Product Liability Law:
The Economic Impact on Pennsylvania

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by

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1. INTRODUCTION

An essential goal of public policy is to "promote the health and welfare" of the citizenry. One important public policy instrument that has far-reaching impact is the system of product liability law. Properly formulated, a product liability system—a set of substantive rules and standards, court procedures, and civil penalties—serves an important role by encouraging a diversified and prosperous economy and, at the same time, providing the appropriate incentives for manufacturers and other businesses to take the steps necessary to design and produce safe and valued products.

Whether our current product liability system is performing these functions efficiently, predictably, and fairly, however, is hotly disputed. From the economic perspective, not every product liability system will be able to efficiently balance desirable social and economic goals. Just as any benefits of the product liability system are spread throughout society, so too are its costs. That is, the costs that the product liability system imposes on business—including the efforts to comply with vague or unrealistic legal standards and the expenses associated with actual or possible litigation—are typically passed on to consumers and employees via higher prices and reduced employment opportunities.

Clearly society cannot simply ban every product that has some degree of risk associated with its use; this would make illegal nearly every product found in the modern household. In other words, "risk-free" products are a physical and economic impossibility,[1] and impossible product safety standards clearly do not lead suppliers to produce safer products. Nor will an increase in the safety of new products necessarily produce a corresponding increase in aggregate product safety; if new products are made expensive by mandated safety improvements, then some older and perhaps increasingly riskier products will remain in use longer. Moreover, costs of the product liability system such as those that result from unnecessary regulatory or legal burdens (such as high degrees of uncertainty) provide no safety benefits and serve only to decrease economic efficiency and employment levels and to increase prices. Thus, the product liability system can have the perverse effect of decreasing both aggregate product safety and economic activity.

Unfortunately, systematic research on the economic impact of product liability law is scarce. The purpose of this study is to assess the nature and extent of the economic impact of the product liability system on Pennsylvania businesses and the general business climate in Pennsylvania. The conclusions of the study are derived in part from the results of a survey of chief executive officers (CEOs) of Pennsylvania businesses. The CEO, as the person who is ultimately responsible for a firm's business strategy, is in a unique position to assess the effects of the product liability system. Because the product liability system may affect all facets of a firm's operations, from production to marketing to research and development, our survey tries to capture anticipated effects as well as the direct effects of the product liability system.

This paper is organized as follows. Section 2 discusses our survey methodology. Section 3 outlines the results of the survey with respect to the general and specific impacts of the product liability system on Pennsylvania businesses. Section 4 further quantifies the costs to Pennsylvania businesses of the current product liability system and estimates the increase in business costs in Pennsylvania due to the product liability system over the past three years. Section 5 considers the consequences of the product liability system, not only for business but for the state as a whole. Section 6 concludes. Technical and reference material is contained in the Appendices.

2. THE STUDY

One immediate impediment to measuring the extent and magnitude of the effects of the product liability system on business was that much of the information required is firm-specific or proprietary and not publicly available. We therefore chose to survey CEOs, as they are the most likely sources of the information and insights needed for this study.[2] The survey was conducted in April and May 1989 for a random sample of 439 Pennsylvania firms[3] drawn from Dun and Bradstreet's *Million Dollar Directory*,[4] which lists firms and subsidiaries having one-half million dollars or more in assets. Approximately 6300 Pennsylvania firms meet this criterion, so our sample represented roughly 7% of this population.

Firms in our sample were first telephoned to determine the name and full title of the CEO, and, if possible, to obtain the firm's FAX number. Surveys and cover

letters were FAXed to those firms able to receive FAX and mailed to the others. We received a total of 115 usable survey responses, a response rate of 26%, which compares quite favorably to other surveys of CEOs.[5] Given this sample size, our reported response frequencies serve as reasonable statistical predictors of the population of Pennsylvania firms.[6] Tables 1 and 2 in Appendix 4 summarize the characteristics of the population, sample, and respondents.

The basic motivation of our study was similar in spirit to a national study of the costs of the product liability system recently completed by The Conference Board.[7] Although many of our concerns and results are comparable to The Conference Board's, we deviated from The Conference Board's approach in three important respects. First, we limited our survey to Pennsylvania companies to determine whether national results were representative of the impact of the product liability system on Pennsylvania. Second, we used a broader-based sample not limited to manufacturers that closely reflects the demographics of Pennsylvania firms listed in the *Million Dollar Directory*. This allowed us to examine more fully the characteristics of the firms most directly affected by the Pennsylvania product liability system, as well as to generate a more accurate estimate of the overall impact of the product liability system on Pennsylvania's business environment. Third, we constructed our survey questions to allow us to estimate the total dollar increase in costs to Pennsylvania businesses due to the product liability system.

The survey instrument and cover letter are reproduced in Appendix 1. The types of questions asked can be classified as follows:

(1) *Categorization of Firm* (questions 1-6). These questions classify firms according to product/industry type, size by sales and number of employees, and form of product liability insurance coverage.

(2) *Overall Impact* (questions 7-12). These questions are meant to measure current and future impacts on the firm, its industry, and the overall Pennsylvania business environment. Respondents were permitted a full range of possible answers to impact questions: "Strongly Negative," "Negative," "Little or None," "Positive," and "Strongly Positive." For simplicity, we sometimes aggregate these responses as "Negative" (= SN + N)

and "Other" (= L + P + SP); in such instances, fully disaggregated results appear in tables contained in Appendix 4.

(3) *Impact on Costs* (questions 13 and 14). These questions measure the level (Major, Moderate, Minor) of firms' product liability costs as well as the rate at which firms' costs increased due to the product liability system.

(4) *Impact on Management and Operations* (questions 15 and 16). These questions allow us to address the effects of the product liability system on firms' decisions, and somewhat less directly, the implied consequences for prices, incomes, and employment in Pennsylvania.

3. IMPACT OF THE PRODUCT LIABILITY SYSTEM ON PENNSYLVANIA BUSINESS

3.1 General Impacts of Product Liability on Firms, Industries, and the Pennsylvania Business Environment

The results of the CEO survey confirm many common perceptions regarding the effects of the product liability system on Pennsylvania businesses. As shown in Table 3, an overwhelming 80% of responding CEOs report that current product liability law has had a negative or strongly negative impact on the Pennsylvania business environment. Only 10% state that the product liability system has had a positive or strongly positive effect on the Pennsylvania business environment. Furthermore, as shown in Table 4 in Appendix 4, 77% of CEOs believe the impact of the product liability system will increase in the future, including two-thirds of those who feel that the product liability system is not currently detrimental to the state economy. In aggregate, then, 93% of CEOs believe that the Pennsylvania product liability system does, or soon will, play a significant negative role in the state's economy. (See Table 5 in Appendix 4.)

TABLE 3
IMPACT OF PRODUCT LIABILITY SYSTEM ON PENNSYLVANIA'S
BUSINESS ENVIRONMENT

	PERCENT
STRONGLY NEGATIVE	17
NEGATIVE	63
LITTLE OR NONE	10
POSITIVE	7
STRONGLY POSITIVE	3
TOTAL	100

TABLE 9
CURRENT VERSUS FUTURE IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRMS

		Future Impact			
		GROW	REMAIN	DECREASE	TOTAL
Current	NEGATIVE	80%	17%	3%	52%
Impact	OTHER	30%	57%	13%	48%
	TOTAL	56%	36%	8%	100%

Fifty-six percent of all CEOs surveyed report that the product liability system has had a negative or strongly negative impact on the industry in which their company competes.[8] Only 4% of the respondents feel that the product liability system has affected their industry in a positive manner. Similarly, Table 9 above shows that 80% out of the 52% of CEOs who state that the product liability system has had a negative or strongly negative impact on their firms expect that impact to grow; 30% of the 48% who did not report a negative impact on their own firms expect the impact of the product liability system to grow, so a total of about 67% of respondents either report a negative impact of product liability on their firms or expect that impact to grow. A typical attitude is represented by one CEO who wrote:

> Although our operations have felt very little effect as yet from the product liability system, generally speaking I believe that eventually

all industries will become besieged with nuisance claims, incurring substantial defense costs and, in many cases, unmanageable settlements to avoid lengthy litigation.

Moreover, as indicated in Table 11, 55% of those CEOs who indicate a negative impact on their firms also note that the product liability system has impaired their ability to compete in their industries. This is especially revealing: one would expect managers to be generally unwilling to admit that their firms are in danger of losing ground to competitors.

3.2 Impact of Product Liability According to Firm Characteristics

The survey results also enabled us to investigate the impacts of the product liability system on Pennsylvania business as a function of firm and industry characteristics, including type of business (product-based vs. service-based industries), choice of risk management tactics (self-insured vs. market-based insurance), and firm size (measured by sales and employment). The results of these survey cross-tabulations provide new evidence regarding the types of firms and industries that are affected the most severely by Pennsylvania's product liability system.

We found that certain types of firms are much more strongly impacted by product liability concerns than others. Tables 12 and 13 in Appendix 4 disaggregate the results in Tables 6 and 7 according to the first digit of firms' Standard Industrial Classification (SIC) code.[9] Not surprisingly, manufacturing companies (SIC categories 2 and 3) and wholesale and retail firms (SIC category 5) were particularly impacted by product liability concerns. For example, 69% of the heavy manufacturing firms comprising SIC 3[10] and 68% of firms in SIC 5 indicated a negative or strongly negative industry impact. Similarly, more than 75% of all SIC 3 CEOs reported a negative or strongly negative impact of the product liability system on their firms.

As seen in Tables 12 and 13, most "service" firms (SIC categories 6, 7 and 8) are unaffected by product liability concerns. For example, only about 20% of firms in those categories report that the system has a negative or strongly negative impact on their firm or industry. In contrast, 56% of CEOs in SICs 1 through 5— what we refer to as "product" firms[11]—report a negative or strongly negative effect on their firms, and 61% report a similarly detrimental effect on their industries.

(See Tables 15 and 17 in Appendix 4.) Given this dichotomy of impact on product-based firms and on service-based firms, it is fair to suggest that the direct costs of Pennsylvania's product liability system are borne largely by the product-based sectors of the state's business community. This differential burden hampers manufacturing and other product firms' operations, while leaving service firms relatively unaffected. Since Pennsylvania's traditional strengths lie in manufacturing and the growth of the service sector in Pennsylvania has been slowing in recent years, this phenomenon is potentially critical.[12]

TABLE 15
IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM BY SALES (PRODUCT FIRMS)

Sales (In Millions)

		≤5	5-25	26-50	51-100	101-500	>500	TOTAL
	SN	18%	19%	27%	33%	0%	17%	19%
	N	38%	30%	36%	50%	80%	33%	37%
Impact	L	35%	49%	27%	17%	20%	50%	38%
	P	9%	3%	9%	0%	0%	0%	5%
	SP	0%	0%	0%	0%	0%	0%	0%
TOTAL		34%	37%	11%	6%	5%	6%	100%

The survey also allows a differentiation of product liability effects by firm size. For example, Table 15 reports the impact of the product liability system on product firms according to their annual sales. As can be seen from these results and others found in Appendix 4, the impact of the product liability system is felt by firms of all sizes. A majority of respondents in almost every sales category (except 49% in $5-25 million) report a negative or strongly negative impact of the Pennsylvania product liability system on their firms. As indicated in Table 2, 89% of our population of Pennsylvania firms have sales of less than $25 million, and 52% of responding product firms of this size reported a negative/strongly negative impact.[13] In other words, although larger firms tend to report more severe impacts, smaller firms by no means escape the negative effects of the current product liability system. Because small firms have important roles in employment and research and development, this last result is particularly troubling.[14]

We also investigated the relationship between firms' insurance coverage and the impact of the product liability system they report on their firm. Table 21 shows that product firms using market-based insurance are less severely impacted by product liability concerns than firms that are self-insured or use a captive insurer.[15] Sixty-seven percent of CEOs of self- or captive-insured firms report a negative or strongly negative impact of the product liability system on their firms, compared to 55% for market-insured firms. Qualitatively similar results were found as to other reported impacts (see Appendix 4, Tables 21-25).

4. THE COSTS TO PENNSYLVANIA BUSINESS OF THE PRODUCT LIABILITY SYSTEM

We now turn to the effect of the product liability system on the costs of doing business for Pennsylvania firms. In many respects these results provide a more direct measure of the impact of the current system on Pennsylvania business than the results reported in Section 3. We find, consistent with the overall impacts reported in Section 3, that the costs of the product liability system are concentrated in certain types of firms--specifically, heavy manufacturers and sellers of products. Moreover, we find that these costs are far from trivial. The increase in business costs in Pennsylvania due to product liability is estimated at more than $1.6 billion per year for each of the past three years.

4.1 Reported Cost Impacts

Many survey participants strongly indicated that product liability costs were having a devastating impact on their business. For example, one respondent wrote:

> We as a retail and wholesale distributor of welding equipment, gases, and supplies must increase prices at a higher than average rate just to keep our door open. Our customers do not deserve this.

We asked survey participants to classify the impact of the product liability system on their costs as either "major," "minor," or "moderate" (question 13) and further asked them to report the percentage increase in their costs as a result of product liability over the past three years (question 14). Respondents were offered the following choices for the percentage increase in their costs as a result of the

product liability system: "less than 1%," "1 to 2%," "3 to 5%," "6 to 10%," "11 to 20%," and "more than 20%."

As detailed in Tables 26 and 27 in Appendix 4, many firms report that the product liability system has had a substantial impact on costs, and our study confirms that these costs have increased at an alarming rate. The size of these increases varies according to the SIC category of firms, but the costs attributable to the product liability system are felt to some extent by firms of all types. For example, 31% of respondents in SIC 3, 34% of respondents in SIC 5, and 23% of all respondents report a major impact on costs. Similarly, 41% of firms in SIC 3 report an increase in their total costs due to product liability of 11% or more over the last three years, and 26% of all firms report such extreme increases in their costs due to the product liability system. A conservative averaging of these cost impacts indicates that the average increase in firms' costs due to product liability considerations over the past three years was in excess of 6%,[16] while the average for firms in SIC 5 was 9%. It is important to keep in mind that these results are not simply the percentage increase in product liability costs. Instead, they represent the increase in overall firm costs due to the product liability system.

4.2 Dollar Costs of the Product Liability System to Pennsylvania Firms

To obtain a clearer perspective of the costs of Pennsylvania's product liability system, we estimated the dollar implications of these percentage increases in firms' costs. As detailed in Appendix 2, we used regression analysis to estimate the relationship between percentage cost increases and firm SIC and cost characteristics. Because firms' costs and accounting margins are proprietary information, we estimated the firms' total costs from sales data available either from their survey responses or from the *Million Dollar Directory*. We used two alternative methods to estimate costs. The first and more conservative method is to simply assume that costs are, on average, 50% of sales. The second method is to assume that after-tax profits average 12.5% of costs.[17]

The dollar increase in product liability costs for firms is then estimated in Appendix 2 using the results of our regression on size and SIC indicators. For example, according to this estimate, over each of the last three years a manufacturer in SIC 5 with an annual $100 million per year in sales experienced

cost increases of approximately $1.3 million per year as a result of the product liability system.

This analysis is easily extended to the population of Pennsylvania businesses. As detailed in Appendix 2, depending on the coding of range responses and the rule employed for computing costs from sales, we estimate that product liability costs to Pennsylvania businesses increased at least $3.5 billion, and possibly as much as $10 billion, over the last three years. Our best estimate of this increase is in excess of $5 billion. This estimate is derived by conservatively coding responses and using the rule that costs are 50% of sales. By way of comparison, on an annual basis this exceeds 10% of the entire 1988-89 general fund of the Commonwealth of Pennsylvania, and it exceeds annual Commonwealth expenditures for economic development and protection of persons and property. The three year total exceeds 1988-89 fiscal year expenditures for health and human services (about 30% of the Commonwealth's budget).[18]

We emphasize that these figures only yield information on the increase in product liability costs over the past three years. Total product liability costs to Pennsylvania business are obviously much higher; our estimates represent only the difference between total product liability costs today and total product liability costs to Pennsylvania business three years ago. For example, some firms could have large costs due to the product liability system that have remained essentially flat over the past three years. As suggested by Table 28 in Appendix 4, approximately 33% of product firms that reported a 2% or smaller increase in their costs over the past three years due to the product liability system also characterized the impact of the product liability system on their costs as major or moderate.

Our cost increase estimates, by construction, probably underestimate the actual increase in costs to Pennsylvania business as a result of the product liability system for at least two reasons. First, our estimates cannot reflect the effects on firms that have already been driven out of business by product liability concerns, but do take into account those firms whose product liability experiences have been less unfavorable. Second, our estimates do not attempt to include firms' *opportunity costs*–the value of foregone opportunities. For instance, suppose a firm does not introduce a new product or discontinues a product line due to product liability concerns. By responding in this way to the imperatives of

the product liability system, this firm's direct costs may actually <u>decrease</u>. However, it will also forego revenues, profits, tax payments, and job opportunities that would have otherwise occurred.

Of course, our estimates only measure the direct increase in the costs paid by business. The consequential costs to consumers, workers, and the state treasury that result from firms' responses to the product liability system are ignored. We will return to this point below.

5. CONSEQUENCES OF PRODUCT LIABILITY IMPACTS

5.1 Management and Operations

One clear and consistent message that emerges from CEOs' responses and narrative comments is that possible future product liability concerns matter to businesses at least as much as actual product liability experiences and costs. Further, the uncertainties inherent in the system (e.g., the potential size of awards, the lack of a "state of the art" provision in Pennsylvania product liability law) directly increase the costs of doing business in Pennsylvania. In other words, uncertainty itself is costly, because increased uncertainty leads businesses to take costly defensive actions. Such uncertainties and the costs they produce will be directly reflected in prices, production, and incomes.

The CEO survey demonstrates that Pennsylvania firms have indeed been forced to undertake such actions. These actions have led to higher prices, lower employment, decreased production, and perhaps most serious, a decrease in capital investment that could have serious detrimental effects on the long-term viability of the Pennsylvania economy.[19]

As seen in Table 29, 47% of CEOs indicated that their firms undertook actions that reflect product liability-induced retrenchment. Twenty-four percent of firms discontinued existing product lines, while another 25% decided against the introduction of new products. Other firms were forced to shut down plants (3%) and lay off workers (9%). These are major business decisions, brought about by Pennsylvania's uncertain product liability environment, and are much more serious and lasting than mere price increases. Jobs are lost, potentially beneficial

products are not introduced, and capital, in the form of existing and potential production facilities, is forsaken for the long-term.

TABLE 29
ACTIONS TAKEN BY FIRMS DUE TO PRODUCT LIABILITY EXPERIENCE

ACTION	PERCENT BY FIRMS
CLOSED PLANTS	3
DISCONTINUED PRODUCT LINES	24
LAID OFF WORKERS	9
DECIDED AGAINST NEW PRODUCTS	25
LOST MARKET SHARE	12
DECIDED AGAINST MERGER/ACQUISITION	10
DISCONTINUED PRODUCT RESEARCH	2
MOVED PRODUCTION	1
OTHER	10
NONE OF THE ABOVE	53

5.2 Who Pays? Market Equilibrium and the Overall Costs of the Product Liability System

As already noted, the costs of the product liability system in Pennsylvania are not borne entirely by business. The costs of the system are ultimately paid by consumers in the form of higher prices, by workers in the form of diminished employment opportunities, and by state and local governments in the form of lost tax revenues.

TABLE 30
PRICING POLICY OF FIRMS

	PERCENT
ABSORBED COSTS	43
RAISED PRICES	14
COMBINATION OF BOTH	28
NONE OF THE ABOVE	15

Consider the reported impact of product liability costs on prices. As indicated in Table 30, 42% of all firms raised prices to some extent due to product liability

costs; more than 62% of those whose firm costs increased by more than 5% raised prices. (See Table 33 in Appendix 4.) Further, many firms indicated that product liability considerations cause across-the-board rather than just product-specific price increases. One respondent summed up the situation well:

> Product liability has resulted in increased costs to transact business, and in most cases such costs cannot be easily identified to a particular product line. These costs include an overall increase in liability insurance premiums, litigation expenses, additional research expenditures and training and education of employees and customers. For a company that has multiple business segments and various product lines these costs generally result in an overall deterioration of gross profit margins when such costs are allocated through the cost accounting system. Accordingly, selling price increases must be initiated to restore margins which generally reduces the competitiveness of a product. On the other hand, increased regulations of any nature make it difficult for newcomers to penetrate existing businesses or industries thereby strengthening the competitive positions of longstanding companies which already have a foothold in their particular industry.

However, direct price effects are just part of the story. As seen in Table 29 above, 47% of firms took actions that indicated a reduced willingness to supply products. Thus, at any price level, a smaller quantity is offered for sale than before. Moreover, although 14% of product firms neither raised prices nor absorbed costs, more than 20% of those firms also took actions that reduced their ability to supply products. (See Table 31 in Appendix 4.) Economic theory indicates that market equilibriating forces will cause these contractions in economic supply to lead to increased prices and reduced levels of production, employment, incomes, and tax revenues. Prices rise even when firms attempt to avoid product liability costs by discontinuing activities, since these actions contribute to supply contraction. Over time, more and more of the costs of the product liability system will be reflected in higher prices. Firms cannot immunize themselves from these costs; rather, the tightened profit opportunities created by product liability considerations translate into a reduced number of firms in the industry. Thus, in addition to the higher prices paid by consumers, fewer jobs will be available for workers, and there will be a lower return to capital. (See Appendix 3 for a more detailed discussion of these points.)

Moreover, these effects will be multiplied as those who are most directly affected reduce their expenditures, causing ripple effects throughout the economy. For example, workers may or may not lose their jobs as a result of a firm's response to product liability, but we expect that fewer new jobs will be created. Moreover, the purchasing power of the firm's current and potential employees and stockholders falls, and their diminished purchasing power is multiplied as it ripples through the economy. Less purchasing power means fewer discretionary purchases and perhaps tighter budgets for necessities. It also means lost state and local tax revenues, and corresponding reductions in public services and/or increased tax rates. All of these effects clearly reduce the demand for products, which leads business in turn to hire fewer workers. This reduction in employment, combined with lower business income, means that even fewer products and services will be demanded and manufactured, thus continuing the downward spiral of demand, income, and employment. As this process progresses, the original increase in business costs and decrease in business opportunities are multiplied, increasing the real cost to society.

This "multiplier" effect is clearly felt by many respondents. For example, one CEO wrote:

> We are also concerned about the negative impact of product liability on our industrial and commercial customers. As they decrease operations, decide against expanding operations, or elect to locate outside of Pennsylvania, our sales are adversely affected.

5.3 Implications for the Competitive Position of Pennsylvania

Research indicates that a state's general business environment is a good predictor of firms' variable location decisions. The logic is clear: if the general business environment is related to firms' costs and operational experiences, those firms that compete in national markets will be unlikely to locate in states whose general business environment is not conducive to low costs of production. Moreover, those firms that locate in high-cost states but compete exclusively in state or local markets will require higher prices and profits than similar firms located in other states.

Many state governments and business associations make no secret of their desire to use public policy to lure new business to their states as well as to keep existing companies in state. As long as the Pennsylvania business environment is burdened by a product liability system that has substantial cost-increasing impacts, and perhaps more important, is widely perceived as dysfunctional, fewer companies will want to operate in Pennsylvania than would otherwise be the case. This translates into higher prices, fewer employment opportunities, lower state income, and reduced tax revenues.

6. CONCLUSIONS

The results of this survey of Pennsylvania CEOs allow many conclusions to be drawn regarding the effects of the product liability system on Pennsylvania business. First and foremost, the uncertain but growing threat of product liability litigation has had, and will continue to have, a significantly negative impact on the Pennsylvania economy. The increasing costs and uncertainty associated with product liability law depress the state's economy, causing employment losses, plant closures, product withdrawals, and price increases.

Although 80% of CEOs responding believe that the product liability system has a negative impact on the Pennsylvania business environment, it is evident that the direct effects of product liability law impact Pennsylvania businesses unequally. The majority of product firms are significantly negatively impacted, while service firms are relatively unaffected; self- and captive-insured firms report more severe impacts than firms with commercial insurance policies; and, overall, heavy manufacturing firms are the most severely impacted. This last distinction is critical to Pennsylvania, given the state's traditional commitment to manufacturing.

These impacts translate into heavy and sharply increasing costs to Pennsylvania business; we estimate these costs have increased more than $5 billion over the past three years. Many of the damaging effects of the product liability system in Pennsylvania will remain even if the system is changed. Many actions that companies have taken in response to the current legal environment cannot simply be undone. Products have been eliminated or left undeveloped, plants have been closed or never built, and jobs have been lost that may never be

replaced. These effects are chronic, and it will take many years to return many of these industries to their former stature even after the product liability system is reformed. However, if the system is not altered, this dangerous, economy-depressing trend will continue.

The state economy as a whole is thereby negatively impacted by the product liability system. In the end, consumers and workers—the very persons whom the law tries to protect—absorb many of the significant costs of the current product liability system. By accepting the current system, the Pennsylvania citizen is foregoing the unquantifiable, yet significant, benefits of potential products and innovations, employment opportunities, and government services. He is accepting a system that depresses the economy in which he must live and work.

NOTES

1. This argument is clearly stated in Arrow, 1970, and has been argued by many others since. See also Diamond and Rothschild, 1978.

2. In some cases the survey was not completed by the responding firm's chief executive, but was relayed to another knowledgeable officer of the corporation. We believe that this has no influence on the survey results.

3. Approximately 460 firms were originally selected, but some firms could not be reached and were dropped from the study.

4. We chose the *Million Dollar Directory* to avoid the biases that would be introduced by the preponderance of very small firms in other industry directories.

5. Among other similar studies, *The Impact of Product Liability* by E. Patrick McGuire (The Conference Board, 1988) had a response rate of about 14%.

6. This point is explored in more detail in Appendix 2.

7. *The Impact of Product Liability*, E. Patrick McGuire (The Conference Board, 1988).

8. See Table 6 in Appendix 4; in this and other cases, rounding may produce slight discrepancies when percentages are combined.

9. The SIC code system was developed by the United States government in conjunction with the private sector to provide a numerical classification of firms according to the nature of their business activity.

10. SIC category 3 includes primary metal and fabricated metal products. By contrast, SIC category 2 consists of food, paper, and textile products, and chemical products. Hence, for expositional convenience we refer to SIC 2 as "light manufacturing" and SIC 3 as "heavy manufacturing."

11. We include SIC 1 (Mining and Construction) and SIC 4 (Transportation and Utilities) in this grouping because many firms in these categories make or sell products. To any extent some firms in these categories do not technically qualify as "product" firms, we expect that our grouping would under-report the negative impact on makers and sellers of products.

12. For a fuller discussion of this point, see Patricia Danzon, "Who Should Be Liable? A Guide to Policy for Dealing with Risk," Committee on Economic Development (1989).

13. Seventy-two percent of respondents have sales of less than $25 million.

14. Small firms are less likely to be able to absorb product liability costs than larger firms, and hence would tend to experience a greater disruption in their

operations due to any given impact of the product liability system. Because they tend to be more labor-intensive than larger firms, the system will tend to produce a proportionally larger negative impact on small business employment.

15. A captive insurer serves only one firm or a small number of similar firms. Since it does not offer policies to other firms and is not diversified, a policy with a captive insurer is similar to self-insurance with respect to its economic effects.

16. By a conservative averaging we mean coding the response category midpoint of every interior response interval (i.e., averaging every response of "6 to 10%" as "8%"), and the low ends of each boundary interval (coding "less than 1%" as 0% and "more than 20%" as "20%"). The corresponding average among all respondents using the low end of each interval is about 5%, while the average using the high end of each interval is approximately 8%.

17. After-tax profits as a fraction of costs are the product of (1-t) and (S-C)/C (where t = the total corporate tax rate on profits, S = sales revenue, and C = costs). Hence, our second method of estimating costs from sales (a 12.5% after-tax profit rate) is equivalent to assuming that on average, costs equal 80% of sales. In general, our total cost estimates increase as costs as a fraction of sales are assumed to increase. At least for many types of industries, both of these assumptions seem to be conservative.

18. 1988-89 Budget of the Commonwealth of Pennsylvania.

19. It is important to understand that the uncertainties inherent in the product liability system lead to higher product prices, even if there are no defensive measures that firms can take. Because additional uncertainty increases risk, those firms most affected by the product liability system become relatively higher risk industries compared to industries with less pronounced product liability concerns. These riskier firms must earn higher returns to capital than firms with less product liability induced risk in order to attract capital. Thus, if firms with comparatively higher product liability risks must earn comparatively higher average profits to continue in operation, they must cut back operations, raise prices, or both. They may also have to drain funds from less risky operations due to the capital costs associated with their riskier operations.

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APPENDICES

Appendix 1: Survey Instrument

Appendix 2: Statistical Computations

Appendix 3: Market Equilibrium and the Effects of Supply Contractions

Appendix 4: Tables and Cross-Tabulations

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The Wharton School of the University of Pennsylvania

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Dear name ,

Public concern about the product liability system has dramatically increased during the last few years as individuals and corporations have been affected by the rising costs of litigation, insurance and other defensive measures.

Unfortunately, systematic research on the effects of the product liability system on economic performance is scarce. To remedy this gap, we are conducting a survey of CEOs under the auspices of the Pennsylvania Task Force on Product Liability to assess the economic implications of current product liability law in Pennsylvania. Through this survey, we intend to clarify how the components of the product liability system, such as product liability litigation and the threat of litigation, affect the competitiveness of Pennsylvania firms.

A number of states have enacted product liability reform, while others, including Pennsylvania, are presently considering such measures. Legislative hearings on product liability reform could be held in Harrisburg as early as May, and the results of this survey will be presented to legislators at those hearings.

We would greatly appreciate it if you could please take a few minutes to fill out this questionnaire. As a CEO you are in a unique position to describe not only actions taken as a result of product liability considerations, but also opportunities, such as the pursuit of new products or business acquisitions, which have been adversely affected.

The results of this survey will be reported by aggregates only. Any other information, including the identity of respondents and corporations, will be kept strictly confidential unless the respondent expressly permits the use of such information in the survey's accompanying text.

One of our research analysts will be contacting your office today or tomorrow to assist you. If you have any questions, please feel free to contact us at (215) 898-3013. Thank you for your cooperation.

Very sincerely yours,

.

Dr. Peter Linneman, Professor of Finance and Public
Policy and Management

Dr. Daniel E. Ingberman, Assistant Professor of Public
Policy and Management

snumber

Pennsylvania Task Force on Product Liability

BACKGROUND INFORMATION

1. Firm's name.

2. Name and title of the person completing this questionnaire.

3. Annual sales (in millions of dollars).

____Less than 5   ____5 to 25   ____26 to 50

____51 to 100   ____101 to 500   ____More than 500

4. Number of employees.

____Less than 25   ____26 to 49   ____50 to 99

____100 to 249   ____250 to 500   ____More than 500

5. Type of product(s).

____Consumer durables   ____Consumer nondurables

____Industrial equipment and machinery   ____Industrial materials and supplies

____Other

6. Type of product liability insurance.

____Policy with insurance carrier   ____Coverage by captive insurer

____Self-insurance   (that provides insurance to

                                                  your industry only)

OVERALL IMPACT

7. What impact has the product liability system had on your <u>firm</u>?

____Strongly positive   ____Positive   ____Little or none   ____Negative   ____Strongly negative

8. What impact, in your opinion, has the product liability system had on your <u>industry</u>?

____Strongly positive   ____Positive   ____Little or none   ____Negative   ____Strongly negative

9. What impact, in your opinion, has the product liability system had on the business environment in Pennsylvania?

____Strongly positive   ____Positive   ____Little or none   ____Negative   ____Strongly negative

10. How has the product liability system affected your firm's ability to compete with foreign and domestic firms?

____Strongly positive   ____Positive   ____Little or none   ____Negative   ____Strongly negative

11. Do you believe the impact of the current product liability system on your firm will

____Grow in significance   ____Remain the same   ____Decrease in significance

12. Do you believe the impact of the current product liability system on Pennsylvania's business environment will

____Grow in significance   ____Remain the same   ____Decrease in significance

IMPACT ON COSTS

13. What degree of impact has the product liability system had on your firm's costs of doing business -- e.g., product-related litigation, payment of claims, insurance, staff time, record-keeping, legal support?

____Major   ____Moderate   ____Minor

14. What is your best estimate of the increase in your firm's costs over the past three years as a result of the product liability system?

____Less than 1%   ____1 to 2%   ____3 to 5%

____6 to 10%   ____11 to 20%   ____More than 20%

MANAGEMENT AND OPERATIONS

15. As a result of increased liability costs, has your firm

____Absorbed increased costs   ____Raised prices to recover costs

____Raised prices and absorbed costs   ____Done none of these

16. Which of the following actions has your firm taken as a result of actual or anticipated product liability experience? (Check as many as are applicable.)

____   Closed production plant

____   Discontinued product lines

____   Laid off workers

____   Decided against introducing new products

____   Lost market share

____   Decided against acquisition/merger

____   Discontinued product research

____   Moved production overseas

____   Other (Specify)

____   None of the above

COMMENTS

18. Do you have any other comments on product liability you would like to relate?
    (Attach additional sheets if necessary.)

_____

_____

_____

_____

APPENDIX 2: REGRESSIONS AND EXTRAPOLATIONS

This appendix discusses the statistical properties of the procedures used in the calculations reported in the text. Appendix 2.1 describes the regressions that underlie the results reported in Section 4 of the text. Appendix 2.2 discusses the applications of those regression results to the estimate of the costs of the product liability system to Pennsylvania business. Appendix 2.3 discusses the statistical properties of the reported frequencies in the text as predictors of the opinions of the population of Pennsylvania business.

2.1 Regressions

As discussed in Maddala (pp. 259-62) and Pindyck and Rubinfeld (pp. 166-7), the correct regression method here is a form of generalized least squares in which the variance-covariance matrix computed for the data is used to weight the data so to correct for possible heteroskedasticity. Using this framework, we regressed firms' reported percentage cost increases on their SIC and sales characteristics. Variables in our analysis include the coding of responses and the computation of costs from sales. Two alternative methods were used to compute costs from sales: costs were estimated at 50% of sales, or costs were estimated from sales using tax rates and an assumed after-tax profit rate (as a function of costs) of 12.5%. Our "most realistic" predictions are derived using the midpoint of response ranges and the rule that costs average one-half of sales.

The actual regression equation run was:

$$Y = \alpha + \beta_1 \cdot x_1 + \beta_2 \cdot x_2 + \beta_3 \cdot x_3 + \beta_4 \cdot x_4 + \beta_5 \cdot x_5 + \beta_6 \cdot x_6 + \varepsilon \tag{1}$$

where:

Y = reported increase in firm's total costs due to product liability;

α = intercept;

β_i = coefficient on the ith variable;

x_1 = cost of firm, computed as above;

x_2 = squared cost of firm;

x_3 = indicator variable; = 1 if firm in SIC 2 but not petrochemical, 0 otherwise;

x_4 = indicator variable; = 1 if firm petrochemical (SIC 28, 29), 0 otherwise;

x_5 = indicator variable; = 1 if firm in SIC 3, 0 otherwise;

x_6 = indicator variable; = 1 if firm in SIC 5, 0 otherwise;

ε = error term.

Regression results for "Most Realistic Scenario"

Var.	Coeff	Std Err	Pr>0	Conf.	Low	High
α	0.034	0.011	0.002	0.002	0.032	0.036
x_1	-3E-11	3E-11	0.30	5E-12	-3E-11	-2E-11
x_2	-2E-20	1E-20	0.124	2E-21	-2E-20	-1E-20
x_3	-0.005	0.038	0.89	0.007	-0.013	0.002
x_4	0.015	0.012	0.238	0.002	0.012	0.017
x_5	0.143	0.015	0.0001	0.003	0.140	0.146
x_6	0.044	0.023	0.054	0.004	0.039	0.048

101 Observations; results rounded to three decimal places.

$R^2 = 0.6518$, $R^{-2} = 0.6299$

$1.98 = t$

$(t\text{-crit})/n^{1/2} = 0.19701736$

2.2 *Population Extrapolations*

For each firm i listed in the *Million Dollar Directory*, we first used the regression coefficients as estimated above and our estimate of the firm i's total costs to estimate i's percentage increase in costs due to product liability. Call this percentage Y_i and our estimate of firm i's costs C_i; Y_i is calculated by plugging into equation (1). Define $\Delta C_i \equiv$ estimated dollar increase in firm i's costs due to product liability over the past three years. By construction, we have $\Delta C_i \equiv C_i \cdot Y_i$. By summing ΔC_i across all 6309 Pennsylvania firms listed in the *Million Dollar Directory*, we obtained our estimates for the total increase over the past three years in the costs of Pennsylvania business due to product liability.

Using the rule that costs are one-half of sales, we obtained the following estimates for the aggregate costs increase of Pennsylvania business. We believe that it is most reasonable to code responses by the midpoints of the intervals checked; this yields our best estimate of $5 billion. Coding responses at the low end of the interval yields $3.6 billion; coding responses at the high end of the interval yields $5.8 billion. Dividing these figures by 3 yields our computed average increase per year over the three year period.

Using the rule that after-tax profits are 12.5% of costs and current tax laws, we obtain the following estimates. Midpoint coding = $8.5 billion; low end coding = $6.2 billion; high end coding = $10 billion.

2.3 Opinion Extrapolations

In order to extrapolate the opinions of our respondents to the population as a whole, assume opinion responses can be modelled as Bernoulli distributed (N/SN) vs. other responses, with true population parameter θ unknown. Our task is to estimate θ from the survey responses. $\hat{\theta} = \overline{X}$ is the maximum likelihood estimator and uniformly minimum variance unbiased estimator of θ. When $\min[\hat{\theta}n, (1-\hat{\theta})n] \geq 5$, the normal approximation to the binomial distribution applies (Bickel and Doksum, p. 160).

Let $K_{\alpha_n} = z(1 - .5\alpha)$ for sample size n, significance level α, and z a standard normal variate. Let $S = n\overline{X} = \sum_i x_i$. Then confidence intervals have lower and upper bounds

$$\underline{\hat{\theta}} = \frac{(S + .5[K_{\alpha_n}^2]) - \left(K_{\alpha_n}\left[\frac{S(n-S)}{n} + .25K_{\alpha_n}^2\right]^{1/2}\right)}{n + K_{\alpha_n}^2}$$

and

$$\overline{\hat{\theta}} = \frac{(S + .5[K_{\alpha_n}^2]) + \left(K_{\alpha_n}\left[\frac{S(n-S)}{n} + .25K_{\alpha_n}^2\right]^{1/2}\right)}{n + K_{\alpha_n}^2}$$

respectively.

We now produce example confidence intervals for extrapolating the "impact on the firm" (question #7) to the population. θ is our mean estimate for the fraction of the population (or indicated subpopulation) that would respond "negative" or "strongly negative" to question #7; $\underline{\hat{\theta}}$ and $\overline{\hat{\theta}}$ denote the 95% confidence interval (i.e., according to the variance in responses, the probability is 95% that the true value of θ lies in the interval). For example, our best estimate for the fraction of firms that would respond "negative" or "strongly negative" to question #7 is 52%; the true value is estimated to lie within the interval [42%, 61%] with 95% probability. By multiplying these estimated percentages by the numbers of firms in each category listed in the *Million Dollar Directory*, we obtain estimates of the number of firms in Pennsylvania that would respond in this way. For example, we estimate that if the survey were to be completed by every firm listed in the *Million Dollar Directory*, then the probability is 95% that between 2689 and 3840 firms would respond "negative" or "strongly negative" to question #7 of the survey.

Estimated Probabilities

SIC	2	3	5	TOTAL
θ	.35	.76	.56	.52
$\underline{\hat{\theta}}$	.18	.57	.39	.43
$\overline{\hat{\theta}}$	.56	.88	.72	.61

Estimated Numbers of Firms

SIC	2	3	5	TOTAL
$\overline{X}$	204	699	1091	3268
$\underline{\hat{\theta}}$	106	526	750	2689
$\overline{\hat{\theta}}$	329	812	1403	3840

APPENDIX 3: MARKET EQUILIBRIUM AND THE EFFECTS OF SUPPLY CONTRACTION

To see how the defensive actions of firms will indirectly cause prices to rise, consider Figure 1, which depicts a "textbook" supply and demand diagram.[1] The demand curve is marked "D" and represents how many units of the product will be purchased at each price. For most classes of goods, economists equate this value consumers place on the product, at the margin, to the value to society. Similarly, the supply curve is marked "S" and represents how many units suppliers of this product are willing to sell at any given price. For competitive markets, this is simply the marginal cost of business.
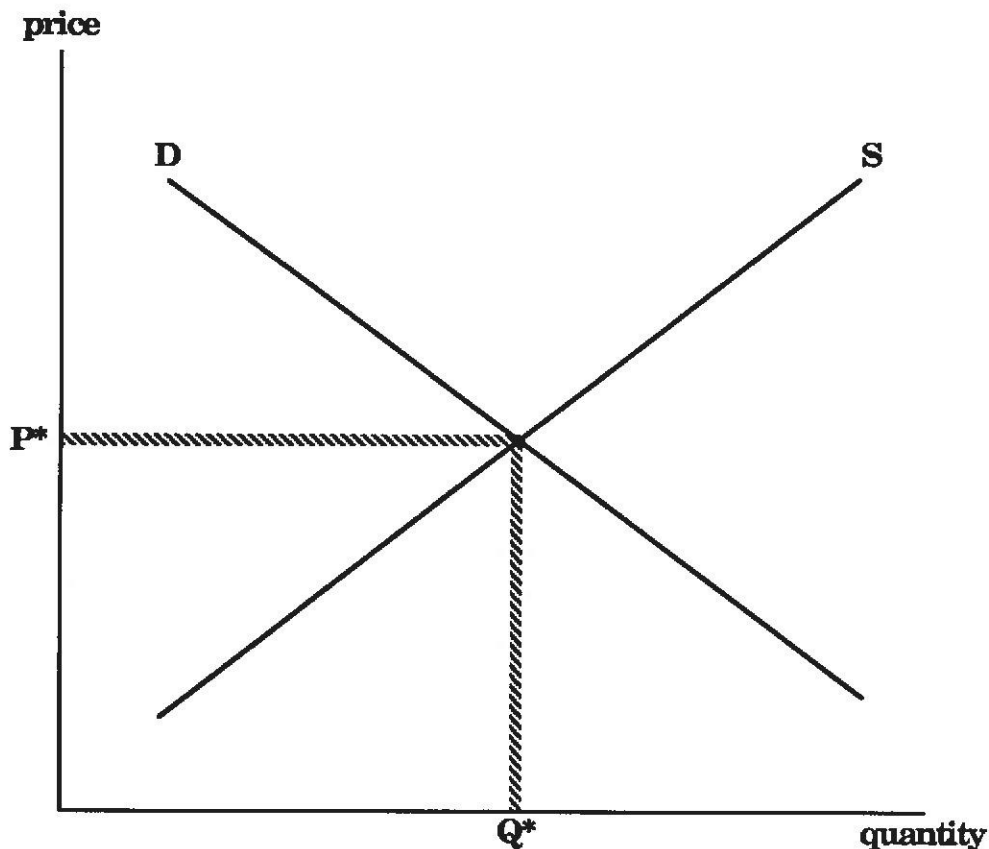
FIGURE 1
MARKET EQUILIBRIUM

The equilibrium of the market–the number of units that will be traded and the price at which they will trade–is found at the intersection of the supply and demand curves at price P^* and output Q^*. Observe that in equilibrium all gains to trade are exhausted. Any additional units will cost more to produce than consumers are willing to pay. Now suppose that because of additional costs due to product liability concerns, firms are willing to supply fewer units at every price than before. This causes the supply curve to shift up and to the left, as shown in Figure 2 in the movement from S to S'. The new equilibrium price and quantity are P^{**} and Q^{**}, respectively. As is evident from the diagram, the equilibrium price rises and the equilibrium quantity falls. Also, due to the lower production levels, in aggregate fewer jobs are available and lower profits are earned by shareholders. Because prices are rising while workers' and stockholders' incomes fall, real purchasing power falls much more than the increase in price by itself might at first suggest.
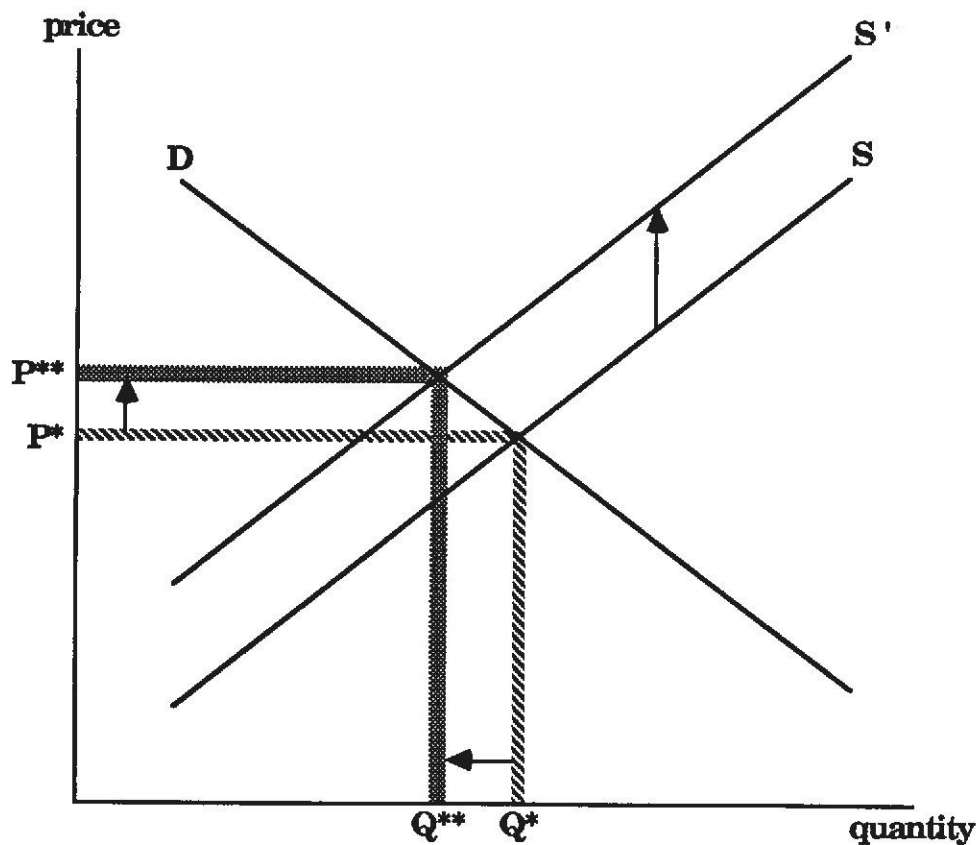
FIGURE 2
EQUILIBRIUM EFFECTS OF SUPPLY CONTRACTION

One deficiency of the above analysis is that it ignores firms' abilities to enter and exit industries. Standard economic analysis predicts that the industry supply curve as firms have time to exit the industry will become more elastic (flatter), and price will settle to the minimum of long-run average firm costs. As shown in Figure 3, this means that over time, more and more of the costs of the product liability system will be fully reflected in higher prices.[2] Tightened profit opportunities will then reduce the number of firms in the industry. Thus, in addition to the higher prices paid by consumers, fewer jobs will be available for workers, and lower profits for stockholders (who are most typically retirement plan beneficiaries).
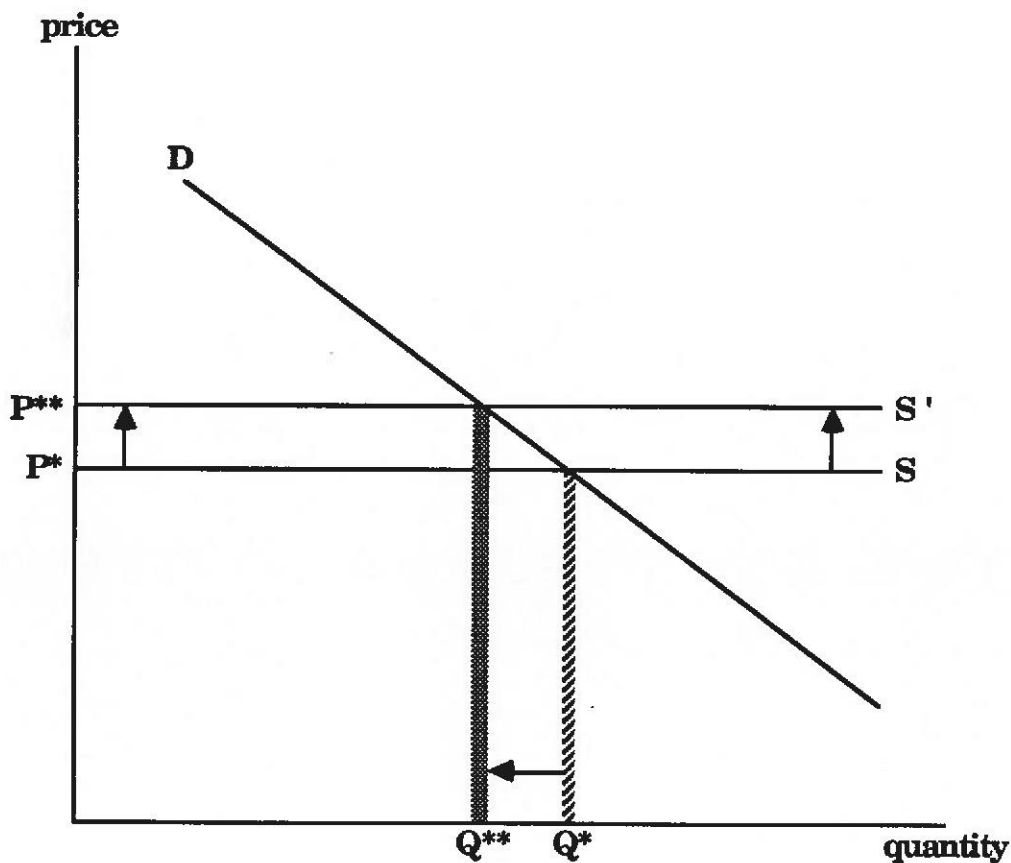
FIGURE 3
LONG-RUN EQUILIBRIUM EFFECTS OF SUPPLY CONTRACTION

As noted earlier, these effects will be multiplied as those who are most directly affected reduce their expenditures, causing ripple effects throughout the economy. These effects impact the public and private sectors alike. One important implication of this is the reduction of state and local tax revenues that results, causing an increase in tax rates or a reduction in services, or both. This compounds the reduction in incomes discussed earlier.

NOTES

1. The arguments contained in this appendix can be found in any standard microeconomics text. See, for example, Pindyck and Rubinfeld, 1989, pp. 19-26 and pp. 275-281.

2. Recall that the respondent quoted on p. 13 asserted that the product liability system reduces competition. Many economists have argued similarly regarding regulation in general; see, e.g., Stigler, 1971. The analysis in Figure 3 ignores this effect and hence underestimates the actual price increase that would be predicted to occur as markets become less competitive.

APPENDIX 4: SURVEY RESULTS AND CROSS-TABULATIONS

This appendix contains summaries and cross-tabulations of responses to the CEO survey. Due to rounding of cell entries, not all percentages sum to 100%. There may also be minor variations between percentages shown in summaries and those shown in cross-tabulations insofar as the numbers of those responding to certain questions differed.

TABLE 1
FREQUENCY DISTRIBUTION BY ONE-DIGIT SIC CODE

		Population		Sample		Respondents		RESPONSE RATE
		NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	
	0	132	2	5	1	0	0	0%
	1	703	11	52	12	8	7	15%
	2	586	9	58	13	23	20	40%
SIC	3	921	15	84	19	29	25	35%
Code	4	424	7	29	7	7	6	24%
	5	1939	31	136	31	32	28	24%
	6	1175	19	47	11	10	9	21%
	7	365	6	25	6	5	4	20%
	8	79	1	3	1	1	1	33%
TOTAL		6324	100	439	100	115	100	26%

TABLE 2
FREQUENCY DISTRIBUTION BY SALES

		Population		Sample		Respondents		RESPONSE RATE
		NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	
	<5	3879	62	240	55	38	35	16%
Sales	5-25	1720	27	123	28	40	37	33%
(In	26-50	323	5	29	7	11	10	38%
Millions)	51-100	145	2	7	2	6	6	86%
	101-500	167	3	28	6	8	7	29%
	>500	75	1	12	3	6	6	50%
TOTAL		6309	100	439	100	109	100	25%

TABLE 3
IMPACT OF PRODUCT LIABILITY SYSTEM ON PENNSYLVANIA'S BUSINESS ENVIRONMENT

	PERCENT
STRONGLY NEGATIVE	17
NEGATIVE	63
LITTLE OR NONE	10
POSITIVE	7
STRONGLY POSITIVE	3
TOTAL	100

TABLE 4
IMPACT OF PRODUCT LIABILITY SYSTEM ON PENNSYLVANIA'S BUSINESS ENVIRONMENT WILL:

	PERCENT
GROW IN SIGNIFICANCE	77
REMAIN THE SAME	19
DECREASE IN SIGNIFICANCE	4
TOTAL	100

TABLE 5
CURRENT VERSUS FUTURE IMPACT OF PRODUCT LIABILITY SYSTEM ON PENNSYLVANIA'S BUSINESS ENVIRONMENT

		Future Impact			
		GROW	REMAIN	DECREASE	TOTAL
Current	NEGATIVE	85%	12%	3%	80%
Impact	OTHER	68%	26%	6%	20%
	TOTAL	77%	19%	4%	100%

TABLE 6
IMPACT OF PRODUCT LIABILITY SYSTEM ON INDUSTRY

	PERCENT
STRONGLY NEGATIVE	19
NEGATIVE	36
LITTLE OR NONE	41
POSITIVE	3
STRONGLY POSITIVE	1
TOTAL	100

TABLE 7
IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM

	PERCENT
STRONGLY NEGATIVE	18
NEGATIVE	33
LITTLE OR NONE	43
POSITIVE	5
STRONGLY POSITIVE	0
TOTAL	100

TABLE 8
IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM WILL:

	PERCENT
GROW IN SIGNIFICANCE	56
REMAIN THE SAME	36
DECREASE IN SIGNIFICANCE	8
TOTAL	100

TABLE 9
CURRENT VERSUS FUTURE IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM

		Future Impact			
		GROW	REMAIN	DECREASE	TOTAL
Current	NEGATIVE	80%	17%	3%	52%
Impact	OTHER	30%	57%	13%	48%
	TOTAL	56%	36%	8%	100%

TABLE 10
IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM'S ABILITY TO COMPETE

	PERCENT
STRONGLY NEGATIVE	8
NEGATIVE	21
LITTLE OR NONE	69
POSITIVE	1
STRONGLY POSITIVE	1
TOTAL	100

TABLE 11
IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM VERSUS
IMPACT ON FIRM'S ABILITY TO COMPETE

		Impact on Ability to Compete		
		NEGATIVE	OTHER	TOTAL
Impact	NEGATIVE	55%	45%	52%
on Firm	OTHER	4%	96%	48%
	TOTAL	29%	71%	100%

TABLE 12
IMPACT OF PRODUCT LIABILITY SYSTEM ON INDUSTRY, BY SIC CODE

SIC Code

		1	2	3	4	5	6	7	8	TOTAL
	SN	13%	4%	31%	0%	29%	11%	20%	0%	19%
	N	38%	48%	38%	43%	39%	11%	0%	0%	36%
Impact	L	50%	48%	31%	43%	26%	67%	80%	100%	41%
	P	0%	0%	0%	14%	3%	11%	0%	0%	3%
	SP	0%	0%	0%	0%	3%	0%	0%	0%	1%
	TOTAL	7%	20%	25%	6%	28%	8%	4%	1%	100%

Key:

SN: Strongly Negative
N: Negative
L: Little or None
P: Positive
SP: Strongly Positive

TABLE 13
IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM, BY SIC CODE

SIC Code

		1	2	3	4	5	6	7	8	TOTAL
	SN	13%	9%	28%	0%	28%	11%	0%	0%	18%
	N	38%	26%	48%	57%	28%	11%	20%	0%	33%
Impact	L	50%	61%	24%	29%	34%	67%	80%	100%	43%
	P	0%	4%	0%	14%	9%	11%	0%	0%	5%
	SP	0%	0%	0%	0%	0%	0%	0%	0%	0%
	TOTAL	7%	20%	25%	6%	28%	8%	4%	1%	100%

TABLE 14
IMPACT OF PRODUCT LIABILITY SYSTEM ON
FIRM'S ABILITY TO COMPETE, BY SIC CODE

SIC Code

		1	2	3	4	5	6	7	8	TOTAL
	SN	0%	0%	15%	0%	16%	0%	0%	0%	8%
	N	38%	23%	33%	43%	6%	0%	20%	0%	21%
Impact	L	63%	77%	52%	57%	74%	89%	80%	100%	69%
	P	0%	0%	0%	0%	0%	11%	0%	0%	1%
	SP	0%	0%	0%	0%	3%	0%	0%	0%	1%
	TOTAL	7%	20%	26%	6%	28%	8%	4%	1%	100%

TABLE 15
IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM, BY SALES (PRODUCT FIRMS)

Sales (In Millions)

		≤5	5-25	26-50	51-100	101-500	>500	TOTAL
	SN	18%	19%	27%	33%	0%	17%	19%
	N	38%	30%	36%	50%	80%	33%	37%
Impact	L	35%	49%	27%	17%	20%	50%	38%
	P	9%	3%	9%	0%	0%	0%	5%
	SP	0%	0%	0%	0%	0%	0%	0%
	TOTAL	34%	37%	11%	6%	5%	6%	100%

TABLE 16
IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM'S
ABILITY TO COMPETE, BY SALES (PRODUCT FIRMS)

Sales (In Millions)

		≤5	5-25	26-50	51-100	101-500	>500	TOTAL
	SN	9%	8%	9%	17%	0%	17%	9%
	N	19%	22%	18%	17%	60%	33%	23%
Impact	L	72%	69%	64%	67%	40%	50%	67%
	P	0%	0%	0%	0%	0%	0%	0%
	SP	0%	0%	9%	0%	0%	0%	1%
	TOTAL	33%	38%	11%	6%	5%	6%	100%

TABLE 17
IMPACT OF PRODUCT LIABILITY SYSTEM ON INDUSTRY, BY SALES (PRODUCT FIRMS)

Sales (In Millions)

		≤5	5-25	26-50	51-100	101-500	>500	TOTAL
	SN	24%	19%	18%	33%	0%	17%	20%
	N	39%	35%	55%	33%	60%	50%	41%
Impact	L	30%	46%	18%	33%	40%	33%	36%
	P	3%	0%	9%	0%	0%	0%	2%
	SP	3%	0%	0%	0%	0%	0%	1%
	TOTAL	34%	38%	11%	6%	5%	6%	100%

TABLE 18
IMPACT OF PRODUCT LIABILITY SYSTEM ON
FIRM, BY EMPLOYMENT (PRODUCT FIRMS)

Employees

		≤25	26-49	50-99	100-249	250-500	>500	TOTAL
	SN	17%	18%	28%	13%	27%	15%	19%
	N	38%	41%	33%	38%	9%	62%	37%
Impact	L	33%	35%	39%	44%	64%	23%	38%
	P	13%	6%	0%	6%	0%	0%	5%
	SP	0%	0%	0%	0%	0%	0%	0%
	TOTAL	24%	17%	18%	16%	11%	13%	100%

TABLE 19
IMPACT OF PRODUCT LIABILITY SYSTEM ON ABILITY
TO COMPETE, BY EMPLOYMENT (PRODUCT FIRMS)

Employees

		≤25	26-49	50-99	100-249	250-500	>500	TOTAL
	SN	9%	6%	12%	6%	9%	15%	9%
	N	14%	35%	24%	13%	18%	38%	23%
Impact	L	77%	59%	65%	75%	73%	46%	67%
	P	0%	0%	0%	0%	0%	0%	0%
	SP	0%	0%	0%	6%	0%	0%	1%
	TOTAL	23%	18%	18%	17%	11%	13%	100%

TABLE 20
IMPACT OF PRODUCT LIABILITY SYSTEM ON INDUSTRY, BY EMPLOYMENT (PRODUCT FIRMS)

		Employees						
		≤25	26-49	50-99	100-249	250-500	≥500	TOTAL
	SN	22%	24%	28%	13%	18%	15%	20%
	N	35%	47%	33%	50%	27%	54%	41%
Impact	L	35%	29%	39%	31%	55%	31%	36%
	P	4%	0%	0%	6%	0%	0%	2%
	SP	4%	0%	0%	0%	0%	0%	1%
	TOTAL	23%	17%	18%	16%	11%	13%	100%

TABLE 21
IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM, BY INSURANCE TYPE (PRODUCT FIRMS)

		Impact					
		SN	N	L	P	SP	TOTAL
Insurance	CAPTIVE/SELF	25%	42%	33%	0%	0%	12%
Type	CARRIER	19%	36%	39%	6%	0%	88%
	TOTAL	20%	37%	38%	5%	0%	100%

TABLE 22
IMPACT OF PRODUCT LIABILITY SYSTEM ON INDUSTRY, BY INSURANCE TYPE (PRODUCT FIRMS)

		Impact					
		SN	N	L	P	SP	TOTAL
Insurance	CAPTIVE/SELF	25%	58%	17%	0%	0%	12%
Type	CARRIER	21%	38%	38%	2%	1%	88%
	TOTAL	21%	40%	35%	2%	1%	100%

TABLE 23
IMPACT OF PRODUCT LIABILITY SYSTEM ON PENNSYLVANIA'S BUSINESS ENVIRONMENT, BY INSURANCE TYPE (PRODUCT FIRMS)

		Impact					
		SN	N	L	P	SP	TOTAL
Insurance Type	CAPTIVE/SELF	17%	75%	0%	0%	8%	12%
	CARRIER	19%	59%	13%	7%	2%	88%
	TOTAL	19%	61%	11%	6%	3%	100%

TABLE 24
IMPACT OF PRODUCT LIABILITY SYSTEM ON COSTS, BY INSURANCE TYPE (PRODUCT FIRMS)

		Impact			
		MAJOR	MODERATE	MINOR	TOTAL
Insurance Type	CAPTIVE/SELF	33%	33%	33%	12%
	CARRIER	23%	39%	39%	88%
	TOTAL	24%	38%	38%	100%

TABLE 25
FUTURE IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRMS, BY INSURANCE TYPE (PRODUCT FIRMS)

		Impact			
		GROW	REMAIN	DECREASE	TOTAL
Insurance Type	CAPTIVE/SELF	58%	25%	17%	12%
	CARRIER	60%	33%	7%	88%
	TOTAL	60%	32%	8%	100%

TABLE 26
IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM COSTS, BY SIC CODE

| | | | | | SIC Code | | | | | |
		1	2	3	4	5	6	7	8	TOTAL
	MAJOR	13%	13%	31%	0%	34%	13%	20%	0%	23%
Impact	MODERATE	50%	30%	45%	29%	34%	25%	80%	100%	39%
	MINOR	38%	57%	24%	71%	31%	63%	0%	0%	38%
	TOTAL	7%	20%	26%	6%	28%	7%	4%	1%	100%

TABLE 27
FIRM PERCENTAGE COST INCREASES AS A RESULT OF PRODUCT LIABILITY SYSTEM, BY SIC CODE

| | | | | | SIC Code | | | | | |
		1	2	3	4	5	6	7	8	TOTAL
	<1%	38%	39%	22%	71%	25%	50%	0%	0%	32%
	1 TO 2%	25%	35%	15%	0%	9%	0%	0%	0%	15%
Increase	3 TO 5%	13%	9%	15%	0%	22%	0%	20%	0%	14%
	6 TO 10%	13%	0%	7%	14%	22%	25%	40%	0%	14%
	11 TO 20%	0%	9%	19%	0%	9%	25%	40%	100%	14%
	>20%	13%	9%	22%	14%	13%	0%	0%	0%	13%
	TOTAL	7%	21%	24%	6%	29%	7%	5%	1%	100%

TABLE 28
IMPACT OF PRODUCT LIABILITY SYSTEM ON FIRM COSTS BY FIRM PERCENTAGE COST INCREASES

| | | | | Increase | | | | |
		<1%	1-2%	3-5%	6-10%	11-20%	>20%	TOTAL
	MAJOR	0%	6%	21%	42%	36%	86%	25%
Impact	MODERATE	23%	47%	57%	58%	45%	7%	36%
	MINOR	77%	47%	21%	0%	18%	7%	38%
	TOTAL	31%	17%	14%	12%	11%	14%	100%

TABLE 29
ACTIONS TAKEN BY FIRMS DUE TO PRODUCT LIABILITY EXPERIENCE

ACTION	PERCENT
CLOSED PLANTS	3
DISCONTINUED PRODUCT LINES	24
LAID OFF WORKERS	9
DECIDED AGAINST NEW PRODUCTS	25
LOST MARKET SHARE	12
DECIDED AGAINST MERGER/ACQUISITION	10
DISCONTINUED PRODUCT RESEARCH	2
MOVED PRODUCTION	1
OTHER	10
NONE OF THE ABOVE	53

TABLE 30
PRICING POLICY OF FIRMS

	PERCENT
ABSORBED COSTS	43
RAISED PRICES	14
COMBINATION OF BOTH	28
NONE OF THE ABOVE	15
TOTAL	100

TABLE 31
PRICING POLICY BY NUMBER OF ACTIONS TAKEN DUE TO PRODUCT LIABILITY EXPERIENCE (PRODUCT FIRMS)

		Actions						
		0	1	2	3	4	5	TOTAL
	ABSORBED COSTS	49%	26%	8%	56%	0%	22%	40%
Pricing	RAISED PRICES	11%	21%	25%	11%	0%	0%	13%
Policy	COMBINATION OF BOTH	20%	42%	50%	33%	0%	78%	32%
	NONE OF THE ABOVE	20%	11%	17%	0%	0%	0%	15%
	TOTAL	56%	17%	10%	8%	1%	8%	100%

TABLE 32
PRICING POLICY BY SALES (PRODUCT FIRMS)

Sales (In Millions)

		≤5	5-25	26-50	51-100	101-500	>500	TOTAL
Pricing Policy	ABSORBED COSTS	50%	28%	70%	33%	40%	50%	42%
	RAISED PRICES	15%	11%	10%	33%	40%	0%	14%
	COMBINATION OF BOTH	26%	36%	20%	33%	20%	17%	29%
	NONE OF THE ABOVE	9%	25%	0%	0%	0%	33%	14%
	TOTAL	35%	37%	10%	6%	5%	6%	100%

TABLE 33
FIRM PERCENTAGE COST INCREASES VERSUS PRICING POLICY

Pricing Policy

		ABSORBED COSTS	RAISED PRICES	COMBINATION OF BOTH	NEITHER	TOTAL
Increase	<1%	40%	9%	11%	40%	31%
	1 TO 2%	59%	12%	29%	0%	17%
	3 TO 5%	53%	7%	33%	7%	14%
	6 TO 10%	36%	21%	36%	7%	12%
	11 TO 20%	25%	25%	42%	8%	11%
	>20%	36%	21%	43%	0%	14%
	TOTAL	42%	14%	28%	16%	100%