PROPERTY RIGHTS, ENVIRONMENTAL RESOURCES, AND THE FUTURE

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I. INTRODUCTION

Environmental resources, like all other resources that are scarce and valuable, must be controlled to avoid the "tragedy of the commons." Therefore, authority to control the resource must be established. In a large economy this can be done either through private property and markets, or politically and bureaucratically, through government. In which system—private ownership or government ownership—will resources be more carefully utilized and protected against destructive use?[1]

With the failure of socialist systems generally, including several variants in Eastern Europe, it is increasingly obvious that market systems make more efficient use of resources for human purposes. Even economist Robert Heilbroner, long sympathetic to socialism, recently admitted that capitalism is generally superior in meeting the needs of people. Yet at the same time, he asserts that environmental resources are different; it may be necessary to socialize them in order to protect them.[2] A comparison of the environmental problems experienced under socialism in Eastern Europe with those in the more market-oriented Western European nations, however, suggests that he is wrong—government ownership and control works just as badly with environmental resources as with all other resources.

To a large degree, the ability of private owners to control pollution better than government follows from the fact that pollution is waste from production and consumption processes (for example, auto pollution is primarily unburned fuel in auto exhausts). Private ownership diminishes such waste, because under a private regime users pay for resource inputs and thus have an incentive to reduce them. Energy consumption, for ex-

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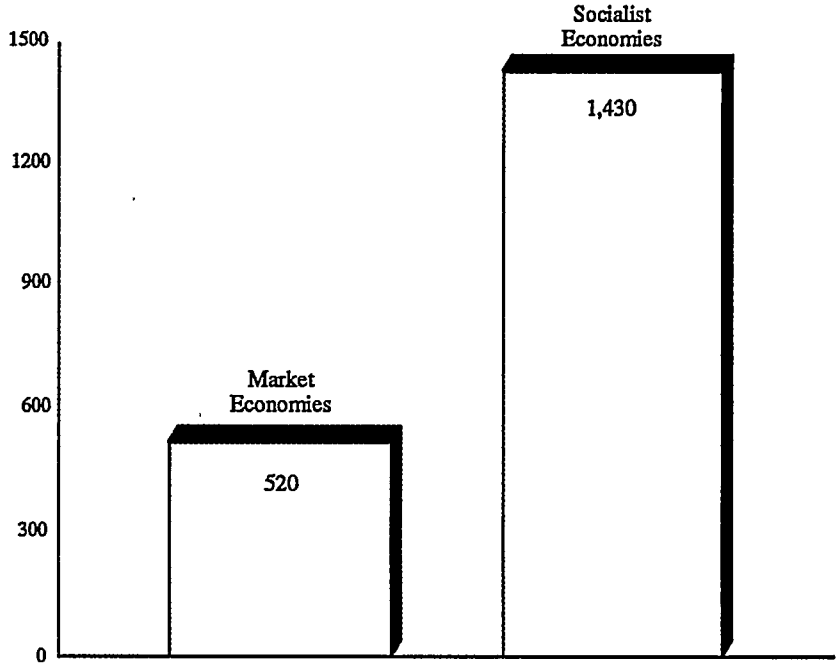
1. This issue is addressed in Richard L. Stroup, *Controlling Earth's Resources: Markets or Socialism?*, 12 POPULATION & ENV'T 265 (1991). The volume is a *festschrift* for Garrett Hardin, who popularized the "tragedy of the commons" concept.

2. *See* Robert Heilbroner, *After Communism*, NEW YORKER, Sept. 10, 1990, at 91.

ample, is lower in market economies than in socialist ones [See Figure 1].[3] When energy use is made more efficient by the institution of private ownership, resource extraction is reduced, and energy waste declines as well.[4]

FIGURE 1

Energy Use Per $1,000 of GNP
(1986)



Note: Energy consumption is measured in kilograms of coal equivalent. Market economies are the United States, Canada, Japan, UK, West Germany, France, Belgium, Switzerland, Austria, Denmark, Sweden and South Korea. Socialist economies are the USSR, Czechoslovakia, East Germany, Hungary, Poland, Romania and North Korea.

Yet distrust of private ownership of environmental resources remains widespread. A reason frequently given for allowing only government ownership of these resources is the claim that

3. *See* Mikhail S. Bernstam, THE WEALTH OF NATIONS AND THE ENVIRONMENT 24, tbl. 5 (1991).

4. According to Mikhail Bernstam, who assembled this data from official sources, energy resources amount to about half of all resources used in modern economies. *See id.* at 23.

markets are inherently shortsighted. Direct ownership of air and water, of course, would be hard to establish as a practical matter, so this question of ownership is not a serious issue.[5] In the case of many other natural resources, such as animal and plant species and forests generally, however, private ownership is a realistic option.

The assumption that private owners would be unwilling to make the necessary investments and have the patience and foresight needed to provide the future with sufficient forest resources was the chief reason that Congress founded the U.S. Forest Service at the turn of the century and allocated eight percent of the nation's land to its care.[6] Bernhard Fernow, first Chief of the Forest Service (then called the Division of Forestry) summed up this sentiment when he declared: "[T]he time element, together with the large capital required in timber-wood production, renders the forestry business undesirable to private enterprise of circumscribed means."[7] Government should own the forests because "the maintenance of continued [timber] supplies . . . is possible only under the supervision of permanent institutions with whom present profit is not the only motive. It calls pre-eminently for the exercise of the providential functions of the state to counteract the destructive tendencies of private exploitation."[8]

Fernow was far from alone in his distrust of private enterprise. Harold Hotelling, a prominent natural resource economist, warned in the 1930s that the world's finite supply of natural resources was being rapidly, perhaps irrevocably, depleted for personal gain. Hotelling recommended government regulation of natural resource development for the good of fu-

5. Note, however, that technology may yet make feasible some form of ownership. Even without ownership of air and water, the liability system associated with private property can and does protect the owners of potentially damaged resources. When fishing rights are privately owned, as they are in England and Scotland, owners have both the standing and the incentive to stop polluters from polluting in ways that would impair the value of their rights by harming the fish. See Jane S. Shaw & Richard L. Stroup, *Gone Fishin'*, REASON, Aug.-Sept. 1988, at 34, for a description of this regime, which was successful well before environmentalism was a strong political force.

6. *See* Forest Reserve Act of 1891, ch. 561, § 24, 26 Stat. 1095, 1103 (codified in scattered titles and sections of U.S.C.); Forest Reserve Act of 1897, ch. 2, 30 Stat. 11, 35 (codified in scattered titles and sections of U.S.C.); Robert Nelson, *Mythology Instead of Analysis: The Story of Public Forest Management*, *in* FORESTLANDS, PUBLIC AND PRIVATE 28, 29 (Robert T. Deacon & M. Bruce Johnson eds., 1985).

7. Bernard Fernow, *quoted in* Barney Dowdle & Steve H. Hanke, *Public Timber Policy and the Wood-Products Industry*, *in* FORESTLANDS, PUBLIC AND PRIVATE, *supra* note 6, at 89.

8. *Id.*

ture generations.[9] More recently, Sterling Brubaker, a resource economist with the Washington-based think-tank Resources for the Future, repeated this now familiar claim that "securing the interests of future generations . . . can only be protected by public intervention."[10]

Despite its widespread acceptance, the claim that the public sector is more far-sighted in its investment strategies than the private sector has not been confirmed either empirically or in theory. Our view, which we believe to be well-supported in logic and in fact, is that when property rights are clearly established, the private sector's market-oriented decisions will tend to allocate resources to their highest valued uses across time, while the political and administrative decisions made in the public sector will tend to allocate resources to uses for which current political supporters exert the strongest immediate pressures.[11] If this view is true, it has profound implications for the social utility of using private property rights wherever possible (rather than government ownership) to encourage wise use of natural resources.

How can we test the hypothesis that private stewardship, when it can be arranged, is superior in conserving resources? One method might be to examine whether privately-owned resources (for example, a forest) produce and retain more value over time. But because publicly-owned resources, especially those that offer environmental amenities, are seldom bought and sold, and thus seldom valued in the market, a direct test of our hypothesis is difficult. Other evidence, however, though slightly less direct, can help to compare the performance over

9. *See* Harold Hotelling, *The Economics of Exhaustible Resources*, 39 J. POL. ECON. 137 (1931).

10. Sterling Brubaker, *Land Use Concepts, in* GOVERNMENTAL INTERVENTIONS, SOCIAL NEEDS, AND THE MANAGEMENT OF U.S. FORESTS 103 (Roger A. Sedjo ed., 1983).

11. Indeed the argument can be made that uncertainty about future resource availability and prices, and speculator inability to "bet" against a resource price increase by selling short (while other speculators can bet in favor of a price increase by buying a claim in the resource) currently exaggerate market price. This is consistent with the fact that, despite Hotelling's observation that mineral resources' *in situ* price should rise over time at a rate equal to the interest rate (otherwise, why would anyone invest in holding or developing them?), most resource prices seem to fall or stay about the same over long periods of time. This suggests that the market has invested too much, rather than too little, in providing minerals to the future. Too little is consumed over time (by generations that are poorer than those which follow), if maximum total value is the criterion in a world with a positive opportunity cost of time. Other investments, rather than the provision of minerals, would have yielded more value to succeeding generations. *See* Richard L. Stroup & John A. Baden, *Property Rights and Natural Resources Management*, LITERATURE OF LIBERTY, Oct.-Dec. 1979, at 1.

time of the market and government sectors. This article compares and contrasts the time horizons reflected in decisions in three areas in which both public and private decisions are made: assets used to provide public services, employee compensation and pension funding, and electric utility regulation.

The following section explains the logic of our argument by showing the importance of capital markets in providing incentives to serve future as well as present desires. Section III compares the incentives facing decisionmakers in the public sector. Section IV provides an example illustrating the results of incentive differences between the private and public sectors, in the context of local bus systems. Section V provides a comparison of the extent to which each sector uses future compensation (higher pensions) to shift costs of current activities onto the future. Section VI shows how government regulation of electric utility prices has tended to provide current benefits at the expense of larger future costs. The final section describes our conclusions.

II. Investment Incentives For Property Owners

Private ownership gives people the right to use or to sell their assets as they desire, subject to social and legal constraints. Economic theory suggests that property owners will make resource-use decisions designed to reap benefits in the form of greater personal wealth. Property owners' wealth is directly linked to the value of owned assets—natural resources such as land or forests, for example. Property owners can choose immediate benefits by consuming a portion of an asset's value through consumption of its returns, by borrowing against the asset's value, or by selling off a portion of the asset. Alternatively, they can enhance their wealth and future income by postponing consumption now and investing more in the asset, including reinvestment of returns.

Within the marketplace, price measures an asset's value. The projected value of an asset's future returns determines the price that people are willing to pay for an asset today. The current market price reflects the present, discounted value of all future revenue flows that are expected to stem from the asset.[12]

12. Asset returns do not accrue instantaneously, but over time. To compare future and current returns, future proceeds must be translated into present values. They must

The ability to capitalize future value into an asset's present value induces property owners to consider the long-term implications of their asset-use decisions. It creates a strong incentive for owners to consider fully the effects of deferring consumption of their asset returns. Furthermore, it implies that property owners will be responsible to future users. Any activity that reduces the future benefits or increases the future costs stemming from an asset results in a reduction of that asset's current value. As soon as an appraiser or potential buyer anticipates future problems, his assessment of a property's value falls, and the owner's wealth declines immediately. Even if one is not personally concerned with the future, it is nevertheless in a property owner's current economic self-interest to consider future generations by attempting to maximize his property values.[13]

Potential buyers interact with owners to maximize asset value over time. Individuals who believe that an asset will be worth more in the future stand to increase their wealth by buying the asset now and deferring its use. Their wealth will rise when others recognize the future value, and begin to bid up the asset's price. Again, these profit-maximizing buyers might not consider themselves to be future-oriented, but through their attempts to maximize personal wealth, their investment decisions encompass a long-range perspective.

Corporate behavior can be expected to reflect this economic logic.[14] Corporate officers who do not expect to be present when future problems arise may well be concerned primarily with the short term. But current stock prices reflect the knowledge available to market participants. Wealth-maximizing stockholders immediately incorporate any new information they can find concerning the future effects of current activities into the price they are willing to pay for a company's stock.

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be discounted, to allow for the fact that future revenues are less valuable than present ones.

The discount rate reflects, in part, risk assessment, the marginal rate of substitution between current and future consumption, and the opportunity cost of other projects not undertaken that yield future payments in excess of current costs.

13. *See* Stroup, *supra* note 1.

14. When an asset owner no longer makes the decisions regarding his or her asset's use, conflicting wealth-maximization goals may arise between the principal owner and the investing agent. For a thorough analysis of the principal-agency issue, see Armen Alchian & Harold Demsetz, *Production, Information Costs, and Economic Organization*, 62 AM. ECON. REV. 777 (1982). *See also* Michael Jensen & William Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure*, 3 J. FIN. & ECON. 305 (1976).

Corporate actions that are perceived to increase a firm's future value will cause its stock prices to rise, just as behavior that is perceived to reduce future value will be reflected in falling stock prices. In such a manner, the asset market holds short-sighted corporate officers accountable for the effect of their actions on future generations.[15]

III. Investment Incentives For Public Officials

Public choice theory suggests that public officials are not unlike individuals in the private sector, and thus make decisions designed to further their self-interest,[16] as well as the slightly broader (but still socially narrow) interests of their agency. Unlike private decisionmakers, however, public employees are legally barred from reaping any financial reward from their investment decisions. Bureaucratic "wealth" is more closely linked to the size, budget, and influence of the agency with which a public official is associated. Therefore, the direct benefits of bureaucratic wealth-maximizing behavior are realized through an agency's expanding status and power, and can be enjoyed only during a public official's tenure in office.

Politicians, to survive politically, must satisfy voters at the next election. They are accountable only to current voters, and thus have strong incentives to concentrate on the current benefits their constituents will enjoy as a result of their resource-use decisions. Self-interested voters could generally be expected to support political decisions to incur costs now and enjoy the benefits later only to the extent that they are willing to be altruistic toward future citizens at their own expense.[17]

Because politicians and bureaucrats do not own the assets they manage, any decision to defer taxpayer or resource-user consumption in order to increase asset value does not directly affect their personal wealth, and is likely to decrease rather than increase the political support for their bureau. When asset ownership is public and non-transferable, decisionmakers are motivated to focus on the short-run effects of resource-use de-

15. *See* Stroup, *supra* note 1.

16. For two of the seminal works in public choice theory, see William A. Niskanen, Bureaucracy and Representative Government (1971), and James Buchanan & Gordon Tullock, The Calculus of Consent: Logical Foundations of Constitutional Democracy (1962).

17. *See* Richard L. Stroup, *Comments on Marian Clawson's Problems of Public Investment in Forestry*, *in* Investments in Forestry 201 (Roger Sedjo ed., 1985).

cisions, and have less incentive to postpone consumption in order to increase asset value or future output.[18]

Likewise, taxpayers own no transferable shares in public assets that can be traded to augment their personal wealth. Consequently, with the notable exceptions discussed below, an individual taxpayer stands slight chance of increasing his personal wealth by initiating a change in political activity that benefits everyone. The non-transferability of publicly-owned assets thereby dissuades the individual citizen from closely monitoring political resource-use decisions.[19] This fact contrasts sharply with the incentives facing a stockholder in a corporation. Stockholders, unlike voters, have an incentive to monitor organizations in which they have a transferable ownership stake. They can, upon diligently monitoring corporations of specific interest, either "bail out" of stock ownership when trouble is suspected (for instance, shortsighted management behavior), or buy more heavily into the stock of a promising firm. Either way, the owner's decision has a direct and immediate impact on his personal utility, quite unlike a citizen's vote at election time.

A. *Special-Interest Pressures*

When private asset owners can capture the future benefits of public investments in the market price of their property, they may bring about political decisions favoring long-term (although not necessarily efficient) investment projects. Empirical analysis has shown that property owners who are able to privatize public benefits are strongly motivated to lobby politicians to create such benefits; thus, special-interest groups—organized coalitions of selected voters engaged in wealth or benefit-maximizing behavior—typically exert a powerful influence on political decisions.[20]

18. *See* W. Mark Crain & Asghar Zardkoohi, *A Test of the Property-Rights Theory of the Firm: Water Utilities in the U.S.*, 21 J.L. & ECON. 395 (1978); *see also* Stroup, *supra* note 1.

19. This is especially true regarding state and local investments (or lack thereof) for individuals who are likely to move out of their current political jurisdiction before long-run costs or benefits are felt. It will pay them to act as if the present matters far more than the future. A partial exception is that individuals who own real estate will find that its market value captures the net benefits and tax costs of current policies' effects on future users and owners of the property.

20. *See* L. COHEN & ROGER NOLL, THE ELECTORAL CONNECTION TO INTERTEMPORAL POLICY EVALUATION BY A LEGISLATOR (Stanford University, Center for Economic Policy Research Publication No. 36, 1984); John L. Dobra & William L. Eubank, *Political Survivorship: An Interest Group Perspective*, 51 S. ECON. J. 1038 (1985); Barry R. Weingast et al.,

As an example of how catering to special-interest pressures can lead to public investments yielding long-term benefits, consider farmers who own land surrounding a proposed dam site, or merchants and residents who own land adjacent to possible future subway entrances or highway access ramps. Attempting to maximize their own wealth by increasing the value of their property, these owners have a strong incentive to support construction of a new dam, mass transit system, or highway. When property owners can capture the benefits from public investments without bearing full responsibility for the direct costs, one can anticipate abundant political investments directed towards these private benefits. The fact that most new public investment projects undertaken in the past decade have been sports stadiums, convention centers, and arts and entertainment complexes, rather than bridges and sewers, attests to the influence special interest pressures exert in the political decision-making process.[21]

B. *Theoretical Expectations*

Because public officials cannot directly benefit from decisions to defer consumption, one would expect to see a bias in political decisions in favor of projects yielding visible and immediate benefits while deferring less visible costs into the future, and against projects that have clearly identifiable current costs while generating less apparent future benefits.[22] On the other hand, because property owners can increase their personal wealth through decisions to defer consumption, we would anticipate that their consumption and investment decisions would more fully consider the long-term ramifications. Evidence from the three case studies described below supports this hypothesis.

IV. Investment In Public Infrastructure

In the United States, infrastructure assets are predominantly publicly-owned. Local and county governments are the princi-

The Political Economy of Benefits and Costs: A Neoclassical Approach to Distributive Politics, 89 J. Pol. Econ. 642-64 (1981).

21. *See* House Wednesday Group, The Rules of the Game: A Statement on Federal Highway Policy (Feb. 4, 1991) (unpublished policy statement, on file with the House Wednesday Group, 386 Ford House Office Building, Washington, D.C. 20515.

22. *See* James D. Gwartney & Richard L. Stroup, Microeconomics: Private and Public Choice 469 (5th ed. 1990).

pal owners of sewers, water systems, streets, roads, and mass transit facilities. The federal government owns the interstate highway system.

The decay of the nation's infrastructure has become apparent as accidents involving exploding underground water mains, subway fires, collapsing bridges, pothole-ridden roads, and buckling highways have occurred with increasing frequency over the past decade. Pat Choate and Susan Walter chronicled this deterioration in their study of the public capital stock, *America in Ruins: The Decaying Infrastructure*.[23] They estimated that $33 billion would be required to repair current bridge deficiencies; $700 billion to repair and maintain existing non-urban highways during the 1980s; between $75 and $110 billion to maintain municipal water systems over the next twenty years; and $25 billion to meet water pollution control standards during the next five years.[24] According to their projections, annual public investment levels throughout the 1980s must be between five and ten percent of GNP merely to restore the nation's existing capital stock.[25]

Actual public investment during the 1980s, however, fell far below that. Spending between 1980 and 1984 averaged 0.4% of GNP[26] and reached its apex at 2.2% of GNP in 1987.[27] According to Choate and Walter, the under-investment in infrastructure reflects growing pressures on public officials to provide both social and infrastructure services, to restrain tax increases, and to operate within shrinking budgets. They contend that while inadequately investing in infrastructure may meet short-term budget-balancing goals, it imposes serious long-term social costs.[28]

George Peterson of the Urban Institute has extensively studied investment in public works across the nation, and attributes infrastructural decay to a political environment that encourages

23. *See* Pat Choate & Susan Walter, *America in Ruins: The Decaying Infrastructure*, *in* REBUILDING AMERICA'S INFRASTRUCTURE: AN AGENDA FOR THE 1980S 1, 1-2 (Michael Barker ed., 1984).

24. *Id.*

25. *Id.*

26. David Aschauer, *Is the Public Capital Stock Too Low?*, CHI. FED. LETTER, Oct. 1987, at 1.

27. *Infrastructure and America's Economic Future: Hearing Before the Comm. on Public Works and Transportation*, 101st Cong., 2d Sess. 368 (1990)(statement of Dr. David Aschauer, Senior Economist, Research Dept., Federal Reserve Bank of Chicago).

28. Choate & Walter, *supra* note 23, at 7.

its neglect. Peterson states that "if public officials have to choose between trimming maintenance or trimming current services, or between cutting back expenditures and laying off public employees, there is a built-in bias against capital preservation."[29] In addition, the consequences of deferred maintenance are not immediately visible. He asserts that "[t]hey may not show up for four or six years, which is a political lifetime. . . . [Deferred maintenance] is a type of debt that is passed forward from one generation to the next."[30]

A. *Consequences of Deferred Maintenance*

Several studies support the claim that political decisions are biased toward addressing immediate and visible needs, and away from less visible, long-term responsibilities. The National Council on Public Works Improvement (NCPWI), which Congress established to assess the nation's infrastructure, stated that maintaining public assets is "perhaps the single most important element of government's stewardship obligation. It also is the element that is easiest to defer, and the one most likely to be cut from the current expense budget."[31] A 1978 National Urban Policy Report commissioned by President Carter concluded that "failure to keep up a city's infrastructure is often a politically less sensitive action than cuts in the municipal work force."[32]

A 1985 study of nine U.S. cities conducted by CONSAD Research Corporation found in interviews with city officials that "among all mechanisms that hold down total spending, limiting infrastructural outlays usually has the least immediate repercussions: City employees seldom lose jobs, perceived necessary services are not cut back, officials aren't blamed for callousness towards the poor."[33] CONSAD researchers Michael Pagnano and Richard Moore reported that

> the effect of limiting infrastructural expenditures is almost

29. *America's Urban Capital Stock: An Interview with George E. Peterson*, URB. INST. POL'Y & RES. REP., Spring 1980, at 7, 8.

30. *Id.* at 8.

31. NATIONAL COUNCIL ON PUB. WORKS IMPROVEMENT, FRAGILE FOUNDATIONS: A REPORT ON AMERICA'S PUBLIC WORKS—FINAL REPORT TO THE PRESIDENT AND CONGRESS 21 (1988).

32. DEPARTMENT OF HOUS. & URBAN DEV., THE PRESIDENT'S 1978 NATIONAL URBAN POLICY REPORT 94 (1978).

33. MICHAEL A. PAGNANO & RICHARD J.T. MOORE, CITIES AND FISCAL CHOICES: A NEW MODEL OF URBAN PUBLIC INVESTMENT 84 (1985).

> imperceptible. Over time, however, it may create problems. The trick is predicting when these problems will occur. Some water lines are over 100 years old and in no need of repair. Others are much newer and in dire need of attention. The gamble taken by city officials is that the effect will not be immediate but long-term.[34]

New York State Comptroller Edward V. Regan reported to the NCPWI that "when highways and bridges are regularly maintained there is no press coverage. When they are rebuilt it is an 'event.' There is a ribbon-cutting and plenty of press coverage. The incentives, therefore, are for public officials to purposefully starve the maintenance budget."[35]

A recent report by The House Wednesday Group, a caucus of delegates to the House of Representatives, acknowledges the effect of short political horizons: "The postponement of maintenance exacts little short-term political cost because the negative consequences of deferral take time to become obvious. . . . Thus maintenance is likely to suffer as a political priority."[36]

An Urban Institute survey of over 40 municipal public works agencies documented that public officials routinely neglect preventive maintenance.[37] Preventive maintenance practices, such as cleaning and flushing pipes, painting bridge components to prevent corrosion, and sealing road joints, are known to slow asset deterioration, extend productive life-spans, and avoid more extensive and costly future corrective maintenance.[38] The same officials who reported their knowledge of the long-term benefits of routine maintenance also acknowledged that such practices were consistently considered to be low expenditure priorities and were rarely incorporated into their overall invest-

34. *Id.*

35. NATIONAL COUNCIL ON PUB. WORKS IMPROVEMENT, *supra* note 31, at 21.

36. House Wednesday Group, *supra* note 21.

37. *See* HARRY P. HATRY & BRUCE G. STEINTHAL, GUIDE TO SELECTING MAINTENANCE STRATEGIES FOR CAPITAL FACILITIES 2-3, 11 (Guide to Managing Urban Capital Series Vol. 4, 1984).

38. *Id.* at 11. Hatry & Steinthal cite studies of bridge maintenance programs in New York City, sewer system programs in Milwaukee and Savannah, Georgia, and water distribution programs in Minnesota that show how preventive maintenance programs targeting identified "high-risk" segments within public works systems are effective means of preventing serious future problems. These studies include BETZ, CONVERSE, AND MURDOCH, INC., NEW YORK CITY WATER SUPPLY INFRASTRUCTURE STUDY: MANHATTAN (1980); SAVANNAH MANAGEMENT & AUDITING DEP'T, WATER AND SEWER OPERATIONS STUDY (1980); ROBERT G. TRACY, PRIORITY ASSIGNMENT FOR BRIDGE DECK REPAIRS (1978); DALLAS OFFICE OF MANAGEMENT & BUDGET, DEFERRED MAINTENANCE ISSUE PAPER (1982).

ment strategies.[39] Furthermore, few officials reported that they had ever quantified the actual costs that would result from deferring maintenance.[40] The Urban Institute's findings are consistent with the theoretical premise that decisions made in a political system will tend to defer costs for current benefits whenever possible.

B. *How Government Budgets Reflect Short-Term Biases*

Businesses distinguish between maintenance procedures that increase an asset's value and extend its usable life and those that do not. The former are treated as capital expenses. These expenses are added to an asset's original cost and result in a higher asset value. The latter are treated as current operating expenses. This accounting distinction indicates businesses' awareness that maintenance is a form of investment in the existing capital stock. Since maintenance that extends asset life is a capital expense that is capitalized over the life of the asset, a structural incentive exists for private firms to include preventive maintenance in their long-term investment strategies.

Government budgets, however, treat all maintenance expenditures as current operating expenses that must be financed through current revenues. This has important implications for government's long-term investment strategies in public works assets. It forces public officials to choose between spending on services that yield visible and immediate results, and spending to preserve the public capital stock, which yields real, yet unseen and deferred, benefits. Moreover, public officials have a strong incentive to defer routine maintenance until major restoration or new capital purchases, which can be financed with borrowed funds, are required.

Choate and Walter document that public officials routinely allow existing public works to deteriorate when rehabilitative efforts could restore assets at a lower cost than that required for new construction. For example, they cite General Accounting Office findings that old cast-iron water mains could often be restored to an almost new condition through in-place scraping and re-lining. The cost would be between thirty and fifty percent of the cost of replacing the mains.[41] Despite the poten-

39. *See* HATRY & STEINTHAL, *supra* note 37, at 11, 69-70.
40. *See id.* at 71.
41. *See* Choate & Walter, *supra* note 23, at 62.

tial savings, this has not been done.

A Federal Reserve study indicates that federal capital grant policies exacerbate neglect of the existing capital stock.[42] Excluding operating expenditures from federal grant eligibility creates a financial bias for new capital purchases.[43] A 1984 Lehman Brothers study found that public officials deliberately allow assets to deteriorate to the point that federal funds become available for major rehabilitation.[44] Ninety percent of the state and local officials interviewed in this study confirmed that federal capital funds cause them to lower the priority they attach to maintenance and repair.[45] A 1988 Congressional Budget Office report lends further support by concluding that cities regularly retire municipal buses before the end of their useful lives and purchase new vehicles with federal capital subsidies.[46]

C. *Private Sector Comparison*

Does the practice of systematically deferring maintenance differ in the private sector? Few empirical studies have compared maintenance practices and their effects on service-life duration between publicly and privately-owned assets. But one such study of the local mass transit industry is consistent with the claim that private companies attempt to preserve the value of their capital assets to a greater extent than government organizations.

Federal Reserve economist Brian Cromwell, in a study of mass transit systems around the U.S., observed the maintenance practices of owners of mass transit vehicles. He found that private companies expend greater resources on maintenance,[47] and that privately-owned transit buses have longer in-service lives and do not deteriorate as rapidly as public buses.[48]

The study showed that privately-owned transit companies devote more labor hours to fleet maintenance than do public agencies (fourteen to seventeen percent more, after controlling

42. *See* Brian Cromwell, *Capital Subsidies and the Infrastructure Crisis: Evidence from the Local Mass-Transit Industry*, 25 FED. RESERVE BANK OF CLEVELAND 11, 13 (1989).

43. *Id.* at 13.

44. *See* LEHMAN BROS. KUHN LOEB, PUBLIC INFRASTRUCTURE: PROBLEMS, PRIORITIES, AND FINANCING ALTERNATIVES (1984).

45. *Id.*

46. *See* CONGRESSIONAL BUDGET OFFICE, NEW DIRECTIONS FOR THE NATION'S PUBLIC WORKS (1988).

47. *See* Cromwell, *supra* note 42, at 16.

48. *See id.* at 18.

for wages, operating conditions, fleet composition, and age).[49] Private companies also keep their buses in service longer. Over thirty-eight percent of the buses in private fleets are more than twelve years old, as compared to twenty-two percent of public fleets.[50]

Cromwell's findings also indicate that public equipment depreciates more rapidly than private equipment [See Figure 2].[51] Cromwell collected price information on 645 mass transit vehicles sold in 1987 and 1988[52] and found that privately-owned vehicles had a resale value that was more than twice that of similar, publicly-owned vehicles.[53] The difference in resale prices supports the contention that maintenance increases an asset's value. It also indicates that the maintenance of privately owned assets is superior to that of publicly owned assets, and supports the claim that asset owners consider more fully the effects of future asset values in their investment strategies than do public officials.

49. *See id.* at 16.

50. *See id.*

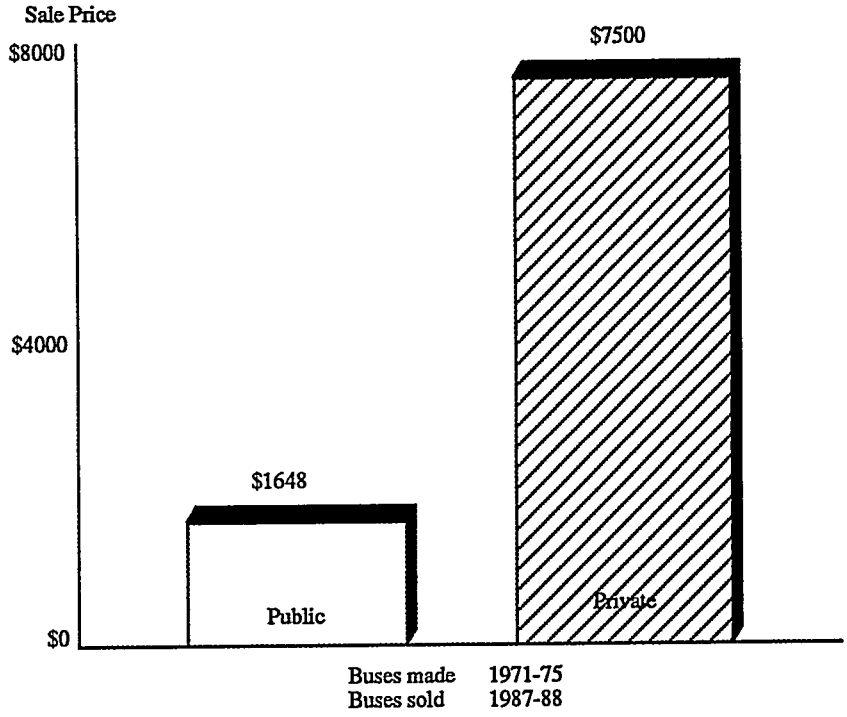
51. *See* FEDERAL RESERVE BANK OF CLEVELAND, ECONOMIC REVIEW Q2 (1989).

52. Cromwell's study focuses on the effects of federal capital grants administered by the Urban Mass Transit Administration (UMTA) on maintenance and scrappage rates of public sector fleet vehicles. The UMTA requires local transit agencies to operate buses purchased with federal funds for at least 12 years or 500,000 miles. Failure to do so results in ineligibility for federal assistance with new capital purchases. Cromwell shows that this 12-year limit is below the potential operating life of 15 to 20 years for standard bus models when properly maintained. *See id.* at 15.

53. *See* ECONOMIC REVIEW, *supra* note 51.

FIGURE 2

Private Firms Preserve Value



D. *Evaluating Government's Long-Term Management of Infrastructure*

In its investment strategies affecting public works assets, the public sector has demonstrated a strong tendency to focus on immediate pressures rather than on society's long-term needs. Public officials face hard choices in setting spending priorities between providing services that yield visible and immediate benefits, and those that yield less obvious future benefits. The structural and political incentives they face create an apparent preference to maximize current services and defer costs into the future.

George Peterson indicates the extent of the government's pattern of postponing payment for current services when he compares deferred maintenance of public works to unfunded

pension liabilities: "These are all ways that the current generation of taxpayers can consume public services, yet shift some of the costs of paying for them to taxpayers of the future."[54]

V. Deferred Worker Compensation

Public employee compensation packages and unfunded public pension plans provide another example of the tendency for public officials to make decisions that will maximize visible current benefits and defer their less apparent costs into the future.

A. *Pension Benefits as a Percent of Total Compensation*

Total employee compensation for labor services consists of wages and pension benefits. Wages are the income that workers currently receive in exchange for their labor services. Pension benefits represent payment for current labor services that workers postpone to receive as retirement income. Wages are employers' immediate financial liabilities, while pension benefits represent employers' future obligations to employees.

Public employees receive a greater percentage of their total compensation in the form of pension benefits than do private sector employees. Economist Richard Ippolito found that, as a share of total compensation, government pensions are three times larger than those in the private sector.[55]

The extent of deferred labor costs in the public sector is also indicated by comparing the funding rates for public and private pensions. The funding rate is the percentage of a worker's salary that would have to be set aside annually so that, with interest, the accumulating funds would pay the retirement benefits earned during the year. In 1986, the full funding rate for most private sector pension plans was 5% to 15% of payroll.[56] For the federal civilian retirement plan, it was about 36% of payroll, and for the military pension scheme it was about 58%.[57]

B. *Unfunded Pension Liabilities*

A pension plan is fully funded when employers set aside enough money each year to cover the future pension benefits

54. *America's Urban Capital Stock: An Interview with George E. Peterson, supra* note 29, at 8.
55. *See* Richard A. Ippolito, *Why Federal Workers Don't Quit*, 22 J. Hum. Resources 281, 285 (1987).
56. Herman B. Leonard, Checks Unbalanced 32 (1983).
57. *See id.* at 32.

that employees have earned over the year. An underfunded pension plan is one in which the employer's annual contributions, together with interest, are inadequate to cover workers' earned pension benefits.

It is important to note that if the employer is a private business, the asset value of the firm falls as future pension liability accrues. As long as the firm is solvent and can borrow, there is no advantage to postponing the worker payments, or failing to fund the pension. The reduced current expense is matched by the reduction in the current value of the firm.

C. *Comparing Public and Private Pension Funding Practices*

The routine practice of underfunding public pension plans is well-documented.[58] Robert Inman, of the Wharton School of Business, has estimated the underfunding of public pensions to be as high as forty percent.[59] Local and state administered pension plans are even less solvent. A 1983 study found that assets covered less than forty-five percent of the liabilities of state-administered pension plans.[60] The federal military retirement system has, since its inception in 1948, been a "pay-as-you-go" scheme. No funds are currently set aside to cover future pension liabilities of current military personnel. Pension benefits are paid to former members of the armed forces with current tax revenues.

Inman notes that the long-term economic consequences of underfunded public pensions are severe, and include higher government wage bills and tax burdens, lowered national savings, and municipal insolvency. The fiscal crises faced by New York City and Cleveland in the late 1970s were largely a result of their growing obligations to pay previously unfunded employee pensions.[61]

Offering public employees generous pension benefits, if

58. *See* Dennis Epple & Katherine Schipper, *Municipal Pension Funding: A Theory and Some Evidence*, 37 PUB. CHOICE 141 (1981); Shawna Grosskopf et al., *Pension Funding and Local Labor Costs: A Dynamic Analysis of Illinois Police Pension Funds*, 54 S. ECON. J. 572 (1988); Robert Inman, *Public Employee Pensions and the Local Labor Budget*, 19 J. PUB. ECON. 49 (1982); George Mumy, *The Economics of Local Government Pensions and Pension Funding*, 86 J. POL. ECON. 517 (1978).

59. *See* Inman, *supra* note 58, at 49.

60. *See* Frank S. Arnold, State and Local Public Employee Pension Funding: Theory, Evidence, and Implications (1983) (unpublished Ph.D. dissertation, Harvard University).

61. *See* Inman, *supra* note 58, at 50.

matched by adequate pension fund contributions, does not postpone payment for current services. It can merely reflect workers' desire to receive more income later in life. That government officials offer public workers generous retirement benefits and simultaneously make inadequate provisions to cover the higher future liabilities shifts the responsibility of paying for current services onto future taxpayers. This behavior is indeed occurring, consistent with our theoretical expectations.

Government officials, if they are dedicated to their agency's mission, have strong incentives to defer employee compensation and to underfund pension plans, and they face no immediate consequences from doing so. They enjoy the short-run political benefits of restraining wage and tax increases and of increasing the level of public services they can provide from any given budget.[62] The cost to future taxpayers of generous pension benefits and underfunded pension plans becomes evident only when retiring employees begin to collect their promised benefits—long after today's government officials have left public office. And typically, it is the public treasury, rather than their own bureau, that is left with the bill for past services.

Public accounting standards facilitate government officials' lack of accountability for incurring higher pension liabilities. Governmental income statements are not required to disclose unfunded pension liabilities. While government budgets are public documents, they provide no indication of accruing pension liabilities, nor of current efforts to meet future obligations. And unlike their private sector counterparts, neither public officials' personal wealth nor a public agency's market value can be lowered by the decision to burden future generations with higher costs.

Private companies, however, are held immediately accountable for their future pension liabilities via the firm's market value. Companies whose stock is publicly traded are required to fully disclose all pension liabilities in their accounting records. This becomes public information, and is readily incorporated into the market's assessment of a firm's current value.

D. *Federal Oversight of Private Pensions*

Has government action pushed private firms into the better

62. *See* Grosskopf et al., *supra* note 58, at 581.

provision of funding for the pensions they do grant? To the contrary, most private pension plans are fully funded despite strong political inducements to underfund. The Employee Retirement Income Security Act (ERISA)[63] was enacted in 1974 to secure workers' pension benefits and to prevent perceived mismanagement of pension funds.[64] As part of ERISA, the PBGC was created to insure private defined benefit pension plans.[65] The PBGC insures eighty percent of workers covered by private pension plans, and two-thirds of private pension assets.[66]

According to Ippolito, "[u]nderlying ERISA and its legislative history is the idea that workers can suffer large losses if a firm makes pension promises without proper funding."[67] As he points out, underfunding pensions could be effectively discouraged by assessing direct liability against firm owners through stricter funding standards or modifying bankruptcy laws.[68] Instead, when all companies that offer defined pension benefit plans must subscribe to federal PBGC insurance, companies with fully or over-funded plans are forced to offset other firms' deficient pension contributions. James Lockhart, the PBGC's executive director, acknowledged that "about half of the present premium represents a subsidy from the well-funded to the underfunded plans, creating a direct incentive to underfund."[69]

The practice of underfunding pension plans, which is perceived to jeopardize workers' pension benefits unjustly, is standard procedure for all public pension plans (ERISA exempts all government pension plans).[70] As a Labor Department official

63. 29 U.S.C. §§ 1001-1461 (1988).

64. *See* Richard A. Ippolito, *Pension Security: Has ERISA Had Any Effect?*, REGULATION, No. 2, 1987, at 15.

65. *Id.* at 18. There are two kinds of pension plans: defined contribution and defined benefit plans. In a defined contribution plan, annual employer pension contributions can be claimed by employees after short vesting periods, even if they leave the firm. In a defined benefit pension plan, workers are promised an annuity upon retirement that is in proportion to final wages and years of service. Workers' claims to promised benefits are conditional on meeting vesting requirements and on the continued operation of the pension plan.

66. *Id.* at 16.

67. *Id.* at 20.

68. *See id.* at 20. Unlike wages, underfunded pensions are treated as unsecured liabilities in a bankruptcy. Ippolito reports that only about 10% of these liabilities are paid by bankrupt firms. *Id.*

69. *See American Pensions; Grey Peril*, THE ECONOMIST, May 11, 1991, at 78.

70. 29 U.S.C. § 1003(b)(1) (1988).

put it, "Unlike a private company, the government doesn't have to worry about not being able to pay its workers' future pension benefits because, well, it will always have the right of eminent domain over taxpayers' monies."[71]

E. *What the Results Suggest*

Government officials are pressured to restrain wage expenditures while continuing to provide high levels of current services, at least for important political constituencies. By paying their workers in large part with generous pension benefits and simultaneously underfunding public pension plans, they can help themselves to achieve these goals. This action, however, forces future taxpayers to pay for already-consumed labor services.

A comparison of public and private employee compensation packages and pension funding practices demonstrates that governments will act to maximize the visible and current benefits of resource use, and defer hidden costs into the future. Subject to the discipline imposed by the market's incorporation of future value into its assessment of a firm's current value, private companies consider much more fully both the current and future obligations incurred by employing current labor services.

VI. Price Regulation

Politically short time-horizons are also evident in governmental control over private industry. Regulation of the electric utility industry provides an example of how political pressures can discourage private investors from addressing long-term needs. Utility investments require a long-range perspective. It takes a minimum of six to eight years to build a power plant, and financial and regulatory constraints can extend the lead times for new generating capacity to between ten and fourteen years.

An evaluation of the impact of regulation on the utility industry's performance lends a slightly different perspective than direct comparisons of public and private decisions. While this evaluation's suggestions are less conclusive, they are consistent with the hypothesis that public decisions are designed to maxi-

71. Telephone Interview with John Breyfogle, U.S. Department of Labor (Apr. 29, 1991).

mize visible and current benefits and defer less visible costs into the future.

A. *Public Utility Regulation*

Throughout the United States, state Public Utility Commissions (PUCs) regulate the selling price of electricity generated by private, investor-owned utilities.[72] PUCs set electricity prices that will, in theory, allow a utility to recover its costs fully, including a "fair and reasonable return" on its investments.[73]

Electric utility regulation operated relatively smoothly through the 1960s. The cost of generating electricity fell as utilities built larger and more efficient power plants. Cost savings were passed on to electricity users in the form of lower rates.[74] The amicable relationship between utilities, PUCs, and electricity consumers, however, began to change in the early 1970s.[75] Inflation, interest rates, fuel costs, and environmental regulation rose, causing the industry's capital and energy costs to increase dramatically,[76] and ratcheting up the pressure on the industry to resist tight rate-of-return regulation.

From 1973 to 1986, the nominal cost of capital nearly tripled for most utilities.[77] Petroleum prices after the 1973 OPEC oil embargo were 400% higher than their pre-embargo levels.[78] Moreover, the electric utility industry is highly capital and energy-intensive; the cost of these two inputs accounts for 75% of electricity's generating cost.[79] Utilities attempted to pass these higher capital and energy costs on to their customers, and the average price of electricity rose from 2.38 cents per kilowatt hour in 1973 to 7.44 cents per kilowatt hour by 1986.[80]

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72. PETER NAVARRO, THE DIMMING OF AMERICA: THE REAL COSTS OF ELECTRIC UTILITY REGULATORY FAILURE 3 (1985). Slightly more than 80% of the nation's electricity is provided by over 150 investor-owned utilities. The remaining 20% is supplied by the federal government's Tennessee Valley and Bonneville Power authorities, and state, city, and rural cooperatives. *Id.*

73. *Id.* at 6.

74. *Id.*

75. *Id.* at 7.

76. *Id.* at 7-9.

77. *Id.* at 10.

78. *Id.* at 8.

79. *Id.* at 9.

80. *See* Peter Navarro, *The U.S. Regulatory Environment and International Trade: Lessons from the Electricity Sector*, 8 J. POL. ANALYSIS & MGMT. 466, 467 (1989).

B. *Political Pressures Facing PUCs*

In the mid-1970s PUCs were confronted not only by utilities routinely requesting rate increases, but also by well-organized and well-funded consumer coalitions demanding rate relief. Several industry analysts have demonstrated that the electricity prices allowed by state PUCs during this period were inadequate to cover the utilities' escalating costs.[81] One study estimated that by the early 1980s, the utility industry earned a return on its invested capital that was three percentage points below the industry's real cost of raising capital.[82]

In studies conducted for the Department of Energy, economist Peter Navarro found that elected utility commissioners face strong political pressures to restrain rates.[83] His empirical analysis indicated that the stronger the political pressures facing a PUC, the more likely that the PUC would pursue rate-suppressive policies.[84] In Navarro's judgment,

> [c]ommissioner-candidates know that campaign promises to hold rates down are likely to woo ratepayer votes, and once in office commissioners have to worry about reelection. Because elections are held every three to six years and power plants take eight to twelve years to build, the benefits of allowing utilities higher returns so that they can undertake capital investment programs typically are not felt before commissioners' terms expire. This short-term political horizon is reinforced by the tendency of consumers to focus more on the immediate costs to them than on the future rewards when evaluating commissioners' performances.[85]

C. *Higher Capital Costs from Rate Suppression*

Rate suppression benefits current electricity consumers by

81. *See* Craig J. Bolton & Roger E. Meiners, *The Politicization of the Electric Utility Industry*, *in* ELECTRIC POWER, DEREGULATION AND THE PUBLIC INTEREST 249, 259 (John C. Moorhouse ed., 1986); SCOTT FENN, AMERICA'S ELECTRIC UTILITIES: UNDER SIEGE AND IN TRANSITION 6-7, 45 (1984); NAVARRO, *supra* note 72, at 10; Peter Navarro, *Public Utility Commission Regulation: Performance, Determinants, and Energy Policy Impacts*, ENERGY J., Apr. 1982, at 119, 125; Peter Navarro, *The U.S. Regulatory Environment and International Trade: Lessons from the Electricity Sector*, 8 J. POL. ANALYSIS & MGMT 466 (1989); Peter Navarro & Jeffrey Dubin, *Regulatory Climate and the Cost of Capital*, *in* REGULATORY REFORM AND PUBLIC UTILITIES 141 (Michael Crew ed., 1982).

82. *See* Eugene Brigham & Dilip Shome, *Equity Risk Premiums in the 1980s*, *in* PETER NAVARRO, THE POLICY GAME 154 (1984).

83. Navarro, *Public Utility Commission Regulation: Performance, Determinants, and Energy Policy Impacts*, *supra* note 81, at 125.

84. *Id.*

85. NAVARRO, *supra* note 72, at 98.

restraining immediate increases in the price of electricity. Unfortunately, it also impedes the utilities' ability to recover their expenses, including their cost of capital.[86] Moreover, rate suppression intensifies the upward pressure on utilities' capital costs by increasing the risk that purchasing utility stocks and bonds will yield below-market returns. Furthermore, Navarro has shown that rate suppressive regulatory environments have led to greater volatility in industry earnings and more frequent episodes of earnings attrition.[87]

To attract investors, utilities have promised investors higher returns through a "risk premium" on their invested funds. Stephen Archer of Willamette University has estimated that investors demand a one to two percentage point risk premium when buying the stocks and bonds of utilities operating within rate suppressive regulatory environments.[88] This estimate has been corroborated by Navarro, who calculated the risk premium to be in the range of several hundred basis points (a 100-basis-point increase represents a one percentage point increase in the interest rate).[89]

Falling utility stock and bond values indicate that investors have viewed utility stocks and bonds as risky assets. When the market price of a company's common stock falls in relation to the book value of its assets, so does the real value of a shareholder's common stock. During the 1980s, the market-to-book ratio consistently fell for the utility industry.[90] During the same time period, Moody's and Standard & Poor's downgraded the credit-worthiness rating of most utility bonds from the low risk range of AAA and AA to the higher risk ranges of A and BBB and lower.[91] As bond ratings decline, the interest charges on borrowed funds rise.

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86. *See id.* at 81.

87. *See* Navarro, *supra* note 80, at 468. Earnings attrition refers to the loss utility shareholders experience when inflation drives a wedge between the return allowed by PUCs at the beginning of a rate period and the return actually earned by the utility at the end of the rate period.

88. *See* Stephen H. Archer, *The Regulatory Effects on Cost of Capital in Electric Utilities*, 107 PUB. UTIL. FORT. 36, 38 (1981).

89. *See* Navarro & Dubin, *supra* note 81, at 154-56, 160.

90. *See* PETER NAVARRO, THE POLICY GAME 160 (1984).

91. According to a 1982 report prepared for the U.S. Department of Energy by the consulting firm Booz, Allen, and Hamilton, Inc.; "The Impact of Electricity Cost and Availability on Economic Growth and Competitiveness," Standard & Poor's made 100 more downgradings than upgradings of utility bonds between 1973 and 1981. By 1983, only one utility held a AAA bond rating and the median rating was A (versus AA in 1973). *See* NAVARRO, *supra* note 72, at 45.

Navarro illustrates the impact that lowered bond ratings can have on capital costs:

> Let's assume that a utility's bond rating fell from AAA to BBB and that the company must issue $500 million in bonds for a new coal plant. Let's assume also that the interest rate on a BBB bond is two hundred basis points higher than on a AAA bond. . . . This two-percentage-point gap, which approximates the average spread witnessed [in the early 1980s], means that the BBB-rated utility has to pay $10 million more per year in interest charges than if it were rated AAA. These charges will be passed on to consumers in the form of rate increases worth $300 million over the thirty-year life of the bonds.[92]

D. *Consequences of Higher Capital Costs*

Utility executives have responded to higher capital costs by minimizing their use of capital. Several utility industry analysts contend that the pattern of rate suppression and capital minimization observed during the past two decades has raised the costs of providing power, and will ultimately result in higher prices for less reliable power.[93]

Pursuing cost minimization strategies, utilities have bypassed opportunities to build new power plants and convert old plants to utilize efficient, low-cost fuel mixes.[94] The costs of generating power are therefore higher than they would be if otherwise economically viable investments had not been discouraged by rate suppression's higher capital costs. Higher operating costs represent foregone potential savings in a utility's fuel bill.[95] While estimating the lost savings is difficult, Navarro projects that they could easily total hundreds of millions of dollars through the year 2000.[96]

In a 1983 study conducted for the Department of Energy, Navarro compared future electricity rates for electric utilities across the country under two different regulatory scenarios.

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92. *Id.* at 46-47.

93. *See* Archer, *supra* note 88; FENN, *supra* note 81, at 39; WILLIAM GORMLEY, THE POLITICS OF PUBLIC UTILITY REGULATION (1983); Navarro, *supra* note 80, at 469; NAVARRO, *supra* note 72, at 13; Navarro & Dubin, *supra* note 81, at 142.

94. Electricity can be generated by many power sources: coal, oil, natural gas, hydro, nuclear, solar, geothermal, biomass, or wind. A particular power plant's optimal generation mix depends primarily on its proximity to various energy sources and on the mix of its existing plants. *See* NAVARRO, *supra* note 72, at 29.

95. *See id.* at 30.

96. *See id.* at 31.

The first scenario reflected the rate-suppressive, capital-minimizing environment utilities have experienced since 1973. The second set of assumptions allowed utilities to earn their market cost of capital and undertake all economically-viable investments. The study estimated the costs of rate suppression for the sampled utilities to range from $242 million to $2.8 billion through higher fuel costs and foregone investment opportunities. Navarro projected that suppressing electricity rates throughout the 1970s and early 1980s would result in electric bills as much as 11% higher for Pacific Coast utility consumers, and 33% higher for Southeastern utility consumers by the year 2000.[97]

The North American Electricity Reliability Council recently estimated that the demand for electricity grew by slightly more than three percent during the late 1980s.[98] According to Navarro, utilities cancelled construction plans for new power-generating facilities during the 1980s to an extent that jeopardizes their ability to meet this projected growth.[99] At this growth rate, the Department of Energy warned that utilities' underinvestment in new power plants would seriously reduce the reserve capacity of utilities in several states and increase the risk of power shortages and failures.[100]

Rate suppression poses an additional, more subtle threat to the continued reliable supply of electricity through its squeeze on utilities' operations and maintenance budgets. Economist Marie Corio investigated the relationship between rate suppression, reduced operating and maintenance expenditures, and the probability of power failures. She concluded that "if a utility's earnings are squeezed, poor [power plant] unit performance follows—although it takes a couple of years for this to become apparent in lower equivalent [equipment] availability and . . . higher costs to the ratepayer."[101] According to a National Electric Reliability Study, seventy-five percent of all power interruptions reported to the Office of Emergency Operations, the Assistant Secretary for Environment, and Safety and

97. *See id.* at 89.

98. Telephone Interview with Eugene Gorzelnik, Director of Communications, North American Reliability Council (May 5, 1991).

99. *See* NAVARRO, *supra* note 72, at 19.

100. *See id.* at 56.

101. Marie R. Corio, *Why is the Performance of Electric Generating Units Declining?*, 109 PUB. UTIL. FORT. 25, 30 (1982).

Emergency Preparedness during the 1970s were due to problems related to facilities operations and maintenance.[102]

E. *Evaluating the Effects of Rate-of-Return Regulation*

Rate-of-return regulation discourages efficient resource use over time by distorting the incentives of regulators and utility executives to address long-term needs. Political pressures motivate utility commissioners to appease current users by holding electricity rates below the industry's costs of providing power. The ultimate costs of this decision are borne by future electricity consumers. Utility executives, in turn, focus on earning allowable returns on investment rather than designing investment strategies that will maximize their assets' value over time. In the past, when permitted returns exceeded the industry's capital costs, utilities generally over-invested in new plant and equipment. More recently, when allowable rates-of-return fell below capital costs, utilities responded by failing to undertake the investments required to provide low-cost power and meet projected load growth. In either case, investment decisions have reflected the immediate political concerns that control utility commissions' decisions rather than maximization of long-term resource values.

VII. Conclusion

The evidence presented above suggests that immediate political pressures strongly influence decisions made in the public sector. Political decisions in the areas of infrastructure, employee compensation, and utility regulation exhibit a bias toward using resources so that visible and immediate benefits are produced while future costs that are less obvious, but no less real, are accrued. Costs are deferred, even when doing so is not economical. By contrast, the current value of property rights to assets holds owners accountable for future consequences of their current actions. When free from political interference, the private sector tends to consider more fully the long-term effects of current resource-use decisions. These findings support our theoretical expectations.

While the logic of the theory seems unambiguous as to the

102. *See* Navarro, *supra* note 72, at 62 (citing S.P. Walldorf & L.C Markel, The Electric Utility Industry—Past and Present: Background Information for the National Electric Reliability Study (1980)).

effects of capitalization in the presence of private and transferable property rights, the evidence we present is far from decisive. A more systematic and rigorous comparison of the long-term effects of public and private sector investments is needed. The information that is currently available, however, suggests that, by acting to maximize property value, property owners have a strong motivation to behave in such a manner that the interests of future generations are secured, while voters, and thus politicians and other government officials, lack such an incentive. In light of this information, it seems reasonable to recommend that calls for greater government ownership to protect natural resources be subject to close scrutiny, and that ways to extend the conservation benefits of private property rights be explored.