S. Hrg. 105–127

DEPARTMENT OF COMMERCE'S TECHNOLOGY GRANT PROGRAMS

HEARING

BEFORE THE

SUBCOMMITTEE ON OVERSIGHT OF GOVERNMENT MANAGEMENT, RESTRUCTURING, AND THE DISTRICT OF COLUMBIA

OF THE

COMMITTEE ON GOVERNMENTAL AFFAIRS UNITED STATES SENATE

ONE HUNDRED FIFTH CONGRESS

FIRST SESSION

JUNE 3, 1997

Printed for the use of the Committee on Governmental Affairs

U.S. GOVERNMENT PRINTING OFFICE

41–565 CC WASHINGTON : 1997

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

41–565

COMMITTEE ON GOVERNMENTAL AFFAIRS

FRED THOMPSON, Tennessee, *Chairman*

SUSAN M. COLLINS, Maine
SAM BROWNBACK, Kansas
PETE V. DOMENICI, New Mexico
THAD COCHRAN, Mississippi
DON NICKLES, Oklahoma
ARLEN SPECTER, Pennsylvania
BOB SMITH, New Hampshire
ROBERT F. BENNETT, Utah

JOHN GLENN, Ohio
CARL LEVIN, Michigan
JOSEPH I. LIEBERMAN, Connecticut
DANIEL K. AKAKA, Hawaii
RICHARD J. DURBIN, Illinois
ROBERT G. TORRICELLI, New Jersey
MAX CLELAND, Georgia

Hannah S. Sistare, *Staff Director and Counsel*
Leonard Weiss, *Minority Staff Director*
Michal Sue Prosser, *Chief Clerk*

SUBCOMMITTEE ON OVERSIGHT OF GOVERNMENT MANAGEMENT, RESTRUCTURING, AND THE DISTRICT OF COLUMBIA

SAM BROWNBACK, Kansas, *Chairman*

ARLEN SPECTER, Pennsylvania
ROBERT F. BENNETT, Utah

JOSEPH I. LIEBERMAN, Connecticut
MAX CLELAND, Georgia

Ron Utt, *Staff Director*
Laurie Rubenstein, *Minority Staff Director and Chief Counsel*
Esmeralda Amos, *Chief Clerk*

CONTENTS

	Page
Opening statements:	
Senator Brownback	1
Senator Lieberman	14

WITNESSES

TUESDAY, JUNE 3, 1997

Mary Lowe Good, Under Secretary for Technology, Technology Administration, U.S. Department of Commerce, Washington, DC	2
Robert M. White, University Professor, Carnegie Mellon University, Pittsburgh, Pennsylvania	9
Tim Draper, Managing Director, Draper Fisher Associates	24
T.J. Rodgers, President and Chief Executive Officer, Cypress Semiconductor Corporation, San Jose, California	30
Stephen Moore, Director of Fiscal Policy Studies, Cato Institute, Washington, DC	40
Dwight D. Carlson, Vice Chairman, Perceptron, Incorporated, Ann Arbor, Michigan	41

ALPHABETICAL LIST OF WITNESSES

Carlson, Dwight D.:	
Testimony	41
Draper, Tim:	
Testimony	24
Prepared statement	61
Good, Mary Lowe:	
Testimony	2
Prepared statement	49
Moore, Stephen:	
Testimony	40
Prepared statement	85
Rodgers, T.J.:	
Testimony	30
Prepared statement	65
White, Robert M.:	
Testimony	9
Prepared statement	58

APPENDIX

Prepared statements of witnesses in order of appearance	49
Letter from the National Venture Capital Association, dated June 4, 1997, submitted by Senator Lieberman	94

DEPARTMENT OF COMMERCE'S TECHNOLOGY GRANT PROGRAMS

TUESDAY, JUNE 3, 1997

U.S. SENATE,
OVERSIGHT OF GOVERNMENT MANAGEMENT, RESTRUCTURING,
AND THE DISTRICT OF COLUMBIA SUBCOMMITTEE,
OF THE COMMITTEE ON GOVERNMENTAL AFFAIRS,
Washington, DC.

The Subcommittee met, pursuant to notice, at 1:46 p.m., in room SD–342, Dirksen Senate Office Building, Hon. Sam Brownback, Chairman of the Subcommittee, presiding.

Present: Senators Brownback and Lieberman.

OPENING STATEMENT OF SENATOR BROWNBACK

Senator BROWNBACK. Thank you all for coming today. I appreciate your attendance. We are getting started a little bit late and I apologize about that. Both Senator Lieberman and I had conflicts in our schedule and he will be coming shortly, but I wanted to go ahead and get the hearing started because we have people that traveled some distance to be able to be here today to testify.

This is our fifth in a series of hearings on the Department of Commerce. In previous hearings, we have heard testimony on the Department's census and statistical functions, trade functions, National Oceanic and Atmospheric Administration, and general department management issues.

Today's hearing will be looking at technology grants administered by the Department of Commerce, primarily the Advanced Technology Program. The ATP provides hundreds of millions of taxpayer dollars each year to companies and joint ventures to spur the development of high-risk, pre-competitive technologies.

Funding for this program has exploded over the years. It was started in 1990 during the Bush administration with $10 million. This year, the program received $225 million. This is during a time period in our efforts to balance the budget, from $10 million in 1990 to $225 million this year, and the administration has requested $275 million for next year. The administration has also made it clear that they would like to invest even more in this program.

Some view these subsidies as critical to American competitiveness in the global high-tech marketplace. However, because many of these grants go to industrial giants such as GE and IBM, others view the program as a wasteful corporate hand-out. These companies already have multi-million-dollar R&D budgets and the incentives to invest in technology. In addition, there is an exploding ven-

ture capital market and market for initial public offerings for smaller concerns.

I would note for those in attendance today that the week before we went on the Memorial Day break, this Committee, the Governmental Affairs Committee, passed a corporate welfare commission bill. The commission will review the Advanced Technology Program as well, if that is enacted into law. It has cleared the Committee and will be heading on to the floor.

Today, we will hear testimony from experts on both sides of this issue. We have three panels. In the first panel is Dr. Mary L. Good, who is Under Secretary for Technology, Technology Administration, at the Department of Commerce, and then Dr. Robert White, who is a professor at Carnegie Mellon University and former Bush administration official when the ATP program was first launched. We will have our second panel of industry representatives, and then a third panel of both industry representatives and one of the think tanks in Washington.

Without further ado, what I would like to do is go ahead with our first panel, even though Senator Lieberman is not here. You can present your written testimony and summarize. I personally, and I know Senator Lieberman is the same way, appreciate shortened testimony and then an interaction. Make sure, though, that you hit the key points we need to hear.

The ATP program will be reviewed in the appropriations process as it comes up and will certainly be reviewed in the corporate welfare commission, if that is initiated, and I do hope we will have the administration's support in initiating such a commission.

So with that, Dr. Good, we welcome you. I understand now this will be your last testimony before leaving the Department of Commerce. Is that correct?

TESTIMONY OF MARY LOWE GOOD,[1] UNDER SECRETARY FOR TECHNOLOGY, TECHNOLOGY ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE, WASHINGTON, DC.

Ms. GOOD. That is correct.

Senator BROWNBACK. Well, what a way to go out. Testifying in front of Congress again is, I know, no pleasant task. I will hope not to make it too difficult on you today.

Ms. GOOD. Thank you, Senator.

Senator BROWNBACK. But I appreciate you being here and the microphone is yours.

Ms. GOOD. Thank you very much, Mr. Chairman. What I would propose to do is to summarize some of my testimony and simply submit the entire statement for the record, if I might.

Senator BROWNBACK. Without objection.

Ms. GOOD. And that will leave us some time, hopefully, for some dialogue. But I would like to particularly emphasize some of the testimony and I will say a few words just in summary about the other programs in the Technology Administration, but I will focus on ATP, since that is obviously the major issue that people want to talk about today.

[1] The prepared statement of Ms. Good appears in the Appendix on page 49.

But to set that in perspective, I would like to point out that really this is sort of a special time. It is kind of a window of opportunity to make some historical progress in dealing with what most of us believe is really a pressing issue of both eliminating the Federal budget deficits at the same time that we preserve crucial government functions that are important to the Nation's well-being and to all of those of our citizens. Clearly, that is a major task that is before us today.

We believe that the President's budget agreement with the congressional leaders is both a heartening and remarkable feat. It is an opportunity that we should not and must not waste, and it is an opportunity that we must make work. So it seems that it is really incumbent upon the administration and Congress to evaluate which investments we should make in order to both maintain our standard of living and provide the foundation for continued economic growth and opportunity.

So the trick is to figure out how to pinpoint the most promising Federal efforts that are likely to pay off in the long run and how those investments for the future should be balanced against today's pressing needs. So, that is why I really welcome the Subcommittee's hearing today. The topic is clearly one of great importance to the Nation, and so let me quote from someone who told me quite eloquently recently the following things:

"Truth No. 1: Research and development, science, and education bring advancements and innovation. Truth No. 2: Innovation has been the basis for our competitive edge, peaceful and defense, and of our extraordinary lifestyle; it is the cornucopia of the modern America and the envy of the world. Truth No. 3: Funding research and creating an environment that encourages private research and innovation are the bedrock upon which much of our national economy is built."

Now, those are the words that were in the opening statement of one of your colleagues, Senator Bill Frist of Tennessee, who spent some time with us recently in another hearing on how our efforts in the Technology Administration were helping to ensure that these truths continue to be positive forces for the Nation.

Now, I think that all of us agree that sustained economic growth, with the jobs and higher standard of living that it brings, is clearly amongst the Nation's highest priorities. And among the drivers of growth, technology is the single most important determining factor. It is estimated to account for as much as 50 percent of the Nation's long-term growth. So I have essentially spent my professional career advocating the importance of R&D and technology in our academic, industrial, and government budgets.

The technological infrastructure that we have built over the past 50 years spans industry, academia, and the government, and it has generated enormous dividends to the Nation. But in today's technology-based global economy, our infrastructure is more vital than ever before. It is essential to our prosperity, our job base, and the creation of wealth, which in turn are the foundations of our standard of living, quality of life, national security, and global influence.

I spent 20 years at Louisiana State University and on the National Science Board fighting for university-based research because it allows us to develop world-class scientific and technical talent,

while simultaneously contributing to the Nation's knowledge base. And then during the almost 15 years that I spent at Allied Signal, I worked to preserve our R&D base in that industrial setting in an era of major consolidation, streamlining, and a new emphasis on product quality and process improvement.

Now, while the company was making these needed adjustments, it was in its long-term interest to maintain R&D investments that would underpin the company's future competitive abilities. Now, the success of both of these efforts relied heavily on the commitment of the U.S. Government to maintain a stable R&D portfolio at the Federal level that could be leveraged by both academia and industry.

For the universities, it has been the base of their support. For industry, it has created the infrastructure that has provided a flow of new talent and programs that filled gaps in new technology development and critical generic technologies that the industry could not provide for itself.

Now, the Federal budget today is often cast as a $70 billion-plus investment. That is still larger than any other nation's, but the reality of that number is really much more sobering. Nominally stated, it is $74 billion. The actual fiscal 1997 Federal budget in R&D—what could be called the science and technology base—is only $41 billion. The rest, about 44 percent, is in short-term developments unique to specific defense weapons systems, thus offering extremely limited usefulness to the economy as a whole.

Of that $41 billion, nearly a third of that is spent on health research. So the Federal investment in every other field of science and technology, from physics and materials to computing and communications, from energy and the environment to software and simulation, is substantially less. It is really only $28 billion, out of the total Federal budget of about $1.7 trillion. As the Federal Government tightens its belt to achieve a balanced budget, we must not lose sight of the sustained investment required to ensure America's economic and technological leadership into the 21st Century.

Now, while we contemplate the size and scope of our public R&D investments, we must take into account what is happening in the rest of the world. Nations everywhere have recognized the link between technology, economic growth, and job creation. They are rapidly expanding their scientific and technological capabilities. They are establishing a sophisticated array of technology policies, and they are expanding their public investments in R&D in order to retain and grow their domestic industries, while attracting the engines of economic growth to their own shores.

Just as a brief summary of that, if you look at what is happening particularly in Southeast Asia today, you find that their major emphasis is on technology transfer to Southeast Asia, both by bringing people and resources and creating an environment which actually gets people to invest and build R&D facilities in that part of the world.

One of the biggest investments of American companies in R&D today is in Southeast Asia, and the rate at which new R&D facilities are being built around the world is very high. Fortunately, we so far have been able to attract a fair amount of those to our shores as well, and in the interim time the issue is how do we keep get-

ting that investment here, as well as having our people out-source their R&D across the world.

Now, in this environment, what we find is that the competitive pressures of the global marketplace have forced our American firms to move their R&D into shorter-term product and process improvements. And what we are in the process of seeing is an innovation gap and it is developing between the fundamental research that is done primarily at the university level—the gap between that and the enabling and emerging technologies that will underpin the products and services of the 21st Century and the shorter-term development activities of U.S. corporations. These technologies are for potentially large economic and social returns to the Nation, and they do indeed languish in many cases due to their high costs, but particularly because of high risks.

Now, the Advanced Technology Program seeks to try to bridge this innovation gap by forming partnerships with companies and consortia to advance these technologies to a developmental prototype. We don't do product development in ATP and we don't do process development in ATP. It is truly a research project to look at how we develop a new technology from an idea to a stage where it can be looked at as to whether or not it will be of commercial interest.

An Office of Technology Policy analysis of the white papers from the U.S. technical community, which was submitted in conjunction with the ATP program, shows that high risk was the most frequently cited reason for seeking Federal support; that is, the program ideas had an inherent risk, exceeding the industry threshold to the point that private investment could not occur in a timely fashion.

If you want a dose of reality, I would urge you to sit down with some of the small company entrepreneurs trying to get financing when they need between about $250,000 and $5 million to develop a prototype just to show proof of concept, or sit down with a group of venture capitalists, which we have done in many cases. The funding for these higher-risk ventures when the technical ideas are just that—they are concepts, they are not hardware, they are not software—is extraordinarily difficult to come by.

That is one of the key motivators of the ATP, to co-fund the very risky technologies that have enormous potential if they can overcome the initial hurdles. Then, and only then, will the financial markets and the managers of larger company R&D operations be willing to invest in these ventures.

I want to make something really very clear. ATP managers strongly believe that we should leverage private sector development of enabling technologies without displacing private capital funding, and we have significant evidence that makes us very confident we are not supplanting private investment.

Now, cost-sharing is often cited as the primary benefit of this program. Other important benefits are derived, though, from the Advanced Technology Program. First, companies come together to share the cost and risk of developing technologies in which they share mutual, non-competing interests. Thus, while a technology may be too expensive or carry too high a risk for a single company or single industry to develop, ATP encourages the types of partner-

ships that spread costs and risks, reducing each company's barrier to investment. These partnerships also allow the technology to be employed in a broad array of potential market applications, enabling companies to recoup more quickly their R&D investments.

Finally, ATP's technical and business reviews engender a great deal of prior planning, addressing the full scope of innovation activities. These reviews improve the planning process and serve as a bellwether for potential investors of the validity of the technology projects that receive grants because it is known that they have survived a rigorous review of the technical and financial aspects of the technology. Projects that do not receive grants nevertheless benefit from these critical reviews, we think.

We have made tremendous technical progress since we launched this program in 1990 with our first awards—288 awards have been made to date involving more than 700 participants, and that doesn't include the subcontractors and informal collaborators. Among our participants are more than 100 universities, who are involved in over half of all the ATP projects. Now, let me repeat that because we perhaps have not made that point clear enough. More than 100 universities are involved in over half of all of the ATP projects.

Overall, NIST has committed about $990 million, and industry cost-shares by adding another $1 billion. Because ATP was only a pilot program prior to 1993, all but a handful of these awards were made in the last 4 years. While it is still too early to judge long-term benefits, survey results show that the program has accelerated technology development, expanded the funding that companies otherwise would provide for long-term research, improved research productivity, created and retained high-wage jobs, improved companies' competitive standing, and fostered valuable industry-industry, industry-government, and industry-university alliances that have increased the R&D efficiency.

I would refer you to a report that we gave to the Congress last year entitled "The Advanced Technology Program: A Progress Report on the Impacts of an Industry-Government Technology Partnership," which I think really provides some of our issues on how effective the program has been.

But if you want an outside opinion on the effectiveness of the ATP, a glimpse at the extraordinary impact that it is beginning to have, let me just refer you to a recent announcement from the National Center for Manufacturing Sciences. NCMS headed up a consortium of suppliers, makers, and users of printed-wiring boards. These are the thin composite boards that form the backbone and nervous system of virtually every electronic product.

The challenge for this consortium was to deal with fundamental limits in both materials and processes that were becoming more severe as electronic devices increased in complexity and speed. NCMS and its team members assembled in 1990 to attack these issues, with support from the ATP. In an announcement last month, NCMS declared that the results of their ATP co-funded project quite literally saved an industry and shaped an unprecedented process for the performance of cooperated research and development. And I congratulate my co-person here today, Dr. White, be-

cause this grant was given during his tenure in the Technology Administration.

And it is no small industry. The U.S. share of the printed-wiring board industry today is $7 billion. It is a key segment of the $20 billion domestic electronic interconnect industry that employs over 200,000 people. We invested about $12.8 million altogether. The remainder of the funding for this 5-year, $26.6 million project came primarily from the private sector, along with some funding from the Energy Department for participation by Sandia National Laboratories.

That is really an amazing return on investment, and it would be awfully hard to argue by those data that this was not a wise investment in taxpayer dollars. So I would like to submit for the record a statement from NCMS which explains their findings after looking at this project, and I think it is one that you should look at very carefully.

[The statement of NCMS follows:]

LANDMARK COLLABORATIVE RESEARCH PROGRAM CREDITED WITH SAVING DOMESTIC PRINTED WIRING BOARD INDUSTRY

NASHVILLE, Tenn.—At a recognition ceremony held at its annual meeting today, the National Center for Manufacturing Sciences gave its Collaborative Project Excellence award to a 5-year R&D program focused on Printed Wiring Board (PWB) technology. Printed wiring boards are a critical component in electronics products, and they are used in virtually every sector of the U.S. economy.

In his remarks, NCMS President John Decaire noted that this program had quite literally saved the $7 billion U.S. PWB industry—a key segment of the $20 billion domestic electronic interconnection industry that employs over 200,000 people. Dr. Decaire went on to say that as the hundreds of innovations created in the PWB program diffused into companies who manufacture PWBs, the Nation's global market share—which had declined precipitously in the 1980's—began to increase again. Based on current estimates, the Nation's global market share in this important industry, which now stands at about 28 percent, could exceed 32 percent by the year 2001.

Lucent Technologies, Via Systems, Texas Instruments, United Technologies, and IBM were all recognized for their participation in this program. The National Institute of Standards and Technology (NIST) also provided support for this effort through its Advanced Technology Program. In particular, Dr. George Uriano, retired former head of the ATP, was recognized for his efforts in building the ATP.

The National Center for Manufacturing Sciences is the largest collaborative R&D effort in the United States. NCMS has more than 200 corporate members in the U.S. and Canada, and manages an annual collaborative project portfolio of some $80 million. The organization, formed in 1986, held its 11th annual meeting of members this week at the Opryland Hotel in Nashville.

Ms. GOOD. Now, as I said, it is really still early for ATP. Only a few dozen projects have been completed to date. We are just beginning to see the results of this work spread throughout the various industry sectors, and it likely will be years until the full impact is understood. That will happen when we see entire new technologies and even new industries created out of the basic technology research cosponsored by the ATP.

So when policymakers in the administration and Congress worry about how to allocate scarce dollars from the government's constricting discretionary accounts, we must all look toward the future and should opt for efforts like ATP because they really are beginning to make a difference on the economy as a whole. That, in a nutshell, is how we view ATP and what its worth is.

In my written testimony which is for the record, I have also discussed the Manufacturing Extension Program. And, Senator Brownback, you might be more familiar with that one, because of your background in the agricultural arena. The MEP was fashioned very much on the old agricultural extension services. That program is going very well, and at this moment also I think enjoys relatively strong political support across the country, frankly, and I think for the most part has been a very good program. We now, as of this year, have coverage in 50 States with the MEP program.

I will not take the time to spend on the details of the other programs that we have, but let me just finish by saying that if you look at the $28 billion that we spend for all of the industries, except the health industry, it really is a rather small investment and it is the fundamentals on which an awful lot of the rest of our work is going to happen. As I look around the world today, I would consider that a rather modest portfolio rather than a great and wonderful set of numbers.

As we look around the world in the global economy, two things are really very important. I spent 2 weeks in China in the last month, and if you look at Southeast Asia, in particular, what is happening is that the ability to do research and development and technology development and commercialization at the cutting edge does not belong to the United States alone anymore. It does not belong to the United States and Western Europe. It now belongs essentially across the world.

We have absolutely world-class R&D facilities in Southeast Asia today. We have world-class R&D facilities in Europe. We are in a position where the only way for us to compete is to run faster and do things better and faster, which means that we must leverage the monies we do spend in the kinds of transition programs that MEP and ATP provide which connect to the very basic research that we do in the universities, provide for the research and the technology development, and it is research. It is not development in the usual sense. We must do that if we are going to leverage for ourselves the value that we have in training our people.

The other issue is that to be competitive, the issue is going to be how do we incentivize and how do we attract companies to do state-of-the-art R&D and manufacturing in the United States. What they look for today is people, the ability to have quality people, and they look for infrastructure that makes it advantageous for them to invest here. Programs like ATP build that infrastructure, and it is a pool of technology that they feel they can draw from.

I would just like to finish by saying that I don't look at ATP as a corporate welfare program. I look at it as a country welfare program, which is very different. That is what the government is all about. If, by doing that, it incentivizes people like General Electric and DuPont to do some things that they would not do—and, remember, ATP requires them to say that they will manufacture in the United States and do the research in the United States. And if we can encourage them to do these emerging technologies here in the United States by cost-sharing some of these very high-risk technologies, I consider that to be country welfare we simply can no longer do without.

So thank you very much for the opportunity to address you and I will be happy to try to answer any questions or elaborate on any of the other programs, if you would like.

Senator BROWNBACK. Thank you, Dr. Good, and thank you for gracing us with your final testimony before Congress.

The next person up is Dr. Robert White, a former colleague of mine, of sorts, if I could put it that way, when I was here as a White House fellow in the Bush administration and Dr. White was in the Department of Commerce. We worked together on a few items then.

I welcome you back in a new capacity as a professor and thank you for coming in front of our Subcommittee.

TESTIMONY OF ROBERT M. WHITE,[1] UNIVERSITY PROFESSOR, CARNEGIE MELLON UNIVERSITY, PITTSBURGH, PENNSYLVANIA

Mr. WHITE. Thank you. It is a pleasure to be back. As you mentioned, I am a University Professor at Carnegie Mellon University in Pittsburgh, and served as the first Under Secretary of Commerce for Technology during the Bush administration. Before that, I was vice president of Control Data Corporation, and also a principal scientist for the Xerox Corporation.

What I would like to try to do today is to bring that experience to bear on the Advanced Technology Program, and in particular, since this program was begun during the Bush administration, I would like to try to explain why I think it is an appropriate role for the Federal Government.

Dr. Good has referred to a number of the Technology Administration's programs as a "portfolio." My vision is that these programs, as well as many others, play a very strategic role in the whole technological infrastructure of the United States. The argument I am going to make depends very much on a concept that I would like to try to explain. It is the concept of the national innovation process. This is the broad process by which scientific discoveries are converted into commercial products. It is a complex process and one that necessarily involves industry, government, and academia.

Since technology has become such an important factor in our economic growth, it is very critical for the United States that its innovation process be optimal. The introduction of technology into our lives is much more rapid today than it has been in the past. It interesting to note that it took 39 years for the telephone to gain 30-percent acceptance, 18 years for TV, 14 for the personal computer, and only 5 for the World Wide Web.

This means that in order to be competitive, all parts of the innovation system—industry, government, and academia—must work together. We can no longer afford, for example, to have academia off doing research in a vacuum, with only the hope that these discoveries will somehow be recognized by U.S. industry.

Since the innovation process benefits so many stakeholders, I believe it is appropriate that the Federal Government assume responsibility for ensuring that the process is efficient. Indeed, the U.S. Government already invests in supporting innovation. It funds

[1] The prepared statement of Mr. White appears in the Appendix on page 58.

science. It provides a patent system to protect inventors. It maintains international standards of length and time. The Bayh-Dole Act, for example, stimulates the commercialization of federally funded research, and the list goes on.

I want to argue that ATP is another, but a very unique instrument by which the Federal Government supports this innovation process. ATP should be measured on its impact on the innovation process. Now, I want to support my argument by two examples, two examples with which I am personally familiar.

Every personal computer, or any computer for that matter, stores its data and programs on something known as a hard disk drive. The hard disk drive industry in America is a $50 billion industry and it is largely dominated by U.S. companies. In 1988, there was a very fundamental discovery made in France and it soon became clear that this discovery could have a very major impact on the hard disk industry. However, the number of questions to be answered from this fundamental discovery represented far too many options for even IBM to explore.

Therefore, the manufacturers, as well as all their smaller suppliers, joined together and applied for an ATP grant. They were successful in receiving a grant, and now, 5 years later, these companies are on the verge of announcing the incorporation of this new effect into their future products. So it is, in fact, not too early to assess ATP. It has already impacted a $50 billion industry and kept it competitive.

Not only did this grant bring together large and small companies, it also involved several universities, as well as NIST itself. The fact that ATP funds are channeled through industry to the universities assures a focus for the university research that is unique to ATP. There is no other program in the Federal Government that links industry and universities this way.

In many cases, this research is also carried out in the same laboratories where there is a lot of curiosity-driven research underway that is perhaps funded by the National Science Foundation or other agencies, and it provides a realistic context for this research as well.

There was also a very interesting phenomenon that occurred near the end of this particular program. As the companies began to become familiar with the issues involved in the science, they began to develop their own internal strategies, with the result that their involvement with this program began to wane. And thus we observed a natural transition between the pre-competitive phase, characterized by risk-sharing and government cost-sharing, to a competitive phase that is now borne entirely by the companies themselves. If this were corporate welfare, this transition to independence would never have occurred. Thus, ATP provided a catalyst.

As a result of this program, the U.S. disk drive industry is ahead of its global competitors. Most of the participants feel that without this federally enhanced partnership, they would perhaps have fallen behind. What it did was to increase the odds that the U.S. industry would learn how to use this new discovery before their global competitors.

While the ATP funds were an important ingredient, ATP also provided a structure in which technical personnel from these different companies would interact in a way which they normally would not do. Incidentally, many feel that if IBM had been restricted from this project simply by virtue of its size, many of the others would have withdrawn as well. It's one of those responses, "If you join, I'll join."

The involvement of universities also means that students that were supported by these ATP funds will now diffuse out into the industry. Papers and books will be written, contributing to U.S. leadership in the disk drive engineering. Thus, ATP funding will have had an enormous impact on the U.S. engineering infrastructure.

The second example is that of a small company. A number of years ago, Honeywell had developed a memory technology for space applications. A Honeywell employee saw a commercial application, and so he obtained rights to the technology and started his own company. To demonstrate the commercial feasibility, he obtained an SBIR grant—that is another one of these Federal contributions to the innovation process.

Then to scale up, the company sought more funding, but because the risk was still large, venture funds were either not interested or wanted too large an equity position. So the company obtained an ATP grant and eventually demonstrated the technology to the point that today Motorola has now invested in this company and it is successful. It also turns out that this particular technology has many other applications, so that in this case ATP really has spawned some other companies as well.

In both these examples, ATP played a decisive role. In the first, it accelerated the innovation process. In the second, it sustained what was eventually shown to be a valid technology, and these are only 2 of the 288 projects that have been funded by ATP since it began.

Now, could these results have been obtained without a Federal role? I personally don't think so. The point is that in these cases, at least, other approaches to developing the technology didn't work. There is a tendency in industry today to use technology, not develop it. That is not to say that there may be many cases where corporations will develop their own technology or cases where venture capital will step up to an opportunity.

Right now, the U.S. high-tech industry is flying high and there is a temptation to say leave us alone. But how easily we forget. In 1992, Andy Grove was in my office saying that the U.S. was about to become a technological colony to Japan.

As I said at the beginning, the innovation process is complex, but it is important that this process be robust and responsive to the Nation's scientists, inventors, and entrepreneurs. As these examples indicate to me, at least, ATP addresses a small but important part of this innovation process. So ATP is not about funding industry, it is about supporting the American innovation process.

Thank you, Mr. Chairman.

Senator BROWNBACK. Thank you very much, Dr. White. I appreciate your testimony and comments.

I think what we will do is we will run the clock here along about 7 minutes each so Senator Lieberman and I can bounce back and forth a little bit on the conversation with the witnesses.

You both presented a very good presentation. I would like to first start off, if I could, Dr. Good, with you. The week before we went on recess, this Committee passed a corporate welfare commission bill out of Committee. I am assuming the administration does not oppose such a commission, but I don't know that anybody was there to testify. Can you comment about that, in general?

Ms. GOOD. To be honest, Mr. Chairman, I am not sure where the discussion is within the administration presently on that issue, and I suspect there has been no discussion of any substance yet. But I am sure they will take a position at some point. I just don't know what it is.

Senator BROWNBACK. Have you reviewed that legislation?

Ms. GOOD. I have not had a chance to review it in detail.

Senator BROWNBACK. OK. I am presuming the administration would not oppose a commission on corporate welfare. They may look at the language in it and want to change some of the details, and we are certainly open to that, but I can't believe anybody would defend the issue of corporate welfare. Now, there becomes an issue of what it is, but I can't think that they would oppose a commission looking at corporate welfare on this.

Ms. GOOD. Senator, unfortunately, in these kinds of issues, the devil is in the details and it depends upon how it is defined and all of the other issues that go with it. And you are absolutely correct; it will depend upon the conditions and some of the wording and what it means. Who decides what corporate welfare is has a lot to do with how one goes about looking at it.

Senator BROWNBACK. It passed strongly on a bipartisan basis and it is a bipartisan commission. Both Senator Kennedy and myself were on the original proposing group, so it has a pretty wide base of support.

Ms. GOOD. I understand.

Senator BROWNBACK. I hope the administration can look at that because there is a feeling amongst a number of us that the real way we get at this issue is probably to get it to a commission. We always get into these eyes of the beholder type of issues.

Ms. GOOD. Exactly.

Senator BROWNBACK. I voted against the market promotion program which provides some subsidies to corporations to market products overseas, all of them agricultural products, some of them companies in my State. But there would be others who would say that is not corporate welfare. So I do hope that the administration can take a strong look and ultimately support that commission bill, or if they don't, tell us specifically why they can't support that legislation.

Ms. GOOD. Thank you very much, Mr. Chairman. I am sure that is the case, and it clearly is an issue that the administration is interested in, so it is not a question that it is not of interest. I just do not know where the discussions are presently.

Senator BROWNBACK. OK. One of the problems that I have had with the Advanced Technology Program has been that I think it takes our eye off of the ball here on the real issue of growth and

development. I appreciate Dr. White's statements particularly about when Andy Grove was in saying we are going to become a colony of other more developed nations, and now our technologies are booming and flying high.

How much, though, of that is due to an ATP program. How much more could we achieve if we would lower our capital gains tax rates, if we would improve our product liability environment in the United States? I worry that what we do with programs like ATP is focus on the parsley rather than the steak and we look at the narrow, small issues here that we can complement, when if we could create an overall better atmosphere. For example, by lowering capital gains rates. Senator Lieberman and I support zeroing capital gains rates in Washington, D.C. I would like to see us take it across the rest of the country. In addition, we should be improving the product liability environment.

When Congress passed the statute of repose on the general aviation industry, that industry—and pardon the pun—took off. We got 9,000 new jobs in the aircraft industry in Kansas alone when we put that statute of repose in there.

Ms. GOOD. Exactly.

Senator BROWNBACK. Now, it strikes me that that is the steak that we are after here, and these tend to make us look at a narrower, smaller point, not that they can't be positive, but they take our eye off of what we really ought to be focusing on. You are in the Department of Commerce. Several of these measures have not been supported by the Department of Commerce, yet this one is.

Ms. GOOD. I would suggest, Senator, that Dr. White's comment about the issue that you have to look at the whole is very important, and I don't think it takes one's eye off the ball. Today, the issue will be whether or not we provide the environment that creates the opportunity for people to invest here in the United States, and invest at the high end of the market, if you will, in terms of R&D and advanced manufacturing.

That will require all of these issues. It will require an appropriate business climate, and the issues you are talking about all fit in that. But it, at the same time, will require a technology base which is absolutely necessary, and it will also require an educated workforce to be able to take advantage of it. So I don't think one is taking one's eye off the ball at all. I think what you need to do is to look at the whole.

I agree with you that ATP in and of itself won't salvage the world. It is a part of the portfolio we are going to need, however, to really be successful. So the technology base and what we are spending on the R&D in this country is a very important piece of that. So I would argue with you the other way around. If you really believe the fact that about 50 percent of our economic growth over the last 50 years—and most economists do—has been based upon the development and the utility of technology, then not to worry about the technology portfolio—it is as important as worrying about the business climate. I would argue you must look at both of them. You can't ignore one or the other. It is not an either/or.

I would also argue that when my total investment in the United States for all of the technology development and basic research and underlies that is $28 billion, which is less than what is spent in

some of our competitors, we are not talking about wasteful money. We can argue about whether the programs are the right ones, whether they are being managed properly. Those are the issues. We are surely not over-investing.

So the question here is how to get the whole, so it is not a question of looking at the parsley. This is one of those cases where if you ignore the technology base—and we are using the seed corn today in our high-flying industries, and the high-tech industry is using the seed corn we planted with lots of investment over the last 25 years. These things come to fruition over time. So unless you make the investment now, in the year 2015 there will be no seed corn to have. So it is a question of both of them.

The business climate issues that you talk about are absolutely important, and we need to look at them and we need to try to make them work and we need to make them as attractive as we can. At the same time, these technology issues are equally important, not just the parsley.

Senator BROWNBACK. Senator Lieberman.

OPENING STATEMENT OF SENATOR LIEBERMAN

Senator LIEBERMAN. Thanks, Mr. Chairman. Thanks to both of you, Dr. Good and Dr. White.

I have an opening statement which I would like to ask be printed in the record as if read.

Senator BROWNBACK. Without objection.

Senator LIEBERMAN. Thanks, Mr. Chairman.

[The prepared statement of Senator Lieberman follows:]

PREPARED STATEMENT OF SENATOR LIEBERMAN

Mr. Chairman, it is a pleasure to join you at this afternoon's hearing on the Department of Commerce's technology grant programs.

Before proceeding with my brief remarks, I would like to take a few moments and pay tribute to our first witness Dr. Mary Good as this is her last official appearance as Under Secretary for Technology at the Department of Commerce. Dr. Good has been an extremely articulate promoter for a continued Federal investment in science and technology. While doing so, she has won respect from all parties for her refreshingly direct and candid style. My own State of Connecticut has benefited from companies and partnerships resulting from the Federal programs under her charge at the technology administration. Dr. Good's leadership has benefited America as well, during our period of transition from the cold war to a global economy where a Nation's ability to compete is heavily influenced by its ability to generate technological innovation. Dr. Good has now served four Presidents and led successful careers in academics and industry. My office and I wish her the best of luck in her new choice of endeavor. Thank you again.

Turning now to the task at hand which is an examination of the Department of Commerce's technology grant programs—namely, the Advanced Technology Program or ATP and the Manufacturing Extension Program or MEP. As most of the scrutiny concerns the ATP, I will restrict my comments to that program.

The ATP was designed to bridge the "innovation gap" that exists between fundamental research on enabling technologies and the shorter term development activities of U.S. companies. In order to achieve this goal, the program supports broad, partnership based efforts that expedite the transfer of new knowledge from laboratory to general public usage. I believe the program to be an effective one. Some points to consider in this debate:

- By statute, the ATP funds only projects that are pre-competitive in nature—which means technologies at the stage of development prior to where the forces of the free market come into play. As a result, the true success of the program will be seen 5 or 10 years from now in the long term economic

growth that will come from the introduction of new technologies and industrial processes based on ATP supported R&D.

- The overwhelming majority of ATP funds are directed at consortia involving industrial, university and Federal partners. Such partnerships are essential, both for leveraging scarce Federal funds and for creating the connections that enable faster technology introduction. Without the creation of such conduit programs like ATP, the results of exploratory research often end up on the shelf or worse, exploited by other countries.
- The Coalition for Technology Partnerships, a group of small, medium and large businesses, trade associations and technical societies, recently wrote that it was the experience of many of its members that the major alternative source of funding—venture capitalists—normally does not provide "patient capital" for the type of high risk, enabling R&D for which ATP applicants are seeking funds." Venture capitalist are usually looking for a relatively quick return on their investments and so, justifiably search for "ready for market" products. In funding high risk, longer term research, the ATP addresses an important aspect of technology development.

The ATP has drawn fire in the past as an example of government meddling in the marketplace or corporate welfare. In my opinion, these charges display a lack of understanding concerning the complex nature of technological innovation. For years policy makers and scientists have referred to a linear or pipeline model of discovery with basic research at one end pumping out ideas to be grabbed by those in applied research. Of these advances, a select few seep out into the market. Testimony by noted scientists, industry leaders and directors of national laboratories before the Senate Science and Technology Caucus has convinced me that the pipeline model is not accurate today. Moreover, it is arguable that there ever really was a clear delineation between basic and applied research.

Rather, the research enterprise represents a continuum with little distinction to be made between basic and applied science. Every level within the continuum provides returns—economic, social and intellectual gains for the society as a whole. Specific examples of innovation emanating from the research continuum represent a complex web of scientific discovery, industrial interest, serendipity, availability of funds and individuals willing to risk their personal fortune on the basis of a new idea. The Federal Government, with a fundamentally different perspective than industry has a clear role to play in this process. Generally, the scope of government involvement should be limited to potentially useful technologies that are pre-competitive. In the case of a strategic technology which has implications for our national defense, obviously the role of the Federal Government must be extended. As with most policy debates, flexibility and pragmatism are to be encouraged, especially in the arena of innovation which encompasses such a broad spectrum of human activity.

The Advanced Technology Program was designed to suit our new understanding of the innovative process. The expert collection of witnesses before this panel contains representatives from key participants in this process. I look forward to a frank exchange of ideas.

Senator LIEBERMAN. I want to thank both of you and, Dr. Good, thank you as you are leaving Federal service for your extraordinary service and advocacy. I think you have won the respect of people all around. I was interested to note in looking at your biography that this is the fourth President you have served in one or another capacity, which is a remarkable record. In a sense, you are the basic research-to-marketplace continuum in one person, having had a remarkable career in the academic community, in industry, and in government, and I congratulate you for that and thank you very much. I wish you well in the next chapter of your career.

Dr. White, thanks for your service in starting this program and in some sense reminding us, which I think most people around here know, that this was a program, ATP, that started in the Bush administration and in that sense has had bipartisan support over the years, and I hope it will continue to enjoy that.

I have been a supporter of these programs. I should admit my bias at the outset. I don't think they are corporate welfare. From

all that I know about them, they are industry-driven. It is not a bunch of bureaucrats up here in Washington, spinning a wheel and deciding what is going to win and what is going to lose. They have followed a scrupulous line so that they have entered this continuum from laboratory to marketplace before the forces of the market take hold, and I think your example, Dr. White, was an excellent one.

But I do want to ask you some questions around that because I think the fundamental question we have to answer is whether the ATP projects make development happen that would not otherwise happen. I mean, let me step back very briefly.

Senator Brownback and I are in embarrassing agreement, on most things, but we agree on the capital gains and product liability reform all being part of an economic growth climate. When I go home, people want to know, what are you going to do to help us hold our jobs, create new jobs? We are going through a remarkable transition, but what jumps out is this work that has been done and seems to be broadly accepted now that if you ask the question what gives us economic growth, job creation, more than 50 percent of it is up here, is brain power, innovation, creativity, technology. Now, obviously, we need capital to make that happen, etc.

So the question is can we, looking at the ATP projects, say that to facilitate the innovation we needed government involvement? Or to put it another way—and Dr. Rodgers does this in his testimony which I have looked over—if these ideas are so good or if the products that emerge from these ideas are so good, why doesn't the market take care of it without government having to come in through a program like ATP to facilitate this move from basic research to marketplace? Do you want to take a first shot at that, Dr. Good?

Ms. GOOD. Yes, let me do it, and then I would sure like Dr. White to have a chance to comment on it as well. I have asked that question of a lot of people. The SBA has done a study recently which would suggest that if you have a project, new business, new project, new idea that you want funded, if it is less than $250,000, you can get it funded one way or another. You can mortgage your house or borrow from your neighbors, or whatever, and people do that all the time and it works OK.

Senator LIEBERMAN. Maybe get an SBIR grant, too.

Ms. GOOD. You can get an SBIR grant.

Senator LIEBERMAN. Yes.

Ms. GOOD. If it is over $5 million and it is to the point where there is some market availability and you can do a market study, and so forth, there really is venture capital out there today which is available and for the most part, if you work it hard, can be had. The problem is in that middle, between the $250,000 and the $5 million kind of activity, and the reason is that that funds ideas, not prototypes. They are at a time when I can't put anything on the table for the venture capital people.

So I have talked to the venture capital people and I have argued with them that they ought to be willing to put money at this level as well. And I had a long conversation with one of them about 3 months ago who has a very large venture capital fund, and he made two comments. He said, there are so many opportunities for

venture capital around the world today—and he said around the world today—that for me to bother with these sorts of small start-up ideas that I have no concept of where they are going is not worth my time and it is not fair to my investors.

And I said, well, then, how do you get these things started? And he said, well, I don't know, but if you get them up to this point, then I will talk about them. And he said, let me explain to you why this is the case. He says somebody has to look at these and decide whether the technology makes any sense or not, and he said, I don't have people on my staff to do that; I would have to hire consultants; these are small deals; it would cost me more money to do it. He said, I can do a $50 million deal with the same kind of cost that I can do a $5 million, so I don't want to do that.

He said, furthermore, I would have to babysit these companies early on and I don't want to do that either. He said, right now there are too many other opportunities where it is already up to the level where I can look at it, make a judgment, and it has a 3- to 5-year payout. He said, I am looking for 3- to 5-year payouts in my venture capital problem. So, that means the money available for those which are ideas to let a person with a high-risk idea get it to the point where I can do a prototype and then really look at the market is really interesting.

Now, what has happened, which I find very fascinating—we have had a number of ATP projects that, once they have been through the screening process, and so forth, couldn't get a nickel when they first started and wrote the proposal. But once they got through the screening process—in other words, we had now done—the process had done for them the consulting work, if you will. Then they could get a venture capitalist to come in and put up half the money.

Senator LIEBERMAN. Interesting.

Ms. GOOD. So the point is ATP is a catalyst to get this sort of thing off the ground. For small companies in many cases who have just this idea that they brought out of a research laboratory, it is all that is available.

The other case which has been extremely valuable in ATP is the opportunity that a couple of the examples that I gave and the ones that Dr. White gave. It is an umbrella where a group of different companies can come in to look at what a new idea might do for them at a pre-competitive stage.

Senator LIEBERMAN. So it is a facilitator, in a way.

Ms. GOOD. It is a facilitator and an umbrella and it really does work. That works extraordinarily well. So for both of those kinds of examples, there just isn't private capital available.

Senator LIEBERMAN. Dr. White, I am sorry. Between my long introduction and Ms. Gqood's excellent answer, I have used up my time on the first round. I will come back.

Senator BROWNBACK. If you want to give a short answer to that, that is fine.

Mr. WHITE. Yes. A short answer, I think, is that what ATP also helps do is reduce the risk that is involved. As Mr. Rodgers says in his testimony, companies base decisions on return on investment, and that depends on what you think the risk is on getting a return. And in many of these cases, the risk is so high that companies themselves are not willing to invest, but if they can share

that risk with ten other companies, and then on top of that get a matching from the Federal Government, that is a big enticement and many companies will do that.

It's analogous to being asked to donate to an alma mater when some donor is going to match your donation. While it is only 50 percent, I am more inclined to contribute.

Senator LIEBERMAN. That is the way we feel about the capital gains tax. If we lower it, people will naturally respond to maximize their position.

Ms. GOOD. I would simply remind you that, also, if you remember, at the end of the war—and Dr. White is a really good person on this issue—at the end of the war after the Defense Department had built the first major computer, they showed that to Mr. Watson of IBM and his evaluation and market was that perhaps they would see three around the world and he wouldn't touch it. The end result was the government continued the development of that technology to the point where it was clear that there would be a lot more sold, and all of a sudden the companies were interested. It is that piece of the innovation piece that we hope to address by ATP. We need to do more, not less of it.

Senator LIEBERMAN. Thank you.

Senator BROWNBACK. Dr. Good, GAO has concluded a study in January of 1996. I am sure you are familiar with this study.

Ms. GOOD. I am, right.

Senator BROWNBACK. It is critical of a number of the areas in the Advanced Technology Program.

Ms. GOOD. Right.

Senator BROWNBACK. And I want to go through a couple of those and I want to hear your response about them. They say 40 percent of the applicants receiving ATP grants said they would have pursued their projects had they never received the funding in the first place—40 percent.

Now, I have a couple others here I want to put out for you, if I could. It says 65 percent of ATP grant awardees never bothered to seek funding from other sources before applying for an ATP grant. And then they also said after ATP declined to fund their proposals, half of the near-winners continued their projects with other funding sources anyway.

Now, I think you have answered that last one by saying that the ATP program is a catalyst that encouraged them to go on forward, and I will accept that. Those other two are very troubling numbers and they suggest more of a first-stop shop, corporate welfare type of program, if you look at those numbers, and those are substantial and they are large and they are GAO-based.

Ms. GOOD. I understand that, but the 40 percent—if you really look at the numbers, however, what you do find, of the 40 percent that said they continued, you also find that they continued at a much lower level and much less pace than they would have had they gotten the funding. So it is not a black-and-white here.

In fact, of the 40 percent who said they would have continued anyway, they also said—over half of them said it would have been a much smaller program and would have been much longer, drawn-out, which means you may have actually missed the window for the technology altogether. So the 40 percent, I think, is overdrawn. I

don't think that they have actually looked at all the data and it is just a hard number and when we followed that up, it just doesn't hold.

The group that did not look for other funding—I think the issue there is many of them already knew that it was very difficult to get. And as I have just told you, the SBA, who has really done a good study of that, will tell you that for the folks who are looking for money for this kind of activity within the range I gave you, their ability to find it is pretty close to zero.

Senator BROWNBACK. Now, 40 percent of the ATP grants go to large companies; what I have here, the AT&Ts, GM, GE, IBM, Phillips Petroleum, and 3M, all companies that have received ATP program funding. Now, you are looking at a budget of $225 million.

Ms. GOOD. For this year, right.

Senator BROWNBACK. It was a $10 million program under the Bush administration. I guess they were a little cheap on it as a program. But if you look at the Fortune 500 companies, the aggregate net income of those companies reached $325 billion, the Fortune 500 companies, and I just want to put these numbers in a little bit of perspective. You know these numbers.

Ms. GOOD. I know the numbers.

Senator BROWNBACK. Three hundred and twenty-five billion dollars for the Fortune 500 companies. Two hundred and twenty-five million dollars of ATP programs represent less than one-tenth of one percent of that figure, of their net income. So we are talking really on the very smallish end of this sort of money and dollars.

Ms. GOOD. That is correct, which is why I don't understand why we spend so much time on this program.

Senator BROWNBACK. Well, maybe it is because of a philosophy involved here. When you get to philosophy, you can talk a long time of whether or not the government really can do this. And not that we won't pick some good winners or losers, but wouldn't it truly be better if we just cut the taxes overall and let the winners sort themselves out?

Ms. GOOD. I don't think you would get this activity at all if you did that, Senator. That is the problem.

Senator BROWNBACK. You don't think if we——

Ms. GOOD. No, sir, I don't.

Senator BROWNBACK [continuing]. Zeroed capital gains and had a very strong product liability environment that we wouldn't attract this sort of activity?

Ms. GOOD. You won't attract most of this activity and the reason is, again, as I told you, if you talk to the people who are going to spend that money, there are so many opportunities today for investing which are relatively short-term. These are high-risk, long-term issues and the money would not necessarily go there at all, and to make that conclusion just doesn't wash. Talk to the people who are going to invest it and you find out where they want to invest it. It is not in these high-risk, longer-term issues.

The other point I would make is that, looking at this business about 40 percent went to large companies, you also have to take that apart. The majority of those by far went not to a single large company. They went to groups of companies where the large company, frankly, we coerced in, not the other way around. And you

want them in because they have the capability and the people to do some of these cutting-edge issues that the smaller companies who are part of that consortium just don't have. And they bring to that the ability to move some of these ideas at a much faster rate.

So if you look at those numbers, what you find is these are not single companies. General Electric by itself doesn't have a project. General Electric, in a consortium with some university people and some small companies, does. That is a very different idea. See, I look at it very differently than you do. If I can get IBM or DuPont, for example, to bring their expertise to the table at 40 to 50 cents on the dollar to get into a totally new technology which they are not in today, wouldn't do without some encouragement, and get them to share their expertise with three or four smaller companies to get that new technology going in the United States, I think that I have taken them, that they have not taken me.

That is a different opinion about that because what I have done is coerced them into doing something they wouldn't do on their own. But what they have done is given the country and these smaller companies and universities they are working with—they have given us their expertise and their resources to get at a cutting-edge problem that they would not do and would not share, by the way, if they had funded it all on their own.

So we are talking about getting these technologies shared with small companies, getting small companies up and running. I have visited one of the DuPont spin-offs here about 3 weeks ago, this Hard Core, DuPont Hard Core, which has gone from about 5 people to 75 people in the last 2½ years. We were able to get DuPont to bring their resin technology to the table and have a small group of entrepreneurs take that and move into some new composite materials to build infrastructure, things like piers and things like that, which will not have the usual environmental impact that the ones we build today will have.

This would never have happened. DuPont would not have done that. It is not their business. They wouldn't have been a part of that, and they will spin it off. It won't be a part of their business. But we were able to get them to bring their expertise, and without that this company would never have floated.

So I look at it very differently. If we can con those people into putting their expertise and the kind of value that they have on the table to help with these kinds of programs, I have helped the country a lot and I have conned them into doing something they wouldn't do on their own. That is to our benefit. It is to the benefit of all those guys, those young people. The guy running that company for Hard Core is about 35 years old. He started running it when he was 30. That would have never happened in DuPont itself.

Mr. WHITE. I would like to underscore what Dr. Good says. I mean, the capital resources that are available to us in universities through some of these ATP programs is enormous. We have had access to billion-dollar fabrication lines to try out ideas, and so forth, and that would never have happened.

Senator BROWNBACK. Well, I appreciate your comments and your testimony on this. We will have the next panel to explain to us a little bit whether they think you are right that we need these ver-

sus cuts in capital gains and product liability environment is the better——

Ms. GOOD. Remember, I didn't say we didn't need some of those, too.

Senator BROWNBACK. And Senator Lieberman may have a couple more questions, too. Also, I would like to remind you of a statement you said that the administration should work, as well, on product liability reform and capital gains cuts, that you think those are important things. And, frankly, I don't see a whole lot of help on those, so——

Ms. GOOD. What I said is we really need to work on business climate in its entirety, and I still believe that.

Senator BROWNBACK. Well, I hope as you are parting from the Department of Commerce, you may urge them a little more in that area.

Senator Lieberman.

Senator LIEBERMAN. Thanks, Mr. Chairman. I would second that.

Dr. Good, I want to tell you that you are probably the first witness I have heard come before the Subcommittee and proudly proclaim themselves to be a con artist. [Laughter.]

But you have done it in a good cause.

Ms. GOOD. Listen, if we can make it work for the country, I am perfectly happy to do it.

Senator LIEBERMAN. This has been interesting, and I think Senator Brownback's questions are very important. They go to a point of concern and vulnerability of the program, which is why are we giving these big companies that make all this money more money to get involved in these areas?

I think you both gave the answer, and you gave it earlier, Dr. White. Because of return on investment questions, they might not get into these areas—they wouldn't get into these areas otherwise. What you are doing in, as far as I know, more than 80 percent of the cases of the grants is you are bringing them together with a bunch of companies to pool their resources, and then work with the universities to see whether some of these technologies are plausible.

But let me take you back one step in the process here and, Dr. White, maybe you want to start this. We say that this is an industry-driven program, and I am not going to do this correctly. I want to give you my impression and ask you to help me fill in the blanks. As I understand it, you bring together in the ATP program committees or task forces of folks from university, industry, and in some cases government. If I am not mistaken, sometimes the DoD will sit in and say, hey—I will give an example of one I have been interested in lately from my service on the Armed Services Committee—we need work in advanced x-ray lithography that is not going on now, and can you bring a group together and stimulate this work?

Am I right about that. Otherwise, how do you decide when you see DuPont or IBM or AT&T is not doing—how do you decide what you want to tell them to do? What is the basis of that judgment, Dr. White?

Mr. WHITE. Well, I am going to have to let Dr. Good wrestle with that a little bit because you are talking about focus programs

which did not exist during the Bush administration. Incidentally our program ended up at $50 million at the end, not $10 million.

I think that the way it worked during our period was that it was simply announced that one could compete for this funding, and the conditions under which that funding was available were announced and that stimulated companies themselves to come together to take advantage of this opportunity. Because it was being, in a sense, driven by the government, there was an implied blessing that it was all right for these companies to work together, which in the past they would be reluctant to do.

Senator LIEBERMAN. For antitrust reasons?

Mr. WHITE. For antitrust reasons.

Senator LIEBERMAN. Yes.

Mr. WHITE. And so there was an acceptance of this process. And it also brings together the technical people. We talked earlier about other mechanisms for stimulating the economy. At one point there was debate between whether you have an ATP or a R&D tax credit. ATP brings together the technical people to develop ideas and make proposals. Some of the other kinds of mechanisms that will help the innovation process deal with other aspects of it, but not necessarily the technical people. So I think that is one of the big strengths of this program as well.

Now, I think I will let Dr. Good address the issue of these focus programs.

Senator LIEBERMAN. Yes, Dr. Good, please explain those and what you mean when you say that ATP is industry-driven.

Ms. GOOD. The focus programs were put together for two reasons. One was that in the general programs, after it got over the $50 million level, the question was how to organize it in a way that it could be managed, if you like, in some rational way.

For example, if you look at the research programs across the government, even at the National Science Foundation, you fund areas, if you will, in different kinds of things and you try to do that by talking to all the peers to find out where there are areas that make sense. So the focus programs were designed in the following way.

There was an RFP put out which said that we were going to run these workshops and we would like for the industry groups to come in and talk about what it is that they see over the next 10 or 15 years that are going to be technical barricades to where they would like to be. And those were done in a whole bunch of different industrial areas and the issue was to get them together to talk about that and to think about what was going on in the basis research community today, where there were some what you might call idea breakthroughs that might really have a big impact on their industry.

So they wrote white papers, if you will, and those white papers then were used to generate the focus programs. They were totally industry-driven. They were totally industry-organized. Let me just give you one quick example. It turns out that over the last 15 or 20 years, we funded a lot of work in the universities on computer algorithms and on software development, and what have you.

The software industry came in and said that one of their biggest problems was that it was still a very inefficient industry. Something like at that time—this has been about 5 years ago; it hasn't

improved a lot, but it has some. They made the comment that about 85 percent of all the custom software that is written is never used because it is not done well enough to make the cut. It is a very inefficient business. So their concept in their minds was if you could somehow have blocks of software which could then be manipulated to build these systems, you would have an opportunity to move this ahead faster.

Well, no one was willing to start with fundamental applied mathematics algorithms to try to do that, but one focus program was put together to do exactly that and it simply said to all the little companies out there who wanted to try and thought they had an idea about how to do that, you can propose it any way you want. There are no restraints in a focus program on how your proposal is written or which piece you want to work on.

So the whole idea was for them then to figure out ways of doing this block construction, if you will, for software development. And that is moving along rather well and the question was how to take these ideas that had been done by these rather inscrutable mathematicians and turn that into something that could be manipulated to make software more efficient more quickly and with less errors, and more usable.

Senator LIEBERMAN. But there again, none of the individual companies were prepared to invest in that?

Ms. GOOD. No.

Senator LIEBERMAN. That seems like a very basic investment that they should have made.

Ms. GOOD. The reason they were not is that no one knows whether it will work. It is probably one of the riskiest programs in all of the ATP pieces. You don't know how to put it together yet. You don't know whether the artificial intelligence is going to be available to actually manipulate the blocks, even if you can do them. So it was truly a research program to see whether you could drive that fundamental mathematics concept to a practicality.

Senator LIEBERMAN. Time is up. Thanks very much to both of you.

Senator BROWNBACK. Yes, thank you both very much.

Ms. GOOD. Thank you for inviting us.

Senator BROWNBACK. Yes, and good luck.

Senator LIEBERMAN. Good luck.

Senator BROWNBACK. Our next panel is Dr. T.J. Rodgers, CEO and founder of Cypress Semiconductors, which is one of Silicon Valley's leading chip-makers, and then Tim Draper, Managing Director, Draper Fisher Associates, a venture capital firm in California. He has helped raise, and has raised millions of dollars for high-tech start-ups, and Mr. Draper is a third-generation venture capitalist. I didn't realize we had that many generations even yet taking place, so that is good to have.

We are delighted to have both of you gentlemen here. I believe both of you have a 5:30 flight back to California. Is that correct?

Mr. DRAPER. I do.

Senator BROWNBACK. And it is out of Dulles, so we want to be conscious of your time, and I am sorry we have taken longer than we perhaps should have on the first panel.

Mr. RODGERS. Actually, I have a backup flight, so if you would let Mr. Draper go first, we would both be better off.

Senator BROWNBACK. OK, we will do that. So, Mr. Draper, thank you very much for joining us and coming out. He didn't know his way to Washington. He doesn't usually come out this way and I told him that is good if that is the case.

We are delighted to have you here in the Subcommittee. You can summarize your testimony, if you would like, and we can have questions and answers, or present it however you would like to. The microphone is yours.

TESTIMONY OF TIM DRAPER,[1] MANAGING DIRECTOR, DRAPER FISHER ASSOCIATES

Mr. DRAPER. OK, terrific. I appreciate being here. Thank you very much.

Shut it down, shut it down. It is a waste of money. In fact, I have $10 that I am going to save here in taxes and I will leave it right here for you guys and you give it back if you don't shut it down.

Senator LIEBERMAN. Take it back right now. [Laughter.]

Mr. DRAPER. Now, I understand that it is a tradition for witnesses to appear before Congress in hearings like this to ask you to spend Federal tax dollars on their behalf on some very important program, and this program would theoretically help my business, help my portfolio companies. Every time a portfolio company runs into an ATP option, I advise against wasting their time.

It takes 6 months, at the very minimum, for them to make a decision. It takes 3 weeks for venture capitalists to make their decision, and even that is frustrating for the entrepreneur. So I am actually going to stand here and ask you to not spend Federal tax dollars on my behalf.

Senator BROWNBACK. Thank you.

Mr. DRAPER. I fund in the $250,000 to $5 million range. I just heard that there are none of us out there. In fact there are many of us out there. There is more competition than I would like to have. I heard them say that they saved a $7 billion PC board industry. I don't buy that. We, at Draper Fisher Jurvetson, actually created a $7 billion company out of a $120,000 investment.

This saving of the PC board industry—the PC board industry was basically created by a need, the need to put chips together, and the need was a marketplace need. Hard disks were created by the private sector. In fact, my father funded Priam and Quantum. Quantum invented the 5-inch disk drive and Priam invented the 9-inch disk drive. So the idea that the ATP people are saying that they have created all of this technology or that they are a real benefit to all of us is hogwash.

The venture capital business is everywhere now. It is all throughout the country. There are start-up venture funds throughout the country. The only things that are limiting them are government regulations. Sure, if you can get the capital gains tax down to zero, boy, there will be a lot of capital for these things.

The private individual is allowed to gamble. They are able to play the lottery. They are able to do all these things with their

[1] The prepared statement of Mr. Draper appears in the Appendix on page 61.

money that have an expected value, below one. But anybody who is worth less than $1 million is not allowed to invest in a venture fund. So, if you really want these start-up venture funds to proliferate everywhere, make the lottery illegal and allow investments.

The government has done its damnedest to keep money away from entrepreneurs, and we still seem to have plenty of them and there are plenty of great ideas out there and there is still plenty of money out there. The venture business is right in the inflection point of a boom because we have seen that there was this non-market force keeping people away from investing in venture funds. So we have been able to benefit from this in a big way. We have been able to generate returns that are so far above the S&P, they make your eyes water, and the reason is there are non-market forces at work and we are continuing to benefit from them.

Now, people are recognizing that, for some strange reason, these venture capitalists are making a lot of money for their investors, so we are getting an awful lot of interest in investing in venture capital. In fact, I think 3 years ago we had $2 billion in the venture capital industry. There is now $10 billion. Last year, $10 billion came into our industry.

Senator BROWNBACK. Ten billion dollars last year alone came in?

Mr. DRAPER. Last year. So it is booming and people are recognizing that this is a great way to invest their money, and they are leaving the safe harbors of the 3Ms and the GEs and they are moving into sort of this dense forest of venture capital where they are not quite sure which way to go, but it seems to be able to generate great returns for them.

Then I heard them say something about it is too early to determine the long-term benefits of their programs. Well, it is no surprise to me. As a venture capitalist, my partners and I specialize in providing seed money to start-up companies. To date, we have invested in more than 150 high-tech companies involved in everything from Internet content and services to flexible semiconductors and software applications.

In fact, we funded a company that had technology that, even the government wouldn't have looked at, and we took a risk on something that we thought might really make a big difference out there in the world and now we have attracted a whole bunch more money to it. There has been $20 million dedicated to this new integrated circuit that uses light rather than electrons and they move a lot faster. That is just sort of an example of the risks we'll take. We will take a risk, but it has to make sense in the marketplace. And if it doesn't make sense, no one has any reason to do it. The ATP says, well, these are programs that no one would have funded before, and you look at it and you say, well, if no one would have funded it, there is a reason.

So I would like to accomplish three things today. First, as a founder and chairman of a venture capital firm, I will give you my sense of the health of the high-tech market, which I think I may have already. Second, I will share with you my personal experience in dealing with the ATP program, or ATP, as it is known, and I will give you my perspective on what high-tech start-ups are accomplishing without government dollars. And I will encourage you

to proceed with great energy in the direction you are headed, I hope.

So, first, how is the high-tech business doing? Well, last year we had more IPOs—those are initial public offerings—than ever before. A lot of money is being channeled into our industry, so that is very promising. Investors can't seem to get enough of the high-tech stocks and that is because they generate good returns. Technology wins in most situations. Technology won the Gulf War. Technology wins in all wars, and technology matters. But if there is no marketplace for technology, there is no reason to do it.

Our industry accounts for 11 percent of the United States gross national product—11 percent—and 25 percent of our Nation's manufacturing output. We employ more than 4.2 million people who earn about double the average wage. Our industry represents the biggest reason that the United States has the most competitive economy. So we are the envy of the world, and the heroes of the world are actually the entrepreneurs. At the World Economic Forum in Switzerland, the people that they wanted to see most were Bill Gates and Steve Jobs. Nobody cared about the heads of state.

Now, I know that you and many of your colleagues applaud the economic successes of the high-tech industry, and I know the government is trying to use tax dollars to pick winners and losers among high-tech ventures. Now, I am going to be polite, but I must say that it is headed wrong. It is bad policy, it is a complete waste of money. The reason it is a waste of money is that those decisions are made by people who don't really care that much.

I mean, we care a lot about how our companies do from an economic standpoint. Our success, sometimes our livelihood, depends on their success. Government employees care in the global sense. But they don't really work to make these companies successful. There is no financial reward to government officials to really create a success out of one of their investments, so they don't bother, but I don't want to encourage more attention by the government either. The less our government gets involved, the better.

So here is my personal experience. I had to run one of our portfolio companies for about a year. It was called Amtel. It was back in 1990. It was an HDTV company, and during this time the HDTV world got a lot of hoopla, from ATP's interest in HDTV, so we thought that was great because then we could get a lot of press for free. But then we realized that all the investors were waiting for the results of the ATP program to make a decision on who they would fund, who they would back, in HDTV. So we were almost forced to put in an ATP proposal. So we did that and we worked very hard on it and we came to Washington and we had lots of meetings and we did everything we could. All told, we spent about $200,000.

We hired a consultant who was really good at working these ATP angles. We took the engineers off the project in order to do the technology section of the ATP program, and then we waited. It went on and on. We waited. We raised $1.5 million in contingent matching money which was going to come in if the ATP came through. So we waited 6 months, and the venture capitalists went

on to the next thing. They weren't really interested in us that much anymore. It had a lot to do with just the time that went by.

And it was supposed to be a proposal for advanced technology in HDTV, high-definition television, and we looked around at all the technologies. There were about 40 companies, roughly, and of those 40 companies there were 3 that we thought were real solid-state, digital, exciting companies that we thought were real competition, and I have got to say Zenith was not one of them. Zenith was doing sort of a refurbished CRT technology that still hasn't found the market. It has been many years, and we knew that their technology was hopeless. But Zenith got the grant.

Now, not only did we lose our opportunity to get funding there, but so did five or six other start-up companies with promising technologies. Zenith was not even a digital technology, and if you are a technologist at all, you know that digital technology is clearly the direction the whole world is headed.

Anyway, it had a devastating effect on our company and so we reluctantly declared defeat and moved on. Ironically, now there is a whole lot of interest in our technology, so the company may yet recover, but it's probably over. And Zenith without any novel technology had been working for years with those good folks in government, had applied for many grants, and they had won many grants. So they won this one. All we had was better technology.

And these are just the facts. We understand the world and the market. And, with that grant or without that grant, Zenith is still getting its lunch eaten by Sony and the other imports. So I would say that was at least one example where the ATP program was a total fiasco.

Simultaneously, all the venture capitalists were waiting for the response from the ATP to decide for themselves and they kind of hung in there even though it took 6 months for the program to finally come up with a decision, after three or four false starts. Once the decision came in, they basically killed our company and several others like it.

Today, as a venture capitalist myself, I know that there is just plenty of private money available for good entrepreneurial ideas that play well in the marketplace. We compete for companies with other venture capitalists in bidding wars. A lot of money, $10 billion, went into our industry last year. That is 1,000 $1 million start-ups, and the venture capitalists that I compete with are generally brilliant technologists with good business skills and keen strategic sense, and I would take a mediocre venture capitalist over the best in the ATP program in a heartbeat.

And I do not buy any of this argument about basic research versus applied research. We have had many successes that came out of basic research. In fact, Parametric Technology was one guy in a garage, a Russian immigrant with a new idea for how to develop an algorithm that could make you look at a three-dimensional object in two dimensions and three dimensions and flip back and forth. And it is now worth $7 billion in the marketplace, and that is a lot of great jobs and a lot of great wealth, and that was created out of a raw idea.

And when we fund a company, we let them go; we let them do what they wanted to do. When the ATP funds a company, they

point them into some odd direction. And for what reason? I mean, what supreme being came up with that list of ideas that the ATP feels should be funded? It certainly wasn't the marketplace.

So I say this with great respect. There is a lot the government does well. In fact, I can think of very few private alternatives to the Department of Defense, although they could use some competition internally. My grandfather, General William Draper, served as Under Secretary of the Army during World War II. He was responsible for helping oversee economic construction of Germany and Japan under the Marshall Plan. My dad was the chairman of the Export-Import Bank and then worked as the head of the United Nations Development Program for 7 years.

So I have a lot of respect for the awesome powers of a well-functioning government. However, picking winners and losers in the high-tech industry should not be the domain of the government.

We in the venture capital business try to provide everything to a little entrepreneur that we possibly can. We become his financial strategist. We become his head-hunter. He needs people. We have a wide network. We find great people for him. So we try to hire the right managers and engineers for him, get him going, get him moving. An entrepreneur is a lonely job and in some ways we are the corporate therapist, trying to make people feel good about what they are doing and get them to work together. We understand the entrepreneur's soul.

The government cannot touch the soul of these entrepreneurs. They can't get in there and help these guys who are going to just do everything in their power to change the world in the way that they want to change the world. All the government does in their meddling is tweak the vision of the entrepreneur, which is the cruelest thing you can possibly do.

In evaluating whether to provide seed capital for a start-up, we look at two factors, and both are fuzzy. It is the individual entrepreneur and the markets. We look for entrepreneurs who want to change the world in some way. We invest in their enthusiasm, their fire. We are looking for an entrepreneur with a real sparkle in his eye, or her eye, and with some real fire in their belly. And then we are looking for markets that are extraordinary, changing, moving, markets that are going to change. And large markets, markets that affect a lot of people. And so that is what we look at. No government form I know of can properly evaluate people or markets.

We also look at technologies. If a technology is significant enough, it can make important changes if we tweak the market, if we tweak the management, if we bring in some good management to help an entrepreneur in a certain market. Sometimes, a great technology will help that to happen. So we are looking for significant improvements and our time horizon is different from that of other venture capitalist's, some are longer, some shorter.

Ours is 5 to 10 years. We are looking for very big winners in 5 to 10 years, and we look for things that can become billion-dollar enterprises and we don't find them every time. In fact, we make lots of mistakes along the way, but a few of them make up for all the ones that don't work, and that is the way it has been historically.

And we go through a rigorous due diligence process, and it is one where we do it with the heart and the soul and the brain rather than just purely an ivory-tower look. We are interviewing the entrepreneur over and over and over intensively. We work with them. It takes about 3 weeks and then we make a decision and we don't fool around. We tell them no very quickly, we tell them yes very quickly. If we don't act quickly we will lose the best deals to other VCs. ATP does not face competition, so they don't need to act quickly or responsibly.

What kind of bureaucrat would perform this type of subjective due diligence before picking winners and losers? They do extensive due diligence, but it will be a whole different kind. Have you filled out the form correctly? Have you had 15 consultants look at this technology, and what do they say about it? They are all very theoretical, but not direct. They don't matter; they aren't deciding based on things that really matter.

Would a bureaucrat know, or even care whether the market was ripe for this? Would he know about the timing of the market? Would he have been investing in this business for many, many years? Would he know when to throw in the towel? There are certainly times when we have got to cut the entrepreneur off. There are businesses that don't work.

So what I am saying is that the free market works. Government is no substitute for the free market, and I could go on and on about that. There is no better system than the market for choosing worthy new technologies and products, and government subsidies distort this market and damage the marketplace. It hurts, it hurts. It does not help. It hurts. So the government's job should be to let the market do its job.

I understand that Congress is under a lot of pressure to work toward a balanced budget. If you are looking to save the $275 million dedicated to ATP, I would do it right now, and take my 10 bucks too, and if you want to save another $4 billion, I think you could look all the way throughout the Department of Commerce. I think there are a lot of places there you can save a lot of money, and I know there are a lot of other corporate welfare programs that are not doing us any good.

So I would like to finish on a high note. I am pleased to say that the future of the high-tech industry is very bright. Things are going very well, and as long as we are basically left alone, things will continue to be successful throughout the high-tech sector. We bring you jobs. We bring you high-paid employees. We bring you wealth. We bring you all these great things, even high tax dollars. So leave us alone.

Senator BROWNBACK. Well stated, and we appreciate you bringing us those things. I wish you didn't bring us as much from the standpoint that I want to get those taxes cut down so you can go do more and bring less tribute to Caesar.

Mr. Rodgers, CEO and founder of Cypress Semiconductors. It is one of Silicon Valley's leading chip-makers. You have lived the life of the hero entrepreneur, and I appreciate your coming here and testifying and look forward to your testimony. The floor is yours.

TESTIMONY OF T.J. RODGERS,[1] PRESIDENT AND CHIEF EXECUTIVE OFFICER, CYPRESS SEMICONDUCTOR CORPORATION, SAN JOSE, CALIFORNIA

Mr. RODGERS. Thank you, Mr. Chairman. First, a couple comments. I heard earlier about this disk drive consortium from Dr. White that needed the government to get done. I know that since I read that proposal this last weekend, IBM and Seagate are two big participants and I know, for example, that Seagate is the largest disk drive company in the world. And I know Al Shugart, founder, chairman and CEO of Seagate. So I ran out of here after I read Mr. White's testimony and called Al and said, Al, tell me you don't believe in corporate pork. And he says, I don't. And I said, Al, I have got a statement here signed by 51 CEOs that if an independent commission similar to the military base-closing commission identified a fair and substantial government spending cut in the area of so-called corporate welfare, I would support that cut even if it meant funding cuts to my own company. And Al said, sign me up, and I will, and there are 50 other CEOs on this list and many of them currently get grants from ATP. So they are, if you want to say, negatively biting the hand that feeds them. But, in reality, they don't believe taxing the country is worth the benefit even to their own companies.

Senator BROWNBACK. I want to submit that statement that you have—I have a copy of it here—for the record. What do you have, 50 CEOs that have signed?

Mr. RODGERS. Well, it turns out I called 5 of my friends and the one that is stapled to my testimony has 5 or 6 on them. And then they called their friends and I got 25 more last night, and then they called their friends and I got 6 more this morning. So I will give them all to you. They are still probably coming in over at the Hyatt.[2]

We in Silicon Valley don't believe in socialism. We believe in capitalism, we believe in paying our own way. I just want to make that point.

The second point: We don't fund risky developments. That is absolutely not true. A good example is Conductus. Conductus is a superconducting company that not only was venture-funded, but is now a public company being funded by the public, funded partly by Kleiner, Perkins, Caulfield and Byers, and again got ATP grants for superconduction. The fact is John Doerr, another signatory on my document here, one of the partners of Kleiner Perkins, a well-known venture capitalist, has signed up and said cut off the corporate pork, we don't need it, it doesn't do that much good.

I would like to bounce back from my formal testimony to give—I apologize for the 8,500 words I handed in, but I am passionate on this topic—a shortened version of why I see corporate welfare as a direct threat to what I call the American dream or American free-market capitalism. Even though it comes to us in Silicon Valley, I believe it is a problem.

---

[1] The prepared statement of Mr. Rodgers appears in the Appendix on page 65.

[2] The information referred to appears at the end of Mr. Rodgers prepared statement on pages 82–84.

Going back to colonial times, our forefathers didn't like taxes. They thought they were immoral. They thought they were confiscation of wealth. They rebelled at the Stamp Act in 1765 and caused it to be canceled. They threw the tea in the harbor in Boston in 1773 not to pay taxes on it. They declared against the kind in the Declaration of Independence that one of the reasons for going to war was that "you have taxed us without our consent."

When they formed a new Constitution, they made it constitutionally illegal for the Federal Government to tax individuals. Unfortunately, in 1913, we made a big mistake with the Sixteenth Amendment and turned that around. They turned the world on its head. The reason we are so rich is what they did, and it was a moral start to this economic—not economics driving morality. We don't do it because it makes money. We make money because we are good and we did the right thing.

They said we are free. We own ourselves, our property, our intellectual property. We are free to pursue our interests in free markets, with limited government, and that is what drove the so-called American dream. I have been studying the economics of the American dream a little bit and I would like to show you just three charts quickly.

Senator BROWNBACK. Please.

Mr. RODGERS. They are in the testimony.

Senator BROWNBACK. Mr. Rodgers, would you mind standing off to the side here so maybe some people in the audience could see the charts as well?

Mr. RODGERS. Good idea. Chart No. 1 is gross domestic product per capita, and it says in 1996 the average American produced $28,540. Now, it turns out that 85 percent of GDP per capita becomes personal income, so when you are looking at this curve, you are also looking at what Mr. and Mrs. Average make in the United States.

This is Commerce Department data, all this noisy line here, going back to when the government started keeping statistics in 1869, when the GDP per capita was $3,100. That is now in 1996 dollars, so this is all in today's dollars. I went to the history of economics group at Stanford and got a data point for 1776 when we were founded. GDP per capita then was $60, which translates to $919 per capita in 1996 dollars.

Now, think about that for a minute. Here is America, $919, $3,000, $28,000. This is 1776, when America was founded, to today. Here is zero, and back there is minus 30,000 when we came on to the Earth. It took us, mankind, 30,000 years to get to $919, and in 220 years America, because we made the fundamentally right decisions and took the common man—I am not talking about the fat cat here, the common man—from $900 to $28,000. This is an economic miracle driven by a moral, good decision to turn men free in their own self-interest and limit the government from taking their money.

By the way, the graph here shows a slope of 458 percent per century. The slope here is 3 percent per century. So there is definitely something good that happened when America got started. This 458 percent per century, if you turn it around and say how long does it take to double, the answer is 40 years. And what do we talk

about in the American dream? Every generation is going to be better off—2 generations, 20, 40 years, twice as well off. My grandchildren will earn twice as much as I did.

This is the economic slope of the American dream, but it is slowing down. If you look at the last 20 years and you look at GDP per capita in the last 20 years, so now we are talking 1976 to 1996. The yearly growth rate, which was at a 2.5-percent-per-year clip, is winding on down, and these are 20-year averages. This is real data. This is not good quarter/bad quarter kind of stuff. Now, we are down to 1.5 percent.

Well, does this mean that we are in trouble and the American dream is dead? No, but the engine of our prosperity is slowing down and we have to worry about that. Well, why in the last 20 years, after that rocket ride, is it slowing down? Well, there is another curve that I think explains that, and that is this curve.

Where does the money come to fund all these good ideas, these consortia, these getting-together of good, well-meaning people? Well, it comes right out of the pocket of the American taxpayer—me and my company, as well. This is a graph of gross domestic product as a percentage of GDP. So it adds up the Federal, State, and local take on the economy and says what fraction of the economy is controlled by the government.

Well, this is 1900; this is now. It says for the first 30 years of this century, the take was about 10 percent. So even after the income tax got turned on right about there, the government didn't take more. There was a spike to fight World War I, another spike to fight World War II. But look at what has happened in our modern welfare state. It has gone up and up, and now for the last 20 years, exactly the 20 years when we are starting to ail, we have been spending 35 percent of our gross domestic product, what everybody does, on good ideas from the government.

Well, the scale is real simple. Zero is where the Founding Fathers started the company, or a few percent State levy, no Federal levy, and 100 percent is about up here. It is called the Soviet Union. They own everything, they take everything, they control everything. That is socialism that collapses on itself. We are 35-percent of the way from where we started to where we have got to go. You know this. You are both against higher taxes and greater invasion of government into our lives, our economic lives in particular. We all know we have got to cut. The question is how to do it.

I am a Silicon Valley CEO and I am here to tell you I volunteer to be first, and these 50 other CEOs from Silicon Valley volunteer to go with me. Please cut our welfare. We don't want it. We don't want you to take money from people and give it to us.

I looked at the ATP grants. I studied them. I studied the grants from 1992, 1993, 1994 and 1996 this weekend. They are compelling the way they are written. They are amazing—laser-based welding, super-hard coatings of boron nitride. But they really beg the big question which you have asked earlier today. If you look at General Motors and say, General Motors, you make $160 billion a year and you may have $20 billion in the bank, why don't you just fund this wonderful idea yourself instead of asking Mr. Average to fork up a few dollars to do it, well, the answer may be—I heard a new one today—they got tricked into taking the government money.

It may be some long-term research, but the General Motors grant I looked at was to help paint automobiles more efficiently. It doesn't seem to me like that is long-term research. It seems to me like that is what exactly the ATP grants generally are, a little kickback to help lower the R&D budget, the little rebate on your taxes because your taxes are too high.

That is one of the reasons companies come to Washington. We pay 37 percent taxes. Sometimes, it is reasonable to come back and try to get back a point or two. Wouldn't it be better just to lower our taxes and let us spend and invest our own money rather than doing the grant game that we have been talking about?

I was going to rant and rave about all the big companies. I have got them listed in my report. The one you missed when you listed all the big ones, and my favorite, is Time Warner, and apparently——

Senator BROWNBACK. I didn't know they got any.

Mr. RODGERS. Time Warner, yes, they are there. Apparently, Bugs Bunny needs the taxpayers' money somehow. I haven't figured that one out.

Most of the corporate welfare I have looked at is a bad investment for the taxpayer, and I will list three general reasons. One, it is welfare for rich companies. We have heard some statements today. I will pick another one, Sematech. We had a crisis. Andy Grove had this crisis. By the way, his company, which is now not a colony of Japan, I will point out, made $2 billion of profit last quarter and Andy Grove took down $95 million in salary last year. So he is hardly a person about to be subjugated by foreign technological powers, so I don't quite understand that comment in the light of reality.

We gave to Intel and AT&T and IBM $800 million for Sematech, $800 million out of the taxpayer over an 8-year period. Guess what? The ten companies in Sematech, if you add together their earnings, make $800 million a month. If Sematech were so important, they simply could have said to their shareholders, we are going to give 1 month's salary, we are going to have smaller earnings this quarter, we are going to give 1 month's earnings to Sematech. And they would have funded it for 8 years and not stuck the American taxpayer with an $800 million bill.

The second reason why corporate welfare is a bad idea is competition. You already heard one thing, ATP programs undercutting the venture capital industry. I will tell you a story where I come from, and I also come from Silicon Valley. C–Cube Microsystems is one of those true digital television companies, not the Zeniths of the world and not the HDTV that the FCC is talking about, both of which are losers.

C–Cube enabled the first real digital video television broadcasts. Those little satellite disks that carry all those channels and don't have to move around are enabled by digital television. I am a member of the board of directors of C–Cube. We fought for years, and lost money for years, to get that technology accepted. It is a labyrinthine government process to get a new kind of TV going. We got it done and we finally started to make money.

Now, in one of those supposed short-term grants that the ATP funds, they gave money to LSI Logic, a $1.2 billion corporation,

which then took the money and entered into digital video compression and put out a chip. This wasn't a long-term chip. This chip was done in a few months. It came head-on to the C–Cube chip and LSI announced they were going to attack the digital video market with a new chip, short-term R&D to get into that market.

By the way, Wilf Corrigan is the CEO of LSI Logic, the one who received the grant to attack C–Cube. His signature is here. He says, cut it off even if I lose grants to my own company. He was one of the ones that signed up front. So this ATP grant hurt C–Cube, which had struggled the right way to make money, and it hurt the venture capitalists who had put money in without government subsidies.

The third reason why corporate welfare is bad is that most of the spending is to no benefit. Most of those grants I read in my area where I can get past the techno babble are jokes. They wouldn't get funded in real companies. That is why, of course, they are going to the ATP. Let me tell you about one and let me tell you how they get sold.

I presume you gentlemen are lawyers, perhaps. How do you evaluate this when they come to you and say the following? This is through a NASA program to grow gallium arsenide crystals, "molecular beam epitaxy" doing "ordered growth" in an "atom-by-atom manner" of "near-theoretical" atomic quality in an "ultra-vacuum of 10 to the minus 14 torr." And this is what I really liked about NASA, in a "cost and time-efficient program" which "could be a model for future commercial space endeavors."

Well, what do you do while you hire an expert, and maybe the expert is good and maybe the expert is not? If he is good, he is working for me. If he is not, he is maybe your consultant. [Laughter.]

No insult intended. Excuse me. I don't mean to be flippant here.

The point is NASA spent $200 million in gallium arsenide. Meanwhile, I am the director of a gallium arsenide company. Gallium arsenide are super-fast chips that truly make the electronic data superhighway, not the one talked about around here. You can put 250,000 pages of information through a gallium arsenide chip per second, and we make those chips at Vitesse.

So 1 day, I called up Lou Tomasetta, a Ph.D. from MIT, the president of Vitesse, and said, Lou, these space chips, what are we missing here? He said, it beats me; they never talked to me; it is useless; it is a "solution looking for a problem." So I was figuring maybe Lou was a little bit too cocky and me, too, so I called the president of America's second largest—Vitesse is first—gallium arsenide company, Steve Sharp, and said, tell me about these space chips. He said, "I tend to ignore these sort of requests." Those wafers cost $10,000. I buy my wafers for $175.

So we took from the taxpayers hundreds of millions and spent it on an industry that neither knew nor cared about that technology program. There is a money-waster, and there are a lot of those in the ATP programs as well. Corporate welfare is a bad investment. We should end it. Corporate welfare, taking the working man's dollar to give it to companies that should be fending for themselves, is immoral when we are asking our senior citizens to forgo Social

Security and Medicare so we can do paint projects at GM for the good of America. We should end it.

Our government did the best for us during that period I showed earlier when we stuck to our founding principles of free markets and limited government. Starting with the Sixteenth Amendment and working our way forward, our government now controls 35 percent of America's output. Those grants, not just ATP but those grants in general, are sold to America with Washington-speak about government-industry partnerships and industry policy and with techno babble like I read you from NASA, and they do not stand up to logical scrutiny.

We are at a crossroads right now where we have to make a decision what we are going to do. Are we going to purge corporate welfare and pork barrel from our vocabulary and get back to the higher plain this country once enjoyed or are we going to stay where we are?

American business is ready to help. We are ready to cut subsidies to ourselves and revitalize the American dream. We don't want you to take money from Americans and give us socialist subsidies. We don't want that kind of money. Capitalists are people who take money from people who give it to them because the capitalists give back to those people something of higher value.

If you compare corporate welfare to the American free market system, it is like comparing taking from people to giving to them immorality to morality and wealth to poverty. We need to choose the free market system and end these grants to corporations, corporate welfare.

Thank you.

Senator BROWNBACK. Thank you very much, Mr. Rodgers, and thank you for the presentation and the charts. I want to get some copies of those. I use some different ones as a percent of GDP, but it is——

Mr. RODGERS. You can have them. I don't want to carry them back on the airplane.

Senator BROWNBACK. Thank you. If I can receive them, I will take them.

It has been my fundamental thesis as well that if we create the right atmosphere in the United States, you guys do fine. It is when we try to manipulate things out of here that we all get in trouble, long term, and it is real tempting to do. Let me tell you, you sit here behind this place in this chair and on this riser and you feel like, well, I want to help you guys. I want to make sure we have more jobs; I would like to see a few of them in Kansas. And then pretty soon, that all takes over in the process and away we go and we don't end up producing things well in the process when we do that. So I appreciate your testimony and I appreciate what you have both done, as well, in creating these.

I have worked on the other side of this, too, where I have said, well, wouldn't it be nice if we could create some jobs with this, bringing in some government money to create jobs. My sense, though, Mr. Draper, is what we end up doing here—and you correct me if I am wrong on this—is that in the venture capital business you generally tend to go for homeruns. You would rather

strike out or hit a homer. Either one is preferable to a base hit because it just drags you around for a long time.

Mr. DRAPER. Right.

Senator BROWNBACK. But we in government tend more to focus on making a base hit because we don't want a failure and the homeruns may be too risky to do, and if we are occupied with a base hit, so be it. That is fine. We hit a base hit on it. What damage does that do in the marketplace, or you could put your money in a better place?

Mr. DRAPER. I think limiting risk-taking in all forms is a crime because the way we look at it is this. We will invest in 10 companies. Five of them will fail completely. Three might get us our money back. And then two might make 20 to 100 to even 1,000 times on our money, and the one that makes 1,000 times on our money doesn't just make us a lot of money, it created a huge company; it created an enormous company.

When government says they create jobs, those are all sort of temporary until the next government decides we are going to create different jobs. Government jobs are not real jobs. These are real jobs. I mean, Parametric employs, I don't know, how many people? How many do you guys employ?

Mr. RODGERS. Two thousand, two hundred.

Mr. DRAPER. Two thousand, two hundred, and Parametric probably employs 25,000 people and those people are very well-paid and continuing to grow, and there are going to be 30,000 people next year and it just continues to grow. Those are real jobs that continue, and there is a huge difference between a job created by a market need and a job created by a government official. Whenever I hear government is creating more jobs, I think, oh, God, they are killing us again.

Senator BROWNBACK. Let me ask, what should we be doing? If we want to create high-tech jobs and we want more high-tech jobs in this country, what should we be doing?

Mr. DRAPER. OK, this is a perfect opportunity. Shut down the ATP program. It is the beginning of a series of dominoes that need to happen. I mean, people in Silicon Valley are going to start making the make-versus-buy decision on government. They are going to move out. They are going to create their own government. This is really dangerous. It is dangerous, from 3,000 miles away, to tell those guys what they should be doing. So, that is issue No. 1.

The capital gains tax—I don't know how many times I have mentioned cutting that in my life. But if you lower capital gains taxes, it is going to make a huge difference. If you shut down parts of government that are trying to help us, that would also help.

Senator BROWNBACK. Do you have other nominees? I mean, ATP you have mentioned.

Mr. DRAPER. Department of Commerce, Department of Energy.

Mr. RODGERS. Transportation.

Mr. DRAPER. Transportation. Education.

Mr. RODGERS. Education, in particular.

Mr. DRAPER. Slam that one quick. The reason for this is we have it duplicated out in Sacramento, for one. We have plenty of laws, regulations, taxes that we pay back there. Why are we paying both

State and Federal to do the same thing is a big question that we continue to ask ourselves.

The other thing that I think really needs to happen is some big deregulation. Individuals who are not worth $1 million cannot invest in the venture capital business, period. I mean, that hurts. That is $5 trillion or something that can't be invested in risky ventures, and the government is protecting the individual. They are saying to the individual, "we will protect you from your own actions." Now, go ahead and play the lottery, it is State sanctioned and will help education. We will protect you from taking a risk and losing money to these shysters, we'd rather you risk it to us even though it won't help our economy any. "Risktaking is why our economy works."

Senator BROWNBACK. Mr. Rodgers, what would you do if you were in the government and truly wanted to actually help create an atmosphere where more high-tech jobs could be created?

Mr. RODGERS. It is the simplest of all answers. The best analogy is Gulliver. The giant is in Silicon Valley and he is tied down by thousands of little threads and you need to cut them all. We are quite capable of being extraordinarily successful. We have managed to be illusive enough so far to have the average income in San Jose to be $42,000 a year, double the average income in the United States. So we are getting rich as a group, all of us, the little guys included, because we are free and we act like we are free. So releasing those other things that restrict our freedom and take our money would just make us more competitive. We would win more victories.

ATP is small potatoes, and I want to reinforce that the problem with it is it is like that first few viruses that get in your bloodstream and then later on it grows. You already said yourself it was a $10 million program. Now, we have got $200 million, on the way to $275 million, and the bigger it gets the more it controls, and the more it controls the more threads are tied on Gulliver and prevent him from fighting the battles for us.

Capital gains is very simple. It is the mantra, and let me talk about the issue of capital gains. I am the issue. To quote the line in the movie "Scarface," I am the bad guy. I am rich. If you cut capital gains, you are going to make me richer. I will tell you that right here. So I am rich and going to get richer, so therefore capital gains is a tax cut for the rich.

But the fact is if you look at me as an individual, what does it mean to cut capital gains? I just bought myself a new Acura to replace my 3-year-old Honda, and it is a small one, an Integra. I don't consume a lot of money. Most of my wealth, 90 percent of it, is invested back in Silicon Valley. I own stocks in hundreds of companies, not just the one or two I told you where I am actually a member of the board of directors. I invest in those companies because I know they have a chance to succeed because I know the venture capital network.

When you tax me with capital gains, when the government, not you—I know your mind set—all I do is go sell those stocks and send the money to, let us say, Al Gore. He is a big fan of the electronic data superhighway. So what we are talking about is unused money; that is, money that is invested, not being consumed, going

from my bank account and my investment control to the Federal Government's bank account and the Federal Government's investment control.

It is Dr. Rodgers versus Dr. Good. Where do you want to bet your money to get invested to make America stronger and create jobs? So cutting the capital gains tax rate will leave the money with the people who earned it to begin with and the people who were smart enough and savvy enough to make money, and those are the people that create jobs. But you are going to have to break through the mantra "tax break for the rich" because it really is leaving the money that the rich have earned, techno rich in my case, with them so that they can create more jobs with it.

It is a tough nut to crack. I will pay my taxes. I always have, but that is the problem you are going to have. That is the biggest one. That little rocket ride I showed, that 1776 thing, would kick up into yet another higher orbit if we could actually, in a technological society as opposed to a colonial society, turn loose the money to be invested in the smartest possible way. That is the biggest one I can think of.

We also hurt our companies, high-tech in particular, with export controls. So, for example, even though you can buy 128-bit encryption all over the world from multiple countries, a high-tech company that exports encryption today gets treated in the exact same law, by the exact same law, in the exact same way, as someone who ships the makings of nerve gas to Iran. It is a munition, according to our laws.

Now, we have the FBI worried that other countries will get encryption. Wake up, guys. They have already got it, in one of the most brilliant maneuvers I have ever seen. One of the reasons I am not that worried is that things change faster than laws can get made. So you make a law to restrict something. By the time you make the United States carburetor act of 1996, we are on to fuel injectors, and by the time you get to fuel injection, we will be on to nuclear engines.

Scott McNealy of Sun Micro, who by the way has also signed this document—and he, by the way, is also a recipient of numerous ATP grants. I put a little pencil mark here. I will give you this copy of all the CEOs who have gotten ATP money who are saying shut it down.

Scott McNealy said, "I can't ship onto the Internet because the encryption I can use is so weak. People can decode credit card numbers and commerce on the Internet can't happen." So he said, "no problem." He went to Moscow, hired a bunch of mathematicians, $2,000 a year for a Ph.D., and he said, guys, make me some encryption, 128 bits, please. So they did, because they can do it. So can everybody else in the world.

Now, when you want encryption, it comes from Moscow and you encrypt your stuff and nobody can read it with 128-bit encryptions. Commerce is going wild talking about export problems of high technology. McNealy is saying, which high technology? We made it in the Soviet Union. So these are the kinds of things where, shall we say, the slower paradigm shift of government cannot keep up with the real world and you need to just sever those ties and let free

people do the right thing for the country. None of us is going to screw up America to make a buck.

Senator BROWNBACK. Thanks. You are both very compelling and do a great job with your presentation. Let me ask you, Dr. Rodgers, because we need to get on to the next panel, when you get everybody that wants to sign or that will quickly sign that letter, I hope you guys will hold a press conference. As well, if you will ship me a copy of that letter when you get your final signatures, I will put it into the senatorial record and speak about it on the floor because I think that is the sort of statement we need to have people putting forward.

Dr. Good and Dr. White were up here earlier. These are good people and they believe they are doing the right and good thing. I have worked with Dr. White on some of these things before. They believe this is what we need to do to help. I mean, this isn't out of any sort of evil intent that people are operating in the government. It is not out of your part that is evil intent.

What I am just trying to look at and what we are trying to consider is——

Mr. DRAPER. Except for that "con" thing.

Senator BROWNBACK [continuing]. How do we be most productive in determining what our role is and how to best fulfill that role. So I would hope you would be willing to hold a press conference on that, and we will sure put publicity on it here as well. I appreciate you guys coming forward.

Mr. DRAPER. By the way, we can get 100 companies to sign that petition, if you are interested.

Senator BROWNBACK. Let us do it because I think that is an important statement, as we move back toward more limited government, that those people are willing to stand up themselves and say I will take it first.

Thank you very much.

Mr. DRAPER. And you are going to make sure this gets to the IRS, right?

Senator BROWNBACK. No. You run into all sorts of ethical issues. I would appreciate if you would take that because otherwise I don't know where—I am not touching the thing.

The next panel up will be Steve Moore, Director of Fiscal Policies at Cato Institute, and Dwight Carlson is an entrepreneur and founder of two high-tech firms, and co-chairman of the National Coalition for Advanced Manufacturing, and a member of the Visiting Committee for the National Institute for Standards and Technology.

So, gentlemen, welcome. Thank you very much. I apologize for the delay, but we have had a lot of questioning and a lot of comment. You probably could help us all if you would really summarize your testimony—it would be appreciated—and maybe react to some of the statements from earlier. That might be the best way to go.

Mr. Moore, please, the floor is yours.

TESTIMONY OF STEPHEN MOORE,[1] DIRECTOR OF FISCAL POLICY STUDIES, CATO INSTITUTE, WASHINGTON, DC.

Mr. MOORE. Senator, that was a very tough act to follow. That was really extraordinary. I have never seen testimony like that before, and I hope you take that to heart. It is hard for me to add much to that.

Let me first say, in keeping with the Truth in Testimony Act, the Cato Institute does not receive a penny of government funds.

Senator Brownback, I appreciate your leadership on this issue of corporate welfare. You and I have talked about this in the past and let me just say from a political standpoint, I think it is very difficult for the Republicans or the Democrats or for any of the Members of Congress to go to their constituents and say that we are going to balance the budget by cutting programs like welfare or cutting programs like Medicare for seniors, cutting programs like veterans benefits, and then saying but we can't cut programs like the ATP that are giving out million-dollar grants to AT&T, Amoco, General Electric, and GM.

We just did a little analysis of eight of the largest companies that received ATP money since 1994 when this program was started. Just eight companies alone—AT&T, Citicorps, and MCI, and so forth—had $25 billion in profits in 1994—$25 billion. Now, I think it is very hard to see how you can go to your constituents in Lawrence, Kansas, and say, well, we have to cut Medicare, but we can't cut these small grants to companies that made $25 billion in profits.

Again, you know that I am not someone who bashes big business. I want to see America have global leadership in the very kinds of industries that T.J. Rodgers talked about, but I simply reject the idea, and I think that this Congress ought to reject the idea that the way to be pro-business is to be pro-business one at a time. You would be much better off cutting these taxes.

If you look at my testimony, Senator, the point that I make is that if you look at the total pie of corporate welfare, as we define it, it comes to in the neighborhood of $65 billion right now in terms of total corporate welfare spending. Now, to put that number into perspective, right now the budget deficit for 1997 is expected to be just a little bit over $65 billion. So if you could cut the corporate welfare out of the budget, we could essentially balance the budget today.

Or to put it alternatively, a better way to think of this is that if you took that $65 billion, Senator—and we heard some pretty compelling evidence earlier today about the good things that ATP has done, and I won't deny that some of these grants have certainly led to some exciting innovations. But if you took that $65 billion that we spend on corporate welfare today, you could entirely eliminate the capital gains tax and the estate tax in this country. That is pretty incredible.

I think it would be hard for anyone—Senator Lieberman, who I have great respect for—to say that if we were left with these two choices, either to have these corporate giveaway programs or entirely eliminate our capital gains and estate tax, which would be

[1] The prepared statement of Mr. Moore appears in the Appendix on page 85.

better to create high-paying jobs in this country, to create more growth and more employment? I don't think there is any question which of those two choices would be better.

It is getting late. Let me just make one last point and then I will turn it over to my colleague, and that is I think one of the most insidious features of these types of programs, Senator, is that I think it does create a kind of climate of corruption in Washington. These programs like ATP do create a kind of cash in/cash out system.

If you look at the last chart in my testimony, Table 4, we look at just some of the major recipients of ATP since 1992, and looked at companies like General Electric, BP America, Dow Chemical, AT&T, Boeing, Chevron, United Technology, MCI. And it turns out that in 1996, these companies made literally hundreds of thousands of dollars in contributions to both parties, not to the Republicans, not to the Democrats, to both parties.

I think Americans really find this kind of sickening, actually, that essentially what we are doing is finding that these very companies that are saying we can't possibly invest in these new technologies unless you give us money are then turning around and giving that money right back to the parties. This is not free enterprise. This is not free markets. I think Mr. Draper said it best. Shut it down.

Senator BROWNBACK. Thank you very much, Mr. Moore.

Mr. Carlson, thank you for joining us and for waiting so long. I appreciate your being here and look forward to your testimony.

TESTIMONY OF DWIGHT D. CARLSON, VICE CHAIRMAN, PERCEPTRON INCORPORATED, ANN ARBOR, MICHIGAN

Mr. CARLSON. Mr. Chairman, thank you for this opportunity to share my experience with the Advanced Technology Program. I began my career in the auto industry in 1962. In 1968, I founded Xycom, a high-technology company, in Michigan. In 1971, we licensed Hewlett-Packard to sell Xycom products in Europe and Asia. So I have had an opportunity to be a supplier to Toyota, in Japan, since 1971 and develop some insight into how international competition is conducted. In 1981, we founded Perceptron, which today is a successful public company supplying three-dimensional machine vision technology worldwide.

After 35 years involved in the industry and in international competition, I have drawn the conclusion that international competition is truly a team sport. The auto industry is a fiercely competitive business which impacts the economies of many industrialized nations. As an example, 1 out of 7 jobs in the United States are related to the auto industry.

In 1992, I had the opportunity to lead an ATP project to improve the competitiveness of the domestic industry. I believe I am the only panel member who has had actual experience in putting together an ATP consortium and managing an ATP project.

Our first project was focused on building of automobile bodies. Much like the foundation of a house, if you get the automobile body correct and square, the doors go on right, the windows go up and down, and so forth. What the ATP did was to enabled us to put together the auto body consortium, which is something I personally

had tried to do unsuccessfully for 10 years in the private sector. What the ATP did was break down a number of the Federal barriers to collaboration. As you know, venture capital does not fund consortia.

The ATP also enabled us to team big auto companies, with small companies like my own. ATP also enabled us to team the small companies with universities. As you know, universities typically do not work with small companies unless they have ATP grants, and I understand why. ATP also enabled us to team the industry with the Federal laboratories, which is something that holds a lot of potential.

Most importantly, ATP enabled us to focus research on improving manufacturing processes. Japan invests 80 percent of its research on improvement of manufacturing processes, only 20 percent on product. We in American turn that right around and spend 80 percent of our research on product and only 20 percent on process.

Also, venture capital in America does not invest in manufacturing process improvement. Michigan is one of the leading States in the Nation in research and development. However, we are an absolute disaster in venture capital. So over the last 2 years, our governor worked very diligently to put together our first venture capital fund. It was just announced a few weeks ago, $170 million of venture capital in one fund.

Its first investment of $12.5 million was to expand the ½-off card shop retail chain in Michigan. I called up the manager of the venture capital fund and I said, what happened? He said, well, we don't invest in start-ups and we don't invest in product-oriented companies; we only invest in service companies. That was yesterday. So I can tell you in Michigan, venture capital does not fund industrial technology and we are a leading industrial State.

A car body today is made up of over 300 parts. In most plants, 60 car bodies are assembled in an hour, 1 every 60 seconds. It is a very complex, real-time process which requires management with real-time data in order to compete. The ATP enabled us to do the research on technology and the techniques to reduce variation in the auto body to plus or minus one millimeter—it is called the two millimeter program—which significantly improved the quality of the domestic industry, reduced costs, and shortened time to market.

Because we were working as a team, we were able to increase both the knowledge of the industry leaders and also empower the workforce. It was an uplifting experience to be involved in plants where we implemented the two millimeter program and to see the improvement in the lives of the workers. I mean, people basically want to improve quality, reduce waste, and they want to be on a winning team.

So why was the two millimeter ATP program so successful? First, I attribute the success to the way the Advanced Technology Program was thought out. It was a very well-thought-out approach which enabled Americans to compete as a team. I understand the credit for the wisdom of the ATP program belongs to people right here in Congress, and I congratulate you.

The second key to success is the way that NIST administers the program. NIST allows the private sector to determine what technologies will be researched. It gives the private sector the complete responsibility for the success of the project. NIST serves as a facilitator, not a bureaucratic controller.

The third key to success is it enables small innovative technologies companies to team with major research universities in America. As I travel around the world, those are the two cultural advantages of America. One is innovative small companies, and, second, are major research universities. Nowhere else in the world do you see these two cultural advantages.

Who benefited from the success of the two millimeter ATP? Well, certainly the automakers benefited from their quality improving, their costs going down, and shortening their time to market. Certainly, smaller companies such as Perceptron. We were able to do research and test new ideas in plants very rapidly, with the support of the auto industry and with the help of university researchers. The workforce was empowered, as I mentioned. The university researchers got funding to do worthwhile research and they saw the results of their work.

The Federal Government also received tens of millions of dollars in additional taxes as a result of eliminating hundreds of millions of dollars of waste in the auto industry. Most importantly, U.S. consumers benefited from higher-quality vehicles. We received a $5 million grant from ATP and matched it with $7 million of private sector funding. Where did the $5 million of ATP money go? It did not go to General Motors, Ford, and Chrysler. It did not go to Perceptron or any other company. We used the entire grant to fund 32 researchers for 3 years to work with smaller companies to solve tough problems in the auto industry.

GM, like Perceptron and all the other companies, paid into the ATP project so we could perform as a team to solve problems which benefited everyone. And the auto industry is not the only industry that benefits from the technology and techniques that we developed. The appliance industry and the aircraft industry all benefit as a result of this work.

The question is whether America can compete. I would like to point out this front-cover article in *Business Week*, April 9. The CEO of Toyota points out that "we plan to dominate, really dominate, the world auto market." Can Toyota do it. As a supplier to Toyota in Japan since 1971, I believe they can. Today, the financial markets place a higher value on Toyota than General Motors, Ford and Chrysler combined. Yes, one Japanese auto company is worth more than the entire U.S. auto industry. Now, if you believe in financial markets and their ability to assess value, that should be a very scary thought. The 1997 J.D. Power customer satisfaction ratings just came out. The Japanese models captured 9 out of the 10 top positions.

Can America compete? I believe we can. However, it will take the best and the brightest we have in industry, the best and the brightest we have in our universities, and the best and the brightest we have in the Federal Government, and it will be a real battle.

The reason that I support the Advanced Technology Program is that I saw firsthand it enabled Americans to function as a team

and significantly improve the competitiveness of industry. The responsibility of the success of the Advanced Technology Program lies squarely in the hands of the private sector. We must lead and perform in order to make the Advanced Technology Program, which was expertly conceived here in Congress and is professionally managed by NIST, successful. You cannot do it for us. We have the ball. You have enabled us to succeed, but now it is up to us.

Thank you.

Senator BROWNBACK. Thank you, Mr. Carlson. I appreciate that. You mentioned in your testimony that the ATP program helped you break down barriers. And don't let me misquote you on that, if that is accurate. Is that correct?

Mr. CARLSON. That is correct.

Senator BROWNBACK. What barriers did it help you break down?

Mr. CARLSON. In the auto industry, for a number of years the Federal Government has been very clear. If we were ever to collaborate in Detroit, they would throw our butts in jail forever.

Senator BROWNBACK. Antitrust.

Mr. CARLSON. This is the only Nation in the world that has its auto industry concentrated in one city. That should be a tremendous advantage, but it is not an advantage unless you can collaborate, and we could not do this without ATP.

Senator BROWNBACK. So does ATP give you a waiver or secure a waiver, or does it give the government imprimatur that keeps everybody from being scared that there is going to be an antitrust suit? What does it actually do?

Mr. CARLSON. The latter. Essentially, we feel that when we are meeting together, the Federal Government, through ATP, is in the room with us.

Senator BROWNBACK. So that you can sit there and talk with each other?

Mr. CARLSON. That is correct, and we do not violate any antitrust laws or any laws of that nature. It is just a matter of being in the same room together.

Senator BROWNBACK. What other barriers did it help you break down?

Mr. CARLSON. The enablers, as I mentioned them, were primarily the ability to team the smaller companies with the universities. That is a key. Universities primarily work with big companies and the government because that is where the research dollars come from, and the ATP was wise enough to realize if they put the money in the hands of small companies, it would attract the university researchers, and it did.

Senator BROWNBACK. OK. So when you say enablers, these are the people paid for out of ATP funds, or are these actually the Federal Government employees that are going around and contacting universities and small companies to——

Mr. CARLSON. No. If the grants go to the small companies, the universities figure that out real quick. They know that.

Senator BROWNBACK. So the universities chase the dollars to the small companies?

Mr. CARLSON. Absolutely. I mean, I think universities truly do what is in the national interest. When President Kennedy wanted us to go to the moon, it was NASA grants and universities went

in that direction. When President Reagan wanted us to be militarily superior, the grants came out of DoD and the universities responded. If you want to be industrially competitive, give grants out of the Commerce Department and the universities will respond. I have to hand it to them. They are a very, very bright group of people and they are very agile.

Senator BROWNBACK. What else did it do in breaking barriers down?

Mr. CARLSON. This investment in manufacturing process improvement takes insight that was provided by NIST—the Bureau of Standards is part of NIST—and NIST has the understanding like the Japanese have that it is important to invest research money in manufacturing process improvement. In this country, in the private sector, we have had a difficult time really appreciating the importance of process improvements. And through the ATP, we were able to work on process improvement.

Senator BROWNBACK. Anything else of breaking barriers down?

Mr. CARLSON. No. That is it.

Senator BROWNBACK. It strikes me what you are describing here is a facilitator role by the Federal Government in putting this together that helped facilitate this consortium for the auto industry.

Mr. CARLSON. It is very important, yes.

Senator BROWNBACK. But you could do that without giving a dime to the industry to do that.

Mr. CARLSON. You could if indeed someone would fund consortia. No one funds consortia. For instance, supply chain optimization—we all know it would be very beneficial. General Motors, Ford, and Chrysler give speeches around the country of how much supply chain optimization could save, but no one puts out any money to do it. So it is a problem. We need to solve it.

Senator BROWNBACK. But they could. The industry itself has the wherewithal and clearly has the money to do this if they so chose to. I mean, the auto industry is profitable at this point in time and they could fund this. Particularly talking about the quantity of money we are talking about here, $225 million versus the profits of the Fortune 500, this is a minuscule amount of money that we are talking about.

Mr. CARLSON. Right, and the leadership has to come from some where, and it is unfortunate but true, because I am an industry person and an entrepreneur—I hate to say this, but the bright, creative leadership for this ATP came from the Federal Government. It did, and to the extent that good leadership is important and it comes from Washington, so be it.

Senator BROWNBACK. I guess what you are describing to me is a system that you saw the facilitator role as very important, particularly the antitrust issue, which I tend to believe is very important as an issue. But that is separate, really, and distinct from putting money into an ATP program. That means we ought to deal with our antitrust laws to get people to cooperate. We have created an atmosphere such that they couldn't cooperate back and forth, or didn't feel like they could without the possibility of being sued by the government.

Mr. CARLSON. That is correct, but I don't want to discount the intelligence that has been brought to this collaboration from people

who are here in Washington. I mean, contrary to popular belief out there in the hinterlands, there are some very smart people in this city.

Senator BROWNBACK. Good. I appreciate your saying that. I think it is good that people be recognized that they have done a number of good things. You heard our earlier panel. People here truly want to do the right thing. It is just, now is this the right way you do it? That is why when I was going down through your barriers, it struck me more that what we need to do is remove barriers more from here rather than putting in necessarily money to do a program like this. You are saying, though, as well, we have benefited from the expertise that the facilitators brought. I appreciate that.

Mr. CARLSON. That is correct.

Senator BROWNBACK. Thank you. Actually, I would like, Mr. Carlson, your reaction to this. If we eliminated corporate welfare and, in exchange, we zeroed out capital gains and estate taxes, would that be a better world?

Mr. CARLSON. I personally pay millions of dollars in taxes, so I would love to have my taxes reduced. However, I seriously doubt in the complex international competition we are facing that simply cutting taxes will do it. Unfortunately, government plays a very big role in safety standards, emissions standards, and whether we tax or don't tax gasoline, etc.

As an example, we have a protective tariff on trucks. We wonder how the auto industry is making money because, in cars, the auto industry hasn't made a dime in 10 years, not a dime. Where is all the money coming from? It comes from trucks. Well, why is it that we can make money in the United States on trucks? It might be because the Federal Government put a 25-percent protective import tariff on trucks.

So whether we like it or not, this is a very complex world. You folks here in Washington have a real challenging job. I don't believe there are simple answers. The two gentlemen before me sort of insinuated that you do this and everything gets better. I wish that was true, but I don't believe it is that simple.

Senator BROWNBACK. Mr. Moore, anything else you wanted to add or respond to?

Mr. MOORE. Well, let me just respond to that. Actually, the three people who testified before you made that point. The fact is that when you look at the rationale for this—and I hear it said all the time that we have to do this to retain our competitive vis-a-vis Japan and Europe. The thing that is extraordinary about this is the model that ATP is based on is really a kind of European model industrial policy.

Senator I mean I don't have to tell you this. Europe is an economic basket case; it is a disaster. The more these countries get involved in these programs, the worse they do economically. They are able to subsidize certain industries, but very much to the liability of the very sector of the economy that really is exploding in the United States, which is our small business sector. You cannot subsidize every small business in America. God forbid that you tried to, Senator.

If you look in my testimony, I just compare the unemployment rate. The United States is doing well. We have sinned much less

than Europe in this regard. I mean, when you look at ATP, this is pretty small potatoes in the grand scheme of things. Europe does this on a vast scale and they have done it to their detriment.

In fact, if you look at what is happening in countries like Germany and France and Sweden, they are having to dismantle these programs because they have no entrepreneurial sector that can compete with the United States. So I just don't see this as being a model that is worth emulating.

Senator BROWNBACK. Thank you, gentlemen, very much. I appreciate it. Thank you all for attending and we appreciate it very much.

The hearing is adjourned.

[Whereupon, at 4:21 p.m., the Subcommittee was adjourned.]

APPENDIX

DR. MARY LOWE GOOD
Under Secretary for Technology
Technology Administration
U.S. Department of Commerce

before the

Senate Governmental Affairs Committee
Subcommittee on Oversight of Government Management and the District of Columbia

June 3, 1997

Thank you Mr. Chairman and Members of the Subcommittee.

This is a special time, when we have a window of opportunity to make some historical progress in dealing with the pressing issue of eliminating Federal budget deficits while preserving crucial government functions important to our nation's well being and to all of our citizens. The President's budget agreement with Congressional leaders is both heartening and remarkable. It is an opportunity that we should not and must not waste. It is an opportunity that we must make work.

It is incumbent upon the Administration and Congress to evaluate which investments we should make in order to both maintain our standard of living and provide the foundation for continued economic growth and opportunity. The trick is to figure out how to pinpoint the most promising Federal efforts that are likely to pay off in the long-run, and how those investments for the future should be balanced against today's pressing needs.

That's why I truly welcome this Subcommittee's hearing today. Your topic is one of great importance to the nation. Let me quote what someone told me, quite elegantly, on this subject recently:

> "Truth number one: research and development, science, and education bring advancements and innovation.
>
> Truth number two: innovation has been the basis of our competitive edge--peaceful and defensive--and of our extraordinary lifestyle; it is the cornucopia of the modern America and the envy of the world.
>
> Truth number three: funding research and creating an environment that encourages private research and innovation are the bedrock upon which much of our national economy is built."

Those are the words of one of your colleagues: Senator Bill Frist of Tennessee, who spent some time with me recently in another hearing on how our efforts in the Technology Administration were helping to ensure that these truths continue to be positive forces for our Nation.

I think we would all agree that sustained economic growth--with the jobs and higher standard of living that it brings--is among our Nation's highest priorities. And among the drivers of growth, technology is the single most important determining factor, estimated to account for as much as 50 percent of the Nation's long-term growth. That is why I have spent most of my professional career advocating the importance of R&D and technology in our academic, industrial, and government budgets.

The technological infrastructure we have built over the past 50 years-spanning industry, academia and government-has generated enormous dividends to our Nation.

But in today's technology-based global economy, our infrastructure is more vital than ever before. It is essential to our prosperity, job base, and the creation of wealth-which in turn are the foundations of our standard of living, quality of life, national security, and global influence.

I spent 20 years at Louisiana State University and on the National Science Board fighting for university-based research because it allows us to develop world-class scientific and technical talent while simultaneously contributing to the Nation's knowledge base.

During almost 15 years at Allied Signal, I worked to preserve our R&D base in an era of major consolidation, streamlining, and a new emphasis on product quality and process improvement. While the company was making these needed adjustments, it was in its long-term interest to maintain R&D investments that would underpin the company's future competitive abilities.

The success of both of those efforts relied heavily on the commitment of the U.S. government to maintain a stable R&D portfolio at the Federal level that could be leveraged by academia and industry. For the universities, it has been their base of support. For industry, it has created the infrastructure that has provided a flow of new talent and programs that filled gaps in new technology development and critical generic technologies that the industry could not provide for itself.

Though the Federal R&D budget is often cast as a $70 billion-plus investment, vastly larger than any other nation's, the reality is more sobering. Nominally stated as $74 billion, the actual FY 97 Federal investment in R&D-what could be called the science and technology base-is only about $41 billion; the rest (44 percent) is in short term developments unique to specific defense weapons systems, thus offering extremely limited usefulness to the economy. And of the $41 billion, nearly a third is spent on health research. Thus, the Federal investment in every other field of science and technology-from physics and materials to computing and communications, from energy and the environment to software and simulation is substantially less -- $28 billion out of total Federal budget of about $1.7 trillion. As the Federal government tightens its belt to achieve a balanced

budget, we must not lose sight of the sustained investment required to ensure America's economic and technological leadership into the 21st century.

While we contemplate the size and scope of our public R&D investments, we must take into account what is happening in the rest of the world. Nations everywhere have recognized the link between technology, economic growth, and job creation. They are rapidly expanding their scientific and technological capabilities, establishing a sophisticated array of technology policies, and expanding their public investments in R&D in order to retain and grow their domestic industries while attracting the engines of economic growth to their shores.

For example, the Japanese Cabinet approved a proposal last summer to double its science and technology budget within five years, spending $155 billion between 1996 and 2000, of which 95 percent is targeted at civilian technologies. If these plans are implemented, Japanese government expenditures will soon exceed, for the first time-in absolute terms-the U.S. government investment in civilian R&D.

Let me try to put this in perspective. For the last half of this century, America has stood as the world's preeminent leader in science and technology. Immediately after World War II, America's R&D investment dwarfed the rest of the world's-in fact, during the 1950s, U.S. defense R&D spending alone exceeded the rest of the world's combined efforts. Our economy was booming while the rest of the industrialized nations were digging out from under the war's rubble and rebuilding their economies. In 1960, U.S. R&D spending was still twice as large as the rest of the world's, however, the gap began to narrow as the post-war economies of the industrialized nations recovered. During the 1980s, as the global market rapidly took shape and new competitors emerged around the globe, U.S. R&D spending fell below half of total global R&D for the first time since World War II. Today, the rest of the world spends nearly a third more than the United States on R&D.

In recent years, the development of technical capability outside the United States has resulted in profound implications.

First, sources of technology outside the United States are becoming increasingly important to the growth and survival of U.S. companies. When we talk about living in a global economy, quite often we think of international trade and the competition between firms from nations across the world. However, globalization also encompasses the three factors of production. Increasingly, capital, labor and technology know no boundaries. On the capital front, foreign direct investment in the United States and U.S. direct investment abroad tripled between 1985 and 1994. And companies are tapping a global labor market. For example, half of the one million people working for the chemical industry in the United States work for foreign companies, while U.S-based firms are using information technology to tap knowledge workers the world over.

On the technology front, U.S. companies have increased the R&D they perform overseas threefold since 1980, and foreign-owned firms now account for $1 out of every $5 spent in

corporate R&D in the United States. In the perpetual race to be the most competitive, many companies have-by necessity-replaced their "not invented here" attitudes with a "hunter-gatherer" orientation that seeks out the best the world has to offer, bringing home leading-edge product, process and managerial technologies.

The Technology Administration, through our National Technical Information Service and Office of Technology Policy, seeks to facilitate U.S. access to these innovations. For example, the Office of Technology Policy is monitoring the S&T activities of other nations and making this information available to U.S. business.

Let me take this opportunity to introduce some of our recent reports to inform this subcommittee's decision making.

Technology in the National Interest highlights the important role technology plays in our economy, national defense, and public interests and discusses key policies and programs within the framework of the Administration's technology policy;

Globalizing Industrial Research and Development documents the rapid expansion of U.S. and foreign investments in R&D facilities around the world; and

International S&T: Emerging Trends in Government Policies and Expenditures documents the S&T policies, programs, and investments of developed and rapidly developing nations.

The cloning of an adult sheep is the most recent testament to the globalization of technology. While the National Institutes of Health has funded much of the fundamental research in this field, it was Scottish scientists who achieved this important breakthrough. It would be a great loss if companies from other nations were able to reap the enormous economic and social benefits of this technology ahead of American companies.

Other foreign technology advances of equal or greater potential-built on the foundation of U.S. fundamental research-have met with much less fanfare. For example, Japanese scientists have made breakthrough advancements in two fields pioneered by the United States: superconductivity and materials.

Federal investments in superconductivity research in support of the now-abandoned Superconducting SuperCollider (SSC) project propelled the United States to global leadership in the field. But it was scientists at Japan's Fujikura Ltd. that developed a new method for manufacturing superconducting tape capable of unprecedented current densities. This technology holds great promise for use in a broad spectrum of applications across many industries, including electric utility equipment, electrical power transmission, and diagnostic medical magnetic resonance imaging. Even now, in its nascent development stage, the market for superconductors is $1.7 billion.

Japanese scientists have also capitalized on another American discovery: bucky balls. These unique carbon forms may well lead to practical superconductors, faster computers, and safer medical treatments. Though two American university researchers and one from Great Britain received the Nobel Prize for their discovery of bucky balls, it was researchers at NEC Corporation's Tsukuba Research Laboratories that discovered and refined a process for creating nanotubes-an elongated bucky ball with the potential for creating composite materials that are stronger and lighter than any metal.

The message from these examples is clear: Nations around the world are now as adept as the United States in using the results of basic research. If America fails to capitalize on its investments in fundamental research, companies around the world will-and the jobs and economic growth from these innovations will flow to their countries, not ours.

Is there a Federal government role? Without a doubt. Let me focus on my own backyard, if you will. The Technology Administration has several initiatives that are designed to help ensure that Americans benefit first and foremost from our national investments in fundamental research.

The U.S. Innovation Partnership seeks to maximize the impact of both federal and state technology investments by fostering greater coordination and cooperation among the states, the federal government, industry, and universities.

We also have proposed a new initiative designed to foster development of the indigenous technology assets of states that are traditionally under-represented in federal R&D funding through better integration of local, state, regional, and federal investments in technology-based economic development. This program--called EPSCoT, Experimental Program to Stimulate Competitive Technology--will complement the National Science Foundation's successful EPSCoR program which was established to spur high quality research in these areas.

In addition, the Technology Administration plans to continue its successful Partnership for a Competitive Economy, or PACE, initiative which brings together leaders from industry, academia, and government in cities across the country to discuss policy issues affecting U.S. innovation and competitiveness.

These efforts are vital to building a cohesive national innovation system that ensures that the benefits of our national investments in science and technology accrue first and primarily to the United States.

The enhanced technological capabilities of other nations has also contributed to their domestic industries' ability to rapidly commercialize new and emerging technology, and prosper in an environment of shorter product, process and service life cycles.

As the competitive pressures of the global marketplace have forced American firms to move more of their R&D into shorter term product and process improvements, an "innovation gap" has

developed between fundamental research on the enabling and emerging technologies that will underpin the products and services of the 21st century, and the shorter term development activities of U.S. corporations. Though these technologies offer potentially large economic and social returns to the Nation, they often languish due to their high costs and high risks.

The National Institute of Standards and Technology's Advanced Technology Program seeks to bridge this "innovation gap" by forming partnerships with companies and consortia to advance these technologies to a developmental prototype. An Office of Technology Policy analysis of white papers from the U.S. technical community submitted in conjunction with the ATP program shows that high risk was the most frequently cited reason for seeking federal support; that is, program ideas had an inherent risk exceeding the industry threshold to the point that private investment could not occur in a timely fashion without public support. If you want a dose of reality, I urge you to sit down and with some small company entrepreneurs trying to get financing when they need between $250,000 and $5 million to develop a prototype just to show proof of concept. Or sit down with a group of venture capitalists. The funding for these higher-risk ventures when the technological ideas are just that -- concepts, not hardware, not software -- is extraordinarily difficult to come by. That is one of the key motivators for the ATP: co-fund the very risky technologies that have enormous potential if they can overcome the initial hurdles. Then, and only then, will the financial markets and the managers of larger company R&D operations be willing to invest in these ventures. I want to make something very clear here: ATP managers strongly believe that we should leverage private-sector development of enabling technologies *without* displacing private capital funding, and we have significant evidence that makes us very confident that we are *not* supplanting that private investment.

While cost-sharing is often cited as the primary benefit of this program, other important benefits are derived from the Advanced Technology Program. First, companies come together to share the costs and risks of developing technologies in which they share mutual, non-competing interests. Thus, while a technology may be too expensive or carry too high a risk for a single company or single industry to develop, ATP encourages the types of partnerships that spread costs and risks, reducing each company's barrier to investment. These partnerships also allow the technology to be employed in a broader array of potential market applications enabling companies to recoup more quickly their R&D investments. Finally, ATP's technical and business reviews engender a great deal of prior planning, addressing the full scope of innovation activities. These reviews improve the planning process and serve as a bellwether for potential investors of the validity of the technology-projects that receive grants are known to have survived a rigorous review of the technical and financial aspects of the technology. Projects that do not receive grants nevertheless benefit from the critical review of their proposals.

We have made tremendous technical progress since we launched this program in 1990 with our first awards. Two hundred and eighty-eight awards have been made to date, involving more than 700 participants--and that doesn't include subcontractors and informal collaborators. Among our participants are more than 100 universities who are involved in over half of all ATP projects. Let me repeat that because we have not been able to make this point clearly enough: more than 100

universities are involved in over half of all ATP projects.

Overall, NIST has committed almost $990 million, and industry cost shares by adding another $1 billion. Because ATP was only a pilot program prior to 1993, all but a handful of these awards were made in the last four years.

While it is still too early to judge long-term benefits, survey results show that the program has accelerated technology development, expanded the funding companies otherwise would provide for long-term research, improved research productivity, created and retained high wage jobs, improved companies' competitive standing, and fostered valuable industry/industry, industry/government, and industry/university alliances that have increased R&D efficiency. Also, I refer you to our report to Congress entitled, *The Advanced Technology Program: A Progress Report on the Impacts of an Industry-Government Technology Partnership*, which provides an assessment of the program's effectiveness.

If you are looking for an outside opinion of the effectiveness of the ATP, and a glimpse at the extraordinary impact that it is beginning to have, a recent announcement from the National Center for Manufacturing Sciences (NCMS) should be of great interest. NCMS headed up a consortium of suppliers, makers, and users of printed-wiring boards, the thin composite boards that form the backbone and nervous system of virtually every electronic product. The challenge for this consortium was to deal with fundamental limits in both materials and processes that were becoming more severe as electronic devices increased in complexity and speed. NCMS and its team members assembled in 1990 to attack these issues with support form the ATP. In an announcement last month, NCMS declared that the results of their ATP co-funded project "quite literally saved an industry and shaped an unprecedented process for the performance of cooperative research and development." And it is no small industry: the U.S. share of the printed wiring board industry is $7 billion, and is a key segment of the $20 billion domestic electronic interconnection industry that employs over 200,000 people in this country. The ATP invested $12.8 million. The remainder of funding for this 5-year, $26.6 million project came primarily from the private sector along with some funding from the Energy Department for participation by Sandia National Laboratories. That's an amazing return on investment -- and it would be awfully hard to argue by those data that this was not a wise investment in taxpayer dollars. I would like to submit for the record a statement from NCMS which explains their findings after looking at this project. I urge you to read it carefully.

As I said, it is still early for the ATP. Only a few dozen projects have been completed to date. We are just beginning to see the results of this work spread throughout various industry sectors, and it likely will be years until the full impact is understood. That will happen when we see entire new technologies and even new industries created out of the basic technology research cosponsored by the ATP. When policy makers in the Administration and the Congress worry about how to allocate scarce dollars from the government's constricting discretionary accounts, we all must look toward the future and we should opt for efforts like the ATP because they are beginning to make a difference now and their potential is enormous.

While ATP focuses on the development of new technologies, NIST's Manufacturing Extension Partnership focuses on improving the performance of America's 381,000 small and medium-sized manufacturers through the adoption and integration of appropriate new manufacturing technologies and approaches. With the exception of a small number of market leaders, most U.S. firms have been slow to adopt these new technologies and approaches that can lead to dramatic improvements in product quality, cost, and time-to-market.

Over just the last four years, the MEP has grown from seven initial extension centers to 360 locations covering all 50 states and Puerto Rico. The program has begun to turn fledgling state efforts at manufacturing extension into a comprehensive network with access to national experts and a rigorous, regular review and improvement process. By requiring that each center raise matching funds from state, local, and private sources, federal MEP dollars have leveraged both dollars and local commitment to manufacturing extension that otherwise would not have been available. To date, about 45,000 small and medium-sized companies have received direct MEP services with results like higher profitability and sales, lower labor and materials costs, retained and added jobs, reductions in required inventory, and increased capital investment.

Our five-year goal is to increase the MEP reach to 15 percent of the potential companies -- 55,000 smaller companies in all. That would be a substantial increase from our current reach of 7 to 10 percent of the potential customers. Next year, NIST plans to expand MEP efforts to help its clients better integrate with larger manufacturers to improve performance throughout the supply chain, to provide technology-intensive strategies for companies, and to help smaller firms integrate information technologies into their businesses.

The Technology Administration has several other key programs that contribute to our technological strength and economic growth. Let me briefly mention two of those efforts and offer to provide this subcommittee with much more information if you desire.

The Malcolm Baldrige National Quality Award, managed by NIST in close cooperation with the private sector, has helped inspire literally thousands of U.S. companies to improve their products and services and to expand their markets through quality management and performance excellence. It is one of the most highly leveraged investments in the entire portfolio of U.S. government programs. Operating with government funding of about $3 million annually, it leverages an estimated $100 million in quality improvement efforts involving companies as well as state and local organizations.

Since 1991, the program has strengthened ties to a growing array of state and local quality programs that mirror Baldrige performance excellence guidelines. In the process, NIST has established an emerging national quality network poised to better serve U.S. businesses of all sizes.

The dividends from following the Baldrige approach are quite literal. In a study released last month, the 16 publicly-traded past Baldrige winners outperformed the Standard and Poors 500 by

about 3 to 1. Even the 48 publicly-traded applicants who made it to the stage of site visits by Baldrige examiners outperformed the S&P by 2 to 1. Quality, and this private-public program, clearly pay well.

Next year, the Baldrige program plans to extend its efforts to two sectors that are absolutely critical to our Nation's future: education and healthcare. The education, healthcare and business communities have expressed clear interest in having NIST establish Baldrige quality awards for those sectors, and NIST already has conducted a successful pilot program. Substantial private sector funds are now being raised by the Foundation for the Award.

Perhaps the crown jewel of the Technology Administration is our NIST laboratory program. The NIST labs are at the heart of the Institute's long track-record of success in serving the public and industry. Focusing on the need for increasingly exacting measures in the world of science, technology, and commerce, NIST plays a large -- albeit behind-the-scenes-role in the Nation's economic growth.

With a unique responsibility in the federal government and the Nation, NIST's laboratory work is vital as we strive to continually improve the U.S. system of measurement and standards. It provides U.S. industry with a major competitive advantage in the global marketplace, which translates to tangible benefits for our economy.

The accuracy of transactions-valued in the trillions of dollars-depends on NIST's maintenance and development of accurate weights and measures for the fair exchange of goods and services. Trillions of dollars in additional sales are supported by NIST-delivered measurement techniques, equipment calibrations, and standards. Moreover, U.S. scientists rely daily on NIST's evaluated data services and measurement expertise for a host of both basic and applied research activities.

With the goal of reducing barriers to U.S. exports in a world where business is increasingly a global undertaking, NIST is seeking to create a comprehensive approach to technical measurements and standards for international trade, and to promote the global use of U.S. standards and measurements. NIST's goal is to develop measurement methods and international infrastructures to provide confidence in the traceability of physical and chemical measurements throughout the world, and to harmonize standards, codes, and regulations in collaboration with other government agencies and the private sector.

There are other crucial efforts within the Technology Administration. These include the Office of Technology Policy, which among other things, develops key information that allows us -- and you -- to make better informed judgments about how to anticipate and respond to vigorous international technology competitiveness challenges. Also among our rather small but highly leveraged programs is the Office of Air and Space Commercialization; our government's coordination of the impressive Partnership for a New Generation of Vehicles; the National Technical Information Service, which is a self-sustaining provider of technical information; and a key recognition program to help the nation better appreciate the importance of technology, the National Medal of Technology.

Ours is a relatively modest portfolio. We are under no illusions about the real limits of tighter Federal budgets. We also are under no illusions about the magnitude of the challenges that this country faces in the decade and the century ahead and the crucial role that technology will play in determining whether the 21st Century is another American Century. Together, we must find a greater common ground for a Federal role in technology development and commercialization that will enable our private sector to forge ahead and provide the basis for a higher quality of life for future generations.

Thank you, Mr. Chairman, and I would be pleased to answer any questions that you may have.

Testimony
of
Robert M. White

Robert White. I am currently University Professor at Carnegie Mellon University in Pittsburgh. Prior to joining CMU I served as Under Secretary of Commerce for Technology during the Bush Administration. And before that I was Vice President of Control Data Corporation and a Principal Scientist at Xerox's Palo Alto Research Center.

The Advanced Technology Program was established during the Bush Administration and I would like to explain why I think it's an appropriate role for the Federal Government.

To do this it is important to understand what I broadly refer to as the innovation process. This is the process by which scientific discoveries are converted into commercial products. It is a complex process that involves industry, government, and academia. Since technology has become such an important factor in economic growth, it is critical for the United States that its innovation process be optimal. The introduction of technology into our lives is much more rapid today than in the past. It took 39 years for the telephone to gain 30% acceptance, 18 years for TV, 14 years for the personal computer, and only 5 years for the world wide web! This means that industry, government, and academia must work together effectively. We cannot afford, for example, to have academia carrying out research in a vacuum with the hope that its discoveries will somehow be recognized by US industry. Since the innovation process benefits many stakeholders it is appropriate that the Federal Government assumes responsibility to ensure that this process operates efficiently. Indeed the US Government does many things to support innovation: it funds science; it provides a patent system to protect inventors; and the Bayh-Dole Act stimulates commercialization of federally-funded research. I want to argue that ATP is another, but unique, instrument by which the Federal Government supports the innovation process.

My argument is based on two examples of ATP grants with which I am familiar. Every personal computer, or any computer system for that matter, stores its data and programs on a "hard disk drive." The hard disk drive industry is a $50 B industry led by the US companies, IBM, Seagate, Quantum, and Western Digital. In 1988 a fundamental discovery was made in France. It soon became clear that this discovery could have a major impact on how data is "read" from a hard disk drive. However, the number of questions to be answered represented far too many options for even IBM to explore. Therefore the manufacturers, as well as smaller suppliers of the reading devices, such as Read-Rite and AMC, all joined together and applied for an ATP grant. They were successful. And, now, five years later, IBM, as well as others, are about to announce the incorporation of this so-called "GMR head" in future products.

Not only did this grant bring together large and small companies, it also involved several universities as well as NIST itself. The fact that ATP funds are channeled through industry to the universities assures a focus for the university research that is unique to ATP. In many cases this research is carried out in the same laboratories also funded by NSF. This provides a realistic context for this research as well.

A very interesting phenomenon also occurred near the end of this program. As the companies became familiar with the issues involved they began to develop their own internal strategies, with the result that their involvement with the program began to wane. Thus, we observed a natural transition between the precompetitive phase, characterized by risk-sharing and government cost-sharing, to a competitive phase now borne entirely by the companies themselves. If this were "corporate welfare," this transition to independence would not have occurred. Thus ATP provided the catalyst.

As a result of this program the US disk drive industry is ahead of its global competitors. Most of the participants feel that without this federally enhanced partnership they would very likely have fallen behind. While the ATP funds were an important ingredient, ATP also provided a structure in which technical personnel from these different companies could interact in a way that would normally not happen. It is also true that if IBM had been excluded from this project by virtue of its size many of the others would have also withdrawn.

The second example is that of a small company. A number of years ago Honeywell had developed a memory technology for space applications. A Honeywell employee saw a commercial application so he obtained rights to the technology and started his own company. To demonstrate commercial feasibility he obtained an SBIR grant. Then, to scale up, the company sought more funding. Because the risk was still large, venture funds were either not interested or wanted too large an equity position. The company obtained an ATP grant and successfully demonstrated the technology to the extent that Motorola has now invested in expectation of future products. It turns out that this technology has numerous other applications. Thus this one ATP success will spawn several other companies.

In both these examples ATP played a decisive role. In the first it accelerated the innovation process; in the second it sustained what was eventually shown to be a valid technology. These are only two of the 288 projects funded by ATP since its inception.

Could these results have been obtained without a federal role? I don't think so. The point is that in these cases at least, other approaches to developing the technology did not work. That is not to say that there may be many cases where corporations will develop their own technology, or cases where venture capital will step up to the opportunity. As I said at the beginning, the innovation process is very complex. I believe that having options, such as ATP, increase the probability of success.

Testimony Submitted to the Senate Subcommittee on Oversight of Government Management, Restructuring and the District of Columbia
by
Tim Draper
June 3, 1997

Mr. Chairman, thank you for inviting me to participate in today's hearing. I appreciate your leadership on the issues being discussed in today's hearing. I hope you will continue to focus on these issues because they are vital to the economic prosperity of our nation and the proper functioning of our government.

Mr. Chairman, as you know, I have submitted my full testimony for the record. In preparing my testimony, I was told that you are sometimes less formal and more conversational than other Chairmen. Therefore, I am willing to read my testimony in its entirety now and then answer any questions you may have, or simply begin answering your questions, whatever you prefer.

I understand that it is almost a tradition for witnesses to appear before the Congress in hearings like this to ask you to spend federal tax dollars on some "important" program. I'm actually here to ask you to direct the federal government to stop spending federal tax dollars in certain areas because it will benefit everyone.

As a venture capitalist, my partners and I specialize in providing seed money to start-up companies. To date, we have invested in more than 150 high-tech companies involved in everything from Internet content and services to flexible semiconductors to software applications.

I would like to accomplish three things today. First, as a founder and chairman of a venture capital firm, I will give you my sense of the health of the high technology market. Second, I will share with you my personal experience in dealing with the Advanced Technology Program, or ATP, as it is known. Related to this, I will give you my perspective on what high-tech start-ups are accomplishing without government dollars. And finally, I will encourage you to proceed with great energy in the direction I understand you are headed.

So, first off -- how is the high-tech business doing? Well, last year, we set new records for initial public offerings and venture capital raised. Investors can't seem to get enough of high-tech stocks.

Our industry now accounts for 11 percent of the United States' gross national product and 25 percent -- one quarter -- of our nation's manufacturing output. We employ more than 4.2 million people who earn almost double the average salary of manufacturing workers. Put simply, our industry represents the single biggest reason the United States has the world's most competitive economy. As a result, we are the envy of the world.

This is why at the recent World Economic Forum in Davos, Switzerland, the most sought-after celebrity was not a head of state. Rather, it was Microsoft CEO Bill Gates. The head of the French Central Bank told the International Herald Tribune, "We need more Steve Jobs, more Bill Gates in Europe."

Senator, I know that you and many of your colleagues applaud the truly landmark, monumental economic successes of the high-tech industry. At the same time, you know and I know that there are those in the federal government who have either already tried, or are trying now, to use federal tax dollars to pick winners and losers among high-tech ventures. Quite frankly, while I want to be polite, I must say that such practices are bad policy... they are bad politics... and most importantly, they are simply an irresponsible waste of money.

Please allow me to give you my own, personal experience in dealing with the federal government in this area both from the perspective of the head of a start-up company and as a long-time venture capital investor.

As acting CEO of Amtel, an HDTV company, I spent about 20 percent of my time and 100 percent of my associate's time during a 6-month period working on an ATP proposal. We worked diligently to write the proposal. We met with various key people to determine whether to link up with other partners and we spent time raising contingency money (when it would have been just as easy to raise real money).

I also had to take engineers off the project to write the technical specifications for the ATP. Finally, I hired a consultant to work with us who had done many of these grants.

All in all, it cost me roughly $200,000 and countless hours of valuable time. The team was very excited about the prospect of the $1.5 mission matching money, although the grant would take us slightly off course because the specs that ATP wanted were not as tight as the specs we were working on originally.

This was to be for advance technology. We were very familiar with all the competitive technologies who had applied and we considered our chances of winning the grant to be excellent. There were two other start-ups who had interesting approaches and about 10 start-ups and 10 larger companies who we deemed no competition because they were simply retreading on R&D created way back in the 1950s.

Once all of the proposals were completed and submitted, it took ATP another five months to review them. When the grant winner was finally announced, we learned that ATP gave the award to Zenith, for their CRT design -- a design we considered antiquated and impractical for the market. It had a devastating effect on our company. It wasn't just losing, it was losing when we learned that the cards had been stacked against us. We later learned that Zenith had applied for, and received, many of these types of grants. They had been working for years with the good folks at ATP.

All we had was better technology. But, the federal government did not pick us. This is not sour grapes. These are just the facts.

3

Simultaneously, all the venture capitalists were waiting for the response from ATP. They wanted to back a winner so they figured the winner of this contest would be a good team to back. When Zenith won, they figured that the start-ups were all worthless and none of us got backing.

Today, as a venture capitalist myself, I know that there is plenty of private money available for good ideas. We now compete for companies with other venture capitalists in bidding wars. $10 billion went into our industry last year. That is, 1,000 million-dollar start-ups. The venture capitalists are generally brilliant technologists with good business skills and keen strategic sense. I would take a mediocre venture capitalist over the best in the ATP program in a heartbeat.

Mr. Chairman, I say this respectfully. There is a lot that the government does well. In fact, there are some responsibilities that only the government can handle.

My grandfather, General William Draper, served as Undersecretary of the Army during World War II. He was responsible for helping oversee the economic reconstruction of Germany and Japan under the Marshall Plan. So, believe me, I have a deep and abiding respect for the awesome powers of a well-functioning government.

However, picking winners and losers in the high-tech industry certainly should not be the domain of the government. Please allow me to explain why.

My firm's philosophy on entrepreneurial investing is that we provide much more than money. A start-up venture capitalist becomes a company's financial strategist... an investment banker... a headhunter searching for the right managers and engineers... a corporate therapist, if you will, providing support and confidence to a new, fledging team of entrepreneurs and innovators.

Respectfully, the government – no federal agency or bureaucrat, no matter how well-intentioned – could ever provide these services. Mr. Chairman, I have read some of your statements about private, nonprofit social programs that transform lives. You have said that, "The government cannot touch the soul."

Well, I agree. In fact, the same is true in launching start-up companies. The government cannot possibly know the soul of the entrepreneur. And I would argue that the government, because it is outside the marketplace, cannot possibly judge the soul of an innovation.

In evaluating whether to provide the seed capital for a start-up, we look very hard at two factors – the individual entrepreneurs and the company's markets. Entrepreneurs are, by definition, heroes. We look for entrepreneurs who want to change the world in some small, or hopefully, big way. In short, we invest in enthusiasm and fire.

When we invest, we are investing in a team of people. Management has to be committed to getting the best people possible for the jobs – people who can do those jobs better than the founder.

4

We are also seeking companies offering significant improvements over existing technology. We see 20 plans a day so eventually we run into some pretty serious innovations.

Before we make the actual decision to invest, we go through an extremely rigorous due diligence process. We evaluate the entrepreneurs, as I said. We thoroughly review business plans. We work with experts to evaluate the particular business market and technology arena. We, of course, examine the product or technology itself.

At any point, we may decide not to invest... not to move forward with our support.

Now, I ask you: what government agency could ever perform these functions? What bureaucrat, with all due respect to competent bureaucrats, could or would perform this type of due diligence before picking winners and losers?

What I'm saying is that the free market works. The government is no substitute for the market. There is no better system than the market for choosing worthy, new technologies and products. Government subsidies... winners and losers selected by non-market forces... simply distort the market. This is not just a waste; it is just plain wrong.

The government's job should be to let the market do its job.

The Congress is under intense pressure to work toward a balanced budget, and you seem to be making progress. I submit that if you are looking to save more than $300 million, zero out the ATP program. And, if you want to save more than $4 billion, then dismantle the Department of Commerce, which is the parent of ATP, and many other expensive corporate welfare programs.

Mr. Chairman, I am pleased to be able to say that the future of the high-tech industry is enormously bright – but only if the government allows us to do what we do best – innovating... creating good jobs with dignity in the private sector... building wealth in areas where literally nothing existed just years before. If the United States wants more good jobs, better lives for our citizens, and a stronger economy, the best thing bureaucrats and politicians can do is leave us alone.

I can tell you that Silicon Valley, which produces a lot of the tax dollars you collect here in Washington, is becoming disenchanted, disenfranchised, and discouraged with the federal government. If you don't do something about it, starting with closing down the ATP program, even the whole Department of Commerce, they might just realize they don't really need you guys in Washington. And they might make the proper, make-versus-buy decision and put you out of business.

Mr. Chairman, thank you again for this opportunity to speak before you today.

STATEMENT OF DR. T. J. RODGERS, PRESIDENT AND CEO
CYPRESS SEMICONDUCTOR CORPORATION, SAN JOSE, CALIFORNIA

CORPORATE WELFARE VS. THE AMERICAN DREAM
EXECUTIVE SUMMARY

- Two hundred twenty one years ago, American colonists declared independence: to be free and to pursue their interests in free markets with limited government. Real Americans hated taxes. They listed as a cause for rebellion in the Declaration of Independence: "for taxing us without our consent." Their new constitution limited government and banned personal income taxes. The Revolution produced the American Dream, during which the common man became better off more quickly than any other time in history. For our first 200 years, from 1776 to 1976, America's per capita income grew at the rate of 450% per century, versus the 3% per century growth rate of the pre-American world.

- Now, the American dream--that every generation will enjoy a higher standard of living--is threatened. Since 1976, the GDP per capita growth rate has steadily declined from 2.5% per year to 1.5% per year, and we hear people say, "America needs a raise." In 1913, the 16th Amendment legalized a federal income tax with a levy of 1% of GDP. Today, the American Dream is threatened by the ever-increasing burden of federal, state, and local taxes, which consume a whopping 35% of our national output. Although we are at peace and without a Cold War, our government is currently spending at a higher rate than the peak 30%-of-GDP rate of World War I, and nearing the record 50%-of-GDP rate of World War II ! There is a broad consensus that government spending must be cut.

- Eliminating "corporate welfare" should be a priority in government spending reduction. The risks are minimal. Savings could reach $275 billion over five years. And there is a moral imperative: We should not be asking our senior citizens to tighten their belts while our government is literally subsidizing the sale of Chardonnay to the French.

- The current pork-barrel system of taxing and spending (read: wealth confiscation and centrally controlled redistribution) creates a downward economic spiral. With corporate taxes so high, companies must lobby for givebacks to remain competitive. Congress is consequently put under extreme pressure to "bring home the pork" to home-state corporations, some of which are political contributors. Payouts to those corporations then pressure the government to raise taxes, which, in turn, stimulates corporations to invent new subsidies, sometimes creatively labeled "government investments" or "government-industry partnerships." "Government-industry partnership," is Washington-speak that means Americans will be compelled to pay for some silly program like the ATP proposal to re-bioengineer cotton, making the cotton fibers more like polyester. We should choose to break out of this downward economic spiral by ending corporate welfare now.

- Technology subsidies to corporations are sold using *technobabble* to camouflage unjustifiable investments, which typically fall into four categories:

  -- Subsidizing the rich: Sematech. We gave $800 million over an eight-year period to 14 electronics companies that currently make more than $800 million in profit *every month*--and they don't even have to pay it back.

  -- Competing unfairly with private industry: the ATP video compression project. C-Cube Microsystems was venture-funded in Silicon Valley and lost money for years before its video compression technology took off. It woke up one day and found a $1.2-billion-dollar rival entering its market *with government funding*. C-Cube's investors paid full fare.

- Spending that provides no benefit: Gallium Arsenide wafers in space. Vitesse Semiconductor in Camarillo, California, makes some of the world's fastest chips using an exotic semiconductor called gallium arsenide. It sees no value whatsoever in the $500-million NASA plan to make gallium arsenide chips in space.

- Spending that hurts the intended beneficiary: European semiconductor subsidies. The European Union put a tariff on semiconductor chips to protect its fledgling chip industry. Now, the EU is removing this tariff, but not before higher chip prices decimated its computer industry. Meanwhile, European chip companies lost market share anyway.

- Taxes to fund government boondoggles come from two sources: from the rich who can afford to pay excess taxes, and from working people whose lives are less well off when the government takes their money. It is immoral and un-American to take money away from people who are just making ends meet in order to subsidize corporations--or anything else. Taxing the rich to fund poorly managed government programs is simply a self-destructive decision: It does nothing more than move money and investment decisions away from proven moneymakers (read: job producers) to Washington amateurs. In both cases, Americans lose.

- One common rationalization for corporate welfare is that Japan and Europe subsidize their corporations, compelling U.S. corporate subsidies in order to remain competitive. The rationalization is totally false. Objectively viewed, Japan's programs have been consistent losers. Western Europe's socialized economies are among the least healthy on the planet, second only to the 100%-socialist disasters in Eastern Europe. The choice to take money from citizens to pursue the government's "good ideas" is pure and simple socialism, which has been consistently self-destructive to the economies of those countries pursuing it to any degree. The damage falls on a gray scale ranging from America's first income-taxless society to the near-100% wealth control of the collapsed Soviet state. Our current taxes total 35% of GDP, in the middle of the gray scale.

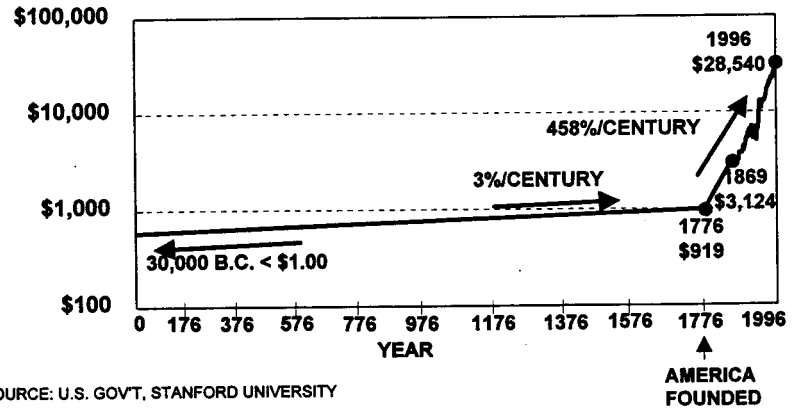
- The best way to shut down corporate welfare is to have a "yes" or "no" vote on a package of corporate subsidies identified for elimination by an independent commission, as we did in the most recent military downsizing. Silicon Valley CEOs would support a fair package proposal to cut corporate subsidies, as attested by a list of names in an appendix to this report. The commission mechanism allows Congress to avoid the lose-lose proposition of voting either for more corporate welfare or against a subsidy to a home-state corporation.

CORPORATE WELFARE VS. THE AMERICAN DREAM

Our forefathers hated taxes. They viewed them as confiscation of individual wealth. They threatened rebellion over the Stamp Act of 1765--a British invention to raise money from the colonies by requiring a tax stamp on documents. They threw the tea into the harbor in 1773, rather than paying taxes on it. And they listed as a cause for rebellion in the Declaration of Independence: "for imposing taxes on us without our consent." The Constitution turned on its head the basic premise of all prior world governments. In other countries, the king, or other sovereign, owned the land, the citizens, their property, and their wealth. People were allowed to own property and to have rights only through the grace of the king, sometimes in a formal agreement such as the Magna Carta. The American Constitution created a bottom-up country by ensuring the people's right to be free: they owned themselves, their intellectual and physical property, and their money. The markets were to be free and the new government was to be given only limited, enumerated powers. Those powers not enumerated were specifically reserved for the people. The new government made it *unconstitutional to levy an income tax on individuals*. The Real Americans who founded our country wanted "the government off of our backs and out of our pockets," to use a Reagan phrase.

This first-ever, morally profound decision to organize a country "by the people, of the people, and for the people" led to the most rapid improvement in the well being of the common man in history. During our first 220 years, the gross domestic product (GDP) per capita of Americans grew from $60 per person in 1776 (equivalent to $919 in 1996 dollars) to $28,540 per person in 1996. Personal income per capita in 1996 was $24,296, or 85% of GDP per capita--most of GDP per capita falls through to personal income. GDP per capita grew at an unprecedented rate of 458% per century from 1776-1996, effectively doubling every 40 years. It took mankind 30,000 years to reach $919 per year, while America catapulted its citizens from $919 to $28,540 in just 220 years.

FOOTPRINT OF CAPITALISM
GDP PER CAPITA (1996$)



SOURCE: U.S. GOV'T, STANFORD UNIVERSITY

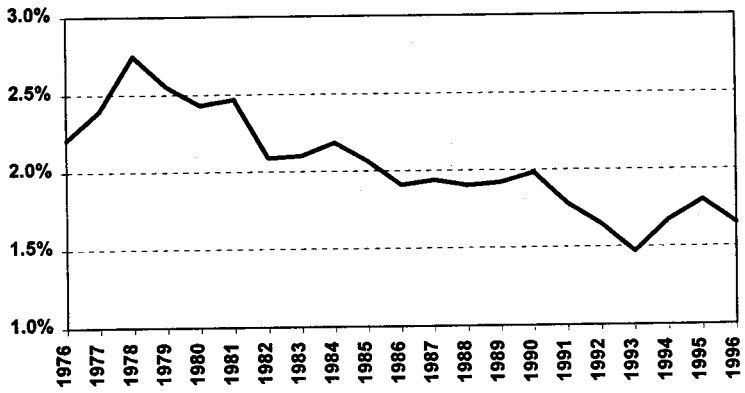
Figure 1. GDP per capita in America rose to $28,540 in 1996 of which 85% or $24,296 ended up as personal income per capita, based on government statistics which go back to 1869. Another source, Another Economic View of American History, by Passell and Atack, provides the estimates for U.S. GDP per capita in 1775 as $60, equivalent to $919 in 1996 dollars.

The doubling of income every 40 years gave rise to the American Dream--the expectation that every new generation in America would be better off than the prior generation. *Something special happened in America in 1776: When the common people decided to stop serving government and to mandate government to serve, they prospered as never before.*

THE SLOWDOWN

The first Americans would have scoffed--or rebelled--if the government had proposed to tax them to "stimulate the economy" by "investing" taxpayer dollars in "government-industry partnerships." That type of language, Washington-speak, is the very un-American language of confiscated wealth, weakness, and usurped freedom. Ultimately, if we don't change--it will be the language of defeat. A closer examination of GDP per capita over the last 20 years, from 1976 to 1996, shows that our engine of prosperity is slowing down.

GDP PER CAPITA GROWTH
(% PER YEAR)



1996 $, 20-YR CAGR
SOURCE: U.S. GOV'T

Figure 2. Graphing the 20-year compound annual growth rate of GDP per capita from 1976 to 1996 shows a decline in growth from about 2.5% per year to about 1.5% per year. The 2.5% growth rate of GDP per capita in 1976 corresponds to a doubling every 28 years. The slower 1.5% GDP per capita growth rate corresponds to a doubling every 46 years.

The American Dream, the engine of our prosperity has not stopped, but it is slowing down. We continue to hear that the working man is not getting better off and that "America needs a raise." How do we get back on track?

CUT GOVERNMENT SPENDING

One important factor slowing the American economy is the ever-increasing consumption of our national wealth by government. In 1913, the 16th Amendment lifted the constitutional ban on federal income taxes. The first federal income taxes were modest in both scope and magnitude.

INCOME TAXES THEN AND NOW

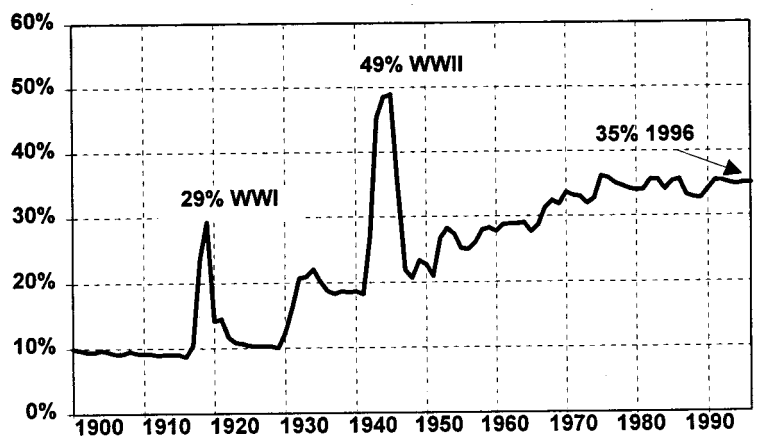
	1914	1994	INCREASE (% PER YEAR)
Income taxes paid (billions)	$6.7*	$683.4*	6.0%
Income taxes as a % of GDP	1%	10%	-
Per capita income taxes	$69*	$2,622*	4.7%
Individual tax filers (000's)	360	113,829	7.5%
% of population filing return	0.5%	45%	-
IRS budget (millions)	$110*	$7,100*	5.3%
IRS employees	4,000	110,000	4.2%
Pages of federal tax law	14	9,400	8.5%
Pages of IRS forms	4	4,000	9.0%
Top income tax rate	7%	40%	-
Income tax rate on median family	0%	28%	-

*All dollar figures in 1994 dollars
SOURCE: CATO INSTITUTE

Table 1. The first federal income tax in 1914 was almost insignificant in terms of the total and per capita amount paid, the percentage of GDP consumed, the percentage of the population required to pay taxes, and the complexity and size of the IRS.

During the last 80 years, every aspect of the federal income tax system has grown much more rapidly than the economy. In 1994, the personal per capita federal income tax levy of $2,622 reached 12% of the $22,104 personal income of Americans. The combination of federal, state, and local taxes now supports spending which consumes a whopping 35% of GDP. Our government is currently consuming a higher percentage of our gross domestic product than the 29% spending peak of World War I !

GOV'T SPENDING AS A % OF GDP



SOURCE: HARRY BROWNE REPORTS, U.S. GOV'T STATISTICS

Figure 3. Government spending as a percentage of gross domestic product has increased consistently since the New Deal of the 1930s. Total spending includes federal, state, and local taxes, adjusted for the federal exemption from state and local taxes. Even though we have no "hot" or Cold War in progress, government spending is near 49% of GDP, the all-time record set during World War II.

Despite this rapid increase in tax collections, the government spent money even faster, piling up in addition a national debt of $4.7 trillion dollars by 1994, over $18,000 for every American. The interest payments on the national debt now amount to two-thirds of the entire budget of the Defense Department. It's time to cut back.

CUT CORPORATE WELFARE

I believe we ought to eliminate immediately most corporate subsidies, so-called "corporate welfare," which amounts to about $65 billion a year. The electronics industry would be unscathed if it lost all of its subsidies, although a few individual companies might be hurt. (Of course, it would be precisely those CEOs who would travel to Washington to make "end of the world" speeches.)

When U.S. airlines were deregulated, removing subsidies in the form of higher fares, the industry got healthier, weak competitors were absorbed by better-managed companies, and airfare became affordable for the first time to many Americans. The airline industry is healthier and better off without subsidies.

There is also a moral imperative regarding corporate welfare: unjustifiable subsidies, such as those to promote the sales of wine and oranges in Europe, should be eliminated completely before the discussion turns to asking senior citizens to endure cuts in Social Security and medicare.

Our current pork-barrel system of taxing and spending has created a *vicious downward economic spiral* that will be difficult to break. If two corporations are taxed at a rate of 37% (my company's current total tax rate), but one of them receives a subsidy equivalent to a 10%-point rebate, the subsidized company will enjoy visibly higher profitability, higher share price, and an enhanced ability to raise funds at a lower cost. Consequently, companies must compete for government subsidies whenever those subsidies make a competitive difference. Even though this is my seventh trip to Congress to oppose corporate subsidies, I would without hesitation pursue any important subsidies offered to my company, because it is my obligation to our shareholders to do my best for them, including obtaining any available low-cost funding. A company that failed to do so would be as foolish as an individual who refused to take income tax deductions because of a strong belief in a flat tax.

The spiral continues as corporations build lobbying organizations to pressure Congress to "deliver the pork" to home-state corporations, which are often political contributors. As Congress succeeds in rewarding home-district corporations with their "fair share of the government pie," the pressure falls right back onto the government to raise the revenue to pay out all of those subsidies. The spiral is completed, as it was in 1993, when tax revenues are raised to pay the bills by hiking taxes on corporations which then seek new and creative subsidies to offset their higher tax rates.

We can use happy words like "government-industry partnership," and "effective representation" to describe the process, but the economics of the downward spiral is *precisely socialism*; that is, the mandated movement of money from individuals and companies to central government control.

At one extreme, when all of the assets (save those of the black market) are controlled by central government planners, we have pure, Soviet-style socialism. At the other extreme, when income taxes are illegal, we have American-style capitalism, circa 1776. That is a black-and-white representation. Today, Americans live in a gray world where the government takes and controls 35% of the country's yearly production. Western Europe's economies are more socialist than ours, and they show it. They have slow growth rates and unemployment rates so high that they would limit any American presidency to one term. And, of course, the socialist disasters of Eastern Europe make even the ailing Western Europe economies look great.

Sometimes, it is difficult to see the obvious big picture because of incremental thinking. An increased tax of only a nickel a day per American supports a $5 billion-per-year subsidy. With easy money and companies promising breakthroughs in health care, pollution control, or electronics for "only" a few billion dollars, government often makes the wrong choice. The road to socialism is paved with nickels--trillions of them--each taken from Americans with the greatest good intent.

The synopses of ATP programs dazzle us with possibilities: "next-generation video compression," "high-definition television (HDTV) studio," "new generation laser-based welding," "less polluting, more cost efficient painting process," "super-hard coatings of boron nitride," and so forth. All of these ostensibly compelling and cost-effective requests for corporate subsidies beg *the big question*: "If you are General Motors, with annual sales of $160 billion, and *$20 billion* in the bank, why don't you fund this great XYZ idea yourself, and patent it?" GM is prevalent in the ATP programs, but don't overlook Ford, Chrysler, General Electric, AT&T, IBM, Black and Decker, Honeywell, 3M, U.S. Steel, duPont, RCA, Phillips, MCI, Goodyear, Goodrich, Amoco, Kodak, Polaroid, Xerox, Caterpillar, Westinghouse, and Time Warner--apparently, Bugs Bunny needs our money.

All of these great corporations with all of their great ideas and big bucks somehow need nickels from the American taxpayer to bring their ideas to market.

There are two reasons for the apparent dilemma. First, some of the projects are worthy and the big companies are simply looking for a tax rebate to get value from their extensive lobbying groups. The second reason is risk avoidance--companies want the government to help fund their long-shot projects.

I believe that the "high-risk" argument used by the Commerce Department is usually just an excuse for making poor investments. Breakthrough ideas often involve great risk; that is, a significant chance for failure. The important evaluation is really not about risk, but about *return on investment* (ROI). Risky ideas can be great, if they offer huge returns. It is like gambling: A bet that has only a 1-in-10 chance is very risky, but it is a big winner if its pays 100-to-1. Conversely, a bet that wins 9 times out of 10 has very low risk, but is not worth making if it pays back only even odds. In Silicon Valley, we have become rich (San Jose has the highest per capita income in the United States) by making many very risky bets, some of which turned out to be colossal winners, like the microprocessor chip. No company in Silicon Valley has ever had the size or assets of General Motors, yet most of us have taken big risks--to get even bigger returns. Analyzing ROI rather than risk shows which poor investments get foisted off on the government: the ones which have high risk and an ordinary return. The mentality of investing "free" government money is straightforward: "We would never invest our corporate money on this Edsel of a project, but if the government invests in it, great. If the Edsel succeeds, it will be a nice business; if not, we have not lost anything."

Medium return/high-risk investments are sold to the government using *technobabble*. Let me give you an example. Most of you are lawyers, and I have a Ph.D. in transistor physics. On Monday, I could convince you that there is a national imperative to build "gallium arsenide wafers in the near-perfect vacuum of space to achieve near-perfect tetrahedral crystals with very high electron mobility." I would convince you with a modified form of the classic "Russian missile gap" argument, which worked so well for the Defense Department during the Cold War. I would paint a picture of a potentially catastrophic technical threat, with which our foreign competitors could wipe out an entire American industry segment. You would support the project. (As a matter of fact, you did, as I will discuss later.)

Meanwhile, on Tuesday, I could come back and tell you that my original technology calculations were in error, and that a more refined version of an existing technology--indium antimonide--could save the day.

And, as a test of my skills of persuasion, I might come back on Wednesday to turn you around again based on recently published "new data." Given that I were a credible scientist from a credible corporation, you would have no choice but to agree. And don't think that your technical experts could help you deal with me--they are the ones my company didn't hire.

I would not even have to be dishonest or a cynic in order to mislead you. I spend many working hours exercising my skills as an engineer/businessman to figure out which one in 10 of the ideas presented to me are worthy investments for our shareholders. I often say "no" to well-meaning engineers in our company who are convinced that their high-risk/medium-return idea is really a medium-risk/high-return idea. Indeed, most Silicon Valley entrepreneurs don't start new companies to become techno-millionaires, but to prove their old bosses wrong, to show that their great ideas were misjudged. I founded Cypress Semiconductor Corporation 14 years ago precisely for that reason. Making difficult technology decisions professionally is what

Silicon Valley is about. Whenever a dollar is transferred from San Jose to Washington, its chances of being invested in something important diminish greatly.

So far we have discussed two unjustifiable forms of corporate welfare, *subsidies to the rich*, tax rebates for research and development that would have been done anyway, and *spending for no benefit*, funding low ROI programs that will never pay off. There are two other common categories: *spending that actually harms the beneficiary* and *unfair government competition against private industry.*

SEMATECH: A SUBSIDY TO THE RICH

By 1986, the Japanese were starting to take over the semiconductor industry, once dominated by American companies. The Semiconductor Industry Association lobbied for a $500-million subsidy called Sematech, a technical consortium. They used the classic arguments to justify Sematech: "critical industry," "Japan has subsidies/we need subsidies," and "jobs will be lost." Sematech was funded, and my company inquired about joining, but the 14 Sematech charter members (12 of the 14 were billion-dollar-plus corporations) effectively excluded us and America's other 100-plus small semiconductor companies by using the mechanism of a $1-million yearly minimum membership fee. Although Sematech was sold to Congress as a consortium open to all companies willing to pay dues of 1% of sales, the $1 million minimum meant that a $20-million semiconductor company actually had to pay 5% of sales. Big companies got a break, paying maximum yearly dues of $15 million. Consequently, for a $3-billion semiconductor company, the dues amounted to 0.5% of sales--10 times lower than the dues paid by the small companies. That is why so few companies joined Sematech, even though it had $500 million to spread around.

My battles with Sematech started when our engineers were denied access to an advanced piece of wafer-making equipment called a "chemical mechanical polisher" (CMP) machine manufactured by an Arizona company then named Westech. Sematech contracted Westech to develop the CMP machine and asked that the machine be held off the market and offered to Sematech members only for one year. The president of Westech assured me that the equipment would be on the open market and that there was no deal between his company and Sematech, but Cypress was denied access to that critical piece of wafer-making equipment, which could have differentiated between winners and losers in the next-generation technology. It was at that point I became a vocal critic of Sematech, the "government-industry partnership" that attacked all competitors, including American corporations like mine. There were rumors about other Sematech deals with equipment manufacturers, but Sematech assured me that there were no "hold-back" equipment contracts. It turns out that there really were contracts to hold back new equipment, but Sematech's new president, Bill Spencer, ended that practice.

Several years later, I agreed to become an expert witness in a trial in Austin, Texas, in which Travis County sued Sematech for failure to pay local road and school taxes. Sematech had claimed on its tax exemption form that it was a "charity." I used my position as a witness to subpoena documentation from them, requesting any contracts between Sematech and the manufacturers of wafer-making equipment, including Westech and others, as well as any contracts between Sematech and its own members. Sematech's lawyers were fast asleep, and provided me with a six-inch stack of contracts, including precisely the contract between Sematech and Westech Corporation to develop and manufacture a "chemical-mechanical polisher," which was to be sold to Sematech members only "for a period of one year after the point of normal product introduction." There were also other hold-back contracts. A bonus of the fishing expedition: Sematech had also granted development contracts to its own members, casting doubt on the fairness of the 50-50 "partnership" between its members and the government.

The behavior of the Sematech members was neither illegal nor unethical. Sematech asked for and received an antitrust exemption at its formation. It used the combined resources of its members and the government to create a competitive advantage, and it did a good job of keeping its secrets away from its competitors. Sematech did what rational people do when the government gives them free money and an exemption from the rules.

A few years ago, Sematech announced that it was not going to accept the last $200 million of its second $500 million grant. Based on my discussions with Sematech leaders, I know that they desired to be independent of government restrictions and not to accept government subsidies when their industry was doing better financially. Consequently, Sematech's budget was cut in half, yet its performance remained essentially unchanged. Bill Spencer changed Sematech from an expensive 800-employee manufacturing organization to a leaner research center and information clearinghouse that relies more on the manufacturing resources of its members. I believe that if Sematech had been formed as a private consortium with a smaller budget, it would have come to its current, more efficient model of operation much more quickly. But with government money, an organization can afford to be inefficient.

To be fair to Sematech, I should note that the abuses I have mentioned are more than five years old and that the new regime at Sematech is doing a good job. Sematech's initial membership of 14 has now dwindled to 10, but the consortium appears to provide value to those remaining companies--it simply never should have been funded by the taxpayer. Sematech falls into the "subsidies for the rich" category because its members include Intel, Motorola, Digital Equipment Corporation, IBM, AT&T, Texas Instruments, Advanced Micro Devices, Rockwell, and National Semiconductor. These companies make enough profit *every month* to pay back the government's eight-year, $800-million investment. At the very least, Sematech should have been funded by a loan, not a gift from the taxpayer.

Jerry Sanders, for 28 years the CEO of Silicon Valley's third biggest chip company, Advanced Micro Devices (AMD), is a board member of Sematech. He would disagree with a lot of what I've said. Also, it was his company that I left to start my company. He challenged me on that issue, too. Cypress and AMD are competitors who have disagreed in court--twice--on intellectual property issues. But, Jerry and I agree on one statement, the one he and I signed at the end of this testimony asking you to cut off corporate welfare. Other Silicon Valley CEOs have also signed up.

UNFAIR COMPETITION: THE ATP VIDEO COMPRESSION PROGRAM

Video compression is the technology that enables digital TV and small-dish satellites. Conventional television requires one satellite transponder per channel and a 10-foot dish to receive the weak analog signal. Digital TV signals are clearer, and 10 channels fit on one satellite transponder (think of the billions saved on the extra satellites that we will not need). The basic concept of video compression is that frame after frame, most TV pictures don't change much. When Dan Rather presents the evening news, he moves, but the set behind him does not, begging the question of technologists: Why not just transmit the differences from frame to frame, rather than re-transmitting the entire picture? The concept is obvious and simple, but the mathematical algorithms and special-purpose computers required to implement it are decidedly not. The leader in video compression technology is C-Cube Microsystems Inc., a quarter-billion-dollar Silicon Valley startup company, which has received an Emmy for its contribution to the television industry. C-Cube is the largest and most technologically potent company in a new industry that will reshape picture transmission not only in television, but also in computers and on the Internet.

Dr. Alex Balkanski, a brilliant mathematician/businessman, is C-Cube's CEO. I am a member of its Board of Directors. Despite C-Cube's leading technology, becoming a successful business in the video compression market has been a struggle. Changing the way pictures are transmitted in a government-regulated market is a prolonged task. The venture-funded company lost money for years while waiting for its technology to take off. Shortly after C-Cube started making a profit, we were shocked to find out that the government had funded one of our competitors. An ATP grant went to LSI Logic Corporation, one of America's top-ten semiconductor companies, to help fund their effort in video compression. Perhaps LSI Logic intended to enter the video compression market anyway, so its R&D group did the heads-up thing by getting all available funds. LSI Logic's CEO is Wilf Corrigan, a friend and competitor. Wilf Corrigan and I agree on ending corporate welfare, as his signature attests.

SPENDING FOR NO BENEFIT: GALLIUM ARSENIDE WAFERS IN SPACE

Gallium Arsenide (GaAs, pronounced "gas") is a semiconductor five to 10 times faster than silicon. GaAs chips are used to transmit data at very high speed on the so-called "electronic data superhighway." GaAs chips are capable of transmitting and receiving signals on a single fiber-optic cable at the rate of 10 billion bits per second, fast enough to transmit 250,000 typed pages of information *per second*.

The Space Vacuum Epitaxy Center (SVEC) is billed as "a NASA center for the commercial development of space." It is funded to grow GaAs wafers on space shuttle flights using a process called epitaxy. NASA's Wake Shield was designed to grow GaAs crystals behind a shield sweeping through space some 30 miles away from the contaminants surrounding the space shuttle. The theory: The vacuum in space is much better than the vacuum earthbound equipment can provide, thus offering the potential to grow more perfect crystals in space. (NASA's technobabble is award winning: "molecular beam epitaxy" doing "ordered growth" in an "atom-by-atom manner" of "near-theoretical" atomic quality in an "ultra-vacuum of 10^{-14} torr" as part of a "cost and time-efficient program" which "could be a model for future commercial space endeavors.")

The Wake Shield became one primary objective of five NASA missions. No one at SVEC would say exactly what the cost of the space wafer experiments was, but a ball-park estimate is $200 million per flight, shared among several experiments. The management of the Wake Shield claimed that although the initial wafers would be astronomically expensive, later production of GaAs wafers in space would cost *only* $10,000 per wafer, a number declared to be commercially viable. Congress bought off on SVEC, and at least two missions have been flown.

Dr. Lou Tomasetta, the CEO of Vitesse Semiconductor Corporation in Camarillo, California, studied at MIT. He is an expert in transistor physics, data communications, and GaAs integrated circuit manufacturing. I enjoy "tech talk" with Lou during our monthly meetings at Vitesse, where I am also a member of the board of directors. *Neither Lou nor I can figure out why our government is making GaAs wafers in space.* Lou calls the program a "solution looking for a problem." Vitesse is one of America's Big Three GaAs companies. Given the possibility that Lou and I were missing something, I called Steve Sharp, a Silicon Valley friend of mine who moved to Oregon to run TriQuint Semiconductor, another of the Big Three. Steve said that he was buying GaAs wafers for $175 each, and that the very highest performance GaAs wafers sold for $1,000. He said that it would be very difficult to figure out how to make money on a $10,000 space wafer. His final comment was, "I tend to ignore this sort of request."

In response to criticisms I published in an industry publication, Electronic News, challenging the commercial value of the space wafers, the head of the SVEC project said the wafers "could be

useful for technologies not yet developed" and then listed numerous commercial products including CD players and optic fibers that already are on the market, with technology derived from ordinary terrestrial wafers.

Maybe we are all missing something, but I think our government has taken several hundred million dollars from American taxpayers to subsidize an exotic technology manufactured in an exotic place for a super-high-tech industry that neither needs nor cares about the investment.

SPENDING THAT HURTS THE BENEFICIARY: EUROPEAN SEMICONDUCTOR SUBSIDIES

Recently, countries with advanced electronic capabilities agreed to remove tariff barriers on a broad range of electronic products because they realize that high prices hurt everyone in the electronics industry.

In an industry where life depends on fast improvement, consider the effect of the tariff that the European Union placed on semiconductor chips imported into Europe. Currently, semiconductors comprise about 20% of worldwide electronic shipments. In other words, the average personal computer contains about 20% of its value in semiconductors. Put another way, for every $1 in semiconductor sales, there are $5 in computer or home electronics sales.

When the European Union decided to protect its fledgling semiconductor industry by imposing a stiff 14% tariff on imported chips, it also raised the price that the European computer industry had to pay for its most important raw material, chips. The EU policy to protect its small semiconductor industry had a devastating impact on its much larger computer industry. Europe's largest computer company, Great Britain's ICL had to sell a 50% stake to Fujitsu to stay afloat. Nixdorf, a prominent German computer company, was acquired by Siemens after a financial crisis. Italy's Olivetti, Europe's biggest PC producer, still sells PCs, but stopped manufacturing, triggering big layoffs. The market share of European computer companies as a group declined. And what happened to the fledgling European semiconductor industry while it was being protected? Its market share dropped from 10.2% to 5.4% from 1988 to 1996. In this case, government "help" damaged all parties concerned.

THE HIDDEN COSTS OF TECHNOLOGY SUBSIDIES

If a tax of a nickel per day per American supports $5 billion in yearly subsidies, the whole $65 billion-per-year tab for corporate welfare can be viewed as a "mere" 65 cents per day per American. An obvious question comes to mind: "Wouldn't you be willing to pay 65 cents a day to make America's companies the most competitive in the world?" While I hope your answer to that question is "no," I would also like to point out that true cost of the corporate welfare exceeds that cost by a lot. Consider the tax levy for corporate welfare as it applies to two groups, average Americans and rich Americans. That 65 cents per day is $237.25 per year, a nontrivial sum for the average American. That means less money in the pockets of families struggling to make ends meet: a bicycle not bought, a vacation not taken, or missing the monthly college fund payment. It is unconscionable and un-American that we would tax working families while we fund the dubious corporate subsidies I have reviewed.

On the other hand, it is much easier to talk about funding corporate welfare by eliminating those "tax loop holes for the rich" (who pay "only 50%" of their income to the government). I am an example as one of those rich people who can afford to pay more taxes. Although I came to California with only $700, I became a founder of a startup chip company which employs over 2,000 people. My personal wealth comes from the 2% of the shares of our company I still own, most of them held since our founding in 1983. The market value of our company is now $1.5 billion. Two percent of $1.5 billion is $30 million. I am rich. What does it matter if the

government takes an extra million dollars from me in order to fund corporate welfare or other "good ideas"?

Like many Silicon Valley people who have created wealth, I consume very little of my net worth. I'm interested in transistors, companies and competition--not yachts and airplanes. Consequently, I invest almost all of the money I have earned right back in Silicon Valley. I have already described two of the companies that I not only invest in, but help to run as a board member. There are numerous other companies that I invest in because I know what they do and why it will make a difference. In aggregate, I hold shares in over 100 companies, almost all of them Silicon Valley high-technology companies whose names you would not recognize. When Congress and the President voted to raise my personal taxes in 1993, I paid the extra amount by selling some of those Silicon Valley stocks. That money then went to Washington to be "invested" in "government-industry partnerships" related to the "electronic data superhighway" (at least as the PR described it at that time).

The point is this: When government raises taxes on wealthy individuals, it is simply taking investment dollars from those individuals and moving them to Washington. Proven moneymakers and job creators lose control over the investment of their funds and unproven Washington amateurs take over. The *real* question for Americans is, "*If you had to bet the creation of your job on investment from wealthy people in the private sector versus investment from the government, which would you choose*?" The answer is obvious. Although it is good stump rhetoric to fume about "tax breaks for the rich," the fact is the average American loses out every time a dollar is taxed out of the private sector. If you really want to enhance the competitiveness of American corporations, cut the capital gains tax and let me invest my own money--I'm very much better at it than government is.

There is one final hidden cost of government interference in the free market: The inefficient use of human resources is the most devastating cost of all. All CEOs know one fundamental truth: that the human knowledge and energy collected in a company is what drives profit. It's not assets, or factories, or cash, but people that separate one company from another. Consequently, in Silicon Valley, we fight titanic battles to woo employees in an area where unemployment is less than 2%. When Cypress was a startup company, we wooed numerous employees from Intel with the lure of a more prominent position (in a very much smaller company), and the potential wealth from stock options. Intel, now the largest semiconductor manufacturer, has counter-attacked in the Valley with a new campaign promising--in writing--a Hawaiian vacation as a sign-on bonus for working at Intel. Recently, when one of our competitors, Cirrus Logic, suffered a problem in the marketplace prompting layoffs, we hired an airplane to fly over Cirrus's headquarters carrying a banner with the message that we had jobs open and listing our Internet address.

Corporate welfare can have a devastating effect in an environment like Silicon Valley. While companies are fighting with salary, stock, and promotions to woo the best and brightest, the government sometimes uses corporate welfare to prop up sick companies. Consider this hypothetical case: When the automobile industry was moving from mechanical carburetors to electronic fuel injectors, what if the government decided to "protect jobs" in the carburetor industry by subsidizing carburetor companies? With American fuel injector companies starving for the human talent, and Japanese competitors taking market share, the government would be spending money to keep people at the failing carburetor companies in order to "save jobs." *Subsidizing losing companies traps people in dead-end jobs, prevents other companies from getting the talent they need, and gives our international competitors an advantage.*

JAPAN AND EUROPE SUBSIDIZE, SO MUST WE

One of the most common--and erroneous--rationalizations for corporate welfare is a scare tactic: foreign governments give out corporate welfare; America must do the same to remain competitive. Perhaps Europe is not an immediate threat, but what about Japan?

Sematech was formed at the height of the Japanese attack on the American semiconductor industry. The American semiconductor industry dominated its market, from its origin in the '60s, through the '70s. As late as 1982, America held a 57%-32% chip market share advantage over Japan. But in the '80s fortunes reversed, and by 1989 Japan actually took a 50%-37% lead. Clyde Prestowitz, a big fan of government subsidies, wrote the book Trading Places, and testified before Congress that Japan's semiconductor subsidies, channeled through its Ministry of International Trade and Industry (MITI), were responsible for the defeat. Prestowitz declared that the American semiconductor industry was lost to the Japanese and pondered whether or not the American computer industry could survive (both assertions were wrong). In 1993, I debated Prestowitz at the Cato Institute, where he went so far as to declare that the semiconductor industry was created by defense spending. Nothing could have been further from the truth, yet Prestowitz was presented as an expert to justify subsidies to Silicon Valley, about which he knew very little.

I also debated Michael Maibach, the chief lobbyist for Intel Corporation, on public television in 1993. Maibach said that Sematech was needed to maintain the domestic supply of military chips. What if our military had to depend on Japan? It was another scare tactic used to justify corporate welfare. Even at its lowest point in 1989, America still manufactured 37% of the world's $49.7-billion worth of chips. The military rationalization for corporate welfare sounded OK in Washington, but it had no rational basis. I reminded Mr. Maibach that my company, Cypress Semiconductor, shipped 20% of its production to the military and had chips in the F-14, F-15, F-16, and F-18, as well as many of the guidance and weapons systems aboard those airplanes. My position was vindicated a few years later when Intel announced that it was voluntarily exiting the military-chip business, despite its Sematech subsidy. Cypress still ships a wide variety of chips to the military.

Did MITI subsidies to the Japanese semiconductor industry hurt our chip companies? Were Japanese companies sharing secret data in a way that would violate American antitrust laws? The answer to both questions is "no." In 1992, I convinced Dr. Yoshio Nishi to testify to that effect at a congressional hearing. Dr. Nishi, then the head of chip development at Hewlett Packard, had been head of the VLSI program at Toshiba, one of the few MITI-sponsored programs that seemed to work. The MITI VLSI program was targeted at entering the dynamic random access memory, or DRAM market, the biggest chip market in the world. Japan successfully entered that market en masse, causing Silicon Valley's three largest companies, Intel, Advanced Micro Devices, and National Semiconductor, to abandon the DRAM market. Intel later acknowledged that it felt it could have weathered the storm, but chose to abandon DRAMs in order to put its full force behind microprocessor development. What a great decision that was! I was working in the memory group at Advanced Micro Devices at the time. We did exit the DRAM business because we could not make money in it. We felt at the time that Japan was dumping DRAM chips into the U.S., selling them below manufacturing cost. In retrospect, I believe now that Japan simply got better at manufacturing than us for a while and was able to produce the chips at extremely competitive costs. Charlie Sporck, then president of National Semiconductor, was the father of Sematech. Sporck used the DRAM failure as a rallying cry.

Dr. Nishi ran the Toshiba DRAM program, which was the most successful of the Japanese efforts. He testified that there *was very little financial aid from MITI to the Japanese semiconductor industry*, and also that the *Japanese semiconductor companies--intense*

rivals--never shared secret information, but only general "roadmap" information that allowed the companies to gauge the effectiveness of their programs and make sure they were headed in the right direction. Three important American semiconductor companies did remain in the DRAM race: Motorola, Texas Instruments, and then-startup Micron Technology in Boise, Idaho. TI now manufactures DRAMs in plants around the world, and Micron has grown to be a $3-billion company known to be able to outmanufacture any of its Japanese rivals. The domestic military chip supply was never in danger, and MITI had very little to do with the Japanese success in the mid '80s. Superbly managed Japanese companies simply beat us--for a while.

The tables have now turned. America again leads Japan in semiconductor market share. Intel's decision to focus on the microprocessor business, combined with its excellent execution, have propelled it to become the No. 1 semiconductor company in the world. American semiconductor manufacturing capability has caught up to Japan's. Our focus on designing innovative chips has proven to be more important than Japan's focus on grinding out commodity chips at very low cost. Many of the American semiconductor companies that were very small startups at the time of Sematech's formation, my company, Altera, Xilinx, Linear Technology, Maxim, Micron Technology, LSI Logic, and VLSI Technology are now substantial semiconductor corporations with revenues from $500 million to $3 billion. These companies manufacture a dazzling variety of products. We all export to Japan. The innovativeness and resilience of the American semiconductor industry enabled it to react to the attack--and win.

Although the MITI VLSI program was successful, the fact is that MITI has also wasted huge amounts of money and has many more failures than successes. For example, MITI's high-definition television (HDTV) program spent $1 billion to define and dominate the next-generation HDTV. Some American executives immediately appealed to Congress to get their corresponding piece of corporate welfare. The realities: 1) the U.S. won the High Devinition Television (HDTV) definition race with a superior digital design, and 2) the only digital TV deployed today is not that burdensome, FCC-approved HDTV system, but a digital enhancement of ordinary television. (Prediction: I have a 2000-line, super-enhanced TV in my house that qualifies as "HDTV," but uses a normal TV input signal. That system will be deployed commercially, and the expensive new HDTV being pushed on a reluctant industry by the FCC will stall; no wonder CBS and NBC want ATP grants to build the first HDTV station.) MITI caused Japanese taxpayers (who live in homes with half the square feet per person of Americans) to lose $1 billion on its HDTV boondoggle.

TRON was a nickname for a Japanese advanced, fifth-generation computer partially funded by MITI that threatened to wipe out the U.S. computer industry. It turned out to be a loser, and the U.S. computer industry remains dominant. MITI support to the Japanese aircraft and biotech industries has also produced no tangible results.

MITI focuses on 13 Japanese industries. The four areas of heaviest emphasis are textiles, mining, basic metals and chemicals. Despite that, these areas ranked lowly--13th, 12th, 10th, and 9th, respectively, in growth rate among the 13 industries. In response to the theory that MITI was not trying for growth in those industries, but simply subsidizing declining industries to ease their pain, Harvard economist David Weinstein stated, "But if that is true, that makes Japanese industrial policy very like its French and American counterparts over the past four decades--politically driven, favor-based, [and] non-helpful to the nation's overall economic functioning."

As I testified before Congress in 1995, *"Corporate welfare does not work anywhere in the world. It does not work because it penalizes a country's winners with excess taxes in order to fund that country's losers with inefficiently run government programs. "They've got subsidies; we need*

subsidies," is exactly wrong. America will be much more competitive on a relative basis if we allow the nations with whom we compete to squander their taxpayers' money, while we encourage our companies to win without subsidies. It's like the Olympics: there comes the day when an athlete must walk alone into the arena of competition. The government cannot lift the weights and run the miles that are required to be a champion--only an individual can."

The fact is that in western Europe or Japan, the choice to take money from citizens to pursue the "good ideas" of government has been consistently self destructive to their economies. Socialism does not work. Socialism is immoral. We should abandon socialist programs like corporate welfare.

BARRIERS TO PROGRESS: THE SYSTEM AND LOBBYISTS

One of the biggest barriers to eliminating the corporate welfare drain is the pork barrel system itself: members of Congress are put in a lose-lose situation forced to choose between voting down a significant subsidy for a home-state corporation, or voting to continue corporate welfare. Congress recently faced the same situation in the downsizing of the military. Individual senators were very reluctant to vote to close down major bases in their home state, yet everyone agreed that the Soviet collapse provided a great opportunity to reduce spending. The solution--to appoint an independent panel to collect military cuts into a single bill for a "yes" or "no" vote without amendments--turned out to be a winner. It got the job done, and even in California where we were hit very hard by military downsizing, most of us believe that we are all better off. We should follow the same procedure with corporate welfare.

Prior to traveling here, I polled a few CEO friends of mine in Silicon Valley to see if they would support a statement saying that they would support cuts to corporate welfare, even if it meant cuts in government funding to their companies. Most agreed, and their statement is attached as an appendix to this testimony. As a general rule, Silicon Valley CEOs like smaller governments and lower taxes, and are willing to forego subsidies to achieve those goals. CEOs would much rather make money with healthy companies in a healthy economy than receive welfare from the government.

I believe that the popular impression that CEOs cling strongly to their corporate welfare is completely inaccurate and stems from two sources: 1) a few CEOs who receive massive subsidies and do fight for them, and 2) industry lobbyists who are out of touch with their constituencies.

I have testified before the Senate and House against corporate welfare since 1989. In my 1995 testimony before a House Subcommittee, my opponent was a lobbyist from the American Electronics Association (AEA). His testimony started with, "We represent 10,000 corporations..." What struck me was that my company was a member of AEA, and that we were paying this man to argue against me! The AEA was out of touch with the Silicon Valley CEOs I know, and absolutely misrepresented my position. Furthermore, the AEA had never polled me to determine whether or not our company wanted them to lobby for maintaining Commerce Department subsidies. The AEA started as a Silicon Valley-based electronics organization. Now, like many other lobbying organizations, it has moved to Washington and been co-opted by the pork-barrel process. One unspoken assumption behind the AEA seems to be, "Our job is to bring home the pork for electronics companies." Although many of us agree with tactical positions taken by the AEA on workplace or technical issues, I know that there is no consensus support for pork-barrel politics among high-tech CEOs. When I returned to California after that meeting, I asked why we had joined the AEA. The answer was that our membership was solicited by mail, the dues were low, and we simply signed up in order to get information. I fired the AEA; we are no longer members.

We are members of the National Association of Manufacturers (NAM). I testified earlier that I do not believe the American taxpayer should be compelled to subsidize the sale of American products overseas. The most recent cover story of the *NAM Briefing* newsletter is entitled, "NAM Report Proves Export Financing is Critical to Job Creation." NAM favors taxing people to subsidize exports. They argue that the Japanese, French, and Spanish do it, and we must also in order to be competitive. In other words, they are using every tired argument debunked in this testimony to justify their favored form of corporate welfare. I am going to fire NAM as soon as I get home.

CONCLUSION

Our government did best for its people when it stayed near its founding principles of free markets, limited government, and enlightened self interest. It did better economically and it did better morally.

Unfortunately, starting with the 16th Amendment, and then the New Deal in the 1930s, we have drifted toward socialism. The government now controls 35% of America's output. That makes us all poorer and less free.

The reasons for government taking one-third of what Americans produce are couched in Washington-speak and technobabble and do not stand up to scrutiny. The words rationalize the workings of a system in which taxing and spending drive us in a downward economic spiral.

We are at a cross-roads where we can choose to seize the opportunity to leave epithets like "pork barrel" and "corporate welfare" behind us and return to the high ground.

American business has always been ready to lead. By 1800, America had more corporations than all of Europe, combined. We can help revitalize the American Dream. *Stop taking money from Americans for socialist subsidies--companies do not need or want that kind of money.* Capitalists make money from customers who voluntarily trade their money for the higher value we provide them.

We declare independence from the corporate welfare state. The difference between it and free market capitalism is the difference between taking and giving, immorality and morality, poverty and wealth. Make the right choice, end corporate welfare.

CORPORATE WELFARE

The high taxes that our company and its employees pay to support the current local-state-federal government tax burden of 35% of GDP hurts our economy more than any possible corporate benefit from government spending. If an independent commission, similar to the military base-closing commission, identified a fair and substantial government spending cut in the area of so-called "corporate welfare," I would support that cut, even if it meant funding cuts to my own company.

Jerry Sanders, CEO, Advanced Micro Devices

Rodney Smith, CEO, Altera

Alex Balkanski, CEO, C-Cube Microsystems

T. J. Rodgers, CEO, Cypress Semiconductor

Len Perham, CEO, IDT

Wilf Corrigan, CEO, LSI Logic

Jack Gifford, CEO, Maxim Integrated Products

John Doerr, Partner
Kleiner, Perkins, Caulfield & Byers

APPENDIX

CORPORATE WELFARE

The high taxes that our company and its employees pay to support the current local-state-federal government tax burden of 35% of GDP hurts our economy more than any possible corporate benefit from government spending. If an independent commission similar to the military base-closing commission identified a fair and substantial government spending cut in the area of so-called "corporate welfare," I would support that cut, even if it meant funding cuts to my own company.

John East, CEO, Actel Corporation
Richard Previtt, President, Advanced Micro Devices
Duane J. Roth, Chairman, President, & CEO, Alliance Pharmaceutical Corporation
Chuck K. Chan, General Partner, Alpine Technology Ventures
James C. Morgan, Chairman & CEO, Applied Materials, Inc.
Gene R. Miller, President, Astec Semiconductor
Jess R. Marzak, Managing Director, BankAmerica Ventures
Robert G. Barrett, Managing Partner, Battery Ventures
Charles Crocker, Chairman, President, & CEO, BEI Electronics Inc.
Don Bell, CEO, Bell Microproducts
Bruce Dunlevie, General Partner, Benchmark Capital
Edward M. Leonard, Partner, Brobeck, Phleger & Harrison LLP
Joe Costello, President, Cadence Design Systems
Michael L. Hackworth, President & CEO, Cirrus Logic
Ted Buttner, President & CEO, Coastcom
Mark B. Hoffman, CEO, Commerce One
Ray Latham, CEO, Computer Graphics Systems
Thomas Van Overbeck, CEO, Cornerstone Imaging
Fred Bialek, Director, Cypress Semiconductor
Ken Virnig, President, Devine and Virnig, Inc.
John Mullen, President and CEO, Dynamic Network Solutions, Inc.
M. Kenneth Oshman, CEO, Echelon Corporation
Curt Wozniak, CEO, Electroglas, Inc.
Norbert Laengrich, CEO, Embedded Performance, Inc.
Paul Rogan, President, Equipe Technologies
William L. Harry, CEO, Exclusive Design Company
Jack F. Nicholson, Managing Partner, Fell & Nicholson Technology Resources
Thomas W. Ford, Managing Partner, Ford Land Company
Allen Batts, President & CEO, Hello Direct
Herman Miller, President & CEO, INET Corporation
Samuel D. Colella, General Partner, Institutional Venture Partners
Scott Cook, Chairman, Intuit
Jim Hawkins, President & CEO, Invivo Corporation
Floyd Kvamme, Partner, Kleiner, Perkins, Caulfield & Byers
Stephen R. Knott, Chairman of the Board, Knott's Berry Farm
Michael Troy, CEO, KnowledgePoint
Bob Swanson, CEO, Linear Technology
John Blokker, President & CEO, Luxcom
Del W. Masters, President, Maxstrat Corporation
Dubose Montgomery, Managing Director & General Partner, Menlo Ventures

Frank DeRemer, President, MetaWare, Inc.
Gale Aguilar, President, Mitem Corporation
Thomas W. Weisel, Chairman & CEO, Montgomery Securities
Robert White, Principal, Montgomery Securities
George Still, Partner, Norwest Venture Capital
Richard Hill, CEO, Novellus Systems
Robert Cohn, Chairman & CEO, Octel Communications
Herbert M. Dwight, President & CEO, Optical Coating Laboratory
Bryan Sheets, Principal, Paul Capital Partners
John M. Richards, Chairman & CEO, Potlatch Corporation
Jim Ashbrook, Chairman of the Board, Prism Solutions, Inc.
Dado Banatao, Chairman, S3 Incorporated
S.S. Fishman, President, Sara Scientific Co.
Al Shugart, Chairman, CEO, & President, Seagate Technology
Pierre Lamond, Partner, Sequoia Capital
James V. Diller, Chairman & CEO, Sierra Semiconductor
John A. Sobrato, General Partner, Sobrato Development Companies
Garrett A. Garrettson, President & CEO, Spectran
Robert M. Stafford, President, Stafford Capital Management
Tom Stemberg, Chairman & CEO, Staples
Scott McNealy, CEO, Sun Microsystems
Robert L. Tillman, President & CEO, Sunshine Medical Instruments, Inc.
Larry Israel, CEO, Telesensory Corporation
Burton J. McMurtry, Venture Capitalist
Lou Tomasetta, President & CEO, Vitesse Semiconductor
Michael McCarthy, President and CEO, Web Publishing, Inc.
Ronald Swenson, Partner, Western Technology Investment
J. Emmett Hammond, President, Wireless Data Corporation
Bernard Vonderschmitt, Chairman, Xilinx, Inc.
William H. Welling, CEO, Xios Corporation
Phillips Smith, CEO, Zycad Corporation

TESTIMONY OF STEPHEN MOORE, DIRECTOR OF FISCAL POLICY STUDIES, CATO INSTITUTE, WASHINGTON, D.C. ON: THE ADVANCED TECHNOLOGY PROGRAM AND OTHER CORPORATE SUBSIDIES

Thank you Chairman Brownback for the opportunity to testify before the Subcommittee on Government Management on the Advanced Technology Program and other corporate subsidies. In keeping with the truth in testimony requirements, let me first note that the Cato Institute does not receive a single penny of federal money of any kind.

Second, I wish to commend you and your staff for your leadership in identifying wasteful and unnecessary spending in the budget--particularly in the area of corporate subsidies. Americans are demanding deficit reduction and government downsizing that is fairminded and balanced--meaning that the budget knife is not spared the most politically well-connected K Street special interests. Both the social welfare and corporate welfare states need to be reformed with equal urgency. You are absolutely right when you argue that the 104th Congress enacted reforms in social welfare programs and that now the 105th Congress must adopt welfare reform part II: eliminating the corporate safety net.

In my testimony today, I will highlight six points.

First, corporate welfare is a large and growing component of the federal budget.

Two years ago Dean Stansel and I co-authored a Cato Institute report entitled "Ending Corporate Welfare as We Know It" in which we estimated that the federal government now spends roughly $65 billion each year on more than 125 programs that provide direct taxpayer assistance to American businesses. This dollar estimate has been generally substantiated by the General Accounting Office and other research organizations, such as the Progressive Policy Institute.

In our most recent report, which I wish to submit for the record, we found that these subsidies were actually expanded by about 1.5 percent on average in FY1997. Table 1 shows the results for the fifty-five most egregious examples of corporate subsidy programs.

The Clinton administration had been a fervent defender of taxpayer aid to American industry. Last year, the White House requested a 3.6 percent hike in funding for corporations. In this year's budget request, the president has called for further increases. Sixteen programs would receive an increase of 10 percent or more. Eight would see their budgets go up by 20 percent or more.

Second, ending all corporate welfare would generate enough savings to entirely abolish the capital gains and estate tax.

Table 1
How 55 of the Worst Corporate Welfare Programs Fared in the FY 1997 Budget Process (outlays in millions of dollars)

Program/Agency	1996 Actual	1997 Appro-priation	Percent Change
Agriculture Department (16 programs)			
Agricultural Credit Insurance Fund	$399.4	$355.3	-11.0
Agricultural Marketing Service	$58.2	$50.3	-13.6
Agricultural Research Service	$740.2	$785.9	6.2
Commodity Credit Corporation Export Loans program	$377.7	$393.8	4.3
Commodity Production Flexibility Contracts (replaces price support programs)[1]	$5,570.0	$5,385.0	-3.3
Conservation Reserve Program*	$1,781.8	$1,800.0	1.0
Cooperative State Research, Education, and Extension Service	$907.5	$908.6	0.1
Economic Research Service	$53.1	$53.1	0.0
Export Enhancement Program[1]	$350.0	$350.0	0.0
Federal Crop Insurance Corporation	$1,263.7	$1,591.0	25.9
Foreign Agricultural Service	$124.8	$135.6	8.7
Market Access Program[1]	$90.0	$90.0	0.0
National Agricultural Statistics Service	$81.1	$100.2	23.6
Public Law 480	$1,134.0	$1,067.8	-5.8
Rural Business-Cooperative Service (RBCS)[2]	$112.4	$104.8	-6.8
Alternative Agricultural Research and Commercialization fund	($6.5)	($7.0)	7.7
RBCS loan subsidies	($49.6)	($20.8)	-58.1
Rural business-cooperative assistance program	($0.0)	($51.4)	N/A
Rural Utilities Service (RUS)[2]	$670.7	$680.9	1.5
RUS loan subsidies	($99.6)	($38.2)	-61.6
Rural utilities assistance program	($498.9)	($566.9)	13.6
Commerce Department (6 programs)			
Advanced Technology Program	$221.0	$225.0	1.8
Economic Development Administration[3]	$348.5	$373.5	7.2
International Trade Administration	$264.9	$270.0	1.9
Manufacturing Extension Partnership	$80.0	$95.0	18.8
Minority Business Development Agency	$32.0	$28.0	-12.5
National Oceanic and Atmospheric Administration: nonweather activities	$1,252.8	$1,281.0	2.3
Defense Department (5 programs)			
Army Corps of Engineers	$3,366.3	$3,503.2	4.1
Defense Advanced Research Projects Agency: applied R&D programs			
Dual Use Applications programs (formerly Technology Reinvestment Project)	$195.0	$195.0	0.0
Advanced Electronics Technologies R&D	$409.0	$368.1	-10.0
Computing Systems and Communications Technology R&D	$396.3	$325.1	-18.0
Materials and Electronics Technoflogy R&D	$248.1	$222.8	-10.2
Energy Department (8 programs)			
Clean Coal Technology Program[4]	$12.0	$12.0	0.0
Energy Conservation programs[2]	$553.2	$569.8	3.0
Industries of the Future and Technology Access programs	($115.7)	($117.6)	1.6
Transportation technology programs	($176.6)	($175.2)	-0.8
Energy Information Administration	$72.3	$66.1	-8.6
Energy Supply Research and Development[2]	$2,727.4	$2,710.9	-0.6
Solar and renewable energy	($275.2)	($270.0)	-1.9
Nuclear energy	($231.0)	($222.7)	-3.6
Biological and environmental research	($419.5)	($389.1)	-7.2
Fusion energy	($244.1)	($232.5)	-4.8
Basic energy sciences	($791.7)	($649.7)	-17.9
Computational and technology research	($0.0)	($153.5)	N/A

Program/Agency	1996 Actual	1997 Appro-priation	Percent Change
Fossil Energy Research and Development[2]	$417.0	$364.7	-12.5
Advanced clean fuels research	($19.6)	($16.2)	-17.3
Advanced clean/efficient power systems	($80.3)	($69.2)	-13.8
Advanced research and technology development	($21.4)	($17.6)	-17.8
Oil technology R&D	($55.7)	($45.9)	-17.6
Natural gas research	($59.7)	($69.1)	15.7
Fuel cells R&D	($52.5)	($51.1)	-2.7
Energy Technology Center program	($55.3)	($54.3)	-1.8
General Science and Research activities	$981.0	$996.0	1.5
Power Marketing Administrations	$312.5	$240.1	-23.2
Uranium Supply and Enrichment activities	$89.9	$60.5	-32.7
Transportation Department (7 programs)			
Commercial Space Transportation Office	$5.8	$6.0	3.4
Federal Highway Administration demonstration projects[4]	$800.0	$800.0	0.0
Grants-in-Aid for Airports	$1,450.0	$1,460.0	0.7
Maritime Administration: Guaranteed Loan Program	$43.5	$40.9	-6.0
Maritime Administration: Operating-Differential Subsidies	$162.6	$148.4	-8.7
Maritime Security Program	$46.0	$54.0	17.4
Payments to Air Carriers (Essential Air Service program)	$22.6	$25.9	14.6
Independent Agencies and Other (13 programs)			
Appalachian Regional Commission	$170.0	$160.0	-5.9
Bureau of Reclamation (Interior Dept.)	$809.2	$775.3	-4.2
Export-Import Bank	$790.2	$772.6	-2.2
Federal Housing Administration	$629.1	$643.1	2.2
International Monetary Fund subsidies[5]	$730.0	$730.0	0.0
NASA: Aeronautical Research and Technology activities	$873.0	$888.0	1.7
National Institutes of Health: applied biomedical research & clinical development[6]	$4,012.0	$4,287.7	6.9
National Science Foundation: High Performance Computing and Communications[7]*	$291.0	$290.0	-0.3
Overseas Private Investment Corporation[8]	$98.0	$104.0	6.1
Partnership for a New Generation of Vehicles[7]*	$241.0	$240.0	-0.4
Small Business Administration[9]	$689.2	$852.3	23.7
Tennessee Valley Authority	$109.2	$106.0	-2.9
Trade and Development Agency	$40.0	$40.0	0.0
TOTAL (55 programs)	$37,706.2	$38,183.3	1.3

Sources: FY97 Congressional Appropriations Bill Reports, and H.R. 3610, FY97 Omnibus Appropriations Bill, Conference Report, Report No. 104-863, September 28, 1996.

*Congressional appropriation figure unavailable. Number listed is based on historical levels.

[1]Production flexibility contracts, EEP, and MAP are mandatory, not discretionary, programs, so the figures listed are from H.R. 2854, Federal Agriculture Improvement and Reform Act of 1996, Conference Report, Report No. 104-494, March 25, 1996, p. 367.

[2]Figures in parentheses for selected programs within this category are shown for illustrative purposes only. Those amounts are already included in the total for this category. They do not represent additional spending beyond that total.

[3]1997 figure includes $25 million in separate emergency appropriations for disaster assistance.

[4]Figures for highway demonstration projects and Clean Coal Technology Program reflect historical level. Separate figures were not available. (Source: House Budget Committee)

[5]Figure for IMF refers to the IMF's General Agreements to Borrow and Enhanced Structural Adjustment Facility. (Source: House Budget Committee)

[6]Figure for NIH applied biomedical research is based on the historical share of total NIH research budget, as calculated by the Congressional Budget Office.

[7]Figure for 1996 is from Analytical Perspectives, Budget of the U.S. Government, Fiscal Year 1997.

[8]OPIC figures exclude insurance fees and other offsetting revenues collected by OPIC.

[9]1997 figure includes $135 million in separate emergency appropriations for disaster assistance.

To put the cost of these $65 billion in industry subsidies in perspective, if all federal spending programs that aid business were purged from the budget, the entire budget deficit could be eliminated for the first time in 30 years. Alternatively, if Congress were to eliminate all corporate spending subsidies, this would generate enough savings to entirely eliminate the capital gains tax and the federal estate tax--forever.

This point bears repeating: we could have a zero capital gains tax in the United States and a zero estate tax for the amount of money that we spend in Washington handing out grants, subsidies, cut rate insurance, loans, and loan guarantees to U.S. businesses. Now you will hear throughout this hearing of all the alleged benefits to American industry and U.S. competitiveness that stem from programs such as the Manufacturing Extension Program (MEP), the Advanced Technology Program (ATP), and other business-related activities of the Department of Commerce. But can anyone reasonably argue with the proposition that if American businesses and workers were competing in global markets today under a regime of zero capital gains tax and zero estate tax, this would do far more to increase their competitiveness than 100 Department of Commerces?

Third, ATP and MEP are the essence of corporate welfare.

Dean Stansel and I have defined corporate welfare as follows: corporate welfare is the use of government authority to confer privileged or targeted benefits to specific firms or specific industries. I would argue that the explicit purpose of programs like the ATP and MEP is precisely to provide targeted benefits to specific firms and industries. In most other corporate welfare programs, subsidizing business is a derivative objective. At ATP And MEP the business subsidy is the objective itself.

Our latest study concludes that the Department of Commerce spends $2.3 billion per year on 7 corporate welfare programs. The following five programs are the worst abusers:

Advanced Technology Program (1997 appropriation: $225.0 million). The mission of the ATP is to enhance the competitiveness of U.S. companies by helping them make better use of basic research in new technologies. In recent years, ATP R&D grants have gone to huge high-tech corporations like Caterpillar, General Electric, and Xerox. ATP was zeroed out by Congress in the 1996 budget cycle, but President Clinton vetoed that bill and secured a compromise that allowed ATP to survive with a 49 percent budget cut. In 1997, ATP's budget was actually expanded by 2 percent.

Economic Development Administration (1997 appropriation: $373.5 million). The Economic Development Administration seeks to improve distressed economies by providing grants and loans to state and local governments, nonprofit organizations, and private

businesses in areas with high and persistent unemployment. EDA's activities include technical assistance grants, which provide technology transfer assistance to private firms, and development grants, which fund the construction and improvement of infrastructure for the development and expansion of private industrial parks and ports. EDA also funds the Trade Adjustment Assistance program, which doles out grants to assist private firms and industries that are deemed to have been adversely affected by increased imports.

International Trade Administration (1997 appropriation: $270.0 million). The International Trade Administration conducts export promotion programs directed toward specific industry sectors through its Trade Development Program. ITA's U.S. and Foreign Commercial Service provides counseling to U.S. businesses on exporting and facilitates participation of U.S. firms in trade shows. ITA also provides marketing services, develops regional and multilateral trade strategies, and investigates economically antiquated antidumping and countervailing duty cases. All those activities are more appropriately conducted directly by the private businesses and industries they are intended to benefit.

Manufacturing Extension Partnership (1997 appropriation: $95.0 million). MEP provides grants to fund the creation and maintenance of dozens of extension centers to assist small and medium-sized manufacturing firms in making use of modern manufacturing and production technologies. General taxpayer funds should not be used to provide assistance to one specific industry, as they are in the case of MEP. This assistance, if necessary, should be paid for directly by the manufacturing firms that use it, not the American taxpayer.

Minority Business Development Agency (1997 appropriation: $28.0 million). The Minority Business Development Agency attempts to promote the development of minority-owned businesses through the provision of management and technical assistance and assistance in gaining access to capital. MBDA activities often focus on helping minority-owned businesses chase government contracts. To encourage the development of minority-owned businesses, the federal government should instead focus on removing the many government impediments to the formation and growth of minority firms, such as unnecessary regulations and the onerous burden of taxation.

Fourth, the ATP and the MEP are modeled after failed industrial policy initiatives in Europe and Japan.

In testimony before the House Science Committee earlier this year, Dr. Mary Goode, Underscretary for Technology at the Commerce Department, argued that other industrial nations are "rapidly expanding their scientific and technological capabilities, establishing a sophisticated array of technology policies, and expanding their investment in R&D." This is a standard argument in

favor of corporate welfare: other nations are doing it, so should we. As the late Commerce Secretary Ron Brown put it in 1995, "shutting down the Commerce Department would be the equivalent of unilateral economic disarmament."

The inference in these statements is that European nations are gaining a competitive economic advantage by pursuing these corporate welfare strategies. But where is the evidence? Just a cursory examination of the economic woes in Europe today, where industrial policy initiatives--of the kind that MEP and ATP are modeled after--are systemic, suggest that if anything the strategy is economically debilitating. Table 2 shows that Germany, France, Sweden and other nations that subsidize major industries with taxpayer dollars have unemployment rates at least 50 percent above ours in the United States. These nations have propped up large, bureaucratic, inefficient corporations through billions of dollars of taxpayer subsidies. The burden of these subsidies now appears to be borne by the small business and entrepreneurial sector of the economy that has been the engine of growth and job creation in the United States. These are the very policies that have led to suffocatingly high tax rates in these nations, and thus a massive exodus of capital.

Since 1980, the United States has created more net new jobs than all of Europe and Japan--combined. Why at a time when industrial policy initiatives are in such universal disrepute around the globe, would the United States want to adopt such anti-competitive strategies? This can only be describes as chasing the losers.

Fifth, ATP unwisely converts the government into the role of investment banker.

The U.S. is the world leader in financial services today. We have the most sophisticated capital markets on the globe. These capital markets work to allocate scarce investment capital to businesses, technologies, and industries that provide the highest rate of return. The investment community and especially venture capital markets pick industrial winners and losers every day. They do this with their own money and with their clients' money. If they do it poorly, they are out of business. This is the very essence of our modern-day capitalist system.

The underlying theology of the ATP is that government can identify companies and emerging technologies that warrant capital financing better than the proven experts in the financial markets can. This is government hubris in the extreme. Moreover, we have had decades of experience with such programs--and the results have been universally disappointing. Examples:

* In the mid-1980s the Department of Commerce issues $1.23 billion in loans and loan guarantees. Not even half were paid

back.

* The Supersonic Transport -- considered an essential technological innovation in transportation by the feds -- was given more than $900 million of taxpayer subsidies. The plane was never developed in the U.S. and is a commercial flop in Europe.

* In the late 1970s the Carter Administration created the ill-fated Synthetic Fuels Corporation to develop a cost-effective alternative to fossil fuels. The SFC was ended in 1981 after $1 billion was wasted and not a single kilowatt of electricity was generated.

But the best example of what happens when the federal government gets into the business of commercial banking is the Small Business Administration. The ATP is analogous to an SBA for high-tech companies. Yet the SBA has a dismal lending record. Historically, many SBA loan programs have had default rates above 20 percent. For a commercial bank, a 5 percent default rate on commercial loans is considered unhealthy.

On a macro-economic level, there is no evidence that the federal government's already huge investment in science and high-tech initiatives has benefited the economy. For example, despite more than $20 billion spent since the end of World War II on federal expenditures in the area of science and technology, Terence Kealy demonstrates in his book The Economic Laws of Scientific Research, that these funds have had no impact in increasing GDP in the U.S.

Sixth, the ATP and other Commerce Department corporate welfare programs put government up for sale to the highest bidder.

In the world of corporate welfare, big is beautiful. A preponderance of the high technology subsidies are diverted to many of America's largest companies, those with K Street lobbyists that help chase down "free" federal dollars. For example, in 1995 the Philadelphia Inquirer monitored the largest beneficiaries of government technology subsidies from 1990 to 1994. Eight of the largest recipients alone had 1994 profits of just below $25 billion. (Table 3 shows the lucky winners.) Can anyone reasonably argue that at a time when the United States government is running $100 to $200 billion annual budget deficits, there is either equity or economy in having Uncle Sam sending out checks to billionaire companies? Can anyone argue that these companies cannot fund vital R&D projects and product development strategies without the help of Uncle Sam?

Table 2—Unemployment Rates in OECD Nations

Nation	Unemployment Rate February 1997
United States	5.3%
OECD-Total	7.5%
France	12.5%
Germany	9.6%
Spain	21.7%
Sweden	10.9%
United Kingdom	7.1%

Source: OECD News Release, April 15, 1997.

TABLE 3

WELFARE TO THE WELL-OFF

Company	1990-94 Technology Subsidies (Millions $)	1994 Profits
Amoco	$23.6	$1,800
AT&T	$35.6	$4,700
Citicorp	$9.6	$3,400
DuPont	$15.2	$2,700
General Electric	$25.4	$4,600
General Motors	$110.6	$4,900
IBM	$58.0	$3,000
Motorola	$15.1	$1,600

Source: Philadelphia Inquirer, "How Billions in Taxes Failed to Create Jobs," June 4, 1995.

But what is even more insidious is that Commerce Department corporate welfare grants appear to be closely tied to campaign donations. Table 4 lists 13 large ATP award winners with the contributions made to the two parties--the DNC and the RNC. ATP appears to be little more than a cash-in, cash-out system. The best way to end this symbiotic relationship between industry and government is to shut down the cash dispensing programs that invite corruption.

TABLE 4

CASH-IN, CASH-OUT?

	1996 Contributions to DNC	RNC
	($ Thousands)	
ATP Award Winners 1992-95		
General Electric	$133	$130
BP America	57	218
Dow Chemical	91	268
AT&T	422	552
BellSouth	115	276
BellAtlantic	160	251
Boeing Co.	148	313
Chevron Co.	176	526
United Technology Corp.	231	239
MCI	607	357
Time Warner	401	325
Textron Inc.	274	373
General Motors	77	426

Source: FEC and Department of Commerce, 1997.

Mr. Chairman, I do not come to this issue with the intention of denigrating the contributions of these great and successful corporations. And I do not come to the issue with an anti-business, or anti-big business motivation. To the contrary. I want to see U.S. companies like MCI And General Motors dominating in global markets. The good news is that American firms are out-competing their foreign competitors today in industries across the board--from microchips to potato chips. Mostly these U.S. firms are winning without the help of government "aid."

It is not pro-business for government to try to help businesses one at a time--as seems to be the overriding mission of the Department of Commerce. It is not free enterprise for the government to be picking winners and losers in high technology markets--or in any industry. The way that the United States Senate can help create more Microsofts, more Intels, more Federal Express's, and more MCI's is not to have government go searching for them. It is to cut taxes, cut government spending, and streamline anti-business regulations that cause more problems than they solve.

A good way to start this crusade to keep American industry competitive is to abolish the ATP and the MEP and the rest of the corporate welfare state that impedes the free market from functioning.

NATIONAL VENTURE CAPITAL ASSOCIATION
1655 North Fort Myer Drive
Suite 700
Arlington, Virginia 22209
Tel: 703/351-5269
Fax: 703/351-5268

June 4, 1997

Honorable Sam Brownback, Chairman
Senate Subcommittee on Government Management, Restructuring
of the Governmental Affairs Committee
601 Hart Senate Office Building
Washington, DC 20510-6260

Dear Chairman Brownback:

The National Venture Capital Association is aware that venture capitalist Tim Draper testified yesterday before your Committee and urged the elimination of the Department of Commerce Advanced Technology Program and the dismantling of the Department of Commerce. NVCA wants to make clear that Mr. Draper is not a member of the NVCA and does not represent the views of the Association.

NVCA is comprised of over 240 professional venture capital firms which invest over eighty percent of all professional venture capital dollars annually in companies located throughout the United States. Many of these venture capitalists have had very good experience with the ATP program and certainly would not be in favor of its elimination. In fact, as research dollars on the company and university levels become more scarce, federal programs such as ATP become more important.

NVCA also wants to clarify that it was requested by Government Affairs Committee staff to recommend a witness who would testify in the manner Mr. Draper testified and we refused this invitation.

While venture capitalists as a whole would rather see less government than more, this does not mean that the government should walk away from fundamental research. Venture capitalists have literally created hundreds of thousands of jobs throughout America in the last decade in industries which are highly research intensive. The government's role in helping to create the basic research which was used to develop these companies should not be ignored.

Attached is a copy of a speech recently delivered by a venture capitalist who is a member of the NVCA. This speech more accurately reflects the position of most people in the venture capital industry than the views presented by Mr. Draper before your Committee this week.

Sincerely,

NATIONAL VENTURE CAPITAL ASSOCIATION

Daniel T. Kingsley
Executive Director

cc: Fred Thompson, Chairman Committee on Governmental Affairs
John Glenn, Ranking Member

Members of the Oversight of Government Management, Restructuring and DC
William V. Roth, Jr.
Arlen Specter
Joseph Lieberman, Ranking
Max Cleland

William M. Daley, Secretary of Commerce

○