Booming and Busting at the Same Time:

Why States Need Dual Agenda Cooperative Technology Programs

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"I'm always a-thinking that with my good health and spirits it would be more creditable in me to be jolly where there's things a-going on to make one dismal." (Charles Dickens, Martin Chuzzlewit, Mark Tapley, chapter 7).

Introduction

When Supreme Court Justice Louis Brandeis referred to state governments as the "laboratories of democracy," he was speaking metaphorically, commenting on states' ability to try new social experiments. During the past three decades, states have brought some literal truth to Justice Brandeis' description. State governments have developed and implemented a remarkable array of programs designed to harness science and technology in service of economic growth. In business incubators, university research "centers of excellence," research parks and all manner of research and technology institutions, states have sought to emulate the federal government's strategy of hitching its economic wagon to the technology stars. As one expects from a series of experiments, these new technology-based economic development programs have varied in their success. But the great majority could be described as, if I may appropriate Raymond Carver's title, "a small, good thing"- beneficial, certainly worth doing, but not exactly the centerpiece of state government.

My state, Georgia, is actually one of the leaders in expenditures for technology-based economic development (TED) programs. In FY2000 Georgia allocated $51 million to its three TED programs. This places it among the top five states in spending for these programs and seems a sizable investment.

But, back to the "small, good thing" notion, it is important to underscore that the *Georgia's TED expenditures represent less than one-half of one percent* of the State's total appropriations for FY2000. Of the total budget of $13.2 billion, public education receives 56.3%, human services 22.8% and public safety 8.5%. While it is not fair to say that everything else is financial flotsam and jetsam, it is at least clear where Georgia, and all other states, position their TED programs- well after the big ticket items.

After having for several years been engaged in systematic evaluations of state TED programs, in my state but also several others, I have naturally developed a good deal of evidence of about the functioning and impacts of these programs. The evidence my colleagues and I have developed (e.g. Bozeman, 2000; Youtie, Shapira and Bozeman, 1999; Melkers, Bugler and Bozeman, 1993; Bozeman and Kingsley, 1997; Roessner, Bozeman and Lee, 1995) is quite consistent with others' findings (e.g. Malecki, 199; Feller, 1988, 1997; Feiock 1991; Rahm and Luce, 1992). The evidence shows that TED programs are generally quite effective in accomplishing their goals.

The problem is the goals are too modest. Many states are booming and busting at the same time- the relatively advantaged portion of the population is enjoying unprecedented income growth, the relatively disadvantaged are struggling with stagnant wages and longer working hours. A dual agenda, much more challenging that traditional economic development goals, requires *technology* based economic development working hand-in-glove with *social* economic development with the objective of leaving no one behind.

Much of the ensuing discussion focuses on Georgia, a state with booming economic development and busting social economic development. Georgia is a morality tale with implications for states with vibrant economies, great or near-great universities, labor shortages and big aspirations.

The Dual Agenda Challenge

It is now time for states TED programs, many of which have for some time been on a holding pattern, to congratulate themselves on a job well done and to take on an even bigger, harder job. Stimulating economic development, even during a boom period is a challenge. But an even greater challenge is to contribute to more even, widely distributed growth, a growth and development so fundamental that it actually reaches the significant proportion of each state's working poor who have been bypassed by the economic boon. It is time to take up a dual agenda, economic development and economic social. My argument for doing this is simple: raw self-interest. With labor shortages, increasing reliance on immigrant labor, low unemployment and a still growing economy, states and their businesses cannot afford the luxury of leaving some citizens behind. The economy, especially today's new knowledge-based economy, voraciously consumes skilled workers. With unemployment rates around 5% or less in many states, most of the skilled workers have been consumed and economies are limited by zero-sum human capital competition.

If raw self-interest is not a sufficient motive for an economic social agenda, perhaps we can consider the issue of fairness. Is growth rate of 10% per year something to boast about if half the population loses ground during the same period? TED programs are not the cause of income inequality, with very rare exceptions, they are not part of the cure. They should be. How? By latching them even more closely to higher education and to the broad based development of "scientific and technical human capital." One way to do this is through a "dual agenda" for TED programs.

Let me explain what I mean by the "dual agenda." Most states have two quite different and rarely joined economic agendas, one *economic development* the other *economic-social*. From the standpoint of economic development- new companies, high paying jobs, wealth creation- TED

programs often do a lot with a little. But few such programs even begin to address the economic-social agenda- income inequality, poverty, racial and class divide.

In a public sector program, the question cannot simply be "what are the benefits and costs?" It is also important to ask "*who* benefits?" This is really not such a radical idea. Distributive and redistributive policies have long been part of the thinking behind our tax code, our educational systems, our health and medical systems. We do not usually think of technology-based economic development this way. I think we should. The chief argument is a simple one: economic development cannot be for the few. Most important, we must find ways to ensure that state TED programs, and economic development programs in general, do not become reverse income transfer programs, taking money from the median taxpayer, transferring it to wealthier taxpayers. In some cases, state economic development programs exacerbate income inequality. This is not an outcome that state policy-makers should be willing to sustain. In the long run, income inequality undermines state economies, especially when significant percentages of the potential labor force are neglected.

Why Inequality, Why not Quality?

If the problem is that some people are doing very well and others, especially those who do not have a strong educational background, are simply progressing at a slower rate, is this reason for concern? Why worry about income inequality? If people are, in general, doing well, what's so bad about unequal? Isn't survival of the rugged individual what made America strong? By one measure, inequality is the American way. By large majorities, residents of Japan and five Western European nations believe, at least according to public opinion polls, that government should guarantee each citizen a minimum standard of living (Burtless, 1999). But when asked the same question, only about a quarter of citizens in the U.S. agree. However, compared to people in these six nations, Americans are much more likely to agree that their society provides

an equal opportunity for people who want to get ahead. The questions surrounding income inequality are just not important ones for many Americans.

Putting aside for the moment the idea of an equal opportunity society, income inequality is *not* explicable merely in terms of some people progressing at a very rapid rate and others progressing as well, but at a somewhat slower rate. For the poorest 20% of the U.S. population, their real income has actually declined by 9% during the period 1977 to 1999. The working poor are doing better, but still many of the working poor continue to fall behind. The number of full-time year-round workers with incomes below the poverty line actually increased by 459,000 in 1998 (the most recent data), as the poverty rate among these workers rose (Sharpiro and Greenstein, 1999). As Table One shows, the *median* wage earner has advanced relatively little during the past two decades, only 8% income growth.

Thus, there is little evidence that the rising tide is raising all ships but some just a little more than others. Some ships are sinking. But why should we worry about this, especially as a matter of state economic development policy? First, there are a host of humanitarian reasons to worry about income stagnation and disparity. For example, we might worry that poor Americans (those below the official poverty line) have death rates comparable to those in Bangladesh, long one of the world's public health disaster zones. Or we might be concerned that poor American's, white and black, are more likely to graduate from prison than from college. But for the present let us leave such humanitarian issues to social policy-makers and consider instead why it may be a concern with income inequality has a place in TED policy.

A poorly prepared labor force acts as a ceiling on economic development. With low unemployment, that ceiling and its unfortunate consequences are become more visible. The solution? Use TED programs, acting in concert with universities, secondary education, and job training programs, to help leverage the development of human capital.

I focus here on economic development in Georgia and the state policy crucible that blends technology development, higher education and human capital development. In many respects Georgia is an instructive case. It is instructive because it has succeeded in many of its economic development roles. But it is also instructive because economic development benefits have been maldistributed, ultimately to the entire state's detriment. Finally, it is instructive because it has recently taken some steps, especially in its well known Hope Scholarship program, that should help expand the economic development pie. I begin with a brief overview of the Georgia economy.

Georgia Economic Development: Booming and Busting at the Same Time

The unemployment rate in Georgia unemployment rate has been below 5% since 1995. For the past three years, it has been less than 4%. State revenues nearly doubled between 1990 and 1999, recently having exceeded one billion dollars per month (Georgia Economic Indicators, 1999). Manufacturing earnings have consistently grown from 1985 to the present, even in the face of labor supply problems. In 1998, an average of more than 16,000 jobs per month went unfilled even as Georgia continued to have one of the highest rates of in-bound labor migration. The number of new corporations created each month more than doubled from 1,763 in 1985 to 3,766 in 1998. The economy is hot.

In 1997 the median family income for whites in Metropolitan Atlanta was nearly $50,000, whereas it was $17,000 for African-Americans. The splits between metropolitan Atlanta and rural Georgia are just as sharp. Clearly, Georgia, as so much of the United States, is enjoying a boom *and* a continued bust. Its experience is much like national trends (Langer, 1999).

Examining the aggregate masks the bust within the boom. Table Two gives figures for income distribution in the United States between 1970 and 1996 (i.e. before the peak of the boom). If we examine changes according to quintile we find, remarkably, that there is *only one*

income quintile that has been increasing steadily since 1970. Everyone else is either declining or holding their own. Between 1973 and 1997 the income of families at the 10th percentile fell 7%, while the income at the 90th percentile grew 38% (Danziger and Reed, 1999). In almost every state, people are being left behind- economic boom, people bust.

The reasons for increasing income inequality and stagnant lower- and middle-income wages have begun to receive considerable attention (e.g. Danziger and Gottschalk, 1993; Karoly and Burtless, 1995; Weinberg, 1996). Factors cited include shift to a service economy, increase in single parent households, increased opportunities for highly skilled workers at the same time as decreased opportunities for unskilled and less skilled workers, global competition, the "knowledge economy" and importance of computer skills, and increasing use of part-time workers (Weinberg, 1996).

It is not my purpose comprehensively to consider the many causes of income inequality in the U.S. Many of them do not related directly to state economic policies. It is a stretch to think that state economic policies can do much about single earner families in broken homes or high teenage birth rates, two of the more important causes of income disparity (Levy and Michel, 1994). But part of the income inequality puzzle is very much relevant to states economic development policies.

Education and State Economic Development, Part I: the Georgia Research Alliance

Georgia ranks as the 11th most populous state with 7.5 million residents in 1997 and is projected to have 7.9 billion in 2000, or about 2.87% of the U.S. population. As is the case in most states, Georgia's TED programs receive much attention but not much funding (at least not on a proportional basis). Despite spending less than one-half of one percent on TED programs, the State of Georgia nonetheless has one of the larger investments in TED programs, both in absolute terms and as a percentage of state expenditures. In 1999, Georgia allocated $51.7

million to R&D-based technology development programs. These expenditures were divided among a Traditional Industries Initiative, the Economic Development Institute (located at Georgia Tech and including the Advanced Technology Development Center and the Georgia Industrial Extension Service), and the Georgia Research Alliance.

The Georgia Research Alliance is by far the largest expenditure for technology-based and economic development, it is the most influential and has received the most attention. My example focuses exclusively on the GRA because it is the part of the State's TED policy that uses higher education as a vehicle for economic development. As we shall see, my argument is that a dual agenda, economic development and economic social, is best pursued through education leveraging strategies.

The most widely heralded and most expensive component of Georgia's TED programs is the Georgia Research Alliance. The Georgia Research Alliance (GRA) was founded in 1990 as a three-sector partnership of the state's research universities, the business community, and the state government. Its mission is to foster economic development within Georgia by developing and leveraging the research capabilities of research universities within the state and to assist and develop scientific and technology-based industry, commerce, and business. In FY 1998, GRA received $ 42.4 million from the State of Georgia, constituting a little more than 80% of the Georgia's TED investment. A major element of GRA is attracting world-class eminent scholars to Georgia, with the presumption that the scientists and engineers will build up the scientific and technical base of the state and permit the research universities to play a key role in working with industry. The GRA programs are centered around major research centers including the following:

- Georgia Center for Advanced Telecommunications Technology (GCATT): GCATT oversees university-based research that helps shape and support the emergence of the advanced telecommunications industry to advance the economy.
- Georgia Biotechnology Center (GBC): GBC supports for scientific programs and assistance for business and economic development. Research activities includes genetics and molecular medicine; vaccine and diagnostics development; drug design and synthesis; microbial conversion and fermentation; protein engineering and production, and biological substitutes.
- Georgia Environmental Technology Consortium (GETC): GETC's mission is to target the research strengths among Georgia's environmental scientists and engineers on the needs of Georgia.

The GRA sponsored research totaled more than $700 million (all sources) in 1996. According to self assessments, the GRA is responsible for an increase in university-based licenses from 22 in 1990 to 50 in 1996 and has yielded six high-tech startup companies. GRA researchers have established partnerships with a number of leading companies including Eastman Kodak, IBM and Hitachi USA. Understandably, the state's universities are keen on GRA programs which have by any measure been a major boon to their ability to recruit leading faculty.

Thus, GRA is the wellspring of the state's TED programs and its importance is underscored in Table Three which gives expenditures by program group for the years 1993-1999.

As one quite close to GRA, I can attest to its success. Not only have I helped develop an evaluation plan for GRA (at the request of it budget overseer, the State's Office of Planning and Budget), but I witness its activities on a daily basis. My own research program, the Research

Value Mapping Program, is housed in its main buildings and is part of its largest center, the Georgia Advanced Telecommunications Technology Center. The GRA has had great success by a great many standards. The State investment of $242 million (by 1999) has paid off in several respects. First, industry has provided $65 million in matching funds. Second, 32 eminent scholar chairs have been created and filled at the participating universities. Third, the GRA and the ATDC have been instrumental in a number of new firm startups in fields as diverse as air quality products, chicken transgenesis, solid waste management, and digital film. The GRA scholars and programs have attracted sponsored research, more than $600 million by GRA's own accounting. GRA does not keep records on students supported through GRA scholars funding and research programs, but anecdotal evidence shows that the State's investment has also paid off in terms of this form of human capital development.

Despite the salutary effects of GRA and, more generally, Georgia's investment in TED programs, some core economic problems remain endemic. The State's TED programs did not create these problems but, when acting in concert with the education programs, they could perhaps prove part of the cure.

Education and State Economic Development, Part II: The Hope Scholarship

Perhaps the most important rationale for a dual agenda is to make sure that our economic-social agenda keeps pace with our economic development agenda. Often the two are on parallel tracks, sometimes they are at odds. Perversely, one of the reasons that the economic-social agenda has made so little headway is that the economic development agenda has made some much. Often, educational "success" adds up to greater inequality. The story of Georgia's Hope Scholarship is important because it shows how a program that has been, at the same time, taken as a model for national policy *and* described as a leading illustration of "plantation economics" can be transformed to a dual agenda role.

Booming and Busting in Education

A dramatic means of making the dual agenda point is to consider three sets of statistics published during August, 2000. In the first place, Georgia Tech, the university that has the leadership role in the state's university-based economic development policy, was rated by a set of experts as the leading university in the nation in technology-based economic development. Less directly applicable to economic development, but nonetheless noteworthy, Georgia Tech announced that its Fall 2000 class had no less than twelve entering freshman with *perfect* 1,600 scores on their SAT's. This statistic looks nice alongside the by now annual result that Georgia Tech has the highest average SAT scores of any public university in the nation. Naturally, we feel inclined to brag about this.

Another set of statistics, also released in August, 2000 tell a different story about Georgia and its economic development. Among the 50 states and the District of Columbia, Georgia ranks number 50 in its high school student's SAT scores (Saltzer, 2000). The title of the story- "Georgia Posts SAT Gains But Still Ranks 50th"- tells us all we need to know about the direct effects of economic growth and higher education on success in the state's high schools.

These three sets of statistics, reported in the same month, provide an exclamation point for may chief argument. It is easy to be highly successful in economic development and, at the same time, have insufficient impacts on positive social change. Just as important, the prospect of Georgia sustaining economic growth when it depends on a young workforce that does not match up well against the rest of the nation is at best problematic. These statistics are about the most compelling case one can make for a dual agenda in economic development.

Higher Education: A Double-Edged Sword?

Persons with only high school education (about half the labor force) have been steadily *losing* income, when adjusted for inflation, for more than a decade. Those with a college

education have always had an edge, but the edge is bigger now. In 1979, the median full-time weekly wage for men with college degrees was 29% higher than those for me with only a high school degree. But 1998, the gap had increased to 68%.

Studies of income inequality consistently report that higher education plays a complex role. One study (Bishop, Formby and Thistle, 1992, p. 353) tells us that "*ceteris paribus,* higher per capita educational expenditures tend to be associated with states that have income inequality which is greater than the U.S. average." Of course, the nice thing about such statements is that is never the case that all things are equal. While is does seem to be the case that higher per capita educational expenditures relates to income inequality, it is not directly a culprit in people being worse off, but rather in people being better off.

The HOPE Scholarship Program

One of the best recent examples of education as a double-edged sword is the State of Georgia's HOPE ("Helping Outstanding Pupils Educationally') Scholarship program. The HOPE Scholarship was established in 1992, tied to the lottery amendment referendum. The lottery, which earmarked revenues for use in education, was approved in November, 1992 and HOPE scholarships began being parceled out in 1993. Funded entirely by the lottery, the program provides full tuition and fees and a $150 per semester book allowance to eligible students attending a state college or university and a $3,000 per year academic scholarship to students attending one of Georgia's private colleges or universities. The HOPE program also includes special programs for teachers, including cancelable loans for teachers' graduate study. To be eligible for HOPE scholarships students must be a Georgia resident, must be a 1993 or later high school graduate, and must have completed high school with a "B" average. To remain eligible, students must maintain a "B" average in college.

The HOPE program provided 141,174 scholarships in 1998-99 at a value of $189.2 million. It has provided about 450,981 scholarship from September, 1993-August, 2000 at a cost of more than $978 million (Georgia Student Finance Commission, 2000). In 1996, President Clinton modeled his America's Hope program, a tax credit for the cost of two years education beyond high school, on the HOPE program. In April, 1998, the National Association of State Student Grant and Aid Programs released a study citing Georgia as number one among 50 states in academic-based student financial aid.

Despite a great deal of favorable publicity and its enormous popularity in Georgia, the HOPE program is not without its critics. The criticisms are straightforward and attack both the revenue source and the incidence of impact. Most of the people who play the lottery are in the lower quartile of income and are disproportionately minority. Very few of the recipients of the program (until recently at least) have come from poor or working poor families and the recipients are disproportionately white and middle class. It is not difficult to infer that the program is an income transfer from the poor to the relatively advantaged. The regressive nature of the program was virtually guaranteed until recently because it counted Pell grant funds *against* the amount available to the student from HOPE. Pell grants were created in 1972 under the Basic Educational Opportunity Grant program, initially providing a maximum award of $1,400 to the lowest income students for financing their college educations. Later, Congress passed the Middle Income Student Assistance Act of 1978, greatly expanding eligibility. As a result of funding pressures caused by increased middle income eligibility, the grants were steadily reduced from a 1979 high of $1,800 to $1,670. To put it another way, the Pell Grant maximum award declined from 77.4 percent of the cost of a college education in 1979 to 33.4 percent of the cost in 1996.

Notwithstanding the increasing cost of education and the decreasing size of Pell grants, the HOPE scholarship program from the beginning was essentially excluding recipients of Pell grants. According to one education organization (Postsecondary Education Opportunity, 1999: p. 3) the "Georgia HOPE Scholarship program [is] the first financial aid program that deliberately and purposefully excluded poor people from eligibility- thus the origin of the term 'plantation economics' of higher education." Even if the rhetoric, which assumes motive, is a bit overblown, it is nonetheless clear that the original HOPE program was not in any respect related to need (the $100,000 income eligibility limit was removed early in the program) and did have some characteristics of an income transfer from the relatively disadvantaged to the relatively advantaged.

In January, 2000, one of newly elected Governor Roy Barnes' first activities after settling into office was to propose legislation ensuring that Pell Grant recipients could receive full benefit from the HOPE scholarship, in many cases more than doubling the educational assistance to the poor. In July, 2000, the HOPE scholarship took on a very different role in state government as the legislature passed the initiative expanding HOPE scholarships.

The fact that the program requires a "B" average remains somewhat of a barrier to many poor students receiving the HOPE scholarship. Poor students are much more likely to have attend high schools that are, at least by traditional criteria, low performing. Grades are associated with income, two parent families, suburban residence, and gender (with males receiving lower grades). Nevertheless, the HOPE scholarship has become a net contributor to the formation of human capital among Georgia's poorer citizen and shows the possibilities for using the state's higher education programs as a means of mitigating social costs and, ultimately, economic development costs.

Rational Self Interest and the Dual Agenda Technology Policy: How States Can Leverage Technology Programs for Social Value

The best way for TED programs to get involved in a dual agenda is for them to exploit a management strategy they have adeptly used so many times before- leveraging. Most TED programs pride themselves in doing much with little and the way they achieve results is to look for leverage points and to encourage resource sharing. Naturally, most previous efforts have been aimed at leveraging resources to promote technology and small business. I am suggesting that similar approaches be taken to promote the growth of "scientific and technical human capital"- the skilled labor needed by new economy companies. The best candidate for leveraging? The state's education system, both higher education and elementary and secondary education. But let us also consider some rational self-interest issues pertaining to state economic development.

If TED programs claimed a dual agenda and wished to address the social limits on economic development, what could they do? The general answer is that they could deploy their existing policy-making and influence tools in new directions. The tools now used by TED programs include incentives used in connection with grants and loans, direct services such as manufacturing extension and business services, and, perhaps most important, marketing, including the development and use of symbols. Here are several state economic development approaches, some general strategies, some more concrete programs, that could use traditional tools to advance the dual agenda.

Skilled Labor Needs and "The Last 5%"

In many regions of the country, the economy has progressed about as far as possible and is beginning to stall for lack of skilled labor. When unemployment rates are quite low, the remaining available work force almost by definition are the hard core unemployed. Further,

even with high employment, there is often a mismatch between the jobs needed to keep a knowledge economy on track and the skills available in the workforce. In some instances this leads not only to unfilled positions but a decreasing quality of employee for high skill positions. Employers simply "make do," adjusting downwardly their expectations. The case of Georgia is instructive. Among people who have worked in their jobs long enough to qualify for unemployment insurance- that is, the most stable and skilled workers- the unemployment rate is 0.7%. The available labor pool is the more than 65,000 adults who have left the Georgia welfare roles since 1994 and, by and large, these people have the skills to assume retail and services jobs but not the manufacturing, technology, and knowledge economy jobs that are spurring economic growth. For now, the vast numbers of skilled workers moving to Georgia from others states and nations is permitting it to tread water. But as Labor Commissioner Michael Thurmond notes, "Right now, the number-one obstacle to continued economic growth is a shortage of skilled workers" (Saltzer, 1998). Again, the Georgia story is not much different than the rest of the nation. In virtually every region, the limits of the labor force put a cap on the prospects for accelerated or even continued economic growth.

An obvious connection between the economic-social and the economic development agendas is the desirability of a more harmonious society. Economic development and social turmoil do not easily combine, especially at high levels of social turmoil. For example, not only does crime reduce the marginal productivity of persons in jail, the productivity costs of crime victimization are at an alarming level in the United States. There is a remarkably strong correlation between unemployment and crime. Crime is just one example of the melding of the economic-social and the economic development agenda. In any state, the economic costs of an unskilled, unemployed permanent underclass are enormous. While it is easy to view the last 3-5% as the "structurally unemployed," it is becoming more and more clear that relegating our

poorest and most disadvantaged citizens to the rubbish heap is simply not an economically rational position. Not only are the opportunity costs high in terms of needs of skilled labor, the real costs of social dependency remain high even after welfare reform.

As we reach further down into the pool of reserved labor we often find that the skills available are so modest that the last 5% can contribute little. But by improving skills of that last 5% and moving them from a net social cost to a net social gain, the potential economic impact is enormous.

Quality of Life

During the past decade, studies of business relocation and new business sites have shown that choices are not based entirely on such business climate as availability of suppliers, raw materials and market demand. Usually there are several locations to choose from that meet these criteria and, so, a variety of quality of life factors become important. And it is important to remember that those making decisions about firm location are not corporate entities but corporeal ones- people, in all their individuality.

One reason to link the economic development and the economic-social agenda is that the two come together in perceptions of quality of life. We know now, and again I draw in part from the case of Georgia, that it is possible to be in the middle of an economic boom and, at the same time, and partly *because* of the economic boom, have a reduced quality of life. During the past five years in Georgia, and largely *because* of the economic boom, schools have become crowded, there are teacher shortages, traffic congestion is among the highest in the nation, the number of "ozone days" increases nearly every year, water shortages are becoming routine. Naturally, these factors have multiple determinants, but economic growth is one. In all likelihood, Atlanta has not quite reached the tipping point where companies will be discouraged chiefly because of quality of life issues. But it is surely an important factor. CEO's think twice

about moving to an area where their children will be taught by uncredentialed teaching assistants in an auxiliary building, that is a trailer, housing 35-40 students. Similarly, CEO's are probably much like the rest of us in their ambivalence about homeless people. Homeless people make most working people a little edgy, even if generally sympathetic. But as an economic boom inflates the cost of land, increases the cost of downtown rents, and, generally, contributes very little to affordable housing, the number of families out on the streets inevitably increases. While it is the dispossessed whose quality of life is most clearly damaged, the rest of are unlikely to think of urban hobo camps or traffic light squeegee men as increasing our qualities of life. In Atlanta, the answer, like most cities, is a vastly increasing commercial suburban rim. While this is not necessarily a bad outcome there are at least bad consequences including a reduced tax base for the core city.

If we assume that the "last 5%" cannot be squandered and that failure to keep pace with demand for highly skilled scientific and technical labor places an effective lid on economic growth and development, then the success of the TED programs, much as the state's economy, should be judged in part on its ability to contribute to these potential limiting factors. TED programs do not drive state economic development. To the extent any governmental activity accounts for state economic development, it is education.

Cooperative Technology Education.

While many state education departments and universities have effective cooperative technology education programs these are rarely, if ever, connected to state TED programs. It is easy enough to do so. If companies benefiting from state funds are encouraged to invest in cooperative education, either at the high school or collegiate level, it is highly likely that progress could quickly be made. The benefits could be considerable. If students are brought in to work with companies at the beginning stages, the companies receive the advantage of cheap labor and,

in the case of university students, significant skills, this at a time of their greatest need. But the students could benefit immeasurably by developing work skills attendant to any cooperative technology program, but also by receiving object lessons in entrepreneurship and the challenges faced by individuals starting new businesses.

Re-Focused Centers of Excellence Programs

The mythology of Centers of Excellence programs is that by providing money to attract world class professors and their research programs, industry will receive technical benefits, will be attracted to the region and will work closely with university researchers to expand existing businesses or create new ones. While different parts of this mythology have more or less veracity, there seems little doubt that such programs, by one means or another, often prove an important economic development stimulus. But if we believe what industrial leaders tell us, or empirical research done on the topic, there is no more valuable aspect to university-industry centers than their role in training students. These students serve as the particularly valuable reservoir of new technical leaders for companies and, of course, some students themselves begin businesses. Many of the Centers of Excellence are living up to their name when it comes to education and training of graduate students. However, they can do more. A few existing centers serve as a model for the use of the center as a community resource.

Recently, we conducted a case study of the University of Michigan's Center for High Performance Optics, one of the leading centers for laser research in the world. As part of their proposal to the National Science Foundation, they included a community outreach component that is something more than window dressing. They recruited an internationally known senior physics researcher, an African-American, to serve as Associate Director for Community Programs. He has taken as his express mission bringing high school students, especially ones from disadvantaged backgrounds in nearby Detroit, to work as interns at the Center. The

Center provides programs for high school science classes, both at the Center and in the community. So far, no one has systematically evaluated this activity, but the anecdotal evidence is certainly encouraging. It seems at least as good an investment as midnight basketball.

Conclusion

It is a Dickensian world, the best of times and the worst of times. This is perhaps nowhere more true than in Georgia-- with its Georgia Tech freshmen class with 12 perfect 1600 SAT's and its dragging-at-the-rear average high school SAT of 974 (861 in City of Atlanta schools), with its less than 4% unemployment and its stagnant wages, with its leadership in new millionaires and in children in poverty. But the Georgia case is not much different than many others caught up in the boom that is also a bust.

For many years it has been even easier than usual to engage in benign neglect of income inequality, assuming that by some miracle of "trickle down" economics the poorest citizens would be lifted up by the same robust economy that has caused us to think of millionaires not as some Jay Gatsby archetype but as our neighbors or even ourselves. And, indeed, the national economic boom has shored up the living standard of many of the working poor, albeit at the price of dual income earners and longer hours. But now many regions are hitting up against the economic ceilings resulting from a shortage of skilled workers and from the "Peter Principal" advance of workers with limited skills. Presently a few palliatives remain, including record important of immigrant workers, now at the highest levels since the 1920's, up 17% just in the past year. However, it is clear that the availability of appropriate skills is *the* limiting factor in a heated up knowledge economy. TED programs, working in concert with the "big ticket" state programs in education, must answer the call.

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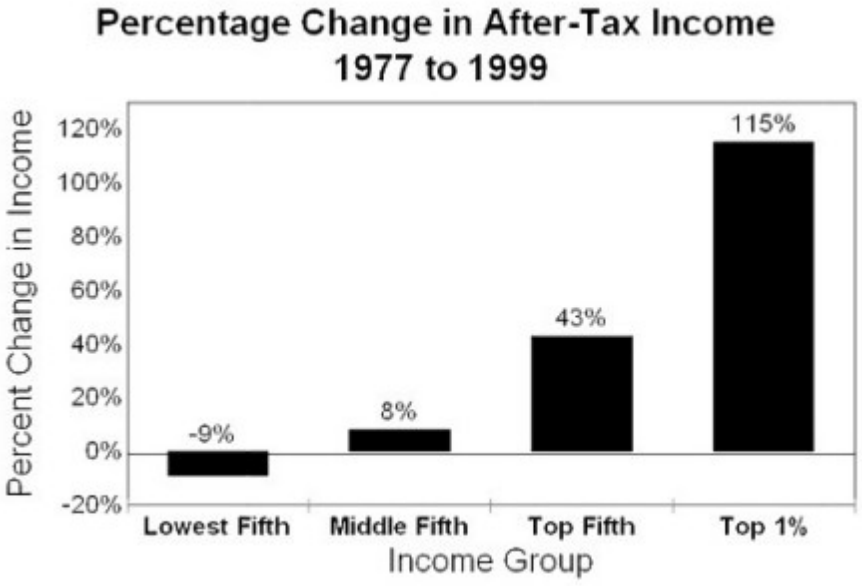
Table One:



Source: CBPP Analysis of CBO Data. 1999 data are projections.

Table Two: Income Distribution for U.S.

	# of Households (In Thousands)	Lowest	Second	Middle	Fourth	Highest	Median Money Income (1996 Dollars)	Gini Coefficient of Income Inequality
All Races								
1996	101081	3.7	9	15.1	23.3	49	35492	0.455
1995	99683	3.7	9.1	15.2	23.3	48.7	35082	0.450
1990	94312	3.9	9.6	15.9	24	46.6	35945	0.428
1980	82368	4.2	10.2	16.8	24.8	44.1	33763	0.403
1970	64374	4.1	10.8	17.4	24.5	43.3	33181	0.394
White								
1990	80968	4.2	9.9	16	23.9	46	37492	
1980	71872	4.4	10.5	17	24.6	43.5	35620	
1970	57575	4.2	11.1	17.5	24.3	42.9	34560	
Black								
1990	10671	3.1	7.9	15	25.1	49	22420	
1980	8847	3.7	8.7	15.3	25.2	47.1	20521	
1970	6180	3.7	9.3	16.3	25.2	45.5	21035	
Hispanic								
1990	6220	4	9.5	15.9	24.3	46.3	26806	
1980	3906	4.3	10.1	16.4	24.8	44.5	26025	

Sources: **Statistical Abstract of the United States**, 1998
Table No. 738 -- Money Income of Households
The Population of the United States, Table 15-12
Table 15-12 -- Share of Aggregate Household Income, by Income Quintile and Race-Ethnicity: 1970-1990
U.S. Bureau of the Census -- Income 1997 -- Table B
Web-site: www.census.gov/hhes/income97
Accessed April 12, 1999

Table Three: Budget for Georgia TED Programs, 1993-99

	Traditional Industries Initiatives	Georgia Research Alliance (GRA)	Advanced Technology Development Center (ATDC)	Total ($ in thousands)
1993	.	15,050	1,555	16,605
1994	2,200	22,000	1,581	25,781
1995	5,172	44,625	1,886	51,683
1996	5,915	29,744	1,979	37,638
1997	7,615	40,129	2,282	50,026
1998	6,160	38,925	2,388	47,473
1999	7,150	42,400	2,178	51,728

Source: Budget Report 2000, 1999, 1998, 1997, 1996 State of Georgia