

President's speeches on the White House web page.

Six examples of how the government is working to use information technology include:

- The Internal Revenue Service. Taxpayers can download and retrieve tax publications and forms on the IRS web site. Between the beginning of this year and April 17 (tax filing day), the IRS web site recorded 968 million hits, which made it one of the most frequently visited sites on the World Wide Web.⁵⁹
- National Weather Service. When Hurricane Floyd was approaching the East Coast of the United States, people visited the National Hurricane Center web site to track the weather on-line. In a two-day period, the web site received 27 million hits for information on Hurricane Floyd.⁶⁰
- Student Financial Aid. The Department of Education has made it possible for students to apply for an estimated \$51.4 billion in federal grants, loans, and work-study opportunities on-line. During the 1998-1999 lending cycle, the Department of Education processed 672,728 loan applications electronically.⁶¹ Electronic filing is not only faster, but also less error-prone. An estimated 12 to 14 percent of paper applications are returned for errors; by filing electronically, students can avoid delays because the

⁵⁹ Internal Revenue Service, "Electronic Transactions Set Records in Successful IRS Tax Season," April 26, 2000.

⁶⁰ Remarks by Secretary of Commerce William M. Daley, Northern Virginia Technology Council, September 17, 1999, available at: <http://www.doc.gov>.

⁶¹ *Towards Digital eQuality*, U.S. Government Working Group on Electronic Commerce, 2nd Annual Report (1999), available at <http://www.ecommerce.gov>.

software immediately identifies errors and allows for on-the-spot corrections.⁶²

- Patent and Trademark Office. The Patent and Trademark Office has put on-line two million patents dating back to 1976, and one million trademarks dating back to 1870. By the end of 2001, every patent ever issued by the United States will be available on-line, and by the following year, more than 14 million Japanese and European patents will be also.⁶³ The databases are searchable, so visitors can find the patent or trademark information they need on the Internet. In addition, the Patent and Trademark Office allows people to file for trademarks on-line and is piloting a system to allow patents to be filed electronically. Finally, like many private-sector entities, the Patent and Trademark Office is using the Web to recruit employees: so far, they have hired at least 700 patent examiners from on-line applications.⁶⁴
- Environmental Information. The Environmental Protection Agency's (EPA) award-winning web site – EnviroMapper – allows consumers to access environmental information for their local neighborhood. The database includes information on drinking water, toxic and air releases, hazardous waste, water discharge permits, and Superfund sites. It also links to text reports, which provide more information.⁶⁵ The EPA spends approximately \$400 million per year to collect these data. Posting them on the Web

⁶² Department of Education, "Applying For Student Financial Aid Quick," February 10, 2000, available at: <http://www.ed.gov/PressReleases/02-2000/easy.html>.

⁶³ Remarks of Secretary of Commerce William M. Daley, E-GOV 99 Conference, July 1, 1999, available at: <http://www.doc.gov>.

⁶⁴ Ibid.

⁶⁵ Available at <http://www.epa.gov/enviro/html/em/index.html>.

saves EPA an estimated \$5 million per year in reduced labor and other costs.⁶⁶

- The Department of Commerce. Last summer, then-Secretary Daley committed to moving the Department of Commerce from a “paper-based bureaucracy to a truly Digital Department” by the year 2002.⁶⁷ The plan entailed ensuring that personnel actions, procurement, and as much internal business as feasible would be conducted on a secure Intranet. These actions should help to increase productivity of government workers and save taxpayers money. (It should nonetheless be noted that the promised benefits of a “paperless” office have often been elusive. The World Bank’s effort to move toward a paperless system, for example, has created significant difficulties.)

In addition to the above examples, President Clinton has directed Federal agencies to take additional steps to utilize the Internet to provide government goods and services. (See Appendix B: Memorandum for Heads of Executive Departments and Agencies on Electronic Government.)

Examples of the steps the President directed agencies to take include:

- Create One-Stop Access for Existing Government Information. The President directed the Administrator of the General Services Administration, in conjunction with other government entities, to create a portal for government information, based “not by agency, but by the type of service or information that people may be seeking; the data should be identified and organized in a way that makes it easier for the public to find the information it seeks.” (In June 2000, President Clinton announced that firstgov.gov, a

⁶⁶ “Maps: Web Sites Provide Enviro Information For Public,” *Greenwire*, December 7, 1999.

free web site that will provide a single point of entry to all government on-line resources, would be created. In September 2000, the site became operational.)

- Put Most-Used Government Forms On-Line. The President directed each government agency to put their most-used government forms on-line by December 2000.
- Agencies Should Use Electronic Commerce for Government Procurement. The President directed government agencies to use electronic commerce, where possible, for government procurement. The hope is that electronic procurement will make government ordering faster and cheaper, as it has for the private sector.
- Act as Leader to Protect On-Line Privacy of Citizens. The President directed agencies to post privacy policies visibly for customers to see. In addition, he directed that each government web site aimed at children should adopt and implement the required information policies to protect the children's information on-line.

⁶⁷ Remarks of Secretary of Commerce William M. Daley, E-GOV 99 Conference, July 1, 1999, available at: <http://www.doc.gov>.

II. The Theory of the Government's Role in a Digital Age

To evaluate what activities the government should or should not be undertaking on-line, it is important to examine the role of government in the economy. The government plays an important but secondary role in the U.S. economy. It is directly involved in economic activities ranging from the conduct of monetary and fiscal policy to public education, bank deposit insurance, housing subsidies, Medicare, electricity generation, and regulatory oversight of a number of industries. The government owns roughly 25 percent of the land in the United States.⁶⁸ Federal government outlays on goods, services, and transfer payments currently amount to 18.7 percent of Gross Domestic Product, down from the recent peak of 23.5 percent in 1983 but still a significant share of the overall economy.⁶⁹ The government also provides the overall legal structure in which private-sector economic activity takes place.

The United States thus has a “mixed economy,” in which the government plays an important – but not the predominant – role. The purpose of this section is to explore the economic theory that could help to inform decisions about what the government should or should not do, or about the appropriate “mix” between government and the private sector.

Views regarding the role of government have fluctuated over time and across countries.⁷⁰ In the 16th, 17th, and 18th centuries, for example, many economics writers supported an active role for

⁶⁸ U.S. Department of Commerce, *Statistical Abstract of the United States 1999*, Table 394, page 240.

⁶⁹ Office of Management and Budget, *Budget of the United States Government: Fiscal Year 2001* (Government Printing Office: Washington, 2000), Historical Tables, Table 1.2.

⁷⁰ For a discussion of how these views have evolved in different countries throughout the 20th century, see Daniel Yergin and Joseph Stanislaw, *The Commanding Heights: The Battle Between Government and the Marketplace That is Remaking the Modern World* (Simon & Schuster: New York, 1998).

government, arguing that the government should promote trade and exports. One of the best-known of these mercantilists was Thomas Mun of England, whose *England's Treasure by Foreign Trade* was published posthumously in 1664.⁷¹ Another famous mercantilist was Jean Baptiste Colbert, the finance minister for King Louis XIV of France.

Partly in response to the prevalence of mercantilist ideas, Adam Smith published his seminal work, *The Wealth of Nations*, in 1776. Smith advocated a limited role for government, arguing that competition and the profit motive would best promote public well-being. In perhaps one of the book's most famous passages, Smith writes, "He intends only his own gain, and he is in this as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it." Subsequent scholars elaborated on this laissez-faire doctrine, in which the private sector plays the predominant role in the economy.⁷²

In the laissez-faire framework that traces its origins to Adam Smith, the government's role in the economy should be limited to correcting the imperfections that may arise out of private production. Since Smith's work, economists have elaborated upon the justifications for governmental action. In particular, there are eight potential rationales for government activity:⁷³

⁷¹ John Kenneth Gailbraith, *Economics in Perspective* (Houghton Mifflin: Boston, 1987), pages 37-45.

⁷² An active role for the government reemerged following the Great Depression and World War II. Maurice Allais, a French economist who later won the Nobel prize in economics, even suggested in 1947 that some firms in each industry should be publicly owned. See Maurice Allais, "Le Probleme de la Planification Economique dans une Economie Collectiviste," *Kyklos*, 1974, II, pages 48-71.

⁷³ For further discussion of these rationales for government activity, see Joseph E. Stiglitz, *Economics of the Public Sector* (W.W. Norton: New York, 1988), pages 71-83.

1. Failure of competition. In the absence of effective competition, the potential gains from private production may not be realized. Those potential gains include lower prices and higher productivity. As the President’s Council of Economic Advisers recently argued, “Industries in which companies compete vigorously tend to be more productive. Conventional economic logic argues that companies operate efficiently and innovate whenever there is the chance of a profit payoff. In practice, however, companies can become complacent and keep doing things the old way even when new, more profitable methods are available. The pressures of competition encourage change and force companies to adopt the more productive methods.”⁷⁴ In the absence of effective competition, these benefits are lost. The government therefore has a role to play in ensuring effective competition in private markets.
2. Public goods. Public goods have two critical properties: First, no additional costs are involved in providing the good to an additional person (formally, the good has zero marginal costs and is referred to as being “nonrivalrous”). Second, it is impossible to exclude individuals from benefiting from the good (formally, the good is “nonexcludable”). A classic example of a public good is national defense: Defending 270 million people does not necessarily cost more than defending 260 million people, and it is generally not possible to exclude anyone from the benefit of national defense. In general, private markets will not supply public goods – or not supply them in sufficient quantities – and therefore the government has a role to play in providing them.

⁷⁴ Council of Economic Advisers, *Economic Report of the President 2000*, op. cit., page 30.

3. Externalities. An externality arises when the actions of one firm or individual affect the well-being of another, but in which the first entity does not compensate (or receive compensation from) the second entity. For example, a negative externality arises when one individual imposes additional costs on another individual, without having to pay the second individual for those additional costs. The classic example of a negative externality is pollution. An example of a positive externality is technology. In general, the government has a role to play in correcting negative externalities or promoting positive externalities. Without government involvement, private markets will typically under-produce goods with positive externalities and over-produce goods with negative externalities.⁷⁵

4. Incomplete markets. A fourth possible justification for government activity is incomplete markets. For example, imperfections in capital and insurance markets – such as the absence of insurance coverage for certain types of risks – may warrant government involvement. A classic example of an imperfect capital market is the inability to borrow against higher future earnings, which justifies a government role in providing loans or loan guarantees for post-secondary education expenses. In addition, certain types of goods or services may require large-scale coordination, which may be possible but difficult to achieve without governmental assistance.

5. Information failures. Government activity may be justified by imperfect information in private markets. For example, the Truth-in-Lending legislation requires lenders to

⁷⁵ The Coase theorem shows that under very restrictive conditions, the externality can be corrected by voluntary private actions even if the role of government is limited to enforcing property rights.

provide clear information about the true rate of interest on loans, and the Wheeler-Lea Act of 1938 made “deceptive” trade practices illegal. As discussed in greater detail below, information is in some ways a public good – and therefore this rationale for government is similar to the second rationale.

6. Macroeconomic fluctuations. The government has a role to play in correcting macroeconomic imbalances, such as those that lead to periodic problems with high unemployment, inflation, or recession.⁷⁶

7. Redistribution. Even if private markets produce goods and services efficiently, society may not like the distribution of income that results. The government may therefore have a role in redistributing income – for example, through a progressive tax system – to produce a more equal distribution of income.

8. Merit goods. Finally, there may be cases in which individuals would make “bad” decisions if left to their own devices, and in which government paternalism is therefore warranted. For example, the government compels individuals to attend school or wear seat belts largely because it is concerned that people will not do “what’s best” in the absence of such mandates. The government may sometimes be justified in compelling individuals to consume “merit goods” (such as elementary education).

⁷⁶ Some economists view the macroeconomic justification for government action as a result of interactions among the other market failures listed.

It is important to emphasize that these factors offer only the *potential* for social gain from governmental activity. They do not automatically justify a governmental role, nor do they define precisely how the government should intervene. In particular, in addition to the potential shortcomings in private markets delineated above, the government itself may suffer from so-called governmental failure – basically, inefficiency in its activities. Only if the government can succeed in effectively correcting a shortcoming in private markets should it undertake the activity.

Viewing governments and government agencies as economic agents, in other words, highlights that they suffer from many of the failures, especially related to incentives that could also affect the private sector. Inefficiencies in the public sector could arise from many sources, including:⁷⁷

1. Lack of bankruptcy threat. Government enterprises usually do not face the same threat from bankruptcy as private-sector firms. In effect, government enterprises often have a “soft budget constraint,” in that they do not face the same limits on their ability to run operating deficits as private-sector firms do.
2. Weak incentives for workers. Public-sector employees are often difficult to dismiss for poor performance; the lack of a credible threat to their employment may attenuate the incentives for strong performance.

⁷⁷ For further discussion of these potential explanations of public-sector inefficiencies, see Joseph E. Stiglitz, *Economics of the Public Sector*, op. cit., pages 198-212.

3. Skewed incentives for managers. Public-sector managers may maximize the size of their agency, rather than social benefits.⁷⁸

4. Risk aversion. Public-sector agencies often do not bear the costs that they impose on others, and the lack of competition insulates them from the discipline of market forces. Bureaucrats may in particular act in a more risk-averse manner than is desirable, because they bear the full costs of failure but do not reap the full rewards of success.

5. Dynamic inconsistency. The government can serve as the enforcer of private contracts. But who is the enforcer of public contracts? The lack of higher enforcement authority may mean that the government is unable to make credible commitments over extended periods of time.

These government failures may play an important role in deciding *how* the government should intervene in private markets, if such government intervention is warranted. The next sub-section emphasizes the different ways in which government action is possible.

Public provision versus public financing

Government involvement in the economy need not take the form of governmental production or provision of goods and services. For example, economic theory suggests that private-sector firms will not produce (or not produce sufficient amounts of) public goods. Therefore, some form of government intervention is warranted. But the government does not need to produce or

⁷⁸ W.A. Niskanen, *Bureaucracy and Representative Government* (Adline: Chicago, 1971).

provide the public good itself. Instead, it could *finance* the production of the good, but leave the actual production to a private-sector entity. Indeed, Andrei Shleifer of Harvard University argues that “when the opportunities for government contracting are exploited, the benefits of outright state ownership become elusive, even when social goals are taken into account.”⁷⁹ For example, national defense is typically classified as a public good. But in 1997, the Defense Department spent roughly \$107 billion in contract awards to businesses in the United States, including roughly \$20 billion for services on military bases and other facilities.⁸⁰

In addition to contracting with private firms, the government can use its taxation and regulatory powers to align private and public interests should such intervention be necessary. For example, a negative externality (such as pollution) associated with the production of some good does not require government provision of the underlying good to address it. Instead, the government can impose a tax on the pollution created during the production process. The tax then aligns private incentives and social objectives.

To be sure, some goods and services must be produced or provided directly by the government, rather than being contracted out to private firms. For example, we can contract to buy military uniforms, but not to wage war.⁸¹ The key point is that government intervention need not take the form of government production. Our focus in this report is primarily on such direct government provision, but it is important to remember that the government’s role is not – and should not be –

⁷⁹ Andrei Shleifer, “State versus Private Ownership,” *Journal of Economic Perspectives*, Volume 12, Number 4, Fall 1998, page 135.

⁸⁰ U.S. Department of Commerce, *Statistical Abstract of the United States 1999*, Table 579, page 370. The \$107 billion represented roughly 40 percent of total Federal outlays for national defense in 1997 (\$270.5 billion).

⁸¹ The hiring of Hessian soldiers during the Revolutionary War, however, suggests that even waging war could be contracted to outsiders, although the scope for such contracting has always been limited and may be even more limited today.

limited to such direct action. In the principles section below, we discuss some of the factors that should influence the choice of both whether and how the government should intervene in private markets.

The role of government in a “bricks and mortar” economy

To a significant degree, a “bricks and mortar” economy is characterized by the conditions required for the government to play a secondary, supporting role. In other words, public goods account for a relatively small share of the overall basket of goods and services produced and demanded in such an economy, and information problems – while significant and typically underestimated – are often not so substantial as to warrant a predominant role for the government. While government intervention can improve economic performance, the scope for such improvements is thus somewhat limited, especially once government failure is taken into account.

In bricks and mortar activities, empirical evidence generally supported this rough theoretical preference for private-sector production – as long as markets were competitive. For example, the World Bank examined studies on bricks-and-mortar markets such as airlines and trucking, and concluded that “on balance...theory and the available microeconomic evidence suggests that, in competitive or potentially competitive markets, private firms are more efficient than state-owned firms.”⁸² (The World Bank study, however, often compared government monopolies with competitive private markets, and failed to distinguish clearly the importance of private

⁸² The World Bank, *Bureaucrats in Business: The Economics and Politics of Government Ownership* (Oxford University Press: Oxford, 1995), page 40.

ownership versus competition.) John Vickers and George Yarrow conclude that “privately owned firms tend, on average, to be the more internally efficient when competition in product markets is effective...However, when market power is significant, and particularly when company behavior is subject to detailed regulation, there is little empirical justification for a general presumption of either type of ownership, and case-by-case evaluation of the various tradeoffs is therefore in order.”⁸³ The evidence thus generally suggests that if markets are competitive, private-sector firms are more internally efficient than public-sector firms.

The role of government in a digital economy

As the economy shifts more toward information-based production, however, the prevalence of public-good-type and informational concerns loom larger.

Public goods were defined above as having two critical characteristics: zero marginal cost and non-excludability. In other words, a public good exists if providing the good to another person involves no additional cost (zero marginal cost), and it is impossible to exclude that person from enjoying the benefits of the good (non-excludability). In practice, however, goods are likely to have one property or the other to varying degrees – very few goods are pure public goods, in the sense that they literally meet both conditions for being a public good. For example, a lighthouse is often used as an example of a pure public good: Shining a light that illuminates the way for one ship does not generally cost more than allowing that same light to illuminate the way for two ships. And it is difficult to prevent ships from benefiting from the light. But it is at least

⁸³ John Vickers and George Yarrow, *Privatization: An Economic Analysis* (MIT Press: Cambridge, MA, 1988), page 40.

theoretically possible for the lighthouse owner to shut off the light if there were no fee-paying ships in the vicinity – so that excludability may be possible to some degree.⁸⁴

Information is, in many ways, a public good.⁸⁵ As Thomas Jefferson realized almost two hundred years ago: “If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of everyone, and the receiver cannot dispossess himself of it. Its peculiar characters, too, is that no one possesses the less, because every other possesses the whole of it.”⁸⁶ As Professor Danny Quah of the London School of Economics trenchantly argues, “When economic value – produced and consumed – is embedded in bits rather than atoms, Jefferson’s comments can be addressed not just to inventors and research scientists but to every economic agent.”⁸⁷

The movement toward an information-based economy thus implies an expansion in public goods, which may be inconsistent with a laissez-faire approach to economic activity. Indeed, as Joseph Stiglitz and others have argued, the public good nature of information suggests that

⁸⁴ Indeed, there were privately provided lighthouses in 19th century England. Ronald Coase, “The Lighthouse in Economics,” *Journal of Law and Economics*, 1974, pages 357-76. But Professor Bradford DeLong of the University of California at Berkeley notes that these “private” lighthouses had the power to tax ships that entered harbors regardless of whether the ships wished to make use of the lighthouses’ services. Coase’s private lighthouses thus were not truly “private” in the sense of a simple market exchange without coercion. Personal communication from Prof. Bradford DeLong, June 13, 2000.

⁸⁵ Information is also almost always an “experience good,” in that consumers must experience it to know its value. Carl Shapiro and Hal Varian of the University of California at Berkeley emphasize that individuals do not know the value of a newspaper, for example, until they have read it. As a result, media producers have invested heavily in branding and reputation. See Carl Shapiro and Hal Varian, *Information Rules: A Strategic Guide to the Network Economy* (Harvard Business School Press: Boston, 1999), pages 5-6.

⁸⁶ Thomas Jefferson, Letter to I. McPherson, August 13, 1813.

⁸⁷ Danny T. Quah, “The Invisible Hand and the Weightless Economy,” Centre for Economic Performance Occasional Paper No. 12, London School of Economics, April 1996, page 6.

individuals will have little incentive to invest in obtaining information (since they earn little return from doing so). Yet if no one invests in obtaining the information, information imperfections arise and private markets are not necessarily efficient.

Professor Bradford DeLong of the University of California at Berkeley and Professor Michael Froomkin of the University of Miami have similarly argued that the shift toward a digital economy may attenuate the presumption that private-sector activity is necessarily more efficient than public-sector activity. They note the “assumptions which underlie the microeconomics of the invisible hand fray when transported into tomorrow’s information economy. Commodities that take the form of single physical objects are rivalrous and are excludible: there is only one of it, and if it is locked up in the seller’s shop no one else can use it. The structure of the distribution network delivered marketplace transparency as a cheap byproduct of getting the goods to their purchasers. All of these assumptions did fail at the margin, but the match of the real to the ideal was reasonably good.”⁸⁸ But, they wonder, “What will happen in the future should problems of non-excludability, of non-rivalry, of non-transparency come to apply to a large range of the economy?”

As one example of the distortions that arise in information-driven markets, DeLong and Froomkin discuss public television. During the 1960s and 1970s, television was basically a public good – it was impossible to exclude receipt of the television signal, and providing that signal to five people cost no more than providing it to four people. Despite this public good nature of television, however, the broadcasting industry survived through advertising. That is, it

⁸⁸ J. Bradford DeLong and A. Michael Froomkin, “Speculative Microeconomics for Tomorrow’s Economy,” unpublished draft, University of California at Berkeley, November 14, 1999.

did not charge for what it was truly producing – television programming – but rather charged for “advertising attention.” DeLong and Froomkin argue that the depth of audience attention to advertisements was not necessarily connected to the depth of audience attention to the programming. Thus, a bias was created toward “lowest-common-denominator-programming.”

In particular, DeLong and Froomkin note that a program with 30 million slightly interested viewers would likely be worth more in advertising terms than a program with 500,000 extremely interested viewers – even if the 500,000 extremely interested viewers were willing to pay more for their program (in total) than the 30 million slightly interested viewers were for theirs. They conclude that, “In the absence of excludability, industries today and tomorrow are likely to fall prey to analogous distortions. Producers’ revenue streams – wherever they come from – will be only tangentially related to the intensity of user demand. Thus the flow of money through the market will not serve its primary purpose of registering the utility to users of the commodity being produced. There is no reason to think *ex ante* that the commodities that generate the most attractive revenue streams paid by advertisers or others ancillary will be the commodities that ultimate consumers would wish to see produced.”⁸⁹

Two other aspects of an information-based economy are worth emphasizing, because they can affect the efficiency of private-sector production without any government role. The first is so-called network externalities. A network externality arises when the value of using a specific type of product depends on how many other people are using it. For example, a telephone is more valuable if many other people own one than if no one else does. Similarly, fax machines are more valuable if most offices (and even homes) have them than if they are rare. Network

externalities thus exhibit positive feedback: The more people use the network, the more valuable the network is, and therefore the more people use it. As Treasury Secretary Lawrence Summers recently noted, "An information-based world is one in which more of the goods that are produced will have the character of pharmaceuticals or books or records, in that they involve very large fixed costs and much smaller marginal costs. And it is one in which network effects will be much more pervasive. Think about a lonely fax machine; it is a hunk of metal that is best used as a door stop. Now think about 100,000 fax machines; that is 10 billion possible connections."⁹⁰

In the presence of such network externalities and positive feedback, private markets are not necessarily efficient. The market may never develop, or it may evolve toward a specific technology that is not necessarily better than other technologies, but that survives solely because everyone else is using it. This phenomenon is sometimes referred to as the "QWERTY" effect, after the layout of letters on typewriters and now computer keyboards.⁹¹ (The QWERTY story is itself an example of a network externality, however: The underlying story is not actually correct, but the story is nonetheless perpetuated through time.⁹²) As Paul Krugman emphasizes, "In a QWERTY world, markets cannot be relied upon to get things right."⁹³

⁸⁹ Ibid.

⁹⁰ Lawrence Summers, "The New Wealth of Nations," Address to the Hambrecht & Quist Technology Conference, San Francisco, May 10, 2000.

⁹¹ See Paul Krugman, *Peddling Prosperity: Economic Sense and Nonsense in the Age of Diminished Expectations* (W.W. Norton: New York, 1994), Chapter 9.

⁹² See Stan Leibowitz and Stephen E. Margolis, "Policy and Path Dependence: From QWERTY to Windows 95," *Regulation*, Volume 18, Number 3, Fall 1995.

⁹³ "Path Dependence," *Investor's Business Daily*, November 22, 1995, page B1.

The second aspect of a digital economy that may undermine a laissez-faire approach is its “winner-take-all” potential, in which low (or zero) marginal costs combined with the possibility of exclusion imply that small differences in quality produce large differences in returns. In such situations, the price commanded by top performers is the difference in value between their product and the next best alternative. The reduction in communication costs associated with the digital economy may thus create such a “superstar” phenomenon in any given field.⁹⁴ As Professor DeLong has noted, “IT and the Internet amplify brain power in the same way that the technologies of the industrial revolution amplified muscle power.”⁹⁵ This phenomenon can generate both substantial income inequality, and also excessive investment in attempts to become the best in a specific field. The outcome can be inefficient from a social perspective.

The shift toward an economy in which information is central rather than peripheral may thus have fundamental implications for the appropriate role of government. In particular, the public good nature of production, along with the presence of network externalities and winner-take-all markets, may remove the automatic preference for private rather than public production. In addition, the high fixed costs and low marginal costs of producing information and the impact of network externalities are both associated with significant dangers of limited competition.

On the other hand, the reduction in communication costs associated with the Internet and other information technology advances may also attenuate information imperfections, which interfere with the efficient operation of private markets. Bruce Greenwald and Joseph Stiglitz have shown

⁹⁴ The evidence for, and ramifications of, a winner-take-all society, in which a few top people in each field enjoy the vast majority of benefits, was examined in a popular book by economists Robert Frank, of Cornell's Johnson Graduate School of Management, and Philip Cook, of Duke University. See Robert H. Frank and Philip J. Cook, *The Winner-Take-All Society* (New York: Free Press, 1995).

that given imperfect information, government interventions can at least theoretically improve the performance of the economy under a wide variety of assumptions. In other words, given the absence of transparent information, the theoretical rationale for a laissez-faire approach is undermined.⁹⁶ If the information-based economy improves the quality and reduces the cost of obtaining information, that factor by itself may imply that private markets work *better* – not worse – than before. As the *Economist* stated, “by increasing access to information, IT helps to make markets work more efficiently... In other words, it moves the economy closer to the textbook model of perfect competition, which assumes abundant information, many buyers and sellers, zero transaction costs and no barriers to entry. IT makes these assumptions a bit less far-fetched.”⁹⁷ One recent study concluded that, “early research suggests that electronic markets are more efficient than conventional markets with respect to price levels, menu costs, and price elasticity...although several studies find significant price dispersion in Internet markets.”⁹⁸

Furthermore, government failure may be even more pronounced in the context of rapidly moving information-laden markets than in traditional bricks-and-mortar markets. In other words, the government may face more difficulty in “keeping up” in a digital economy than in the bricks and mortar economy. The Central Intelligence Agency’s recent moves to create a venture capital

⁹⁵ “Untangling e-economics,” *The Economist*, Survey on the New Economy, September 23, 2000, page 6.

⁹⁶ See Bruce Greenwald and Joseph Stiglitz, “Externalities in economies with imperfect information and incomplete markets,” *Quarterly Journal of Economics*, 1986, 101:229-264. Also see Joseph E. Stiglitz, *Whither Socialism?* (MIT Press: Cambridge, 1994), Chapter 3.

⁹⁷ “Untangling e-economics,” *The Economist*, Survey on the New Economy, September 23, 2000, page 8.

⁹⁸ Michael D. Smith, Joseph Bailey, and Erik Brynjolfsson, “Understanding Digital Markets: Review and Assessment,” in Erik Brynjolfsson and Brian Kahin, eds., *Understanding the Digital Economy* (MIT Press: Cambridge, 1999). See also the discussion in OECD, “The Impact of Electronic Commerce on the Efficiency of the Economy,” Chapter 2, in *The Economic and Social Impacts of Electronic Commerce*, 1998, available at <http://www.oecd.org>.

fund in Silicon Valley highlight the difficulties the government faces in retaining competency in rapidly moving technological developments.⁹⁹

A related perspective on potential government failure in the digital economy is that innovation is arguably more important in such a digital economy than in a bricks-and-mortar economy. And public-sector entities often face weak incentives to innovate. As Alfred Marshall emphasized, “A Government could print a good edition of Shakespeare’s works, but it could not get them written...Every new extension of Governmental work in branches of production which need ceaseless creation and initiative is to be regarded as *prima facie* anti-social, because it retards the growth of that knowledge and those ideas which are incomparably the most important form of collective wealth.”¹⁰⁰

The nature of a digital economy thus may attenuate the automatic presumption that private production is more efficient than government production. But it may also involve a heightened emphasis on the type of innovation at which the government is relatively weak. The lack of clear theoretical guidance regarding the separation between government and business makes decision-making rules all the more important. We therefore turn in the next sections to current and potential future “guidelines” for deciding which activities should be governmental, and which should be provided by the private sector.

⁹⁹ Karen Breslau, “Snooping Around the Valley,” *Business Week*, April 10, 2000.

¹⁰⁰ Alfred Marshall, “The Social Possibilities of Economic Chivalry,” *Economic Journal*, 1907, pages 7-29.

III. Current Government Policy

Current government policy on commercial activities is governed by Circular Number A-76. The basic policy inherent in Circular A-76 was established in Bureau of the Budget Bulletins issued in 1955, 1957, and 1960; Circular A-76 itself was originally issued in 1966 and was most recently revised in 1999. The full text of Circular A-76 is included as Appendix A.

The Circular states explicitly, “In the process of governing, the Government should not compete with its citizens. The competitive enterprise system, characterized by individual freedom and initiative, is the primary source of national economic strength. In recognition of this principle, it has been and continues to be the general policy of the Government to rely on commercial sources to supply the products and services the Government needs.” It adds, “The Federal Government shall rely on commercially available sources to provide commercial products and services. In accordance with the provisions of this Circular and its Supplement, the Government shall not start or carry on any activity to provide a commercial product or service if the product or service can be procured more economically from a commercial source.” Commercial activities are defined to include the following, among others (see Appendix A for a full list – the following is a selective list for illustrative purposes only):¹⁰¹

- Automatic data processing services
- Financial and payroll services
- Statistical analyses
- Vehicle operation and maintenance
- Air, water, and land transportation of people and things
- Trucking and hauling

¹⁰¹ The Federal Activities Inventory Reform Act of 1998, which became law on Oct 19, 1998, mandates such a list to be developed and published every year.

The Circular also notes that certain functions are inherently governmental: “Certain functions are inherently Governmental in nature, being so intimately related to the public interest as to mandate performance only by Federal employees. These functions are not in competition with the commercial sector. Therefore, these functions shall be performed by Government employees.” Inherently governmental functions comprise activities in two categories: (1) the act of governing (examples include criminal investigations; direction of Federal employees; regulation of the use of space, oceans, navigable rivers and other natural resources; and regulation of industry and commerce), and (2) monetary transactions and entitlements (including tax collection and revenue disbursements, control of the Treasury accounts and money supply, and the administration of public trusts).¹⁰²

The Circular further notes that government performance of commercial activity is authorized if there is no satisfactory commercial source available; if such performance is required for national defense; or if the government is operating or can operate the activity on an ongoing basis at an estimated lower cost than a qualified commercial source.

¹⁰² Even in these areas, however, the delineation between public and private is not as clear as it may initially appear. For example, while the government plays the central role in the court system, legal disagreements are increasingly being settled under alternative dispute resolution systems in which the private sector is central. Governments have also, in the past, used the private sector to raise taxes. Surely, the government could contract with private firms to collect tax bills.

PART II:
PRINCIPLES FOR
GOVERNMENT ACTION

Principles for Government Provision of Goods and Services in a Digital Economy

OMB Circular A-76 and other existing norms for government provision of goods and services need to be updated for the digital age. As Vinton Cerf, one of the founders of the Internet, recently stated, “In some sense, the policy issues surrounding the Internet are more important than the technological ones, and they’re harder to solve.”¹⁰³ The purpose of this section is to provide a set of principles for deciding which on-line and information activities the government should engage in, and which it should avoid. The principles, while developed to reflect recent technological advances, are intended to be applicable in both the digital and “bricks and mortar” world. In addition, as technology advances in the future, revisions to these principles may ultimately become necessary. But the principles are intended to be consistent with both current and immediately foreseeable forms of information technologies. Government agencies have a natural tendency to perpetuate themselves and their missions, even if the justification for that mission is no longer present. The principles therefore need to be applied repeatedly over time, to existing as well as new on-line activities. Such an approach will help to ensure that an activity that is appropriate initially does not expand into one that is inappropriate.

The principles are divided into three categories:

- “Green Light” activities, which the government should undertake with little concern;
- “Yellow Light” activities, which the government should undertake with caution;
- “Red Light” activities, which the government should generally not undertake.

¹⁰³ Quoted in Bob Davis and Gerald Seib, “Policing a Wildfire: Technology Will Test a Washington Culture Born in Industrial Age,” *Wall Street Journal*, May 1, 2000, page A1.

The principles include:

"Green Light" for On-Line and Informational Government Activity

- Principle 1: Providing public data and information is a proper governmental role.
- Principle 2: Improving the efficiency with which governmental services are provided is a proper governmental role.
- Principle 3: The support of basic research is a proper governmental role.

"Yellow Light" for On-Line and Informational Government Activity

- Principle 4: The government should exercise caution in adding specialized value to public data and information.
- Principle 5: The government should only provide private goods, even if private-sector firms are not providing them, under limited circumstances.
- Principle 6: The government should only provide a service on-line if private provision with regulation or appropriate taxation would not be more efficient.
- Principle 7: The government should ensure that mechanisms exist to protect privacy, security, and consumer protection on-line.
- Principle 8: The government should promote network externalities only with great deliberation and care.
- Principle 9: The government should be allowed to maintain proprietary information or exercise rights under patents and/or copyrights only under special conditions (including national security).

"Red Light" for On-Line and Informational Government Activity

- Principle 10: The government should exercise substantial caution in entering markets in which private-sector firms are active.
- Principle 11: The government (including governmental corporations) should generally not aim to maximize net revenues or take actions that would reduce competition.
- Principle 12: The government should only be allowed to provide goods or services for which appropriate privacy and conflict-of-interest protections have been erected.

Green Light Principles for Governmental Activity

Principle 1: Providing public data and information is a proper governmental role

It has long been recognized that providing basic public information and data is a public function. Such public information and data includes basic statistical information, public records, public proceedings, and regulatory notices. As Thomas Jefferson is reported to have said, “Information is the currency of democracy.” More recently, Frances Cairncross, a senior editor at the *Economist* magazine, added, “Good information is essential for effective political involvement, and the communications revolution makes information more readily accessible than ever before...Access to publicly available information is no longer confined to an elite (the media, officials, big business).”¹⁰⁴

Public information and data are fundamentally a public good. The government should therefore seek to make as much public information and data available on-line as possible. Interestingly, however, government policy has not always endorsed this objective. Indeed, the original Circular A-130 issued by the Office of Management and Budget (OMB) in 1985 called for a circumscribed role for the government in disseminating public information.¹⁰⁵ In 1989, the Federal Maritime Commission ran afoul of this policy when it proposed opening its electronic

¹⁰⁴ Frances Cairncross, *The Death of Distance* (Harvard Business School Press: Boston, 1997), pages 259-260.

¹⁰⁵ In January 1989, OMB proposed further restrictions that would have limited Federal agencies to providing public information to private firms for dissemination. After substantial protests from affected parties, the proposal was withdrawn and an alternative proposal issued in June 1989. John Markoff, “Policy Shift on Access to U.S. Data,” *New York Times*, April 10, 1989. The June 1989 proposal, entitled the “Second Advance Notice of Further Policy Development on Dissemination of Information,” recognized the public asset nature of governmental information and thus represented a significant shift relative to the January 1989 proposal.