autoregressive moving average (ARMA) process of the following form:

$$(1) \log P_t = \rho_p \log P_{t-1} + \varepsilon_{p,t} + \rho_\varepsilon \varepsilon_{p,t-1},$$

where the shocks $\varepsilon_{p,t}$ are normally distributed with mean zero and standard deviation σ_p . This specification is standard in the literature.⁴

The model economy has a representative household that obtains utility from consuming C and disutility from working H hours. Specifically, we assume that at any time t the household obtains period utility,

$$(2) u(C_t, H_t) = \phi \log C_t + (1 - \phi) \log(1 - H_t),$$

where ϕ is the weight the household puts on consumption. Over time the household discounts period utility at a constant rate β , with $0 < \beta < 1$. Thus, the household maximizes expected discounted utility:

$$(3) U = E \sum_{t=0}^{\infty} \beta^t u(C_t, H_t).$$

The model economy also has a representative firm that has three inputs, labor H , the service flow from physical capital K , and energy E_f . The firm purchases its energy input at relative price P . We choose the following form for the production function:

$$(4) Y_t = Z_t H_t^{1-\alpha} \left[\eta K_{t-1}^\psi + (1-\eta) E_{f,t}^\psi \right]^{\alpha/\psi},$$

which is standard in the literature (see Kim and Loungani 1992 and Dhawan and Jeske 2006). Our functional form implies that the elasticity of substitution between capital and energy is $1/(1 - \psi)$. Thus, if we choose $\psi < 0$, capital and energy will be

1. See Hamilton (2005) for an exhaustive list of references.
2. Dhawan and Jeske (2006) include household energy use and durable goods consumption and confirm the Kim and Loungani results. Leduc and Sill (2004) add monetary shocks and nominal wage and price rigidities but find that energy price shocks still do not play a major role.
3. Mork conjectures that a model like Hamilton's (1988) can produce an asymmetry in the energy price response.
4. The following section will elaborate on the time series properties of energy prices that justify this particular functional form.

complements. In addition, the firm is subject to an exogenous productivity shock Z , also called total factor productivity (TFP), as is the norm in the literature. Kydland and Prescott's (1982) seminal research views business cycle fluctuations as the result of movements in TFP. We assume that the Z evolves according to

$$(5) \log Z_t = \rho_z \log Z_{t-1} + \varepsilon_{z,t},$$

where the shocks $\varepsilon_{z,t}$ are normally distributed with mean zero and standard deviation σ_p . We do not include a constant term because we assume that the model is scaled in such a way as to make log productivity equal to zero on average.

We make a distinction between the service flow of capital and the investment. The entire stock of capital K is used in the production function while investment shows up in the national income and product accounts as the spending on new capital stock. The stock K and capital investment I_k are related via the following equation:

$$(6) \bar{K}_t = (1 - \delta_k) \bar{K}_{t-1} + I_{k,t},$$

where δ_k is the annual depreciation rate of physical capital.

To close the model we assume investment in fixed capital I_k as well as consumption C , and energy expenditures $P \cdot E_f$ are all financed by current production Y . The numerical techniques involved in solving the model are beyond the scope of this paper. We refer the interested reader to Dhawan and Jeske (2006).

Calibration and Time Series Properties of Shocks

The next step is to calibrate this model economy to match data measured at an annual frequency. Calibration means matching the steady state ratios such as K/Y , I_d/Y , hours worked H , and so on to the characteristics in the U.S. data between 1970 and 2005.⁵ The specifics of the calibration exercise are in Dhawan and Jeske (2006), and the exercise produces the parameter values shown in Table 1.⁶

An integral part of this model is the calibration of the shock processes. We now study some time series properties of the two shock processes for energy prices P and productivity Z . This analysis will guide us in finding realistic specifications of the shock processes used to simulate the dynamic model. We start by estimating a stochastic process for energy prices. The series for annual energy prices comes from the Energy Information Administration (EIA). We take the total nominal energy spending (household plus firm level) and divide by the total energy consumption in BTUs to obtain a series for the nominal energy price per unit of energy for 1970–2005. We then divide this series by the GDP deflator to obtain the real relative energy price P .⁷

Estimating the ARMA(1,1) process in equation (1) via the maximum likelihood method, we find that

$$(7) \log P_t = 0.8784 \log P_{t-1} + \varepsilon_{p,t} + 0.5256 \varepsilon_{p,t-1}.$$

(9.6114) (2.6150)

The t -statistics are in parentheses below the point estimates, and $\varepsilon_{p,t}$ has a standard error of 0.0753. Finding a statistically significant parameter estimate on the lagged shock (the moving average part of the ARMA) is consistent with the findings in Kim and Loungani (1992) and Dhawan and Jeske (2006), who also use an ARMA process for their energy prices. One can show that estimating only an AR(1) process, thus dropping the regressor $\varepsilon_{p,t-1}$, generates serially correlated error terms.

For this estimated ARMA process, an innovation ε_p of one standard deviation would, all other things being equal, raise energy prices by 7.53 percent in the current year and by 10.6 percent in the following year before slowly decaying after that. The reason that energy prices rise for two periods in a row is that the moving average term $\rho \varepsilon_{p,t-1}$ also shocks next period's energy price, and that effect is stronger than the decay of the initial shock.

Another ingredient in the model is the stochastic process for productivity Z . From the production function above, we back out the values of Z from the following equation:

$$(8) \quad Z_t = \frac{Y_t}{H_t^{1-\alpha} [\eta K_{t-1}^\psi + (1-\eta) E_{f,t}^\psi]^{\alpha/\psi}},$$

where we use the time series for annual real GDP from the Bureau of Economic Analysis (BEA) for Y and the index for “Nonfarm Business Sector: Hours of All Persons” from the BLS for H . As a measure for the capital stock K , we use the BEA's estimate of the “Net Stock of Fixed Assets.” Moreover, we subtract the BEA series for household nominal energy expenditures from the EIA total nominal energy expenditures series. We then divide by the price per BTU to compute real firm energy usage. With this measure we generate a time series Z_t for productivity from 1970 to 2005.⁸

The essential points of this article will be made by emphasizing that slightly different formulations of the productivity process generate vastly different results in the response of output to an energy price shock. We start with the most basic specification in equation (5), using Z as measured in equation (8) and estimate it via ordinary least squares to obtain the following equation:

$$(9) \quad \log Z_t = 0.8083 \log Z_{t-1} + \varepsilon_{z,t},$$

(8.3768)

where the error terms $\varepsilon_{z,t}$ have a standard deviation of 0.0126.⁹

Typically, when simulating the model one assumes that the innovations to the two shocks P and Z are independent. To check whether this assumption is adequate, we back out the residuals necessary to generate the observed paths for energy prices and productivity. In specification A, the two residuals display a sizable negative correlation of about -0.5 , as shown in Figure 2. Thus, the independence assumption is clearly violated, and feeding these shock processes into the model will miss an important link between energy prices and productivity.

Table 1
Calibrated Parameters

α	0.3600
β	0.9606
ϕ	0.3382
η	0.9940
ψ	-0.7000
δ_k	0.0656

5. For a formal exposition of a calibration process, see Cooley and Prescott (1995).

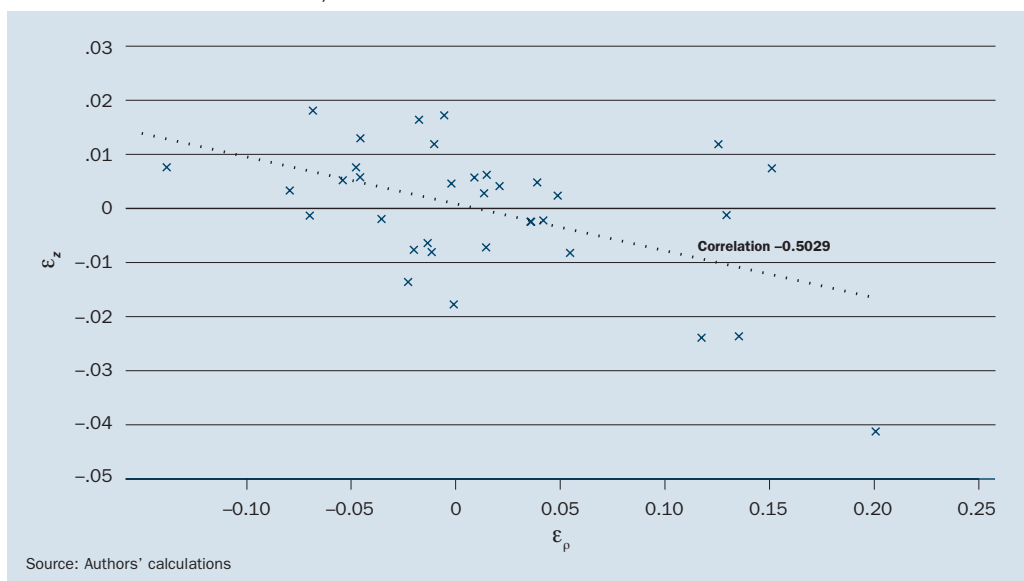
6. This model corresponds to model E-I in Dhawan and Jeske (2006), though on an annual basis. We also performed a sensitivity analysis along the energy share in the economy, which declined over the 1970–2005 period. We find that the numerical results are robust to this decline in energy share.

7. This is the series plotted in Figure 1.

8. This exercise also requires knowledge of the parameters α and ψ . We use the values as specified in the calibration above.

9. Cooley and Prescott (1995), using quarterly data, find $\rho_z = 0.95$, $\sigma_z = 0.007$, which corresponds to $\rho_z = 0.81$, $\sigma_z = 0.014$ on an annual basis, almost identical to our results.

Figure 2
Scatter Plot for Error Terms, 1970–2005



What is the source of the negative correlation between shocks? To investigate this question, we first plot the error terms for the two different subsamples (1970–85 and 1986–2005) in Figure 3. Notice that in the pre-1985 subsample the two error terms display an almost perfect negative correlation (−0.8618) while in the second subsample the correlation is essentially zero (0.0039). Consequently, we estimate another specification in which shocks in the energy price process are allowed also to spill over to the productivity process. Specifically, we regress current productivity not just on lagged productivity but also on the current shock from the energy price equation, multiplied by an indicator variable for the years before 1985. In other words, $\epsilon_{p,t}$ is included as an additional regressor, which is the error from the price equation times an indicator variable $I(t \leq 1985)$:

$$(10) \log Z_t = 0.8238 \log Z_{t-1} - 0.1915 \epsilon_{p,t} I(t \leq 1985) + \epsilon_{z,t}.$$

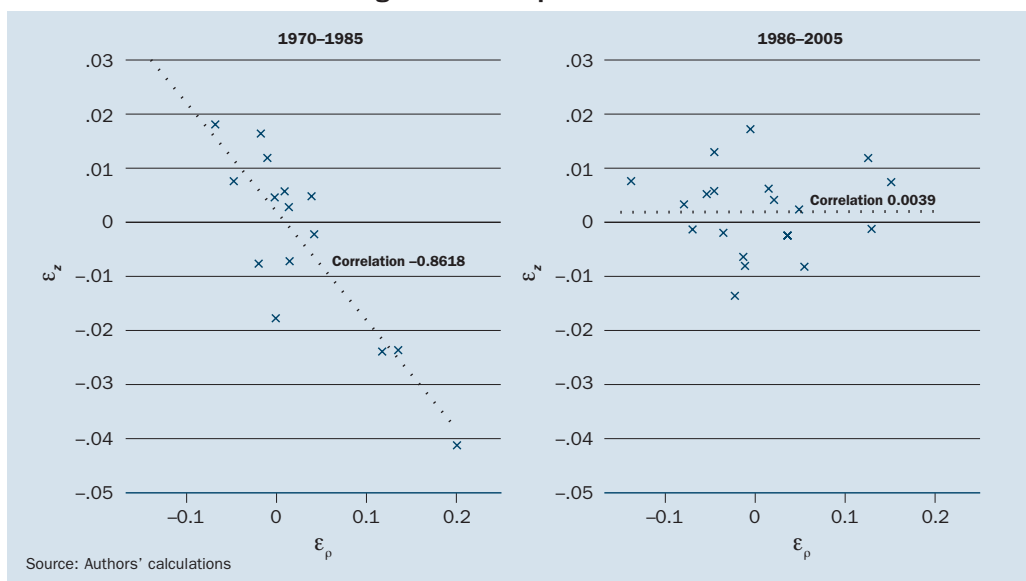
(12.8555)
(-6.6480)

According to our estimates, the coefficient on the spillover term is significantly negative; that is, a rise in energy prices was associated with lower productivity before 1985. Even though the coefficient may appear to be small in absolute value, the spillover effect from energy prices to productivity is substantial. To see this effect, consider the following example. A positive innovation to energy prices by one standard deviation reduces productivity by about 1.5 percent, or about 1.76 times a standard deviation of the productivity shock. Thus, according to our estimates, energy price shocks determine most of the fluctuations prior to 1985.

A Discussion of the Results

The model is simulated by feeding in the shock processes for energy prices and TFP. Specifically, we perform experiments for two alternative specifications of the TFP process. Specification A uses the estimated process above without the correlation term while specification B includes the correlation term. The specifications are as follows:

Figure 3
Scatter Plot of Error Terms during Two Subsamples



Specification A: $\log Z_t = 0.8238 \log Z_{t-1} + \varepsilon_{z,t}$ (post-1985);

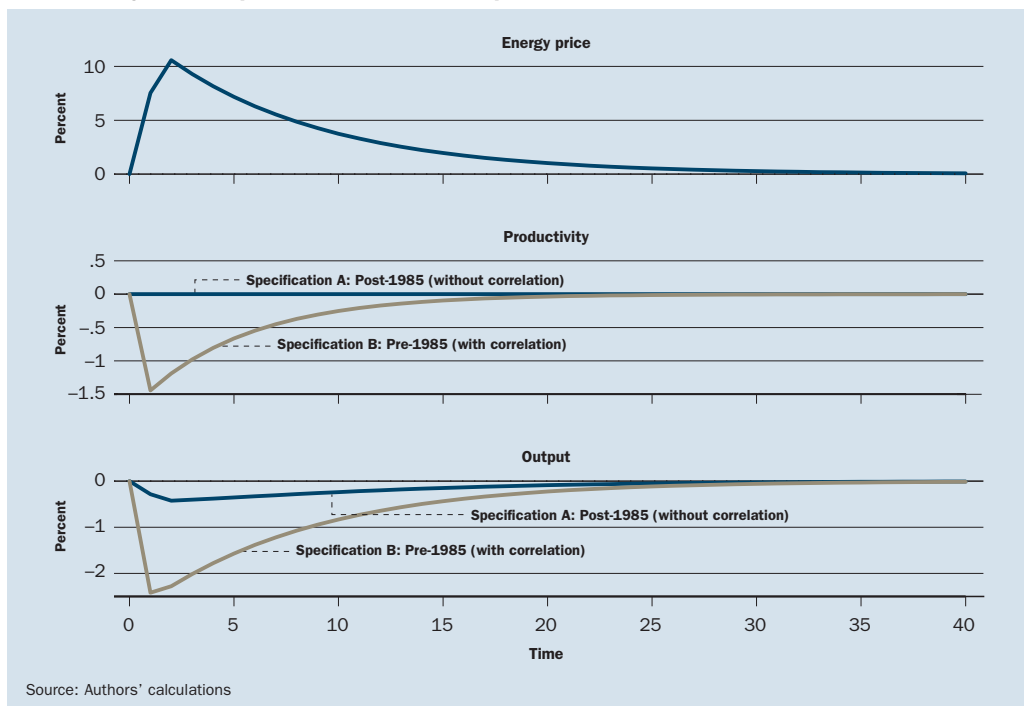
Specification B: $\log Z_t = 0.8238 \log Z_{t-1} - 0.1915 \varepsilon_{p,t} + \varepsilon_{z,t}$ (pre-1985).

We then report impulse response functions to an energy price shock over a time horizon of forty years under the two alternative specifications. The philosophy behind impulse response functions is as follows. The model constructed earlier was calibrated to match steady state properties to those observed in the data. At the steady state, all disturbances or shocks to the system are set to zero by definition. From this equilibrium state, the model is subjected to a shock, in this case an energy price shock, and the model's response for key variables is tracked over time.¹⁰ One can view this exercise as an economic laboratory experiment, studying the response to one shock while switching off all other noise in the economy.

We are primarily interested in the response of output to an energy price increase and therefore report the output impulse response functions to a positive one-standard-deviation shock to energy prices. This shock translates into a 10.6 percent hike in the energy price. The top panel in Figure 4 displays the path for the energy price following this one-time shock. Notice that because of the ARMA(1,1) structure, the price increases for two periods before it decays toward its old value in steady state. The middle panel displays the effect on total factor productivity Z based on the two alternative specifications, as detailed in the previous section. Notice that the impulse response for Z is entirely due to the energy price shock and not its own innovation $\varepsilon_{z,t}$, which we set to zero along the transition path. Therefore, TFP (Z_t) stays at zero for specification A, where energy price innovations had no effect on productivity. In

10. Technically, this procedure means that one solves the first-order conditions to find the decision rules using an appropriate numerical approximation method. Iterating over the decision rules when given a shock generates the desired impulse response functions.

Figure 4
A One-Time Positive Energy Price Shock and Its Effect on Productivity and Output for Two Different Specifications of the TFP Process

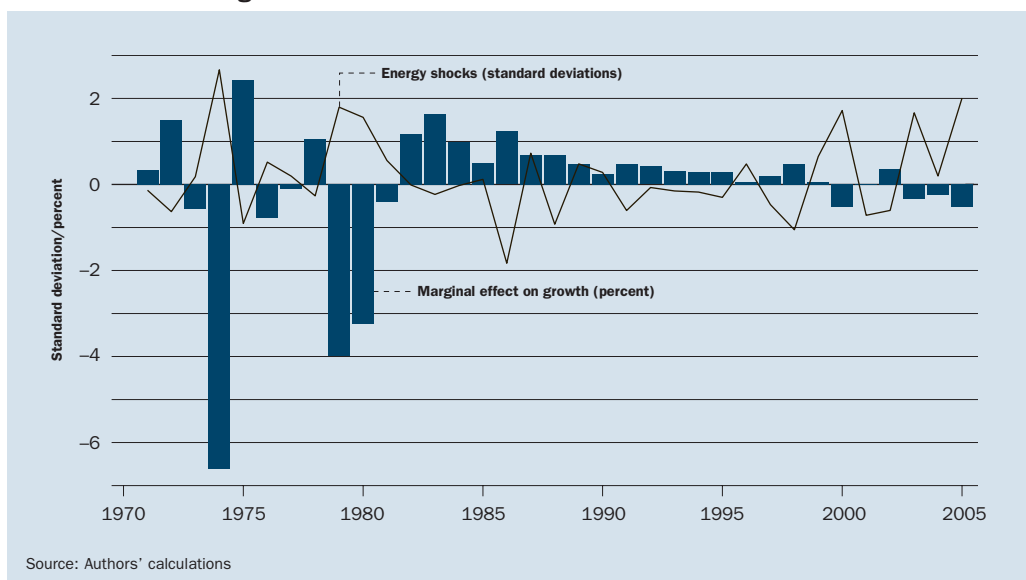


specification B, however, productivity drops dramatically because of the correlation and its negative implications on TFP, as described in the previous paragraph.

The lower panel in Figure 4 plots the drop in output caused by this energy price hike. Notice that the energy price hike does not cause any major output drop in specification A because there is no effect on the TFP process. The biggest drop occurs in the year after the initial energy price hike but amounts to only a 0.43 percent drop in output before converging back to zero. This result is consistent with previous research showing that DSGE models with energy use do not produce major output fluctuations if energy price shocks are uncorrelated with TFP.¹¹

Under specification B, however, output drops by almost 2.4 percent. Even eight years after the shock, output is still 1 percentage point below the level where it would have been without the energy price shock. The technical reason for this big and persistent effect is that the energy price shock substantially reduces TFP, which in turn affects output. Recall from the calibration section that for the 1970–85 period, a positive one-standard-deviation shock to the energy price equation, given the spillover effect, is equivalent to a -1.76 standard-deviation shock to TFP, which is big enough to drag down GDP substantially. Hence, the impulse response function in specification A can be interpreted as the outcome of energy price hikes in an economy set to match data characteristics after 1985; similarly, specification B is for an economy with characteristics from 1970 to 1985. The fact that energy price hikes were associated with major recessions in 1973 and 1980, but seemingly did not have any major output effect in the most recent episode from 2002 to 2005, is thus entirely consistent with our modeling structure.

Figure 5
**Estimated Standardized Energy Price Shocks and
 Their Estimated Marginal Effect on Growth Rates**



So what do these results mean in regard to the question posed in the article's title? In the context of our model, the economy today is far more resilient to energy price hikes than it was before 1985. Even a major energy price hike—caused by, say, a two-standard-deviation shock to the energy price process in equation (1)—represents a drag of a mere 0.8 percentage points in the second year of the impact in the modern era (defined as 1985 to 2005). If the negative correlation observed in the 1970s had prevailed, this price hike would have caused a precipitous 4.8 percent drop in output.

We can also use the model to determine the marginal impact energy prices had on growth between 1970 and 2005. In other words, how have the “observed” energy price shocks between 1971 and 2005 affected output growth in these thirty-five years? To answer this question, we generate a total impulse response function, that is, not with one single shock but with the thirty-five energy price shocks $\epsilon_{p,t}$ one after the other, as derived from our ARMA(1,1) estimation. Consequently, the impact of energy price changes in each year is the impact of the current year shock in addition to the impact from all lagged shocks. In this simulation we assume that specification B for the technology process prevails, that is, the pre-1985 era, when there is a negative spillover from energy price shocks to the technology. After 1985 technology is unaffected by energy prices because the indicator variable in the regression equation (10) is zero. Figure 5 plots the standardized energy price shocks $\epsilon_{p,t}$ and their marginal impact on output growth rates predicted by the model.

11. Specifically, Kim and Loungani (1992) show that energy price shocks do not produce a sizable fraction of business cycle fluctuations. Dhawan and Jeske (2006) show that modeling durable goods on the household side even softens the impact of energy price shocks because households have more margins to adjust their behavior. Particularly, households reduce new durable goods investment sharply to cushion the fall in fixed-capital investment, which mitigates future output losses.

Table 2
Growth Rates: Actual versus Counterfactual

	Actual (percent)	Counterfactual (percent) ^a
2003	2.51	-1.08
2004	3.91	3.98
2005	3.22	-0.64

^a For the counterfactual growth rate, energy price shocks affect TFP.

drop was 0.2 percent. The model simulation reveals that the growth rate that year would have been 3.2 percentage points higher, well outside of recession territory, if there had been no energy price shocks.

After 1985, however, energy price shocks had a much smaller effect on output growth rates. The simulation implies that energy prices did not play any role in the 1991 and 2001 recessions. The most recent run-up in energy prices, while quite dramatic, with three positive energy shocks in a row from 2003 to 2005, did not cause an obvious reduction in real GDP growth. The cumulative impact of energy price shocks on 2005 growth has been a mere 0.5 percentage points. The energy shock in 1980 (and 1979), about equal in magnitude to those observed in 2003 or 2005, did far more damage, as discussed previously.

We can also ask how much damage the energy price hike from 2002 to 2005 would have done had there still been the same type of negative correlation between TFP and energy price shocks as observed in the data before 1985. To answer this question we compute the marginal impact on output growth of energy price shocks, as discussed earlier, but assume that beginning in the year 2003 the economy reverts to the same shock process as observed in the pre-1985 era; namely, TFP is negatively affected by energy price shocks $\epsilon_{p,t}$. Table 2 reports growth rates for GDP for 2003 through 2005 under this scenario. The first column is the actual growth rate as reported by the BEA. The second column is the growth rate under the assumption that TFP is negatively affected by energy price shocks, the same way it had been before 1985.¹² Had the TFP process been of the same structure as before 1985, the recent energy price hikes would have dragged the economy into recession both in 2003 and 2005. Thus, the correlation between energy price shocks and TFP makes all the difference, and recessions would likely have occurred in 2003 and 2005, while without the correlation, the economy showed resilience to energy price shocks.

So far we have stated only statistical facts about a spillover from energy price hikes into reduction of TFP. We have not developed any theory about the causes for a negative correlation between technology and energy price shocks before 1985. One can view this negative correlation as a reduced form representation for other omitted factors in the model. For example, Hamilton (1988) develops a model with multiple sectors in the presence of frictions for reallocating production inputs, primarily labor, between sectors. If energy prices have a differential effect on sectors, the economy has to spend a sizable amount of resources to overcome these frictions. This explanation, of course, raises a question about why these frictions suddenly disappeared after 1985.

An alternative explanation for energy price hikes having vastly differential effects on growth in the two subperiods is that different policies were in place to address the price hikes. Most notably, the 1970s were marked by price controls on energy from 1973 to 1981 and wage controls during the Nixon era. Not surprisingly, during the oil

Evidently, energy price hikes had very adverse effects on growth in 1974, 1979, and 1980, knocking multiple percentage points off output growth rates. For example, energy price shocks reduced output growth in 1974 by an estimated 6.6 percent, meaning that in the absence of energy price shocks, output growth would have been more than 6 percent instead of the actual 0.5 percent decline. Likewise, in the recession year 1980, the actual output

shocks in both 1973 and 1979, gasoline was rationed, while after 1985 prices were allowed to move more freely. Evans (1982) studies the impact of general price and wage controls (not during the 1970s but during World War II) and finds that they caused a substantial output loss.

One can see how price controls have negative effects on productivity. In a market without price controls and any other frictions, the price of a good like oil or a service like labor provides an efficient way of rationing scarce resources because the market allocates them to the most productive use. Specifically, only those firms with the highest productivity are willing to hire workers and purchase energy at a given market price. If, by contrast, the price is not allowed to work as an allocation mechanism, inputs may be used by inefficient firms. For example, if there are lines at the gas pumps, those agents who are the most patient or just plain lucky get the gasoline, while the most productive agents may either get no gasoline or waste precious time and resources while waiting in line. This situation affects businesses directly if they purchase gasoline but also indirectly if it creates uncertainty about whether employees arrive at work on time. If the rules of supply and demand are suspended, then idled resources and misallocation of energy lead to less productive use of energy, which shows up as lower productivity or TFP.

If indeed all of the differential impact on growth is due to price controls, an implication from our model is that price controls not only harm output growth, but their indirect impact on growth (measured as the difference between the impulse response functions from specifications A and B) is larger than the direct effect of energy price hikes (the impulse response function of specification A).

Conclusions

The general equilibrium analysis in this study shows that energy price shocks can cause a large drop in output if and only if they also affect the underlying productivity (TFP) trend. Thus, today's economy is very resilient because the TFP process is not being affected by energy price shocks, as it was from 1970 to 1985. Even the major energy price increases of 2003 and 2005, which are comparable in magnitude to those in 1974 and 1979, did not cause a recession as the underlying trend in TFP has been positive since there were no negative spillovers from energy prices to TFP like those experienced before 1985.

The article discusses that a possible reason for this negative correlation was the energy price controls observed in the 1970s in response to energy price shocks. Thus, if the drop in TFP is due to a bad policy, then the implication from our analysis is that energy price shocks themselves are far less damaging than the policies that may be implemented to address them. This is an example of the medicine likely doing more harm than the condition it was supposed to cure.

Do we believe that the U.S. economy is shielded from any future recessions? Certainly not! While the economy is more resilient to energy price shocks than before 1985, it is still subject to fluctuations in TFP unrelated to energy price hikes. In addition, if policies were to be implemented that inhibit the functioning of free markets, say, through price controls or other measures that lead to energy rationing, the economy will again be susceptible to energy price-induced recessions.

12. This figure is computed by first subtracting the marginal impact as reported in Figure 5 from the observed annual GDP growth rates, as reported by the BEA. This result can be viewed as a model estimate for the growth rate that would have prevailed in the absence of all energy price shocks. Then we add to that number the marginal impact computed under the counterfactual assumption of a negative correlation between $\varepsilon_{p,t}$ and TFP in 2003–05.

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The Federal Home Loan Bank System: The “Other” Housing GSE

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The federal government has played an active role in residential mortgage finance since the Great Depression.¹ Prior to that time, mortgages typically had short terms (often less than five years), carried variable rates, and required final “balloon” payments that were generally refinanced. In the early 1930s residential real estate values (and financial asset values generally) fell dramatically. Coupled with limited refinancing opportunities, this decline generated a wave of mortgage defaults and foreclosures, further depressing the housing market. The federal government responded to this crisis by creating several financial institutions to promote the use of long-term, fixed-rate, fully amortizing residential mortgages. The first of these new institutions was the Federal Home Loan Bank System (FHLB System), which was created in 1932 as a collection of cooperatively owned wholesale banks.

Historically, the twelve Federal Home Loan Banks (FHLBs or Banks) primarily acted as a reliable provider of long-term funding to specialized mortgage lenders. Specifically, the Banks made (over)collateralized loans, known as “advances,” to thrift institutions and a few insurance companies. While the advance business has endured, the FHLB System has evolved since the resolution of the 1980s thrift crisis.

The Financial Institutions Recovery and Reform Act of 1989 (FIRREA) included two provisions that precipitated lasting changes for the FHLBs. First, the law opened FHLB membership to all depository institutions with more than 10 percent of their portfolios in residential mortgage-related assets. This change allowed many commercial banks and credit unions to join the FHLB System for the first time. Membership increased from 3,200 to more than 8,000 between 1989 and 2005 despite the declining number of federally insured thrifts, which were legally required to be FHLB members until 1999. The transition from mandatory to voluntary FHLB membership also arguably forced the Banks to become more attuned to their members’ desire for attractive advance rates and dividend payments. Second, FIRREA imposed “income taxes” on the individual FHLBs. They must now pay 20 percent of

net earnings to cover a portion of the interest on the Resolution Funding Corporation (REFCORP) bonds used to finance the thrift cleanup; another 10 percent is set aside for low- and moderate-income housing programs.

The statutory changes in FIRREA encouraged the FHLB System to grow and to increase its attention to profitability. Between 1989 and 2005 FHLB System total

Financial economists recognize that public guarantees of a private firm's debts can lead the insured firm to take greater risks than it otherwise would.

assets increased from about \$175 billion to \$1 trillion, and its composition of assets changed. Besides a secular increase in advances, FHLB balance sheets have also come to include substantial investment in marketable securities (especially mortgage-backed securities) and member-guaranteed mortgage pools. This shift, in turn, has

resulted in the Banks managing an increasing amount of interest rate risk, including the embedded call options associated with mortgage prepayment.

The FHLBs' growth and profitability trends have been further reinforced by the advances in information technology and financial practice that contributed to financial services consolidation. Even though they are the largest users of FHLB advances, the very largest U.S. depository institutions maintain regional or nationwide branch networks and access to various other wholesale borrowing mechanisms. Furthermore, many of these institutions maintain charters in more than one Bank district, thereby allowing for multiple channels into the FHLB System. These trends have served to heighten competitive pressures within the cooperative and suggest that the FHLB advances are but one of many different sources of nondeposit funding. While the FHLB System has grown in size, complexity, and risk over time, very little research has been published about this institution.²

A government-sponsored enterprise (GSE) is a financial institution chartered by Congress but owned by private shareholders (cooperative members or outside investors, depending on the ownership arrangement). Today three GSEs serve housing (the FHLB System, Fannie Mae, and Freddie Mac), and two others serve agriculture (the Farm Credit System and Farmer Mac).³ GSE debt securities are commonly described as "U.S. agency" obligations, which are perceived by investors to be implicitly guaranteed by the U.S. government despite explicit, legally prescribed denials in offering materials. Financial economists recognize that public guarantees of a private firm's debts (either explicit or implicit) can lead the insured firm to take greater risks than it otherwise would ("moral hazard").⁴ This moral hazard, in turn, imposes a potential cost on taxpayers in the event of financial distress.

The public has recently learned of several significant financial or accounting problems at housing GSEs. In 2002 Fannie Mae disclosed a significant exposure to interest rates as measured by their "duration gap."⁵ The following year the GSEs' regulator, the U.S. Office of Federal Housing Enterprise Oversight (OFHEO), found that Freddie Mac had engaged in questionable accounting practices that allowed the company to manage its earnings by deferring \$5 billion of income into future years.⁶ Most recently OFHEO determined that Fannie Mae inappropriately applied hedge accounting rules and misclassified assets, overstating its equity by \$10.8 billion.⁷ Problems have also arisen within the FHLB System during this time. Standard & Poor's has downgraded derivative counterparty ratings for three FHLBs (Chicago, New York, and Seattle) from AAA to AA+ and currently maintains a "negative outlook" on six FHLBs (Chicago, Dallas, Des Moines, Indianapolis, Pittsburgh, and Seattle).⁸ In all but one instance (New York), the downgrades and outlook changes

were triggered by concerns about individual FHLBs' ability to manage their interest rate risk exposures.

The troubles experienced by some FHLBs came as a surprise to many observers since cooperatives and mutuals are often viewed as less risky than stock-owned firms. Perhaps more precisely, the operation and incentives of cooperative firms are less well understood than those of traditional firms. Recent testimony by former Federal Reserve Board Chairman Alan Greenspan (2004), for example, noted that the FHLBs are more "complex to analyze than other GSEs and hence raise additional issues."

The principal contribution of this article is to identify and analyze differences in the FHLBs' risk-taking incentives vis-à-vis those for Fannie Mae and Freddie Mac. We begin by characterizing housing GSEs generally and then examine the structure, activities, and risks of the FHLB System in particular.

Housing GSEs

The history of U.S. housing GSEs began during the Great Depression with the creation of the FHLB System in 1932. That system has operated for nearly seventy-five years with essentially the same corporate structure (described below). The National Housing Act of 1934 then created the Federal Housing Authority (FHA) to operate a mortgage insurance program; the act also provided for the chartering of national mortgage associations as entities within the federal government. The only association ever formed was the National Mortgage Association of Washington in 1938, which eventually became the Federal National Mortgage Association (Fannie Mae). In 1968 Fannie Mae was converted into a private corporation, with publicly traded shares listed on the New York Stock Exchange (NYSE). Freddie Mac was chartered by Congress in 1970 to securitize mortgages originated by thrifts. During the 1970s and 1980s, Freddie Mac was technically a private company although its equity shares were held

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1. For a discussion of the development of U.S. mortgage markets since the 1930s, see, for example, Quigley (2005) and Green and Wachter (2005).
 2. An EconLit search uncovered seven published academic articles primarily concerning the operation of the FHLB System itself: Silber (1973), Jaffee (1976), Goldfeld, Jaffee, and Quandt (1980), Mays (1989), Hoffman and Cassell (2002), Frame (2003), and Nickerson and Phillips (2004).
 3. The Student Loan Marketing Association (Sallie Mae) is also a GSE serving education, but it is in the process of privatization under the name SLM Corporation.
 4. This moral hazard may also allow the guaranteed firm to grow abnormally large. In the case of housing GSEs, their large scale has resulted in systemic risk concerns as the institutions have become the central players in the U.S. housing finance system and markets for certain U.S. dollar interest rate derivatives.
 5. Duration gap is the difference between the weighted-average duration of assets and the weighted-average duration of liabilities for a given change in interest rates. Frame and White (2004) provide a brief summary of Fannie Mae's duration gap episode while Jaffee (2003) provides greater detail on the practice of interest rate risk management at both Fannie Mae and Freddie Mac.
 6. See Baker-Botts LLP (2003) for a detailed discussion of the questionable financial transactions and an evaluation of their treatment under generally accepted accounting principles. Baker-Botts was retained by the board of directors of Freddie Mac. See U.S. OFHEO (2003) for the supervisory analysis of these issues.
 7. Kopecki (2005) reports an estimated cumulative after-tax write-down of \$10.8 billion for the 2001–04 period. See U.S. OFHEO (2004) and Paul, Weiss, Rifkind, Wharton, and Garrison LLP (2006) for discussions of the problems with Fannie Mae's accounting policies, internal controls, and financial reporting processes.
 8. Moody's has neither downgraded any FHLBs nor placed any of the institutions under a "negative outlook."

The Housing GSEs' Federal Charters

Congress has bestowed some benefits on the housing GSEs that result in lower costs. In terms of operating costs, the three housing GSEs are exempt from paying state and local corporate income taxes and are not required to register their debt and mortgage-backed securities issues with the Securities and Exchange Commission (SEC).¹ Several other features of the GSE charters cumulate to much larger savings by lowering the housing GSEs' funding costs.

The markets appear to believe that the GSEs' obligations carry an implicit federal guaranty. Why? First, the U.S. Treasury is authorized to purchase housing GSE securities up to \$2.25 billion for both Fannie Mae and Freddie Mac and up to \$4 billion for the FHLB System. Second, housing GSE securities are considered government securities under the Securities and Exchange Act of 1934 (hence their exemption from registration). This status means that housing GSE securities can be used as collateral for public deposits, can be bought and sold by the Federal Reserve in open market operations, and may be held in unlimited amounts by federally insured depository institutions. Third, housing GSE securities are eligible for issuance and transfer through the Federal Reserve System's book-entry system, the same used by the U.S. Treasury. Finally, housing GSEs are not subject to the bankruptcy code since they are considered to

be "federal instrumentalities." No resolution mechanism has been specified in the event that one of these firms fails, and hence congressional action would be required.² This action is unlikely to occur quickly.

The housing GSEs' federal charters also impose some important limitations. First, the activities of each institution are largely limited to residential mortgage finance. Fannie Mae and Freddie Mac securitize and invest in only "conforming" mortgages (or securities backed by such mortgages) or those below \$417,000 for 2006; the FHLBs make advances collateralized (almost exclusively) by mortgages or investment securities and invest in mortgages and mortgage-backed securities. Second, each housing GSE has certain social obligations. For example, in 2006, 53 percent of Fannie Mae's and Freddie Mac's business must benefit low- and moderate-income families, 38 percent must benefit underserved areas, and 23 percent must serve "special affordable" needs. The FHLBs contribute at least 10 percent of their net earnings to low- and moderate-income housing programs and are also responsible for paying interest on the REFCORP bonds that were issued in the early 1990s to resolve the savings and loan crisis. Finally, all three housing GSEs are subject to safety-and-soundness oversight, which may entail further restrictions on their scale or activities.

1. Until recently none of the housing GSEs registered their equity securities with the SEC. Fannie Mae and Freddie Mac volunteered to do so in July 2002 although only Fannie Mae, to date, has followed through on that commitment, registering in March 2003. In 2004 the Finance Board required each FHLB to register its equity with the SEC—a process that should be completed by the end of 2006.
2. In the case of Fannie Mae and Freddie Mac, their federal safety-and-soundness supervisor (OFHEO) does not have receivership authority. By contrast, as noted by Carnell (2005), the Finance Board has broad authority to liquidate or reorganize any Federal Home Loan Bank (12 U.S.C. 1446).

solely by the twelve FHLBs and their thrift members.⁹ Freddie Mac was converted into a publicly traded company in 1989, with its shares listed on the NYSE.

Each of the three housing GSEs operates under its own federal charter, which both limits its permissible activities and bestows several institutional benefits (see the sidebar above). The most valuable of these benefits arises from the financial markets' perception that the federal government implicitly guarantees housing GSE obligations. As a result, GSE senior debt obligations are rated AAA even though their stand-alone ratings would be lower.¹⁰ The implicit guaranty allows the GSEs to borrow

at favorable interest rates and then pass some of these savings on to their customers. Hence, by chartering a specific GSE, the federal government can target benefits toward a specific sector of the economy without recognizing the attendant opportunity costs in the federal budget.¹¹ However, potential costs remain if Congress were to provide support to an insolvent GSE. In the late 1980s, for example, the Farm Credit System received a \$4 billion taxpayer bailout.¹²

The market's perception of an implicit guaranty of housing GSE obligations distorts the institutions' risk-taking incentives in a way that may increase the probability of financial distress. A similar situation is well understood in the context of federally insured depository institutions. The idea is that a federal guaranty induces bondholders (depositors) to accept artificially low (perhaps even risk-free) promised interest rates regardless of an institution's true risk of default. GSEs and insured depositories can then increase the riskiness of their activities—which promise high shareholder returns if the risks turn out well—without needing to share those rewards with liability holders in the form of higher coupon rates on their debt (deposits or bonds). The firms' equity holders thus perceive a greater-than-normal benefit from risk taking, and their investment decisions can distort capital flows and decrease the expected benefits of financial intermediation in the economy. If this increase in risk occurs, taxpayers effectively subsidize the equity holders of GSEs and insured depository institutions.

It is important to recognize that insured entities need not explicitly decide to increase their risks. Such a move could be inadvertent. For example, growing businesses often do not improve their infrastructure as quickly as they raise new revenues. If the creditors of a fully private firm felt that its risk-management systems had become inadequate, they could pressure the firm to improve those systems. If the firm failed to respond, its bond and stock prices would fall, raising the possibility of a hostile takeover. Federally guaranteed firms, by contrast, do not benefit from this market discipline, through which outsiders' concerns about such errors of omission can be expressed. If the federal guaranty is considered sufficiently strong, bond claimants may not bother to examine the firm's infrastructure.

The federal government recognizes these potential moral hazards and has created safety-and-soundness regulators to limit potential taxpayer exposure. Fannie Mae and Freddie Mac are regulated by OFHEO, an independent agency within the U.S. Department of Housing and Urban Development (HUD).¹³ The FHLB System is overseen by the Federal Housing Finance Board (Finance Board), an independent

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9. Moreover, Freddie Mac's board of directors consisted of the three board members of the FHLB Board, which regulated the FHLBs and the thrift industry during that time.
10. Fannie Mae and Freddie Mac receive AA– ratings from Standard and Poor's in terms of their risk to the government. However, such ratings incorporate whatever government support or intervention the entity typically enjoys during the normal course of business. See Frame and Wall (2002) for a discussion. Those two GSEs also receive "bank financial strength" ratings from Moody's (on an A–E scale), which are B+ (Fannie Mae) and A– (Freddie Mac).
11. The appendix to the federal budget, however, discusses each of the five GSEs and provides basic information about their mission, history, and financial condition. Although additional costs result from resource misallocations in the real sector, such costs are not recognized in the budget.
12. The U.S. General Accounting Office (GAO) (1990, 90–91) discusses this episode as well as one in the late 1970s, when Fannie Mae was insolvent on a market-value basis and benefited from supervisory forbearance.
13. OFHEO was created by the Federal Housing Enterprises Financial Safety and Soundness Act of 1992. Prior to 1992 HUD maintained exclusive regulatory oversight responsibilities for Fannie Mae and (for 1989–92) Freddie Mac. HUD continues to act as the mission regulator of the two institutions. Before FIRREA's passage Freddie Mac was the responsibility of the FHLB Board.

Table 1
Federal Home Loan Bank System Combined Balance Sheet as of March 31, 2006

	Dollars (in millions)	Percent of assets
Assets		
Advances	614,653	61.2
Mortgage loans (net)	103,530	10.3
Investments	279,012	27.8
Mortgage-backed securities	124,364	12.4
Federal agency securities	20,203	2.0
Other investment securities	10,051	1.0
Federal funds	86,925	8.7
Interest-bearing deposits	34,470	3.4
Reverse repurchase agreements	2,998	0.3
Other assets	6,588	0.7
Total assets	1,003,783	100.0
Liabilities and capital		
Consolidated obligations (net)	918,162	91.5
Other liabilities	40,342	4.0
Membership capital stock	42,602	4.2
Retained earnings	2,814	0.3
Other comprehensive income	(138)	0.0
Total liabilities and capital	1,003,783	100.0

Source: Federal Housing Finance Board

agency within the executive branch.¹⁴ Each regulator is authorized to set risk-based capital standards, conduct examinations, and take certain enforcement actions if unsafe or unsound practices are identified. Nevertheless, both regulatory agencies have been criticized for their alleged ineffectiveness.¹⁵

Ironically, federal supervision of the GSEs may encourage investors' faith in a federal guaranty, despite the government's and the GSEs' explicit disavowals. As a theoretical matter, it is unclear whether the presence of these safety-and-soundness regulators increases or decreases expected taxpayer exposure (Frame and White 2004).

Structure, Activities, and Risks of the FHLB System

The FHLB System includes twelve regional wholesale Banks and an Office of Finance that acts as the FHLBs' gateway to the capital markets.¹⁶ Each Bank is a separate legal entity, cooperatively owned by its member financial institutions, and has its own management, employees, and board of directors. Historically, the individual FHLBs did not compete for members. Each Bank is assigned a distinct geographic area, within which it tries to attract members by offering various credit products, investment products, payments services, and custody services.¹⁷ The FHLB System is often viewed as a whole because most Bank financing takes the form of debt for which the twelve Banks are jointly and severally liable.

Table 1 presents a combined balance sheet for the FHLB System as of March 31, 2006.¹⁸ The largest asset category is member advances (\$615 billion, or 61.2 percent

of total assets), which constitute the primary avenue by which the FHLBs may support housing and community development. Advances are available in various maturities, carry fixed or variable rates of interest, sometimes contain embedded options, and are fully collateralized. In terms of maturities, as of March 31, 2006, 39.8 percent of advances were due in less than one year, 46.6 percent were due in one to five years, and 13.6 percent were due thereafter. Put and call options that can alter the duration and yield of an advance were included in 21.2 percent of the Banks' combined advance book at the end of the first quarter of 2006.¹⁹ The most common forms of advance collateral are mortgage-related assets (whole loans and mortgage-backed securities) and U.S. Treasury and federal agency securities.²⁰ Beyond their explicit collateral, the FHLBs also have priority over the claims of depositors and almost all other creditors in the event of a member's default (12 U.S.C. 1430[e]).²¹ No FHLB has ever suffered a credit loss on an advance.

Each FHLB maintains a portfolio of investments, which on a combined basis totaled \$279 billion at the end of the first quarter of 2006. For liquidity, the FHLBs hold \$124.4 billion in short-term investments, such as federal funds and certificates of deposit, issued by highly rated institutions. The Banks also hold longer-term investments to enhance interest income (\$154.6 billion), especially residential mortgage-backed securities.

The FHLB System's combined balance sheet has come to include a substantial proportion of residential mortgages (10.3 percent) since the introduction of the Chicago FHLB's Mortgage Partnership Finance Program in 1997. The Banks now purchase

The troubles experienced by some FHLBs came as a surprise to many observers since cooperatives and mutuals are often viewed as less risky than stock-owned firms.

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14. The Finance Board was established by FIRREA in 1989 as the regulator of the FHLB System, thereby replacing the FHLB Board. A five-member board of directors governs the Finance Board; the president appoints four full-time members with the advice and consent of the Senate for seven-year terms, designating one of the four as chair. The secretary of HUD is the fifth member.
 15. For example, U.S. Treasury Secretary Snow (2003) testified before Congress that there is a "general recognition that the supervisory system for the housing GSEs neither has the tools, nor the stature, to effectively deal with the current size, complexity, and importance of these enterprises."
 16. The twelve FHLBs are located in Atlanta, Boston, Chicago, Cincinnati, Dallas, Des Moines, Indianapolis, New York, Pittsburgh, San Francisco, Seattle, and Topeka. The Office of Finance is located in Reston, Virginia.
 17. The specific products and services offered by the individual FHLBs can often be found on their respective Web sites. Visit www.fhfb.gov/FHLB/FHLBS_banks.htm for links to all twelve FHLBs and a list of states served by each individual Bank.
 18. This information was provided by the Finance Board. Audited financial statements for the combined FHLB System are unavailable pending the completion of each Bank's registration with the Securities and Exchange Commission.
 19. Puttable advances, which provide the FHLB with an option to require the borrower to repay on prespecified exercise dates before maturity without a fee, made up 16.6 percent of advances. The Atlanta and New York FHLBs together account for more than half of puttable advances outstanding. Callable advances, which provide the member with an option to prepay on prespecified exercise dates, made up 4.6 percent of advances. The Cincinnati Bank is responsible for three-quarters of these loans.
 20. See 12 U.S.C. 1430(a)(3) for a complete list of eligible collateral. Federal agency securities are generally synonymous with debt and mortgage-backed securities issued by GSEs.
 21. Bennett, Vaughan, and Yeager (2005) describe how FHLB advances may increase the probability of bank default and raise the FDIC's expected losses given default.

Table 2

Federal Home Loan Bank Holdings of Mortgages and MBS as of March 31, 2006

	Mortgages (millions of dollars)	MBS (millions of dollars)	Mortgages + MBS (millions of dollars)	Mortgages + MBS (percent of assets)
Atlanta	2,855	18,728	21,583	15.50
Boston	4,838	6,403	11,214	18.31
Chicago	40,931	8,199	49,130	55.95
Cincinnati	8,425	12,395	20,820	26.31
Dallas	518	8,510	9,028	15.88
Des Moines	12,714	5,147	17,861	40.35
Indianapolis	9,867	6,805	16,672	34.37
New York	1,457	9,127	10,584	12.40
Pittsburgh	7,440	9,381	16,821	23.19
San Francisco	5,079	27,072	32,151	14.15
Seattle	7,003	6,599	13,602	25.48
Topeka	2,409	5,999	8,408	17.49
FHLB System	103,537	124,364	227,901	22.70

Source: Federal Housing Finance Board

conforming fixed-rate mortgages on single-family properties from participating member institutions under several distinct programs.²² Roughly speaking, the seller guarantees most of the mortgages' credit risk, while the interest rate risk is borne by the FHLBs (Frame 2003). This mortgage-related interest rate exposure is reinforced by substantial FHLB holdings of mortgage-backed securities (MBS). Table 2 shows that nearly one-quarter of FHLB System assets were mortgage related at the end of the first quarter of 2006: \$103.5 billion in whole mortgages plus \$124.4 billion in MBS. All twelve FHLBs invest more than 12 percent of their asset portfolios in mortgage-related assets. The largest concentrations are the Chicago (56.0 percent), Des Moines (40.4 percent), and Indianapolis Banks (34.4 percent).

The FHLB asset portfolios are largely funded with debt, almost all of which takes the form of "consolidated obligations" issued by the Office of Finance and for which the twelve Banks are jointly and severally liable. As of March 31, 2006, the FHLB System had \$918.2 billion in consolidated obligations outstanding. Discount notes (maturities up to one year) represented 17.1 percent of consolidated obligations, and bonds (maturities almost exclusively between one and ten years) the remaining 82.9 percent. The FHLB System also maintained \$45.3 billion in equity capital at that time (4.5 percent of total assets). Member stock subscriptions are the dominant form of equity, making up 94 percent of total FHLB System equity. History can readily explain the unusually small contribution of retained earnings to total capital: Congress previously took the Banks' retained earnings to help pay for the thrift bailout. Thereafter the FHLBs began to pay out almost all earnings as dividends. The Financial Modernization Act of 1999 clarified that a particular class of FHLB shareholders would legally own the institutions' retained earnings (as well as surplus, undivided earnings, and equity reserves) going forward.²³

The FHLBs face little credit risk in their asset portfolios. As shown in Table 2, however, they hold substantial amounts of mortgage-related assets. The interest rate risk from these assets requires careful treatment because changes in interest rates influence borrower prepayment behavior, which in turn has implications for the

expected life of mortgage assets. For example, when interest rates rise, mortgage investors experience losses in value because they are holding fixed-rate debt instruments yielding a below-market rate of return, and the duration of the asset increases because of lower expected borrower prepayments. In a falling-rate environment, the normal value gains associated with holding fixed-rate debt instruments are reduced by an associated increase in expected prepayments. This phenomenon of additional adverse effects on mortgage investors from decreases or increases in interest rates is often described as the “negative convexity” of the mortgage instrument.

Callable bonds provide one important and straightforward way for the FHLBs to hedge mortgage-related interest rate risk.²⁴ By issuing callable bonds, if interest rates fall and mortgages prepay, the Banks can replace their higher-cost bonds with new ones bearing a lower rate of interest. The Banks also regularly use interest rate derivatives to transform their liability maturities and to hedge some of the negative convexity associated with fixed-rate mortgages. On March 31, 2006, the FHLB System had \$867.6 billion in total (notional amount) interest rate exchange agreements outstanding—mostly interest rate swaps.

It is very difficult to discern how much interest rate risk the FHLB System actually retains. The FHLBs’ primary measure of interest rate risk exposure is the duration of equity, or the sensitivity of a theoretical market value of a Bank’s equity to changes in interest rates (FHLB Office of Finance 2004, 47). However, as discussed in Frame and Wall (2002) and elsewhere, duration analysis may not be well suited to measuring interest rate risk for portfolios containing numerous embedded options. Moreover, these duration positions are reported to the Finance Board only quarterly, and individual FHLBs’ measurements are not directly comparable across institutions. A review of these figures as of March 31, 2006, suggests that there is significant variation across FHLBs—either in terms of their exposures or reporting practices.

The Finance Board protects FHLB solvency by enforcing leverage and risk-based capital requirements. Two leverage requirements are set in statute at 4 and 5 percent of total assets, respectively, depending on the form of equity.²⁵ The Finance Board also computes a risk-based capital requirement based on each Bank’s credit, market, and operational risks. On March 31, 2006, required risk-based capital for the individual FHLBs ranged from 0.4 to 1.2 percent of total assets—well below their leverage capital standards. Capital adequacy could alternatively be evaluated in the context of each Bank’s fair value balance sheets. On March 31, 2006, these fair values (as estimated by the Banks and reported to the Finance Board) ranged between 76.7 percent and 100.7 percent of book value across the FHLB System. In addition, a positive/negative

22. As of late 2004 eight FHLBs exclusively offered the Mortgage Partnership Finance Program in conjunction with the Chicago FHLB, while three exclusively offered their own Mortgage Purchase Programs. The Atlanta FHLB offers both options to its members. Conforming mortgages have principal amounts that are eligible for purchase by Fannie Mae and Freddie Mac. For single-family mortgage loans, the conforming loan limit is \$417,000 in 2006.

23. The Finance Board recently issued a proposed rule to increase retained earnings (see www.fhfb.gov/GetFile.aspx?FileID=4476). However, Paletta (2006) reports that the twelve FHLBs collectively sent a letter to their regulator in opposition.

24. During the first six months of 2004, 57.5 percent of FHLB System bond sales were callable, 16.6 percent were fixed rate, 13 percent carried floating rates, and 9.3 percent were “step-ups/step-downs.”

25. The “unweighted” requirement is that total capital (class A stock, class B stock, retained earnings, and general loan loss allowances) must be at least 4 percent of total assets. A “weighted” requirement sets this standard at 5 percent but has permanent capital (class B stock and retained earnings) multiplied by 1.5.

200 basis point change in interest rates is estimated to affect these fair values by 0.5 to 9.8 percent in absolute value, depending on the institution and direction of interest rate shock.

To summarize, the FHLB System is a very large and highly leveraged financial institution. This GSE appears to face little credit risk but a material amount of interest rate risk arising from its mortgage-related asset holdings. The individual FHLBs manage their interest rate risk by issuing callable debt and entering into interest rate derivative contracts, although their net exposure is unclear.

Ownership and Governance of the FHLB System

The financial markets' perception of an implied federal guaranty of FHLB System debt, coupled with the joint-and-several liability of these same obligations, insulates individual FHLBs' funding costs from their exposure to risk. While the incentives created by such a guaranty for profit-maximizing firms like Fannie Mae and Freddie Mac are reasonably well understood, the FHLB System has a different organizational structure and hence most likely responds differently to changing circumstances.

Ownership. Each FHLB is a mutual organization owned by its financial institution members. By statute, membership is restricted to banks, thrifts, credit unions, and insurance companies that are chartered within the FHLBs' legally defined service area. A stock purchase is required for membership, and formal control of each Bank lies with an elected board of directors. The Financial Modernization Act requires each Bank to design a stock purchase requirement for its members, based on two classes of stock: Class A stock is redeemable on six months' written notice from the member, and class B stock on five years' notice.²⁶ Members resigning their membership are subject to a five-year lockout from the FHLB System.

Table 3 summarizes the new capital structure plans developed by the eleven FHLBs that had them in force as of March 31, 2006.²⁷ Despite significant variation in the specific stock purchase requirements across districts, most of the plans share some general characteristics. First, almost all of the FHLBs rely exclusively on the more permanent class B shares. Second, the stock purchase requirements contain both "membership" and "activities" components. The membership component is generally tied to a measure of member size (for example, total assets or total mortgage assets), while the activity-based component tends to depend on activities that directly affect the size of a Bank's balance sheet, such as advances or purchased mortgages. Finally, each of the requirements is specified with ranges to allow each Bank to adjust stock purchase requirements without having to seek Finance Board approval.

The new capital plans also include some noteworthy differences. Most obviously, the capital requirements for similar activities often vary across the Banks. For example, the activity requirement for FHLB-acquired mortgages varies especially widely, from 0 to 4.5 percent. Additionally, some FHLBs require members to purchase the sum of their membership and activities requirements, while other FHLBs require the greater of the two subrequirements. Such variation in member stock purchase requirements is unlikely to be problematic if institutions can apply for membership only in a single FHLB. But as we will see below, this proviso may be becoming outdated.

Governance. Table 4 shows that the twelve FHLBs differ substantially in both asset size and number of members. The San Francisco FHLB is the largest in terms of total assets (\$227.2 billion), but it has the fourth-fewest number of members (376). Conversely, the Des Moines FHLB has the smallest balance sheet (\$44.3 billion) but the largest membership (1,251). Perhaps even more important to note is

that each FHLB has a small group of large members. The five largest equity holders provide between 29 percent and 74 percent of the individual FHLBs' total equity, and the five largest borrowers are similarly prominent.

An elected board of directors controls the operations of each FHLB. Given the concentration of equity holdings noted in Table 3, one might suspect that each FHLB is easily controlled by a small group of large member institutions, but this is not true. Two important voting limitations make effective control much more diffuse than the equity ownership data would suggest (see 12 U.S.C. 1427[b]). First, no member may vote more than the average number of shares owned by members in its state as of the prior year's end. This rule limits concentration of voting rights because every state has large numbers of small institutions. Second, voting occurs on a state-by-state basis, and each state must have at least one director. To the extent that large members are not equally distributed among the states, therefore, concentrated control is even more limited.

Limiting voting rights does curtail direct control of the FHLBs by the very largest members: As of midyear 2004, only four of the ten largest FHLB shareholders held a Bank directorship. This fact does not indicate, however, that the desires of the very largest members go unheard since these institutions often have competitive wholesale funding alternatives.

Competition. Competitive pressures have been felt increasingly by the individual FHLBs. In terms of the asset portfolio, FHLB advances compete with secured and unsecured wholesale funding provided by investment banks, commercial banks, and brokered deposits. This competition is most intense for large depository institution members, which generally have extensive branch networks and ready access to public capital markets. One way that the FHLBs have responded to this development is by introducing more complicated advances, such as those with embedded options, which are attractive to institutions funding fixed-rate mortgage portfolios. FHLB mortgage programs are also in competition with securitization via Fannie Mae and Freddie Mac as well as outright whole loan sales through a nationwide secondary market.

Competition for members has also escalated. Prior to the Financial Modernization Act of 1999, federally insured thrift institutions were required to become FHLB members. Today, however, FHLB membership is voluntary. The commercial banks, thrifts, and credit unions chartered in a Bank's geographic territory will join only if they receive valuable services. In addition, some acquisitive financial institutions have retained charters in multiple FHLB districts, a practice that permits them to borrow from the FHLB offering the cheapest advances.²⁸ Today about 100 such cases exist, in effect creating a degree of inter-FHLB competition.²⁹ This practice has also spurred policy discussion about whether FHLB membership should be opened further to allow

26. Prior to this act, the law allowed for only one class of stock, which was redeemable on six months' written notice. The Chicago FHLB continues to be subject to this old framework.

27. The Chicago FHLB has not yet converted to the new capital structure. The Bank had originally received regulatory approval in 2002 for a capital plan that relied on members' discretionary stockholdings (excess stock) to support its mortgage portfolio. However, the Bank agreed in early 2005 to delay implementation to the new structure as part of a three-year business plan. Over this period the Bank expects to substantially reduce its ratio of excess stock to regulatory capital before converting to a revised capital plan.

28. For example, Washington Mutual Inc. currently maintains membership in four FHLBs: San Francisco, Seattle, Dallas, and New York.

29. See U.S. GAO (2003) for a discussion of competition within the FHLB System, including the role of the price and nonprice terms of credit.

Table 3
Federal Home Loan Bank Capital Plans: Membership Requirements, Activity Requirements, and Total Requirements
Panel A: Boston, New York, Pittsburgh, Atlanta, Cincinnati, and Indianapolis

	Boston	New York	Pittsburgh	Atlanta	Cincinnati	Indianapolis
Date of conversion	April 19, 2004	Dec. 1, 2005	Dec. 16, 2002	Dec. 17, 2004	Dec. 30, 2002	Jan. 2, 2003
Classes of stock	All B	All B with 2 subclasses	All B	All B with two subclasses	All B	All B with two subclasses
Membership investment requirements	0.35% of "membership stock investment base" (range: 0.05 to 0.50%) Membership stock investment base is the total nondiscounted assets eligible to secure advances (single- and multifamily mortgage loans, Treasury and agency securities, and MBS).	0.20% of "mortgage-related assets" (range: 0.10 to 0.25%) Mortgage-related assets are defined as "residential housing finance assets" (12 CFR 950.1) plus loans secured by manufactured housing, nonresidential non-farm real property, and other mortgage-related securities.	0.55% of unused borrowing capacity (range: 0 to 1.5%)	0.20% of total assets (range: 0.05 to 0.40%)	Cumulative sliding scale that varies inversely with member's asset size At time of conversion scale was \$0-\$25B in assets: 0.15%; >\$25B-\$50B in assets: 0.10%; >\$50B-\$75B in assets: 0.07%; >\$75B-\$100B in assets: 0.05%; >\$100B in assets: 0.03% (range: 0.03 to 0.30%)	1% of total mortgage assets (range: 0.75 to 1.25%)
a. Minimum membership requirement	\$10,000 (range: \$5,000 to \$50,000)	\$1,000	\$10,000	None	None	\$1,000
b. Maximum membership requirement	\$25 million (range: \$5 million to \$100 million)	None	None	\$25 million (range: \$15 million to \$35 million)	None	\$35 million
Activity requirements					Ratio of par value of members' activity stock to members' mission asset activity must be between the minimum allocation percentage and the maximum allocation percentage.	

	Boston	New York	Pittsburgh	Atlanta	Cincinnati	Indianapolis
a. Advances	3% of outstanding principal balance of overnight advances plus 4.5% of outstanding principal balance of nonovernight advances (range: 3 to 6%)	4.5% of outstanding principal balance (range: 4 to 5%)	4.55% of all loans (range: 4.5 to 6.0%)	4.5% of outstanding principal balance (range 3.5 to 6.0%)	Requirement for minimum allocation percentage is 2%; requirement for maximum allocation percentage is 4% (range: 1 to 6%)	5% of outstanding principal balance (range: 2 to 5%)
b. Mortgage purchases	0% of outstanding principal balance (range: 0 to 6%)	4.5% of outstanding principal balance for loans delivered or commitments in effect after the effective date of the plan (range: 4 to 5%)	0% of AMA delivered and held by Bank (range: 0 to 4.0%)	0% of outstanding principal balance (range 0 to 6.0%)	Requirement for minimum allocation percentage is 0%; requirement for maximum allocation percentage is 4% (range: 0 to 6%)	0% of outstanding principal balance (range: 0 to 5%)
c. Standby letters of credit	4.5% of face/notional amount adjusted for conversion factor in 12 CFR 932.4(f) Table 2 (range: 3 to 6%)	0% for contingent liabilities, including lines of credit (range: 0% to risk-based capital requirement)	N/A	N/A	N/A	5% of commitment amount (range: 2 to 5%)
d. Exchange agreements	4.5% of the Bank's current exposure calculated per 12 CFR 932.4(h)(1) plus Bank's potential exposure calculated per 12 CFR 932.4(h)(2) (range: 3 to 6%)	0% of carrying value of derivatives (range: 0 to 5% of book value)	N/A	N/A	N/A	5% of the amount of collateral required from the transaction (range: 3 to 5%)
e. Other	Advance or delivery commitments: 0% of face/notional amount adjusted for conversion factor in 12 CFR 932.4(f) Table 2 (range: 0 to 6%)	N/A	N/A	Targeted debt/equity investments: 8.0% of outstanding principal balance (range: 6.0 to 9.0%)	Advance commitments: Requirement for minimum allocation percentage is 2%; requirement for maximum allocation percentage is 4% (range: 1 to 6%)	N/A
Total stock purchase requirement	Membership requirement plus activity requirement	Membership requirement plus activity requirement	Membership requirement plus activity requirement	Membership requirement plus activity requirement	Membership requirement plus activity requirement	Greater of membership requirement or activity requirement

(continued on next page)

Table 3 (continued)

Panel B: Des Moines, Dallas, Topeka, San Francisco, and Seattle

	Des Moines	Dallas	Topeka	San Francisco	Seattle
Date of conversion	July 1, 2003	Sept. 2, 2003	Sept. 30, 2004	April 1, 2004	June 30, 2002
Classes of stock	All B	All B	A and B	All B	All B with two subclasses
Membership requirements	0.12% of member assets (range: 0.10 to 0.25%)	0.09% of total assets (range: 0.05 to 0.30%)	0.2% of total assets (range: 0.1 to 0.4%) May only purchase class A stock to ful- fill this requirement.	1% of "membership asset value," or assets qualified as FHLB collateral (range: 0.5 to 1.5%)	0.50% of home mortgage loans (range: 0.5 to 1.0%)
a. Minimum membership requirement	\$10,000 (range: \$10,000 to \$30,000)	\$1,000	\$1,000	None	\$500
b. Maximum membership requirement	\$10 million (range: \$10 million to \$30 million)	\$25 million (range: \$10 million to \$50 million)	\$1 million (range: \$500,000 to \$2.5 million)	\$25 million (range: \$10 million to \$50 million)	None
Activity requirements					
a. Advances	4.45% of outstanding principal balance (range: 3 to 5%)	4.10% of outstanding principal balance (range: 3.5 to 5%)	5.0% of outstanding principal balance (range: 4 to 6%)	4.7% of outstanding principal balance (range: 4.4 to 5%)	2.5% of outstanding principal balance (range: 2.5 to 4.5%)
b. Mortgage purchases	4.45% of outstanding principal balance (range 3 to 5%)	4.10% of outstanding principal balance (range: 0 to 5%)	2% of principal amount sold to Bank subject to cap of 1.5% of total assets as of preceding year-end (ranges: for req. 0 to 6%; for cap 1 to 3%)	5.0% of outstanding principal balance (range: 5.0 to 5.7%)	5.0% of outstanding principal balance (range: 0 to 6.0%)
c. Standby letters of credit	0.15% (range: 0 to 0.175%)	N/A	0% of outstanding principal balance (range: 0 to 1%)	N/A	N/A
d. Exchange agreements	N/A	N/A	0% of notional principal amount (range: 0 to 2%)	N/A	N/A
e. Other	Advance commitments: 0% (range: 0 to .35%) Mortgage purchase commitments: 0% (range: 0 to .60%)	N/A	N/A	Provision for capital assessment if capi- tal level insufficient for Bank to meet minimum regulatory requirements or target ratios	N/A
Total stock purchase requirement	Membership requirement plus activity requirement	Membership requirement plus activity requirement	Greater of membership requirement or activity requirement; member only required to hold class B stock equal to the amount by which the activity requirement exceeds the membership requirement	Greater of membership requirement or activity requirement	Membership requirement plus activity requirement

Note: The table does not include the Chicago FHLB because that bank has not yet adopted the capital structure plans described.

Source: Federal Housing Finance Board and individual FHLB capital plans

Table 4
Federal Home Loan Bank Membership as of March 31, 2006

	Total assets (billions of dollars)	Number of members	Membership concentration as a percent of capital ^a	Membership concentration as a percent of advances ^a
Atlanta	139.3	1,210	38.9	49.0
Boston	61.4	467	36.7	47.3
Chicago	87.8	879	29.2	39.7
Cincinnati	79.1	742	50.0	60.4
Dallas	56.9	887	49.4	61.8
Des Moines	44.3	1,251	37.8	24.1
Indianapolis	48.5	434	46.5	52.9
New York	85.3	299	40.3	40.1
Pittsburgh	72.5	334	54.4	61.1
San Francisco	227.2	376	73.7	80.7
Seattle	53.4	367	53.8	65.1
Topeka	48.1	896	40.3	51.4

^a Percentages for the five largest members
Source: Federal Housing Finance Board

any eligible financial institutions to access the FHLB System through multiple channels (multidistrict membership).³⁰

Recent troubles at the Seattle FHLB illustrate how inter-Bank competition may induce risk taking. In 2002 the Seattle Bank decided to change its portfolio structure by substituting mortgage assets for advances. It shed advances by raising the interest rates on them. Washington Mutual, the largest borrower from the Seattle FHLB at that time, responded by moving a substantial part of its advance borrowings to other FHLBs in which its affiliates held memberships, although it maintained its stock investment. The low-interest-rate environment and mortgage refinance wave of 2003, coupled with imperfect hedging, resulted in a material decline in the Seattle FHLB's market value. The Seattle Bank responded by reducing its mortgage purchases, but instead of redeeming excess capital, the institution sought to boost returns by investing in callable FHLB System consolidated debt obligations funded largely with shorter-term, noncallable instruments. The flattening of the yield curve during 2004 resulted in additional market-value losses, which totaled \$260 million by the end of that year.

Risk-Taking Incentives in the FHLB System

An important cost associated with financial institutions operating with government guarantees (implicit or explicit) is the aforementioned moral hazard incentive for such institutions to increase their risk exposure—on purpose or inadvertently—in order to maximize shareholder returns. The recent financial troubles at all three

30. This discussion started with some petitions by acquiring depository institutions to retain FHLB membership in the district of the target even though the target's charter would be dissolved; see U.S. GAO (2003). The Finance Board subsequently issued an advanced notice of proposed rule making about multidistrict membership in October 2001, but the regulator never promulgated regulations. Bair (2003) discusses in detail and analyzes the question of whether the Finance Board has the statutory authority to permit multidistrict membership.

housing GSEs may reflect this moral hazard. The difficulties experienced by some FHLBs are notable, however, because cooperatively owned firms are often thought to be less risky than stock-owned firms. Here we discuss some unique features of the FHLB System that may act to enhance or subdue FHLB risk-taking incentives relative to Fannie Mae and Freddie Mac.

Ownership structure. Some of the FHLBs have argued that their cooperative structure mitigates moral hazard incentives. In 2003 the president of the Federal Home Loan Bank of Dallas testified before Congress that

the [Federal Home Loan] Banks' cooperative corporate structure reinforces our conservative approach to risk management and eliminates many of the incentives that a publicly traded company might have to increase its risk profile in hopes of achieving higher returns for its shareholders. There is no stock compensation for management, directors, or employees of the Banks. (Smith 2003, 31)

Two years later, the president of the Atlanta FHLB expressed a similar view:

The cooperative structure of the FHLBanks eliminates many of the incentives a publicly traded company might have to raise its risk profile in search of higher returns. (Christman 2005, 7)

Under some circumstances, cooperatively owned financial institutions can be less prone to risk taking than their stock-owned counterparts. Moral hazard arises because the shareholders and bondholders (or their guarantor) have conflicting preferences about risk taking. Many leveraged cooperative and mutual financial institutions combine the equity and debt claims to eliminate this potential conflict. For example, credit union and mutual thrift depositors (liability holders) are also owners (equity holders). Empirical evidence for thrifts and insurance companies strongly supports the notion that such cooperative and mutual firms are less risky.³¹

Unfortunately, the analogy between these cooperatives and the FHLB System is not precise. The Banks' equity holders are the member financial institutions, while their bondholders are widely dispersed throughout the capital markets. These two groups remain distinct in the FHLB structure, rendering the "bundling of claims" argument inapplicable. Hence, the cooperative structure of the FHLB System does not necessarily insulate the Banks from excessive risk taking.

Joint and several liability. The cross-guarantee provision in the FHLB System's consolidated debt obligations likely reinforces the moral hazard arising from the perceived federal guaranty.³² Funding costs for the individual Banks reflect the average risk of the FHLB System rather than the exposure of any one institution. Hence, any FHLB System-wide incentive to increase risk because of the perceived implied federal guaranty is further accompanied by an incentive at the individual FHLB level to increase risk relative to its sister institutions, as might be induced by competition for members. In this way, moral hazard incentives could be heightened relative to Fannie Mae and Freddie Mac.

Equity market discipline. For publicly traded firms, share prices may act as a disciplining force; for example, financial difficulties can spur a price decline and signal to management that it should reduce risk. However, for financial institutions that operate with (implicit or explicit) government guarantees, such as the housing-related GSEs, this relationship is less clear. Since the cost of their liabilities is not risk-sensitive, these institutions may be inclined to respond to share price declines by

actually increasing risk. Regulators are charged with monitoring such behavior. In any event, equity market discipline is not even present for the FHLBs since the stock is not traded. Indeed, Bank equity is always exchanged at par so that neither the public nor the regulators will ever see a price decline signaling potential trouble.

Each member's FHLB stock can be separated into a required component (as described in Table 3) and an "excess" component. In order to redeem its required membership stock, the institution must resign from the FHLB and may not rejoin it for five years. This lock-out period represents a significant opportunity cost that renders equity market discipline through membership withdrawal unlikely.

Some members also hold "excess" stock as an investment, which a Bank can leverage to generate additional earnings. Under most circumstances, members can redeem their "excess" stock at par upon demand.³³ So, if a Bank suffers losses or becomes more risky, some members may try to withdraw their excess stock. This action would force the Bank to reduce its scale of operations—a general form of market discipline. However, this avenue is also partially blocked. The FHLB may deny early redemption requests (before six months for class A and before five years for class B shares) at its discretion (12 U.S.C. 1426[e][1]), and, if a Bank's safety and soundness becomes questionable, both the Bank and the Finance Board can limit redemption indefinitely (12 C.F.R. 931.8). This discretion limits market discipline because it provides time for a troubled FHLB to gamble for resurrection.

The recent episode at the Chicago Bank illustrates the lack of market discipline associated with excess stock. When that FHLB experienced accounting difficulties, excess stock redemption requests increased, but the Bank halted redemptions in late 2005 (see FHLB of Chicago 2005). In June 2006, the Finance Board permitted the Chicago FHLB to issue \$1 billion of ten-year subordinated debt (for which the Bank is sole obligor) and to use the proceeds to repurchase excess shares.³⁴ One interpretation of this transaction is that it allowed the Chicago FHLB to increase its risk by substituting debt for equity. However, FHLB excess stock itself has debtlike features,

It is important to recognize that insured entities need not explicitly decide to increase their risks. Such a move could be inadvertent.

31. Esty (1997) examines the riskiness of thrifts during the 1980s and finds that stock-owned institutions had both riskier portfolios and higher failure rates than mutuals. Lamm-Tennant and Starks (1993) study property-liability insurers and uncover that stock-owned firms have riskier future cash flows as proxied by the variance of the loss ratio. Lee, Mayers, and Smith (1997) find that risk in the asset portfolios of stock-owned property-liability insurers increased markedly relative to their mutually owned counterparts following enactment of state guaranty fund laws.

32. One counterargument to this assumption is that joint and several liability may induce the FHLBs to monitor one another. However, the Banks may lack the willingness to do so because of standard "free-rider" problems, the presence of the conjectural federal guaranty, and the fact that they have no authority to directly discipline each other.

33. For this reason, excess stock is actually treated as a liability by the Banks according to Financial Accounting Standards Board Statement 150, *Accounting for Certain Financial Instruments with Characteristics of Both Liabilities and Equity*. The Finance Board, however, treats excess stock as equity for purposes of determining compliance with minimum regulatory capital requirements. Shadow Financial Regulatory Committee (2006) has called on the Finance Board to rethink this position.

34. In doing so, the regulator granted certain waivers that will allow these debentures to be used in determining compliance with the Chicago Bank's regulatory leverage requirement (see Federal Housing Finance Board 2006).

and the lack of market pricing for these claims limits their value as market discipline tools. In any event, the future importance of excess stock holdings is currently questionable as the Finance Board recently proposed a rule that would limit excess stock to 1 percent of a Bank's total assets.

Charter value. Marcus (1984) identifies a factor that may reduce a guaranteed financial institution's interests in increasing its portfolio risk: nonmarketable charter value. This effect depends on the supervisor being able to close a firm whose book

Cooperative ownership itself does not reduce FHLB risk-taking incentives because, unlike many mutuals, the FHLB System does not bundle its equity and debt claims.

value of equity falls to zero even if the institution has "off book" assets that would remain valuable if the firm did not fail. In Marcus's example, a bank's charter value derives from its ability to borrow at subsidized (guaranteed) rates in the future, provided it remains in operation. Financial institutions with charter value effectively

have more capital at risk than the book value of capital shown on their balance sheets. Since greater levels of capital reduce the incentive to engage in risky behavior, other things being equal, financial institutions with charter value will tend to be less risky.

Frame and White (forthcoming) discuss the presence of charter value in the case of Fannie Mae and Freddie Mac. The FHLBs may similarly derive charter value from their ability to borrow at attractive rates in the agency debt market as well as from geographic membership restrictions. However, any disciplining role of charter value is likely to be less for the FHLBs than it is for Fannie Mae and Freddie Mac. First, the Banks' cooperative structure and diffuse control may result in less of the charter value actually accruing to owners because cooperative firms' managers can more easily capture economic rents for themselves (see, for example, Hansmann 1996). The limited competition for members among the Banks due to geographic boundaries creates similar issues. Second, in the event that a Bank's member-owners lost charter value because of a Bank's insolvency, these members would almost certainly have an opportunity to join the reconstituted institution or another FHLB.

Managerial incentives. Managerial incentives can sometimes counterbalance shareholders' incentive to take excessive risks. When they are paid a fixed salary, managers tend to avoid risk. They do not share in the good outcomes, and a bad outcome can substantially harm a manager's career prospects. Managerial preferences can thus diverge from shareholder preferences. To align managers' interests with those of shareholders, executive compensation often includes a performance-based element such as stock options.³⁵ Strictly speaking, cooperative and mutual institutions cannot provide equity-based compensation since they do not have traded equity. However, even a cooperative firm's executives can be offered incentive payments that may be correlated with risk taking.

Before 1999 the Finance Board limited the amount and the form of compensation packages that FHLB directors could offer Bank presidents. A base salary cap was established annually for each institution, and the president's incentive payments could not exceed 25 percent of that cap. The Financial Modernization Act rescinded the Finance Board's direct role over FHLB executive compensation. Since that time the incentive component of the FHLB presidents' actual compensation has roughly doubled relative to salary, from a mean of 22 percent of total compensation in 1999 to almost 40 percent in 2005.

Recent SEC filings provide detailed information on the criteria underlying incentive payments at some of the FHLBs. Much like publicly traded corporations, the reported FHLB incentive payments are tied primarily to the Banks' profitability and growth. For example, the Indianapolis FHLB awards incentive compensation to seven officers with the following weights on four goals: profitability (50 percent), increase in average total advances (25 percent), increase in mortgage purchase production (20 percent), and community investment advances originated (5 percent).³⁶ Some of the FHLBs also provide longer-term incentive payments, such as the Chicago FHLB's "Stock Equivalent Account":

A Stock Equivalent Account ("SEA") shall be established for each award recipient hereunder. Payments to the SEA shall be credited as "shares" at \$100 per share. "Shares" in the SEA shall earn interest at the same rate as the Bank's net return on equity after REFCO during each corresponding quarter. Interest shall be paid in the form of additional and fractional "shares" in the SEA. The interest calculation method herein shall apply to all existing SEA balances as of January 1, 1996. . . . SEA "shares" and interest thereon are vested on March 1 in the year following the year in which such "shares" were first credited to the SEA. . . . SEA "shares" may be converted to cash and withdrawn, at the option of the award recipient, as follows: (1) 50% upon vesting and (2) the balance one year after vesting.

SEA payments are similar to stock awards made by public corporations, although SEA value is based only on past earnings (and not expected future earnings) and cash-outs are subject to a one-year delay.

FHLB executives have been offered increasing incentives for profitability and growth, and both of these are correlated with risk taking. However, it is important to point out that FHLB incentive payments are much lower in both absolute and relative terms than those at Fannie Mae or Freddie Mac or at the typical large bank. Furthermore, FHLB executives are not granted stock options, which provide particularly strong risk-taking incentives. Emmons and Sierra (2004) report that in 2003 the chief executive of Fannie Mae (Franklin Raines) was paid a salary of \$1 million, a bonus of about \$4.4 million, and stock and options worth \$15 million. Indeed, at the end of that year, Raines owned \$17.4 million in stock outright plus options exercisable within sixty days to control another \$113 million in stock. The authors also report that executive compensation arrangements at Freddie Mac were similar at that time.

Overall, there are some important differences between the FHLBs and Fannie Mae and Freddie Mac that influence each institutions' risk-taking incentives. Some differences suggest stronger risk-taking incentives at the Banks, while others do not. The extent to which each housing GSE gears its managerial compensation toward risk taking seems to be especially important. In any event, effective and timely supervision by the Finance Board will be even more critical going forward.

35. According to Murphy (1999, 2489), most executive pay packages contain four basic components: a base salary, an annual bonus tied to accounting performance, stock options, and long-term incentive plans (including restricted stock plans and multiyear accounting-based performance plans).

36. Profitability targets generally tend to be based on the difference (spread) between pre-FAS 133 net income (per dollar of equity) and LIBOR. Many of the plans also tend to leave significant discretion to the board of directors to determine annual incentive compensation.

Conclusion

Historically, the twelve Federal Home Loan Banks provided low-cost liquidity to the mortgage market via collateralized advances to specialized mortgage lenders. Credit losses on those advances have literally been zero since 1932. However, legislative changes in the wake of the thrift crises spurred the Banks to expand in terms of both size and scope. In addition to advances, FHLB balance sheets have also come to include a substantial investment in mortgages and mortgage-backed securities. The attendant interest rate risk has created financial and accounting difficulties at some of the Banks. These troubles caught many observers off guard because they have come to think of the cooperatively owned FHLBs as low-risk institutions.

Like Fannie Mae and Freddie Mac, the FHLB System is a GSE that funds itself largely with federal agency debt obligations that are perceived by investors to be implicitly guaranteed by the U.S. government. While the incentive effects of such guaranteed liabilities on investor-owned firms are quite well understood, the impact on cooperatively owned firms is less obvious and dependent on the firms' structure. We identified some differences between the FHLB System and Fannie Mae and Freddie Mac that can result in differential risk-taking incentives. Importantly, we find that cooperative ownership itself does not reduce FHLB risk-taking incentives because, unlike many mutuals, the FHLB System does not bundle its equity and debt claims. We also find that Bank risk-taking incentives may be heightened by the joint-and-several liability provision in their consolidated debt obligations and a lack of equity market discipline, including a weakened role for nonmarketable charter value. However, the FHLBs cannot avail themselves of equity-based managerial compensation (particularly stock options), which creates high-powered risk-taking incentives in stock-owned firms. Thus, it is unclear whether the FHLBs' risk-taking incentives are necessarily weaker than those at Fannie Mae and Freddie Mac.

The Federal Home Loan Bank System has been financially sound since its inception in 1932. However, the Banks' incentives and ability to take risk expanded in recent years, and no claimant appears well positioned to provide strong discipline. This situation makes the Finance Board's supervisory task all the more challenging and important.

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Official Dollarization and the Banking System in Ecuador and El Salvador

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Since Ecuadorian president Jamil Mahuad announced the adoption of the U.S. dollar as legal tender in January 2000, the discussion about the pros and cons of full dollarization has intensified. In 2001 El Salvador engaged in full dollarization to enhance its economic reform process. The two economies adopted the U.S. dollar as their currency for diametrically opposite reasons: In Ecuador full dollarization occurred in the midst of an economic and banking crisis. In contrast, in El Salvador full dollarization was expected to enhance the set of previous structural reforms put in place to support economic stability and thus attract foreign investors. This article studies the evolution of the banking system in these two countries before and after the adoption of full, or official, dollarization.¹

Under full or official dollarization, a country adopts as legal tender another country's currency, in this case the U.S. dollar. The adopted currency takes over all the functions of domestic currency: a unit of account, medium of exchange, and store of value. The country's policymakers thus give up any possibility of monetary and exchange rate policies. Official dollarization is equivalent to pegging the domestic currency to the U.S. dollar, but it is different from a currency board because it is irreversible. This irreversibility theoretically makes full dollarization a credible economic policy and a way to avoid currency and balance-of-payments crises.

The expected benefits of full dollarization include the elimination of exchange rate risk, contributing to the decline of the country risk premium and interest rates, as well as the reduction of the inflation rate and inflationary expectations. These outcomes are expected to encourage foreign investment and a stable capital flow. One cost of full dollarization is the elimination of the government's ability to generate seigniorage—that is, revenue from issuing domestic money—to finance its fiscal deficit. Without this possibility, the dollarizing country must look for alternative revenue sources or reduce government expenditures. By giving up control of its money supply, a full dollarization regime encourages fiscal discipline (enhancing

policy credibility) but also constrains the fiscal response to stabilize the economy in difficult times.

Some initial conditions could be relevant in the decision to implement official dollarization. Minda (2005) and Edwards and Magendzo (2006) observe that small countries with close trade or financial ties to the United States could favor official dollarization, as Panama did in 1904. Ecuador, El Salvador, and Panama, the largest countries that have implemented official dollarization, are still relatively small and

are very open to U.S. trade and finance, with an average gross domestic product (GDP) of \$11 billion (in 2000 dollars) and an average population of 7 million in 2004.²

The restriction on the role of the monetary authority as lender of last resort is one of the costs of full dollarization.

A relevant factor in policymakers' decision to adopt full dollarization is the

depth and type of partial dollarization already present in the economy.³ A banking system with a large portion of deposits or loans denominated in foreign currency might have a smaller adjustment with the adoption of official dollarization than a system whose share is small or negligible. Banks in a dollarized economy might have internalized the costs of operating in such environment. They could already have foreign currency liquid assets, or the financial system could have adopted other prudential regulations to control or reduce liquidity and solvency risks. In addition, a country that is experiencing a currency or banking crisis might be more likely to implement official dollarization. Edwards (1995) points out that policymakers might be willing to make radical decisions in times of crisis rather than in times of economic stability. The realization and timing of expected benefits from full dollarization might depend on whether a country implemented it after an economic crisis, such as the currency and banking crisis in Ecuador, or as part of its structural reform process.

Official Dollarization and the Banking System

Three effects on the banking system under full dollarization are considered in this article: restrictions on the central bank as lender of last resort, the effect of economic stability on the performance of banks, and the promotion of financial integration with the world economy.

The restriction on the role of the monetary authority as lender of last resort is one of the costs of full dollarization. Central banks provide loans to banks facing liquidity problems. Under official dollarization, printing money is no longer a feasible source of liquidity, and the central bank needs to look for alternative responses to episodes of financial distress. Chang and Velasco (2000) study the case of an economy under a fixed exchange rate regime with a central bank that does not act as a lender of last resort, concluding that this regime is more prone to bank runs than a currency board. In this case, the liabilities of the banking system as a whole are, implicitly, obligations in international currency. Consequently, a bank run is possible if the banking system's implicit liabilities are greater than its liquid assets (in foreign currency). Under full dollarization, the economy is shielded from a currency or balance-of-payments crisis, but the risk of a banking crisis is real. Financial instability is endemic to this regimen.

The solution includes external lines of credit with banks from abroad and reserve funds from taxes or other revenues (Calvo 2001). In their analysis, Chang and Velasco show that a policy of high bank reserve requirements dominates over a policy of large international reserves. "The intuition is that increasing the international li-

Dollarization: Some Definitions and Measurements

Official or full (*de jure*) dollarization is a country's adoption of another country's currency as legal tender.

Under *partial (de facto) dollarization*, a country's domestic currency remains the official legal tender, but transactions can also be carried out in foreign currency, effectively giving the country a bicurrency system.

Other types of dollarization can be distinguished:

- *Currency or payments dollarization*, sometimes referred to as currency substitution, is a country's use of foreign currency for transaction purposes.
- *Real dollarization* is the indexing, formally or de facto, of prices and wages to the dollar.
- *Financial dollarization*, also called asset substitution, occurs when a country's resi-

dents hold financial assets and liabilities in foreign currency. Financial dollarization can be external (using the dollar in claims between residents and nonresidents) or domestic (using the dollar in claims between residents).

Data limitations on cash holdings in foreign currency restrict the measurement of currency or payments dollarization. Financial dollarization can be measured in several different ways. Domestic financial dollarization can be measured as the ratio of foreign currency deposits or loans to GDP or to total deposits or to total loans. External financial dollarization can be measured as the ratio of foreign assets held by banks to foreign currency deposits or cross-border deposits to foreign currency deposits.

Source: Gulde et al. (2004) and Minda (2005)

quidity of the banking system has a social opportunity cost. Under a policy of high reserve requirements, banks internalize this cost; under a policy of large international reserves, they do not" (2000, 3).

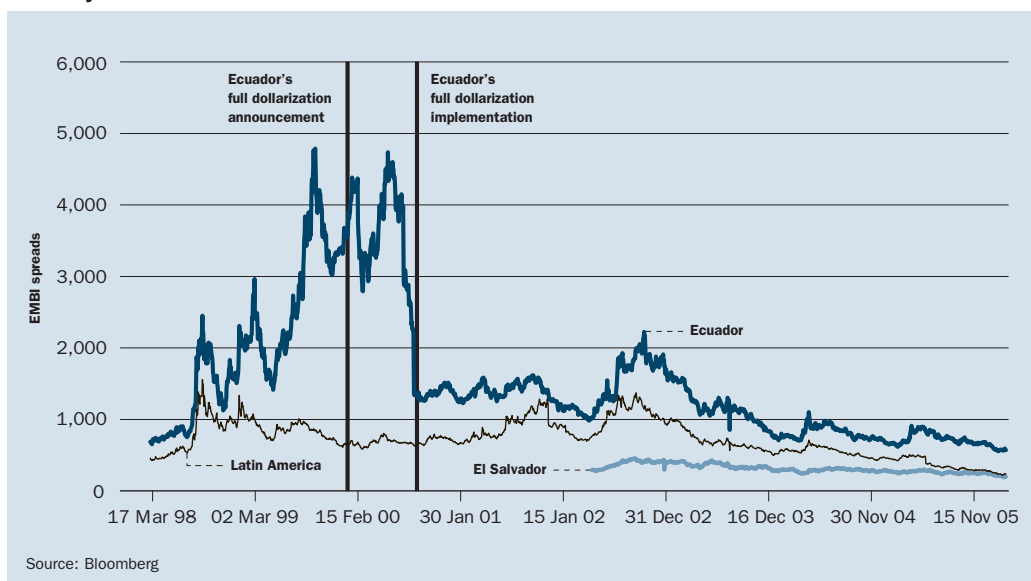
Paradoxically, even though full dollarization limits the central bank's role as lender of last resort and therefore monetary authority responses to financial crises, it might make banks runs less likely because consumers and businesses may have greater confidence in the domestic banking system. The reason is that official dollarization reduces the moral hazard present in highly dollarized banking systems. In a partially dollarized economy, the impact of a large depreciation is widespread in the banking system. Banks expect that the monetary authority would come to the rescue of troubled banks or would delay any sharp devaluations. However, under official dollarization and without exchange rate risk, banks would have to manage their own solvency and liquidity risks better, taking the respective precautionary measures.

Gale and Vives (2002) show that dollarization provides a credible commitment not to help banks in trouble even though it would be *ex ante* optimal to do so. Their study concludes that dollarization is beneficial when the costs of establishing a reputation for the central bank are high, monitoring by the central bank is important in improving returns, and the cost of liquidating projects is moderate.

Under official dollarization, the lack of a lender of last resort encourages changes in the way supervisory and regulatory institutions manage liquidity and solvency risks.

1. In this article, the terms "official" and "full" dollarization will be used interchangeably.
2. Minda (2005) points out that full dollarization affects small countries and territories; a majority are insular (such as the Marshall Islands and Micronesia) and are closely connected to another country (Guam, Puerto Rico, San Marino).
3. See the sidebar above for a description of the types and measures of dollarization.

Figure 1
Country Risk and Full Dollarization



Prudential norms to manage liquidity risk include higher reserve requirements, liquidity requirements, and deposit insurance.⁴ Gulde et al. (2004) point out that these norms reduce banks' profits because banks have to hold more liquid assets, which have a lower return, and required reserves that pay below-market rates and must increase their expenditures to pay for insurance. Official dollarization also eliminates banks' exchange rate services, a good source of revenues, especially in partially dollarized countries.⁵

Banks ultimately benefit from the reduction of inflation, the elimination of inflationary expectations, and price stability, which fosters an environment beneficial to financial intermediation. With the return of confidence in the currency and financial stability, one expects an increase in bank deposits and loans supporting the development of the banking system. In addition, the elimination of currency risk and currency mismatch contributes to a more efficient banking system. As a net result, reserve requirements are expected to be lower given that banks do not have to distinguish between foreign and domestic currency deposits. Moreno-Villalaz (1999) points out that official dollarization in Panama allowed banks to reduce their reserves by an equivalent of 5 percent of GDP.

Official dollarization also lowers transaction and information costs, encouraging trade and financial integration. According to Minda (2005), even if the risk of external shocks cannot be eliminated, full dollarization contributes to diminishing their impact and lowering contagion risk by eliminating exchange risk, signaling to international markets the country's commitment to currency stability. This commitment could foster foreign investment and stable capital flows, promoting the integration of the domestic financial market with the world.

Official Dollarization in Ecuador and El Salvador

In 2000 and 2001, Ecuador and El Salvador, respectively, implemented official dollarization for diametrically opposite reasons. In this section, we discuss the economic background before and after the adoption of the U.S. dollar as their domestic currency.

Ecuador. During the 1990s, attempts to open the Ecuadorian economy to international trade and capital markets failed, for the most part. Large fiscal deficits and increasing external debt led to imbalances that became unsustainable with the decline of world oil prices and El Niño's devastating impact on production and infrastructure in 1998. These external shocks resulted in low economic growth, inflation, and liquidity problems in an already fragile banking sector. Several developments contributed to Ecuador's economic collapse in 1999: the devaluation of the sucre in February, a freeze on bank deposits in March, a default on external debt payments in September, and the country's overall political uncertainty and lack of policy direction.

In January 2000, in an environment of social unrest and lacking congressional support for the implementation of structural reforms, then President Jamil Mahuad called for full dollarization to avoid the collapse of the banking system. Days later,

Mahuad was deposed. Congress confirmed Gustavo Noboa, the elected vice president, as the new president. Noboa continued with full dollarization to promote a return to economic stability. In this already partially dollarized economy, the exchange rate was set at 25,000 sucres per U.S. dollar. Along with full dollarization, the Economic Transformation Law (Ley de Transformación Económica) introduced reforms that provided incentives to private investment in the energy sector, encouraged privatization of state enterprises, and made labor markets more flexible. Over the course of the year, the central bank repurchased almost all the outstanding stock of sucres, and all bank accounts were converted into dollars. The International Monetary Fund (IMF) signed a standby agreement with the Ecuadorian government to support economic stability and recovery, helping to attract additional funding from other multilateral institutions.

Ecuador started enjoying the expected benefits of full dollarization even before the U.S. dollar was officially adopted on September 9, 2000. As a sign of the enhanced credibility provided by full dollarization, the release of frozen bank deposits in March did not translate into a bank run. Economic recovery in the first quarter of 2000 and lower inflation in July represented the stabilizing effect of full dollarization. Ecuador also restructured its external debt in August 2000, reducing the total external debt ratio from 106 percent of GDP at the end of 1999 to around 98 percent in 2000.

Full dollarization eliminated currency risk in Ecuador although country risk did not decline immediately with the announcement of full dollarization in January 2000.⁶ However, country risk became less volatile after dollarization took effect in September and diminished after debt renegotiations with international organizations (see Figure 1).

Initially, dollarization did not help reduce inflation; the adjustment to lower rates has taken some years. The lag in the adjustment of administered prices and the increase in fiscal spending have delayed the convergence of prices to international levels. By 2003 the inflation rate reached 7.9 percent, the first year since 1972 to have only

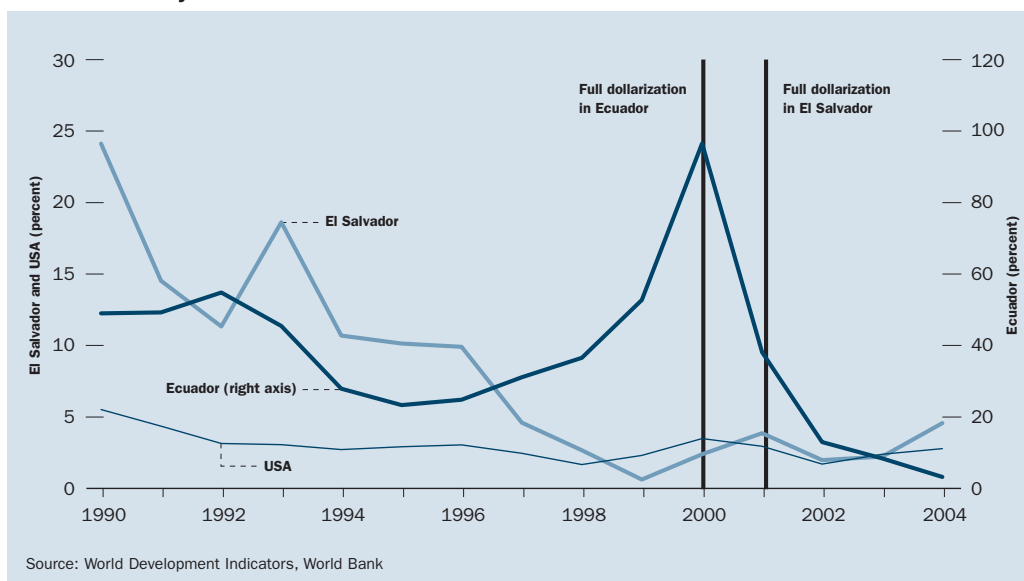
In Ecuador, the lag in the adjustment of administered prices and the increase in fiscal spending have delayed the convergence of prices to international levels.

4. These norms reduce banks' profits, but banks have to face this level of protection voluntarily given that full dollarization has removed currency risk.

5. Duncan (2003) notes that in Peru, a highly dollarized economy, currency exchange transactions represented 2.1 percent of the banks' revenues.

6. The indicator for country risk is the interest rate spread in basis points between Ecuador's emerging market bond index and thirty-year U.S. treasury instruments.

Figure 2
Inflation in Fully Dollarized Countries



single-digit growth. In 2004 inflation rose only 2.7 percent for the year, thus converging to U.S. inflation rates (see Figure 2).

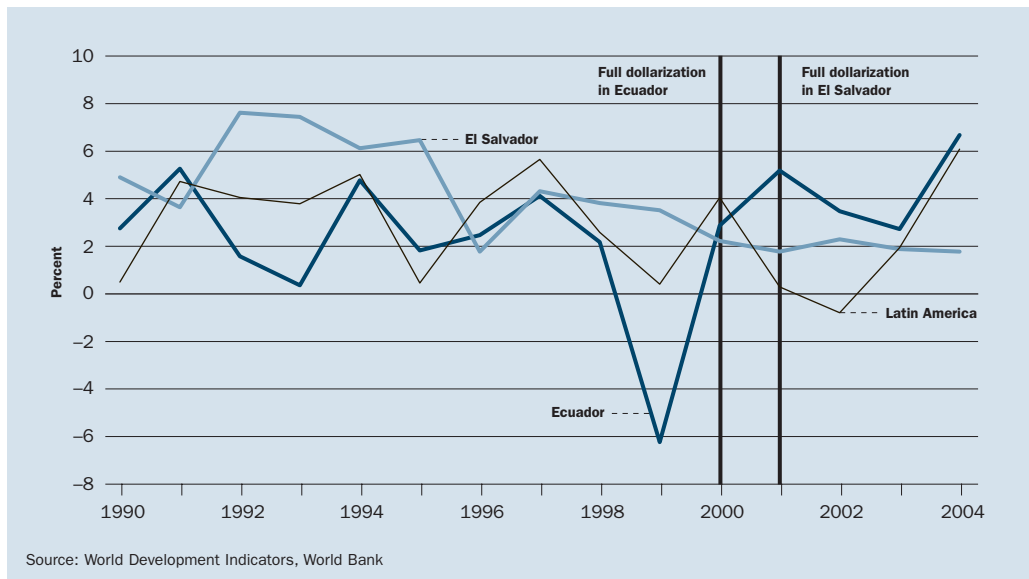
In addition to a more stable and lower inflation rate, clear signs of economic recovery emerged in 2001, with the country reporting real GDP growth of 5.1 percent in 2001. While economic growth reached only 3.4 percent and 2.7 percent in 2002 and 2003, respectively, the economy bounced back in 2004 with almost 7 percent growth, with the help of an increase in oil output from the new oil pipeline, the Oleoducto de Crudos Pesados. Currently, high global commodity prices continue to support economic growth, but the economy had an estimated growth of 2.9 percent in 2005 and is expecting similar growth of 3.0 percent in 2006, according to Economic Intelligence Unit forecasts.

El Salvador. After reaching a peace agreement in the early 1990s resolving a civil war, El Salvador implemented comprehensive structural reforms in the mid-1990s in an attempt to rebuild and stabilize the economy. These reforms included the simplification of the tax structure, reprivatization of the financial system, and financial and trade liberalization (IMF 1998). In addition, in 1993, the central bank adopted a fixed exchange rate policy with respect to the U.S. dollar to minimize exchange rate risk and to foster price stability.⁷

These structural reforms and overall political and economic stability helped bring El Salvador back into the global economy. Export growth and diversification and the growth of the maquila industries helped the economy become less dependent on coffee production.⁸ Additionally, stability and comprehensive reforms have contributed slightly to improvements in per capita income and social conditions. However, even after a decade of steady growth, most measures of poverty and social conditions have not fully recovered from the deterioration of the civil war in the 1980s.

Since 1992, El Salvador's economy has enjoyed stability and a steady decline of inflation rates, from 18.5 percent in 1993 to 2.3 percent in 2000. Interest rates have remained high, however, mainly because of the lack of confidence in the fixed

Figure 3
Real GDP Growth



exchange rate regime. Interest rates declined slightly from 19 percent in 1993 to 14 percent in 2000. Remittances from abroad also increased significantly, growing approximately 155 percent from 1992 to 2000. In 2000, total remittances reached \$1.75 billion, approximately 13 percent of real GDP. GDP growth averaged 6 percent between 1990 and 1995. In 1998 Hurricane Mitch caused widespread flooding and landslides, affecting agriculture, the transportation infrastructure (mainly highways), and housing. But the economy continued growing, albeit at a slower pace, averaging 3.7 percent between 1998 and 2000.

Beginning January 1, 2001, the Salvadoran government implemented the Monetary Integration Law (*Ley de Integración Monetaria*), which established a fixed exchange rate of 8.75 colones per U.S. dollar and made the dollar legal tender and the only unit of account in the financial system. The colón is still considered legal tender and continues to circulate alongside the dollar, but dollars have gradually replaced colones, which are no longer printed. All financial operations are denominated in dollars, and currently the use of the colón is generally limited to some rural areas.

Unlike Ecuador, which adopted the dollar as a policy alternative to bring economic stability, El Salvador had enjoyed economic stability and low inflation rates before official dollarization (see Figures 2 and 3). (Further, El Salvador is currently one of four investment-graded countries in Latin America, a status that demonstrates the confidence of international investors.) The government decided to dollarize in an attempt to lower interest rates, increase foreign investment, improve financial

7. Even before 1993, the historical preference was a fixed exchange rate with respect to the U.S. dollar, in which the rate changed only during the period of the civil war from 2.5 colones per U.S. dollar to 8 colones per U.S. dollar. In 1993, the exchange rate became fixed at 8.75 colones per U.S. dollar. See IMF (1998) for more details.

8. Maquila industries are plants that assemble imported materials and parts and re-export the finished product to the original market.

conditions, and decrease transaction costs in international trade, thereby further accelerating economic growth and stability (see Towers and Borzutzky 2004). In addition, the government argued that dollarization would protect wages and savings against devaluations. Dollarization would also benefit Salvadorans living in the United States by making their remittance transfer costs cheaper.⁹ Officials also pointed out that full dollarization was the logical next step, considering that historically the colón has been pegged to the dollar, especially since 1993. Moreover, the country's economy

While economic growth in El Salvador has decelerated, interest rates, inflation rates, and remittances have improved since full dollarization was adopted.

is closely linked to the United States: Two-thirds of total exports are sent to U.S. markets, and the United States is the origin of a large portion of remittances.

Right after the adoption of dollarization, El Salvador faced several severe shocks, including two earthquakes, declining international coffee prices, increasing

oil prices, and the slowdown of the U.S. economy. These shocks dampened economic growth and other expected benefits from full dollarization. Real GDP grew by only 1.8 percent in 2004 and has averaged less than 2 percent since 2001. Trade growth has also been sluggish, with export growth averaging only 3 percent and imports averaging 6.7 percent since 2001—a sharp contrast to the 17.5 percent export growth in 2000. Foreign investment growth has also been slow, with gross fixed capital formation increasing slightly more than 1 percent since 2001.

While economic growth has decelerated, interest rates, inflation rates, and remittances have improved since full dollarization was adopted. In 2004, lending interest rates (in foreign currency) averaged 6.3 percent, declining considerably from 11 percent in 2000.¹⁰ Although inflation increased slightly to 4.5 percent in 2004, it has averaged around 3 percent since 2001 compared to 7.8 percent from 1992 to 2000. Remittance inflows have also improved significantly, reaching \$2.55 billion (approximately 16 percent of GDP) in 2004, according to the central bank. Economic growth is expected to increase in the coming years as the implementation of the Dominican Republic–Central American Free Trade Agreement (DR-CAFTA) and reforms to deepen the financial sector, along with prudent fiscal policies, support productivity gains and investment.¹¹

Comparing results. For Ecuador and El Salvador, the implementation of official dollarization has resulted, as expected, in lower inflation rates, lower country risk premiums, and gains in policy credibility. The expected benefits have taken longer to materialize in Ecuador than in El Salvador, however. In Ecuador, even though inflation rates started to decline in 2000, not until 2004 did the rates reach levels similar to the U.S. inflation rate. In addition, the fall in the volatility of monthly inflation in Ecuador also was noticeable only after February 2003. El Salvador, on the other hand, continued to enjoy low inflation rates, and inflation volatility declined smoothly after full dollarization.

The same picture can be drawn for country risk; in Ecuador it took eight months after President Mahuad announced full dollarization in January 2000 for international markets to show lower levels of risk premiums, which declined sharply the day that the debt was renegotiated with international organizations in September 2000. But country risk reached levels of below 1000 basis points only after May 2004.¹² In El Salvador, country risk has been below the average spread for the Latin American region since country risk for the country was introduced in May 2002 (see Figure 1).

Economic growth has been influenced heavily by internal and external conditions. In Ecuador the persistence of high oil prices has helped anchor official dollar-

ization in the last two years, thus compensating for the lack of external financing and increases in fiscal expenditures. Higher oil exports have helped pay down public debt and stimulate the economy during a period of political instability. In El Salvador the slow recovery of the U.S. economy, political uncertainty surrounding the elections, low coffee prices, and high oil prices have decelerated economic activity. Figure 3 shows lower, but less volatile, economic growth for El Salvador in 2000 and 2004 than for Ecuador and Latin America. Under official dollarization, both economies continue to be vulnerable to external and internal shocks. But policy credibility and economic stability brought by full dollarization can encourage reforms to promote competitiveness and productivity to overcome such vulnerabilities.

Banking Systems before Official Dollarization

In Latin America, banks are the most significant institutions in the financial system, representing approximately 70 percent of total financial assets. Latin American banks, however, do not reach levels of financial deepening and development observed in developed economies. Throughout the 1960s and 1970s, banks in Ecuador and El Salvador faced a period of stability, which gave way to disruptions caused by the external debt crisis in the 1980s in Ecuador and by a civil war in El Salvador late in that decade. The economic instability, high inflation, and depreciation of the domestic currency that ensued, along with other political and external shocks, did not foster an environment of financial deepening. In this section, we will analyze the banking systems in Ecuador and El Salvador after this period of instability.

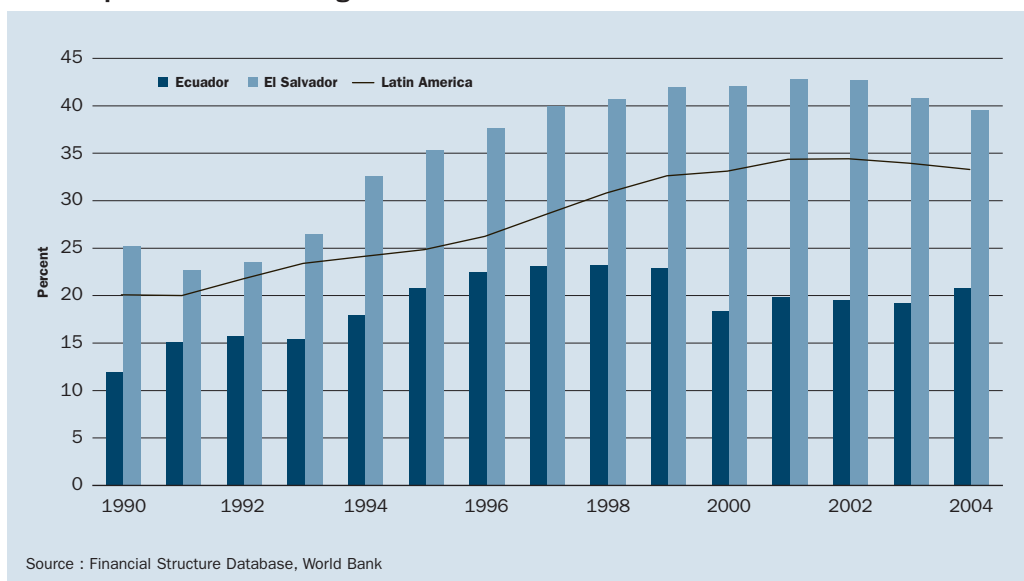
Banking crisis in Ecuador. In Ecuador, the banking crisis of the late 1990s really began a decade earlier and had “[its] roots in a ‘boom and bust’ cycle in the middle of financial liberalization, coupled with lax financial surveillance and bad banking practices” (Jacome 2004, 12). De la Torre, Garcia-Saltos, and Mascaró (2001) argue that the banking crisis can be explained in three dimensions: failure to establish an effective regulatory and supervisory environment in the face of financial liberalization, a credit boom and sudden stop phenomenon, and the exacerbation of financial vulnerability during 1997 and 1998 due to lax fiscal policy and failure to introduce financial reform.

In 1994 the General Law of Financial Institutions (*Ley General de Instituciones del Sistema Financiero*) created the legal basis for financial liberalization, fostering financial intermediation and investment allocation. Banks could then perform dollar-denominated services, and commercial banks were now legally allowed to have off-shore operations. The central bank also underwent significant reform, retaining the ability to provide monetary support to banks in liquidity and solvency troubles (see Beckerman and Solimano 2002). In addition, the law established a modern framework for the development of risk-based prudential regulations.

But the implementation of these new prudential regulations did not materialize quickly. Regulations continued to be outdated, and enforcement continued to be extremely lax, deficient, and uneven. Monitoring difficulties and lack of information

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9. There would be no foreign exchange transaction cost associated with sending remittances after dollarization.
 10. The interest rate for loans in domestic currency was 14 percent in 2000.
 11. The Central American countries involved in DR-CAFTA are Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.
 12. JPMorgan raised Ecuadorian debt from underweight to market weight, despite political uncertainty. In addition, the government was negotiating a new standby agreement with the IMF.

Figure 4
Bank Deposits as a Percentage of GDP



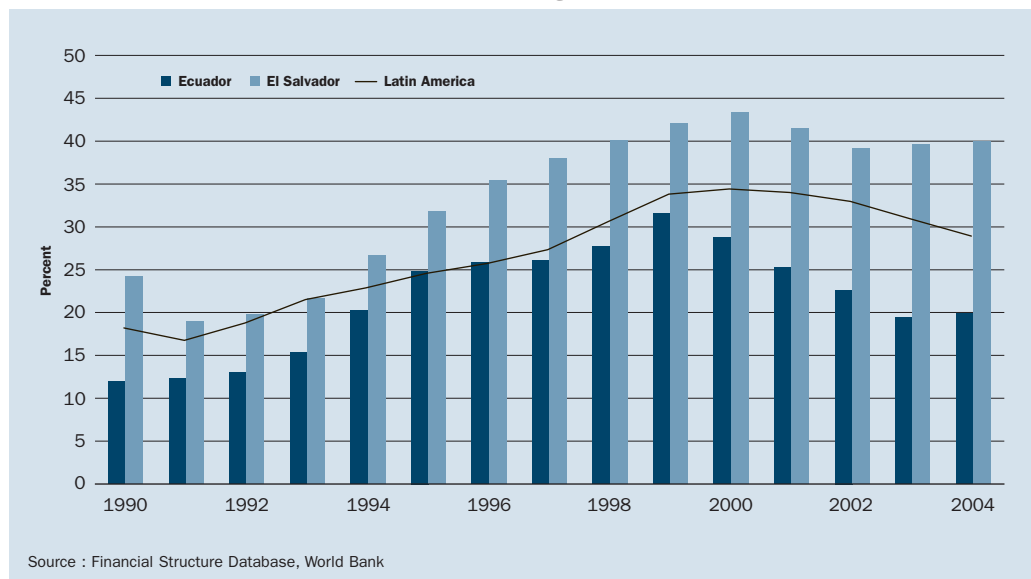
from banks, mainly from their offshore branches, limited the ability to produce an accurate assessment of the soundness of the financial system. In addition, the supervisory authority had no proper strategy or power to intervene in a troubled bank, thus restricting the use of preventive measures to avoid bankruptcies and bank failures.

With lax prudential supervision and regulation, banks increasingly performed risky transactions, encouraged by moral hazard stemming from successive bailouts granted over the 1980s. Related-party lending intensified, loan portfolios became heavily concentrated in certain economic sectors, and dollar-denominated operations increased without the proper measures to hedge currency mismatches, mainly with borrowers earning in local currency but acquiring loans in dollars.

Financial liberalization coincided with a period of foreign capital inflows attracted by higher domestic returns in an environment of domestic macroeconomic stability. The rapid monetization of the economy brought in a sizable credit boom. Credit increased in real terms by 40 percent in 1993 and 50 percent in 1994. The increase in liquidity was encouraged by a decline in reserve requirements from 28 to 10 percent in domestic currency deposits and from 35 to 10 percent for foreign currency deposits (see Jacome 2004).

In 1995, as risky activities intensified in the banking system, Ecuador experienced a sudden stop and reversal of capital inflows, mainly because of domestic political problems, the short but costly war with Peru, and the Mexican Tequila crisis. In addition, the continued depreciation of the currency under the new exchange rate regime created difficulties for banks with currency and maturity mismatches. In an environment of political and economic instability, residents began to shift their deposits to stronger and more stable banks and to dollar-denominated deposits. Nevertheless, the money was kept in the banking system. But the failure of two banks in 1995 and 1996 increased residents' fears. Liquidity pressures on the banking system increased as residents began to panic, triggering deposit runs.

Figure 5
Bank Credit to the Private Sector as a Percentage of GDP



In early December 1998, the government passed the “AGD Law,” which established a blanket guarantee through the Guarantee of Deposits Agency (Agencia de Garantía de Depósitos) (AGD), in an effort to restore a sense of stability in the banking system (see Jacome 2004). The government also included a 1 percent tax on financial transactions (debits and credits) to substitute for income tax. In an effort to avoid the tax, residents began to store money in foreign currency outside of the banking system, further hurting bank liquidity. Deposits contracted 15 and 60 percent in 1998 and 1999, respectively. However, as shown in Figure 4, bank deposits as a percentage of GDP remained at 23 percent in 1998 and 1999 because of the decline in GDP of 7.3 percent.

Since the AGD Law was not helping the banking system, the government imposed a widespread deposit freeze in March 1999. Time deposits and repurchase agreements were locked for at least one year, and savings deposits in excess of U.S.\$500 and half of checking account balances were frozen for six months. Despite the deposit freeze, only three banks became insolvent and had to shut down.

An examination of banking system data shows the effects of the crisis. From 1995 to 1997, loans grew 29 percent but fell 31 percent in 1998 and 1999 (see Figure 5). Total assets also grew 29 percent from 1995 to 1997 but fell 9 and 29 percent, respectively, in 1998 and 1999. Bank assets’ share in total financial assets went from 98 percent in 1997 to 77 percent in 1999, a 22 percent decline. In addition, past-due loans’ performance also deteriorated quite sharply; past-due loans increased a dramatic 307.6 percent in 1999, reaching \$1.1 million.

In summary, prior to official dollarization the banking system in Ecuador underwent a crisis that resulted in a reduction in the system’s size (in terms of both assets and number of banks), in a deposit freeze to avoid a bank run, and in a decline in banks’ lending activities.

Banking stability in El Salvador. In the first half of the 1990s, the Financial System Reform Program (Programa de Fortalecimiento y Privatización del Sistema

Financiero) was initiated as part of the country's structural reform, which established a new role for the central bank; redefined monetary, credit, and exchange rate policies; readjusted the legal and institutional framework; and strengthened and privatized the banking system.¹³ In 1990 the Organic Law for the Superintendence of the Financial System (Ley Orgánica de la Superintendencia del Sistema Financiero) was approved, establishing an autonomous institution to oversee banks, *financieras* (formerly known as savings and loans associations), the central bank, and other institutions of the financial system. In addition,

Policy credibility and economic stability brought by full dollarization can encourage reforms to promote competitiveness and productivity to overcome vulnerabilities to shocks.

commercial banks and *financieras* were privatized through a process that involved several stages, from analyzing each bank's loan portfolio to institutional restructuring. According to the central bank, ownership was returned to the private sector by distributing the largest banks to individual

shareholders and bank employees. During the 1990s financial liberalization was consolidated by implementing laws that established the autonomy of the central bank and its limitations on public financing.

The process of financial liberalization promoted growth in the banking system. Assets rose from 27 percent of GDP in 1990 to 51 percent in 2000. In the first half of 1990s, nonperforming loans were small while indicators of liquidity, efficiency, solvency, and profitability were satisfactory. Assets performed well, and total deposits increased dramatically (see SAPRIN 2001).

In the second half of the 1990s, however, adverse economic conditions affected the performance of the banking sector. Two bank failures in 1997 and 1998 brought to light some weaknesses of the banking system and its supervision and regulation. Banco Fincomer and Insepro-Finsepro were linked to illegal transfers of funds from corporate firms to bank branches, highlighting the fact that resources could be transferred outside the surveillance of supervision and regulation.

While deposits and loans continued to grow, their growth rates declined. From rates of 19.6 percent in 1996, deposits' growth rates slowed to 5.4 and 5.1 percent in 1999 and 2000, respectively. Loan activity growth demonstrated a similar pattern, declining from 20.1 percent in 1996 to only 4.3 percent in 1999 and 1.8 percent in 2000. The performance of nonperforming loans also began to deteriorate along with asset quality.

In response, the 1999 Banking Law (Ley de Bancos) was established, bringing greater transparency in financial activities and forcing banks to monitor credit risk. The law, one of the most progressive in Central America, brought the banking system in line with internationally accepted standards.

Banks after Official Dollarization

The previous discussion raises several questions: Did the banking system introduce changes to overcome the restrictions imposed on the central bank in the role of lender of last resort? Given the expected reduction in inflation, interest rates, country risk, and volatility that ensued from dollarization, how did the banking system evolve? Did banks in fact perform better in an environment of expected economic stability? And, finally, did full dollarization help in the financial integration of the banking system with international markets?

Lender of last resort. In Ecuador the Economic Transformation Law that supported the implementation of full dollarization in September 2000 included changes

in the role of the central bank, the development of a liquidity fund, and the modernization and tightening of banking supervision and regulation. Under the new law, the central bank is able to conduct liquidity operations with banks, including transactions in stabilization bonds with commercial banks and repurchase operations. In addition, a separate Liquidity Support Fund was established to supplement the central bank's capacity during liquidity problems (see Beckerman and Solimano 2002). Banks are required to allocate 1 percent of their deposit base to the fund.¹⁴

Under full dollarization, banking regulations were restructured and tightened, and regulators were given more power to take preventive measures against banks that showed signs of instability. More stringent capital adequacy regulations (which are now much closer to Basel standards) and new credit risk centers were established to improve prudent supervision. In addition, the General Law of Financial Institutions was overhauled in 2001, including reforms such as a prohibition against related-party lending, more stringent loan-loss reserves and capital definitions and requirements, and mandatory consolidated financial reporting. These reforms improved transparency and brought the banking system closer to international standards. Deficiencies do remain, however, and while regulations were updated, actual implementation and enforcement continue to be poor (see Fitch Ratings 2003). Bank accounting standards continue to deviate from international norms while some regulations continue to be lenient, including rules for loan write-offs.

Compared to the experience in Ecuador, where full dollarization supported the banking system in its rebuilding process, full dollarization in El Salvador supported the performance of an already well-established banking system. The absence of a lender of last resort has encouraged Salvadoran banks to hold a growing proportion of their assets in highly liquid instruments. Also, banking system deposits are now insured under the Deposit Guarantee Fund (Instituto de Garantía de los Depósitos) (IGD) set by the 1999 Banking Law. The IGD guarantees deposits up to U.S.\$6,700, or roughly three times GDP per capita.¹⁵ One of the main weaknesses of the fund is that it does not provide adequate coverage for the deposits that it currently insures (U.S.\$2.2 billion). In case of need, it would cover only about 2 percent of the insured funds.

The banking environment. In Ecuador, after the banking crisis and during the initial stages of full dollarization, the government initiated an evaluation process to assess banks' solvency. External auditors determined that the government should intervene in sixteen banks, with all but two closing soon afterward. This restructuring process removed the weakest, most problematic banks from the system. But none of the banks was exempt from the devastating impact of the crisis, and those that remained in operation were weakened by asset quality problems, liquidity pressures, and a sharp decline in the level of activity and, thus, sustainable operating profitability.¹⁶ Consequently, immediately after dollarization, the size of the banking system (in terms of financial penetration) shrank. In 2001, total assets fell to 28.6 percent of GDP (from 38.2 percent in 2000). By 2003, total assets declined to 21.4 percent of GDP, levels similar to those in the 1980s. Since then, deposit growth and loan growth reached 86.4 percent and 111.7 percent, respectively, from 2000 to 2004 in response to the rebound in investor confidence and

13. See the historical outline at the central bank of El Salvador's Web site, www.bcr.gov.sv.

14. This fund is in addition to the reserve requirement of 8 percent.

15. Offshore deposits are not insured.

16. Most banks remained in profit thanks to hefty gains on foreign currency positions when the sucre devalued and to inflation adjustments, which were used to boost capital and increase loan-loss reserves (see Fitch Ratings 2003).

more robust economic growth. Nonperforming loans over total loans have declined, indicating better asset quality and more stability in the banking system.

Although prior to 2001 Salvadoran banks already operated in an environment of free capital flows and low inflation, full dollarization contributed to a reduction in banks' intermediation margins. On the deposit side, local banks compete among themselves within the domestic market. Although large banks have a comparative advantage with their expansive networks, small banks have benefited from full dollarization as their funding costs have converged with those of their larger competitors. Lower lending rates and recent depressed credit have given Salvadoran banks a comparative advantage versus other Central American banks, encouraging larger Salvadoran banks to expand their lending to neighboring countries (Honduras, Guatemala, and Nicaragua). Recent reforms to the banking law in 2003 have limited cross-border lending; however, banks are circumventing restrictions by establishing holding companies in Panama. This practice results in additional risk to the Salvadoran operations of these institutions.

As a response to lower intermediation margins, there has been a process of consolidation to allow banks to compete more effectively. Between 2000 and 2002 four mergers occurred that resulted in a high concentration: Four banks now account for more than 80 percent of the sector's assets and deposits. These banks are among the largest in Central America but are still small by international standards.

Financial integration. Foreign bank presence in El Salvador remains negligible despite the absence of barriers to entering the market. The country has only two foreign-owned institutions that have operated for some time. It is also estimated that about fifty other foreign banks that do not have a local presence provide financing to El Salvador's private sector, on the order of \$1.8 billion as of June 2002, nearly double the amount at the end of 1999 (see Fitch Ratings 2003). Ecuador has twenty-five private banks, of which two are foreign.

Overall, full dollarization helped the stabilization of the banking system in Ecuador by stopping the collapse of the economy. In 2005, despite political uncertainty, financial conditions remained stable, deposits had grown steadily over the previous four years, and banks continued to maintain high levels of liquidity and to improve asset quality. But the long-term sustainability of this policy remains uncertain as institutional weaknesses in the economy and banking system continue. In El Salvador, banks have improved their performance despite the economic deceleration, gaining competitiveness in the Central American region. The regulatory and supervisory institutions have set up regulations comparable to international standards.

Did Official Dollarization Have an Impact on Bank Performance?

To examine how full dollarization and other macroeconomic and institutional factors affected bank performance indicators such as profitability, liquidity, and asset quality, we use panel data including all banks in Ecuador and El Salvador from 1995 to 2004. Following Demirguc-Kunt and Huizinga (1999), we define bank performance Y_{it} for bank i at time t as follows:

$$(1) Y_{it} = f(DOLL_t, MACRO_t, BANK_{it}) + error_{it},$$

where Y_{it} is the dependent variable—bank performance—measured by its profitability, loan quality, and loan growth. Profitability or before-tax profits can be decomposed as net interest income plus noninterest income minus overhead costs minus loan-loss provisions, usually as a ratio of total assets. The indicator for loan quality is

loan-loss provisions as a ratio of total loans (LLP), and, for liquidity, net loans as a ratio of total deposits.

The explanatory variables are a dollarization dummy indicating when the country implemented official dollarization. We also include macroeconomic variables reflecting the state of the economy, including economic growth rates, inflation rates, interest rates, gross domestic product (GDP) per capita, and trade as a percentage of GDP. As indicators of financial structure, we use credit to the private sector as a percentage of GDP, bank deposits as a percentage of GDP, and bank assets' share in the banking system. Another set of variables is specific to banks' activity. These include loan-to-asset ratios and equity-to-asset ratio indicators of capital strength as well as bank size variables such as individual banks' share of loans and deposits as a portion of loans and deposits in the banking system. Country and year dummies are included to capture idiosyncratic effects. These bank activity variables are lagged one period to prevent simultaneity, in particular because balance-sheet variables refer to year-end balances.

The data set, published by Latin Finance, includes information from all banks from 1995 to 2004 in Ecuador and El Salvador. Macroeconomic variables come from International Financial Statistics published by the IMF, financial structure variables come from the Financial Structure Database of the World Bank (2004), and data on dollarization ratios come from the Web sites of the central banks of Ecuador and El Salvador.

The table shows the results of the regression for loan-loss provisions (or loan quality), liquidity, and profitability. As expected, the coefficient of the dollarization dummy is positive and significant in the explanation of loan quality. Given the absence of a lender of last resort, banks need to hold adequate reserves to respond to any sudden increase in nonperforming loans. Trade as a percentage of GDP has a direct relationship with loan provisions, indicating that banks may allocate more reserves for loans given an increase in the openness of the economy that could bring more fluctuations as a result of external shocks. The coefficient on the interest rate is negative and significant, suggesting that an increase in the interest rate could reduce the demand for loans. Economic growth is significant with a negative sign, meaning that economic growth is an incentive to decrease loan-loss provisions. Inflation is also significant with a negative sign; a possible explanation is that unexpected inflation will benefit borrowers and reduce the incentive to increase loan-loss provisions. Relatively larger banks will have a greater loan-loss provision ratio.

The second column of the table shows the results for liquidity, which is net loans over deposits. The dollarization dummy has a negative and significant coefficient; as expected, official dollarization will restrict liquidity in the overall economy, and banks need to make reserves to support their liquidity needs. In this regression, macroeconomic variables and financial structure indicators are also significant. Economic growth has a negative and significant coefficient, showing a direct relationship between economic growth and liquidity. Inflation and bank liquidity have an inverse and significant relationship: Higher inflation increases the demand for money (for example, less deposits) competing with banks. In the case of trade as a percentage of GDP, the relationship with bank liquidity is also indirect: The more open an economy is, the higher the demand for cash for international transactions, competing with bank liquidity.

Full dollarization helped the stabilization of the banking system in Ecuador by stopping the collapse of the economy.

Table
Regressions on Bank Performance Indicators for Ecuador and El Salvador, 1995–2004

Independent variables	Loan quality: Loan-loss provisions	Liquidity: Net loans/deposits	Profitability: Before-tax profits
Dollarization dummy	0.1532** (0.0772)	-2.1611** (0.8520)	-0.168 (0.1727)
Macroeconomic variables			
Economic growth	-0.0106*** (0.0035)	-0.4524*** (0.1704)	0.017* (0.0097)
GDP per capita	-0.0003 (0.0003)	-0.0047 (0.0040)	0.0010 (0.0010)
Inflation	-0.0010** (0.00068)	0.0547*** (0.0206)	0.0033 (0.0030)
Trade as a percent of GDP	0.0039** (0.0016)	0.2588*** (0.0952)	-0.0096 (0.0066)
Interest rate	-0.0014** (0.0005)	0.0645* (0.0355)	0.0095 (0.0092)
Financial structure variables			
Bank assets/central bank assets			-1.676 (1.9096)
Private credit by banks as a percent of GDP		-58.8336** (22.6876)	
Bank deposits as a percent of GDP	0.0111 (0.6214)		
Bank variables			
Asset share in total banks	0.0006 (0.0016)	-0.0213 (0.0119)	0.0003 (0.0013)
Equity-to-loan ratio ($t - 1$)	-0.00002 (0.000016)	0.0004 (0.00048)	0.00004*** (0.00002)
Number of observations	391	391	391
Notes: The table does not include country dummies and year dummies. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.			
Source: Authors' regressions using data from Latin Finance, the IMF, Banco Central del Ecuador, Banco Central de Reserva de El Salvador, and the World Bank			

The regression on profitability indicates that neither the official dollarization dummy, macroeconomic variables (except for economic growth), nor financial structure variables explain bank profitability. Lagged variables that are specific to the bank—such as the ratio of equity to assets and to loans, indicators of bank solvency—are positive and significant in the explanation of bank profitability. This result is similar to that found in the general literature on bank performance. Economic growth has a direct relation with profitability, as expected.

Conclusion

In both Ecuador and El Salvador, the banking system has initially benefited from the implementation of full dollarization. Even though the two countries adopted the U.S. dollar as their country's currency for entirely different reasons, both countries have experienced improvements in banking regulations and in the overall stability of the banking systems. According to our estimations, official dollarization has played a significant role in improving bank liquidity and asset quality. Macroeconomic variables and financial structure indicators have also been relevant in explaining bank liquidity and loan quality, and bank profitability has responded to variables that are bank specific.

While it is still too early to determine whether these initial benefits of dollarization will be sustainable in the long term, both countries have been able to modernize and improve upon the overall safety and soundness of the banking system.

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