ENVIRONMENTAL SCANNING REPORT UPDATE

Fall 2012

PURPOSE AND PROCESS

Definition

By enabling decision makers to understand current and potential changes taking place in their institutions' external environments, Environmental Scanning provides strategic intelligence useful in determining organizational strategies. Some of the consequences of this activity include: better understanding of the effects of change on organizations, better forecasting skills, and enhanced expectations of change.

Most environmental scans review demographics, political climate (e.g., as it impacts funding); technology trends and changes in course delivery, and other "existential" (survival) issues that might be responded to reflexively. Good environmental scanning does this, but also goes beyond and considers factors related to the best interests of society (needs of current students, the economy, job availability, etc) to get a sense of the role it ought to play as it operates under social contracts.

Not only should environmental scans look broadly, but also deeply. Consideration of what motivates current and potential faculty and students may be essential to ensuring the institution stays strong.

Environmental scanning has become a common practice in higher education, especially among larger institutions. (For a sample list, please see endnote i).

It is helpful to understand the context of environmental scanning in an institution's strategic planning process. By taking stock of emerging threats and opportunities, decision makers can better position an organization to achieve its academic, civic and societal objectives.

But environmental scans should not be used to set goals and objectives. Institutions are already chartered to advance cultural and social missions and core visions that relate key aspects of the general welfare such as citizenship and pro-social norms. These social

contracts come first. In accomplishing these social contracts, institutions might use environmental scanning for tactical and strategic guidance, but not for reflex. This image portrays Environmental Scanning in context:

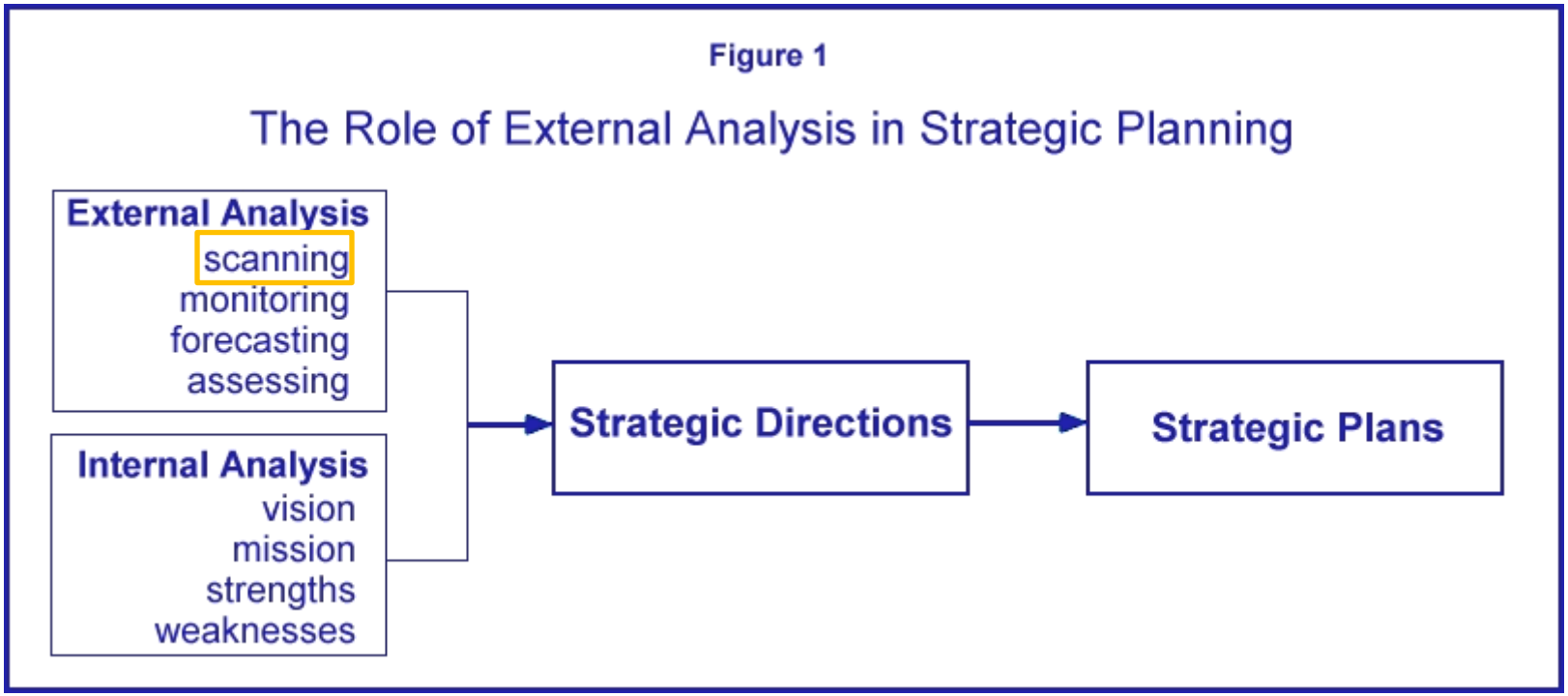

Image taken from http://horizon.unc.edu/courses/papers/enviroscan/ Environmental Scanning, By James L. Morrison

Environmental scanning is said to "promote a future orientation in the thinking of management and staff." An Environmental Scanning "science" has developed with a common language and several canons of categorization for purposes of collecting and organizing a wide range of data for tactical and strategic decision making.

The schema used here follows a popular convention: **Society**, **Technology**, **Economy**, (Natural) **Environment**, and **Politics** (STEEP.)

KEY POINTS

Some key points from this environmental scan:

- The Georgia population is projected to grow robustly through 2020, and the projected number of high-school graduates is trending up well beyond the nation as a whole, although possibly not as steeply as the population of Georgia in general. The challenge will be to enroll minorities who face some structural impediments to college attendance in the state (Trevizo, 2012).
- In the IT world, the big story of the summer in technology is Massive Open Online Courses (MOOCs) -- free undergraduate courses taught by professors at big-name schools. Each MOOC is unique, but courses generally feature a series of short, video segments in which an instructor describes a particular concept or skill, then gives exercises, quizzes and exams. In May, the Massachusetts Institute of Technology and Harvard committed $30 million each to found edX, a non-profit partnership that will offer seven MOOCs this fall. Meanwhile, 16 research universities, including three from outside the United States, have signed agreements to offer courses through a platform created by Coursera, a social entrepreneurship company founded by two Stanford professors. (Marklein, 2012).
- Some technology literature predicts that higher education may see tablets take off, as it is being appreciated as a perfect match for course content as well as Learning Management Systems (Blackboard.) Cameras and access to social media make it useful for field work.
- Also, learning analytics is being applied in various ways – for example, by the Khan Academy. Use by these groups on such a large scale portends that there will be many more applications data becomes available to not only measure effectiveness of various techniques, but being able to determine students' paths to learning.
- Economically, while the economy also continues to be a news story, recent data suggests that the conventional wisdom that recent college graduates stay unemployed and move back in with Mom and Dad may be more urban myth. Recent graduates are finding work at about the same rate as before 2007 – and even in the worst of the Recession, were not as poorly off as some stories reported. The story is quite different for 18-26 year olds without degrees. The problem for all, of course, is finding optimal jobs.
- Politically, some fundamental platform differences exist between the two presidential candidates and are outlined here. Also on the national level, the looming sequestration could hurt higher education if not averted – mainly through cuts to NSF and

NIH funding and not so much to student aid. Of course, "in the United States higher education policy is largely the province of the states," (Zumeta, 2011) and the big political impact to this climate is possibly the state response to national initiatives will take in our region – including the push to greater completions. In Georgia, the Governor is introducing policies that will significantly impact publics –from validating lifetime experience to making articulation between schools seamless.

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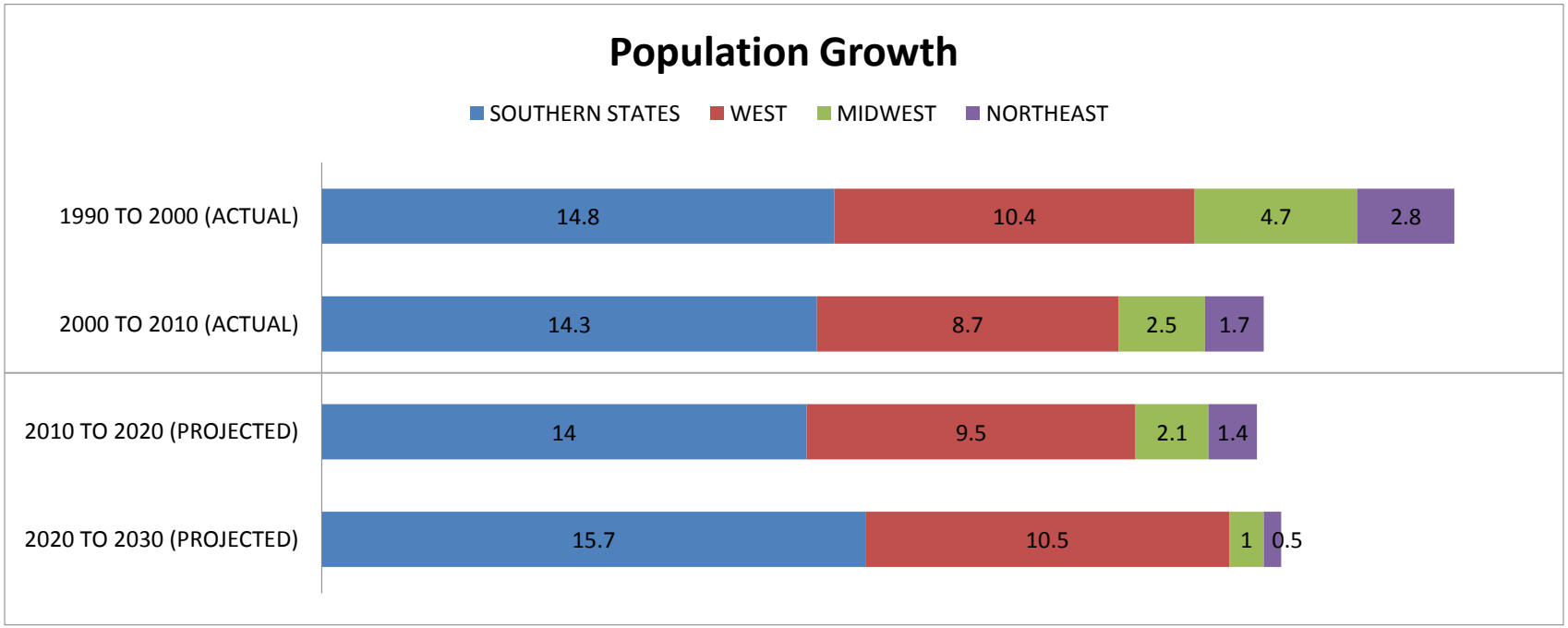
SOCIAL

Population

Southern states[ii]

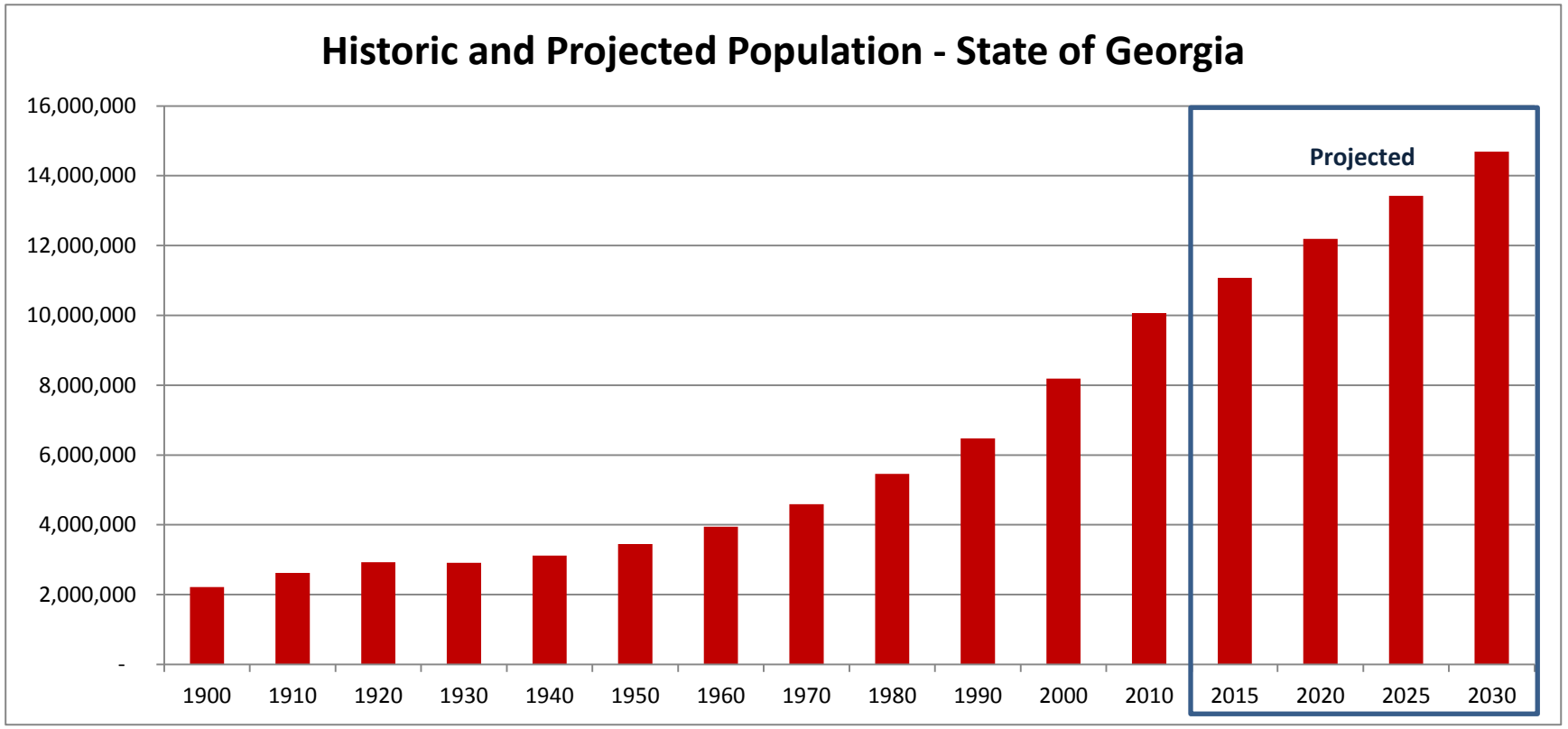
"…by 2030, Southern states are projected to account for more than 39 percent of the US population – up from 37 percent of the national total in 2010." (From SREB Fact Book 2011, page 1.)



Note: US totals may not equal the sum of the parts due to rounding.
Source: SREB Factbook 2011, pg. 1.

Georgia Population Growth

For Georgia, in particular, the effect is even more pronounced. Over the next two decades, between 2010 and 2030, the state's population is projected to grow by an additional 4.6 million people. According to the current projection, Georgia's population will increase 46%, from 10.1 to 14.7 million people by the year 2030. Although the growth rate for each decade of this period (21%) is lower than the very rapid growth experienced during the 1990s, it is similar to the pace of growth posted during the most recent decade (2000-2009).



Source: Georgia 2030 - Population Projections, pg. 1, Georgia Office of Planning and Budget

Total Population and Changes

	Number (in thousands) 2010	National Rank					Percent Change			
		Actual			Projected		Actual		Projected	
		1990	2000	2010	2020	2030	1990 to 2000	2000 to 2010	2010 to 2020	2020 to 2030
Southern States	113,954	---			---		17.5	14.3	12.4	12.4
Georgia	9,688	11	10	9	8	8	26.4	18.3	13.1	10.8

Source: SREB Factbook 2011, pg. 9.

Of course, many things can mitigate a population increase's impact on higher education enrollments. One of these is age. Georgia will continue to be a retirement destination for many from the North and the West, and much of the increases in population will continue to be explained by increases in the ranks of seniors.

Indeed, age is one often-overlooked aspect of demographics which has consequences for higher education, but mostly indirect:

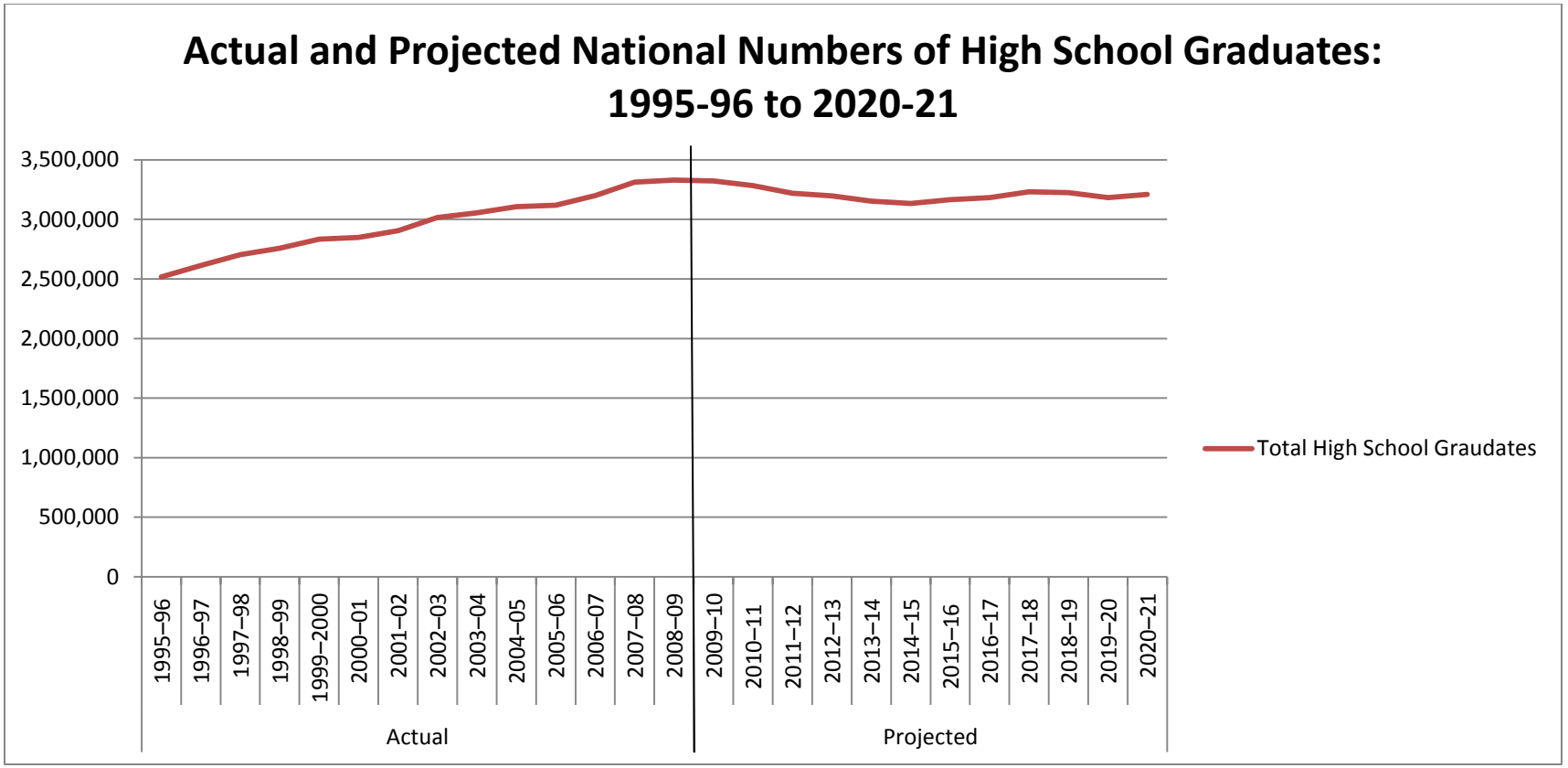
> Not counting immigration, the ratio of working-age people to retirees needing their support will drop dramatically in the United States…. And barring dramatic advances in geriatric medicine, the cost of health care is destined to skyrocket throughout the developed lands. This represents a burden on national [and state] economies that will be difficult to sustain under current medical and social-security systems [which implies more intense competition for higher education for public dollars]…[Also,] The growing concentration of wealth among the elderly, who as a group already are comparatively well off, creates an equal deprivation among the young and the poorer old. This implies a loss of purchasing power among much of the population; in time, it could partially offset the forces promoting economic growth. (Cetron & Davies, 2005).

Adult Learners

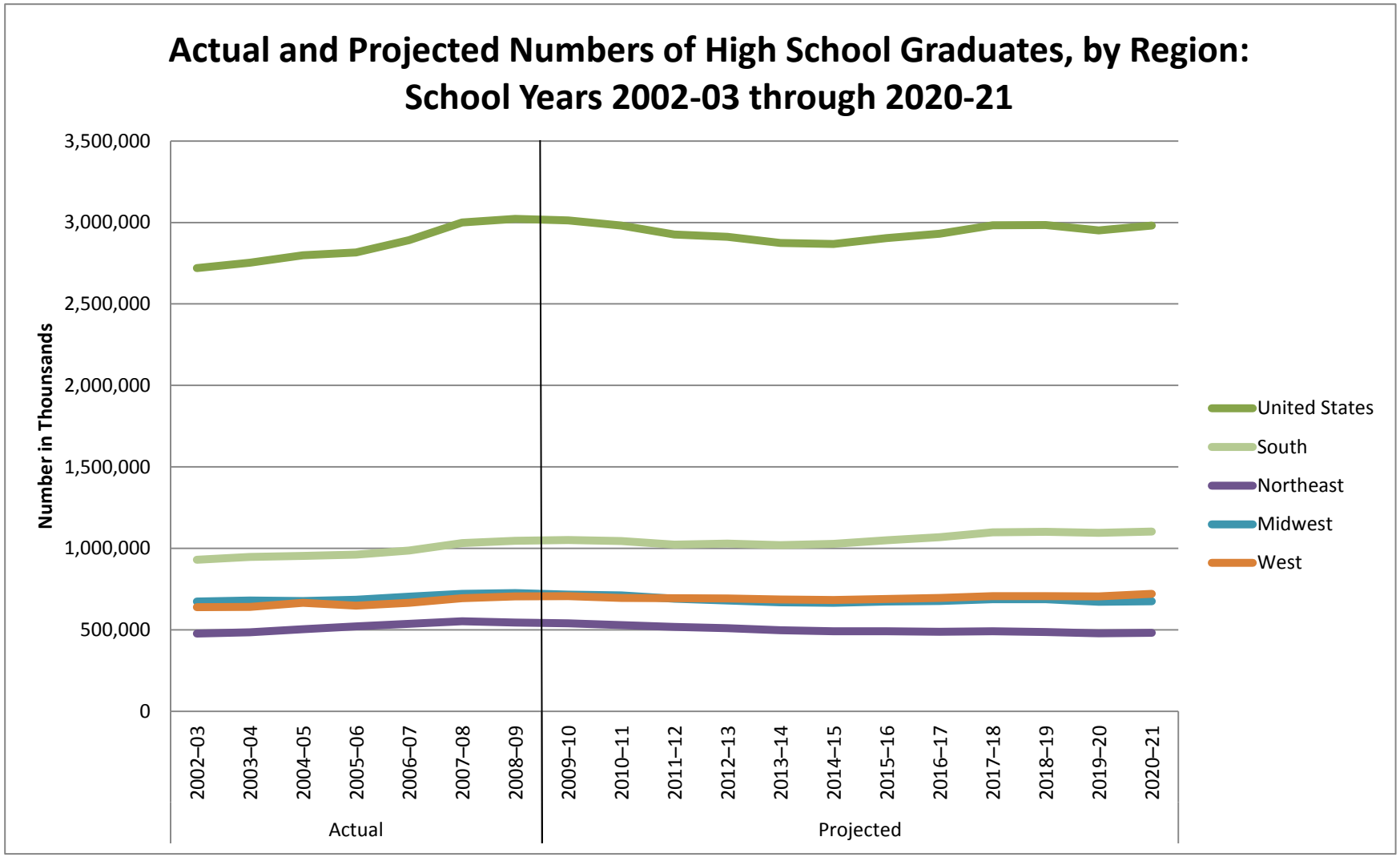
Colleges with programs for adult learners usually focus on the population within the ages of 25-44. Within this demographic, they focus particularly on those without "Associate's or Higher Degree" – which, in Georgia, is 63.8 percent of that working age (25-44) population: (within the adults aged 25 to 44 in Georgia) those without High School Diplomas or GED credentials were 390,000; without Associate's Degree 1,769,000; and without Bachelor's Degrees 1,964,000. (From SREB)

High School Graduates

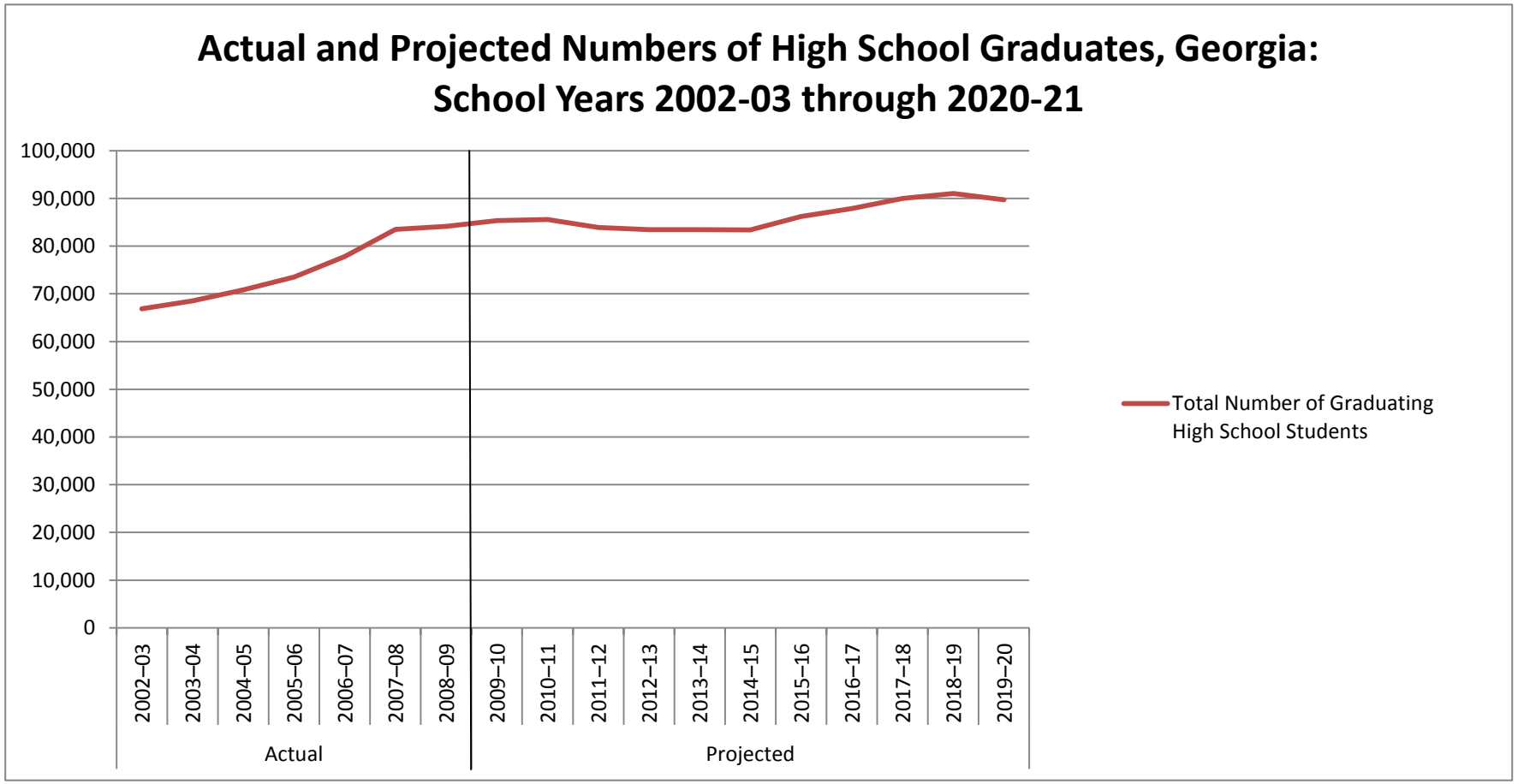
Of course, the demographic of particular interest to higher educators is the trend in high school graduates. Below are National, Regional and State trends for this population segment:



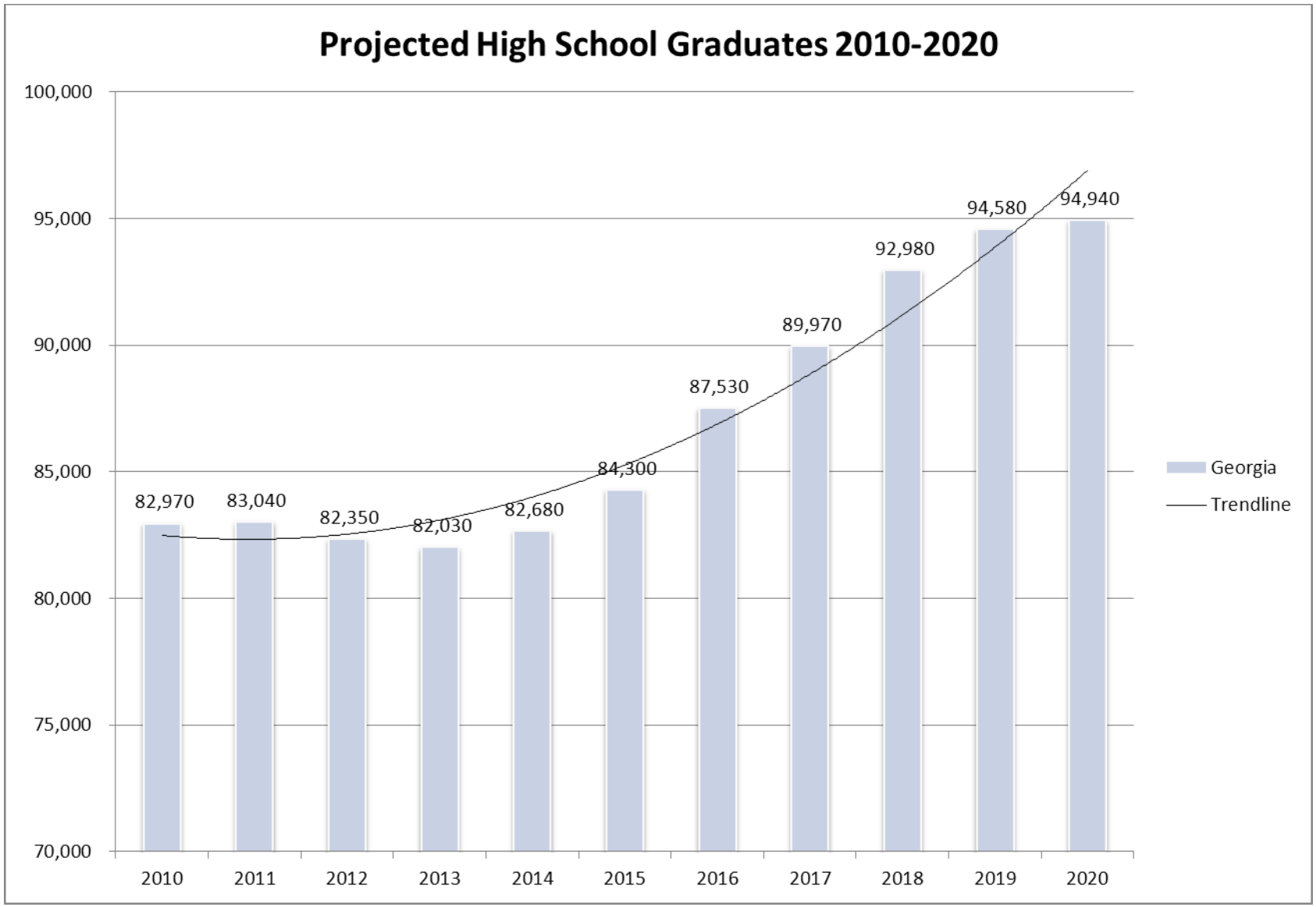
Source: National Center for Education Statistics, Projections of Education Statistics to 2020.



Source: National Center for Education Statistics, Projections of Education Statistics to 2020.



Source: National Center for Education Statistics, Projections of Education Statistics to 2020.


Projected High School Graduates 2010-2020
100,000
95,000
90,000
85,000
80,000
75,000
70,000
82,970
83,040
82,350
82,030
82,680
84,300
87,530
89,970
92,980
94,580
94,940
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Georgia
Trendline

College Retention Rates

Completion rates nationally over the past several years have been stable, despite the widespread interest among many to significantly increase college degree attainment rates. "What's keeping these rates from going up? When asked to identify their single-biggest retention challenge, respondents in the study identified: 1) underprepared or unmotivated students; and 2) a desire for greater collaboration and agreement among faculty, staff, and senior administration regarding retention concerns. A third area of challenge that was evident was the relatively low percentage of respondents (10 to 20 percent) who indicated they had a retention plan that they considered to be of 'excellent' quality."(Noel-Levitz, 2011)

College Participation Rates

More students are pursuing higher education in the US than ever before. Total enrollment in degree-granting institutions topped 20.6 million in fall 2009, and these students are increasingly diverse, are still predominantly young adults and are taking more classes online – some while still in high school. Another 385,300 students attended non-degree-granting postsecondary institutions, taking total participation in post-secondary education to nearly 21 million. (Marks, 2011, p. 33)

Education Attainment

In 2000, 78 percent of adults 25 and older in the Southern states had high school diplomas or had completed their GED. By 2009, 83 percent of the region's adults had these credentials. (Marks, 2011, p.2)

Education levels low for young people in general

Former Florida Governor Jeb Bush stated on 9/25/2012 that only 1/3 of all young people end up with college diploma-or-work-ready high school degree. (Scarborough, 2012)

Enrollment in Southern States grows faster than in nation

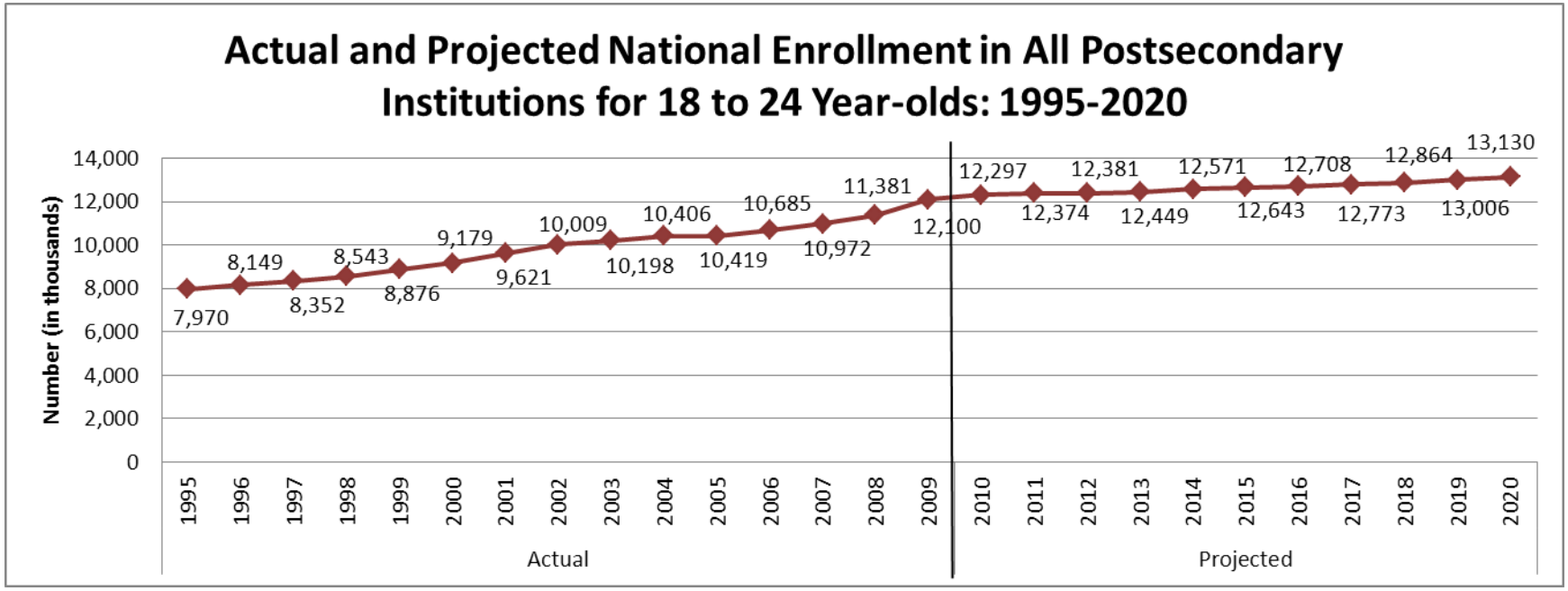
From 1999 to 2009, Southern states increased total college enrollment 45 percent and exceed the 39 percent U.S. average. America's total college enrollment reached nearly 21 million in 2009. Thirty-three percent of these attended in Southern states. From 2004-2009,

eight Southern states had college enrollment growth rates higher than the national average: Alabama, Arkansas, Florida, Georgia, North Carolina, Tennessee, Virginia and West Virginia.

Preference for Privates vs. Publics: [Please see "Preference for Public vs. Private" in Economics section]

Summary of Population Section:

In sum, postsecondary institutions can expect continuing increases in enrollment. And this is particularly true in Georgia.



Student Characteristics

Diversity

From 2000 to 2010, the black and Hispanic populations grew faster than the white population nationwide. In the South, the black population grew 15 percent, the Hispanic population grew 56 percent, and the white population grew 4 percent. Consequently, the proportion of the white population dropped from 66 percent of the total to 60 percent. Black representation remained about 19 percent. Hispanic residents rose from 12 percent to 16 percent of the regional population. In total numbers in Southern states, these changes amounted to 6.6 million more Hispanic persons, 2.7 million more black persons and 2.5 million more white persons (Marks, 2011, p.4). However, the growth of minorities enrolling in higher education was not commensurate with the larger population:

Enrollment of Black Students

	Enrollment Fall 2009	Percent Change from 2004 to 2009	Percent of Total Enrollment in Higher Education		Percent of Two-Year Colleges		Percent of Undergraduate Enrollment		Percent of Graduate and Professional Enrollment	
			2004	2009	2004	2009	2004	2009	2004	2009
Southern States	2,657,782	27.4	20.5	21.9	42.9	45.2	21.0	22.4	16.4	17.7
Georgia	168,979	38.6	31.1	34.9	46.0	43.3	32.2	36.0	23.2	25.7

Source: SREB Factbook 2011, pg. 55.

Enrollment of Hispanic Students

	Enrollment Fall 2009	Percent Change from 2004 to 2009	Percent of Total Enrollment in Higher Education	Percent of Two-Year Colleges	Percent of Undergraduate Enrollment	Percent of Graduate and Professional Enrollment

			2004	2009	2004	2009	2004	2009	2004	2009
Southern States	770,540	43.7	10.2	12.3	53.4	54.4	10.7	12.9	5.7	7.7
Georgia	17,372	92.7	2.3	3.6	39.9	31.0	2.3	3.7	1.7	3.0

Source: SREB Factbook 2011, pg. 56.

Enrollment of White Students

	Enrollment Fall 2009	Percent Change from 2004 to 2009	Percent of Total Enrollment in Higher Education		Percent of Two-Year Colleges		Percent of Undergraduate Enrollment		Percent of Graduate and Professional Enrollment	
			2004	2009	2004	2009	2004	2009	2004	2009
Southern States	3,791,342	11.1	64.9	60.6	38.9	40.5	64.0	59.6	71.8	68.1
Georgia	270,837	10.5	62.6	55.9	35.1	31.0	61.5	54.7	70.2	64.9

Source: SREB Factbook 2011, pg. 57.

Transnational Students

"The dynamics of internationalization are changing. Many of the students that traditionally would have traveled overseas to study for an international qualification are now pursuing foreign degrees in their home, or neighboring, countries at local institutions through an array of collaborative arrangements with degree-awarding institutions from major education-exporting countries (Clark, 2012).

> This growing consumer class in Asia will expand a new segment of students who are willing to pay for a global educational experience while staying in their home country or region … Glocals are characterised by aspirations that usually outstrip

> both their ability to afford a full fee-paying overseas education and their academic merit to gain admission to an overseas institution with financial aid. The traditional segment of international students go abroad for a combination of reasons such as career advancement, quality of education, immigration or the experience of living abroad. Glocals differ from this traditional segment as they look for career advancement and quality of education, without having to go very far from home [through international branch campuses, twinning arrangements and online education… "offshore provision."] High-quality collaborations, such as the one between Yale-NUS in Singapore, are also anticipated to attract glocals. (Choudaha, 2012)

In terms of absolute numbers, more than 400,000 students were enrolled in the UK institutions through TNE. More than 100,000 students were enrolled in Australian institutions (Choudaha, 2012).

TECHNOLOGY

The next generation of college students expects coursework wherever and whenever they want. (Dew, 2010, p. 50)

Massive Open Online Courses

Known as Massive Open Online Courses, MOOCs are springing up all over and enabling learners of all ages around the world to take undergraduate courses by professors at big-name schools, for free. And top universities are clamoring to participate…In May, the Massachusetts Institute of Technology and Harvard committed $30 million each to found edX, a non-profit partnership that will offer seven MOOCs this fall. Meanwhile, 16 research universities, including three from outside the United States, have signed agreements to offer courses through a platform created by Coursera, a social entrepreneurship company founded by two Stanford professors.

"Each MOOC is unique, but courses generally feature a series of short, video segments in which an instructor describes a particular concept or skill, then gives exercises, quizzes and exams.

"Math- and science-related disciplines have dominated course offerings. But Coursera, which lists more than 115 courses on its website, has expanded its repertoire to include subjects such as fantasy and science fiction, world music and poetry. For many courses, autograding technology provides instant and sometimes detailed feedback; Coursera is experimenting with having students evaluate each other's work.

"Students can access the course materials at their convenience, and ask and answer questions on online discussion boards. Often, students organize themselves into study groups and might even meet in person. While they typically never communicate directly with the instructor, classmates may chime in, and the instructor or an assistant may monitor discussions to address commonly raised issues (Marklein, 2012).

Other Trends

Each year the "Horizon Report" (Johnson, Adams, & Cummins, 2012) identifies six emerging technologies likely to have a significant impact on higher education in the next one to five years. Summaries of this year's emerging technologies follow:

Timeframe: The Next 12 months...

•***Mobile Apps***: "Mobile apps are the fastest growing dimension of the mobile space in higher education right now, with impacts on virtually every aspect of informal life, and increasingly, every discipline in the university. Always-connected Internet devices using 3G and similar cellular networks, imbedded sensors, cameras, and GPS have proved to be a feature set with hundreds of thousands of applications. Apps that take advantage of recent developments in these tools, along with advances in electronic publishing and the convergence of search technology and location awareness, made this category of software enormously interesting in a higher education context. Higher education institutions are now designing apps tailored to educational and research needs across the curriculum" (Johnson et al., 2012).

•***Tablet Computing:*** In the past year, advances in tablet computers have captured the imagination of educators around the world. Led by the incredible success of the iPad, which in the fourth quarter of 2011 was selling at the rate of more than 3 million units a month, other similar devices such as the Samsung Galaxy and Sony's Tablet S have also begun to enter this rapidly growing new market. In the process, tablets (a form that is distinct from tablet PCs) have come to be viewed as not just a new category of mobile devices, but indeed a new technology in its own right — one that blends features of laptops, smartphones, and earlier tablet computers with always-connected Internet, and thousands of apps with which to personalize the experience. As these new devices have become more used and understood, it is clear that they are independent and distinct from other mobile devices such as smartphones, e-readers, or tablet PCs. With significantly larger screens and richer gestured-based interfaces than their smartphone predecessors, they are ideal tools for sharing content, videos, images, and presentations because they are easy for anyone to use, visually compelling, and highly portable…Screen technology has advanced to the point that tablets are exceptionally effective at displaying visual content, such as photographs, books, and video; similar advances in gesture-based computing have moved tablets far beyond the point and click capabilities of touchscreens, and tablets are engaging and intuitive devices to use. These combinations of features are especially enticing to educational institutions at all levels. According to a recent study from comScore, the iPad now accounts for 97% of all tablet-based web traffic in the U.S. and 46.8% of all mobile web traffic. … Competing models, including Motorola's Xoom and Samsung's Galaxy Tab have not yet enjoyed the success of the iPad, but together, these companies have solidified tablets as the new family of devices to watch.

Timeframe: Next 1-3 years....

• ***Learning analytics*** employs a combination of data-gathering tools and analytic techniques to study student engagement, performance, and progress in practice. The goal is not just to understand the past, but to help predict the future. This technology trend area will help administrators and teachers revise curricula, teaching, and assessment in real time. Learning analytics will allow educational institutions to tailor education to individual students more effectively. [Editor's note: I found this explanation, provided in footnote1 , helped further my understanding of this point. I also found this paragraph helpful. [footnote 2] For more information, see the 2011 Web version.

1 Today, one of the primary drivers of student computer usage is a college's Learning Management System (LMS) combined with high-speed wireless Internet access. For most students, the LMS is the online gateway to each semester's set of courses.

For each course, an online environment within the LMS is typically used by students to obtain and turn in assignments, perform online exercises, participate in class discussion boards, access required readings beyond the textbook, and check grades. At a growing number of schools, students will also find the instructor's notes and slides used during each class session and supplementary materials not covered in class sessions, as well as audio and video records of each class session.

The primary driver of education computer usage is the preparation and distribution of assignments and lecture materials using word processing, spreadsheet, and presentation applications such as those found in Microsoft Office. Other drivers are student online applications such as email, text messaging, and World Wide Web (Web) browsing both for assignment, research, and entertainment purposes, and for interacting with friends within social networks such as Facebook and MySpace.

Over the past few years, higher educators have pondered whether the tremendous wealth of student-behavior information, that can be collected during routine LMS usage and analyzed to identify trends, can be combined with the vast amount of data found in traditional institutional Student Information Systems (SIS) and campus Enterprise Resource Planning (ERP) systems. Not only can more robust data provide richer analyses of student performance, it also can help in predicting potential student success and failure, identifying at-risk students, and recommending appropriate corrective remedies for faltering students. (Gilfus Education Group, 2011)

2 Learning analytics, the other new trend, is further down the line, with the report's panel of 43 experts pegging its adoption as four to five years away. Using the growing amount of data available about students, learning analytics would allow instructors to tailor education more specifically to each student's needs and make curricular changes on the fly. It also could help instructors gauge how well students are learning. Beyond

Timeframe: Next 1-3 years... (cont.)

•***Game-based learning*** continues to grow as an application area that can enhance learning for students of all ages. Games for education span the range from single-player or small-group card and board games all the way to massively multiplayer online games and alternate reality games. Those at the first end of the spectrum are easy to integrate into the curriculum, and have long been an option in many higher education institutions; but the greatest potential of games for learning lies in their ability to foster collaboration and engage students deeply in the process of learning. Once educational gaming providers can match the volume and quality of their consumer-driven counterparts, games will garner more attention.

Timeframe: 4-5 years...

•***Gesture-based computing technologies*** continue to evolve. Gone is the day of interacting with the computer via just a keyboard or a mouse. Gestures allow the motions of the body to control computing devices. The next generation of students entering higher education will have grown accustomed to interacting with computers and gaming systems via touching, tapping, swiping, jumping, and moving. The Horizon Report specifically mentions new interface technologies such as Kinect, SixthSense, and Tamper, which make interactions with computational devices far more intuitive and embodied. [Editor's note: "gesture-based computing, which incorporates human movement, is already useful in training simulations, the report notes, and could allow students to virtually practice surgery or flip through a centuries-old text."(Weider, 2011)

•***The Internet of Things***: With the advent of the new internet Protocol, version six, objects can now have an IP address, enabling their information store to be accessed in the same way a webcam might be, allowing real-time access to that information from anywhere. At the same time, new wireless communication strategies, such as near field communication, are making it easier for smart objects to connect to networks. The implications are not yet clear, but it is evident that hundreds of billions of devices — from delicate lab equipment to refrigerators to next-generation home security systems — will soon be designed to take advantage

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traditional measures of assessment, such as assignments and tests, educators could look at online social interactions, discussion posts, and how students access information on Web sites to develop a more detailed, and timely picture of a student's understanding of course material. Challenges to adoption include incorporating information coming from a variety of sources and in different formats and concerns about privacy and profiling (Weider, 2011).

of such connections.[3]

[3] While there are examples, such as the Smart Grid, of what the Internet of Things might look like as it unfolds, it is still today more concept than reality. At the same time, the underlying technologies that will make it possible — smart sensors that can easily be attached to everyday objects to monitor their environment or status; new forms of low-energy radio transmission that can enable the sensor to send its information wirelessly or via electric lines to a network hub; and an expanded address space for the Internet — are all well understood, easily mass-produced, and inexpensive. They easy to attach, often much like a sticker; uniquely identifiable; a small data store; and a way to read and write to that store of data. Some applications: inventory control, proximity-based secure data exchange made possible via Nokia's near field communication (NFC) technology. NFC was designed to allow users to make secure payments to kiosks, gas pumps, or dispensing machines via smartphones, but it will also allow smart objects to communicate over distances.

ECONOMY

"High-school students are told that they will not be successful in life unless they attend college. The unspoken assumption is that possessing a college degree is a ticket to a comfortable middle-class life—if not better. That assumption historically was largely true, but it is increasingly not the case. (Vedder, 2012)

Job availability:

While politicians make much of recent graduates moving back home, and while the jobs available may not be of highest quality, employment prospects for recent graduates is not as bad as we are led to believe.

- "Employment prospects for new college grads are better now than at any time since the start of the great recession, say college placement directors, employment experts and students themselves. According to the Associated Press, the unemployment rate for college grads aged 24 or younger has been dropping: From January through April, it averaged 7.2 percent. Comparable rates for 2011 and 2010, not seasonally adjusted, were 9.1 percent and 8.1 percent, respectively
- In a just-released study of 225 employers, Boston research company Millennial Branding finds 87 percent of employers say they will hire more new grads this year than last.
- Almost as many say that in the past six months they have already hired up to 25 new grads each" (Farnham, 2012).

The problem is more one of the types of jobs available. There are more graduates than jobs in managerial, technical and professional vocations. 19.1% of college graduates younger than 25 were in jobs for which they were overqualified (Raasch, 2012).

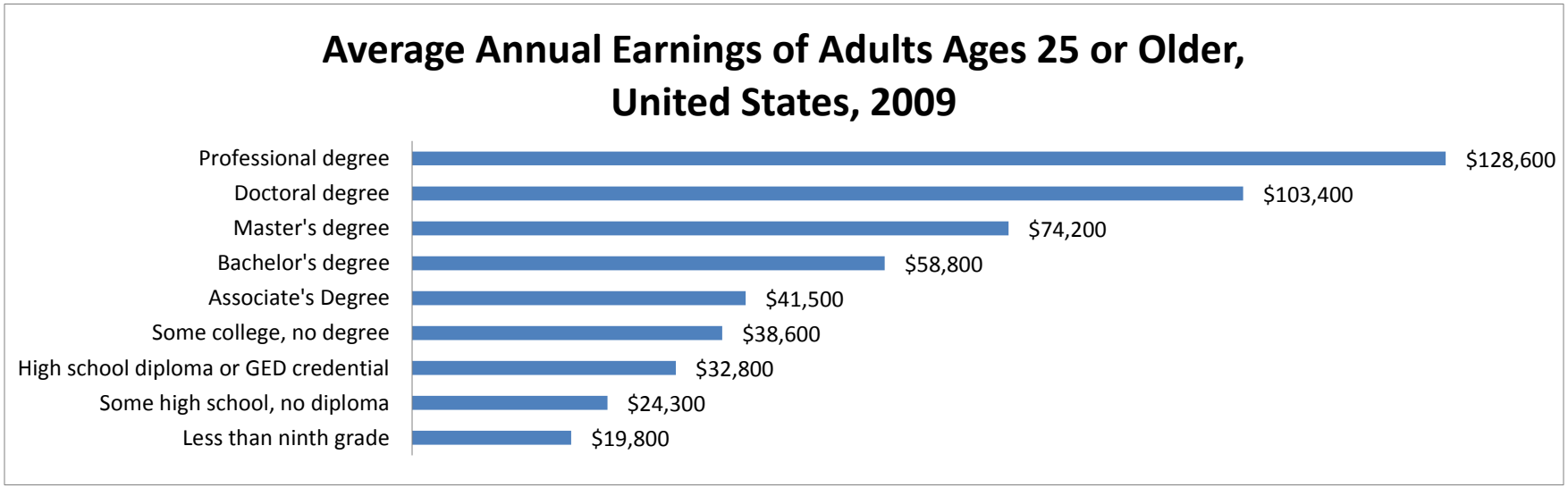
Higher Education still means higher pay

If we equate the value of higher education in economic terms, we can put some numbers on the "value" of a college degree. "U.S. adults with bachelor's degrees—but no higher degree—earned $26,000 more (79%) on average than adults with only high school diplomas or GED credentials in 2009." (SREB Fact Book 2011) Further, unemployment for those 25 and over with less than high school was 12.7 (down from 14.9); for high school diploma only was 8.7 (down from 10.3 in 2010); for some college but no bachelor degree it was 7.1; and for those with a bachelor's degree and higher it was 4.1. (Bureau of Labor Statistics, 2012)

Recession proofing?

Almost half of the jobs lost in the recession that began in December 2007 have been recovered and virtually all of those jobs required some form of postsecondary education (Carnevale, 2012). Just how valuable has a college degree been in the recession and recovery?

- "Job gains (2,199,000) in the recovery are confined to those with education beyond high school."
- "Earnings of workers with a Bachelor's degree or better are still nearly twice that of high school educated workers."
- "Unemployment rates for college graduates (all graduates 4.5% and recent graduates 6.8%) have stayed low relative to those with high school diploma (all 9.4%, recent 24%)



From SREB Fact Book. Source: U.S. Census Bureau

Shortage of STEM Skills

Increasingly, one of our richest sources of employment and economic growth will be jobs that require skills in these areas, collectively known as STEM. There is one unemployed STEM worker for two unfilled STEM jobs throughout the Country. As Raytheon Chairman and CEO William Swanson said at a Massachusetts' STEM Summit last fall, "Too many students and adults are training for jobs in which labor surpluses exist and demand is low, while high-demand jobs, particularly those in STEM fields, go unfilled." STEM-related skills are not just a source of jobs, they are a source of jobs that pay very well. A report last October from the Georgetown University Center on Education and the Workforce found that 65 percent of those with Bachelors' degrees in STEM fields earn more than Master's degrees in non-STEM occupations. In fact, 47 percent of Bachelor's degrees in STEM occupations earn more than PhDs in non-STEM occupations (Engler, 2012).

Fastest-growing jobs require college degrees

Nationwide:

According to the Southern Regional Educational Board (SREB), "jobs that require college degrees will grow at a faster rate over time than those that do not."

"Projections issued after the economic downturn estimated that total job openings nationwide would grow by 10 percent (15.3 million more jobs) from 2008 to 2018. When total opening are calculated (taking into account both growth and replacements), a total of 51 million openings are forecast. Holders of associate's degrees were projected to be qualified for 2.4 million of these openings…People with bachelor's degrees without work experience were projected to be qualified for 3.1 million more jobs (up 17 percent). Unlike previous projections, jobs requiring bachelor's degrees plus work experience were expected to increase at a lower rate than the overall rate of increase (8 percent or 550,000 more jobs.)"

"New jobs requiring only on-the-job training or work experience (no postsecondary education) also were forecast to grow 8 percent. But even with this low growth rate, these openings were projected to account for the 8.1 million of the 15.3 million additional jobs expected in the US by 2018 (Marks, 2011, p. 68).

For further breakdown on where new jobs will be, see endnotes. iii

Georgia: *(Georgetown Public Policy Institute, 2009)*

Georgia's rank in jobs forecasted for 2018		
Education Level	2018 Jobs	Rank
High school dropouts	590,000	11
High school graduates	1,463,000	27
Some college, no degree	1,042,000	35
Associate's degree	381,000	45
Bachelor's degree	946,000	23
Graduate degree	460,000	18

- Between 2008 and 2018, new jobs in Georgia requiring postsecondary education and training will grow by 306,000, while jobs for high school graduates and dropouts will grow by 160,000.
- Between 2008 and 2018, Georgia will create 1.4 million job vacancies both from new jobs and from job openings due to retirement.
- 820,000 of these job vacancies will be for those with postsecondary credentials, 424,000 for high school graduates and 171,000 for high school dropouts.
- Georgia ranks 23rd in terms of the proportion of its 2018 jobs that will require a Bachelor's degree, and is 11th in jobs for high school dropouts.
- 58% of all jobs in Georgia (2.8 million jobs) will require some postsecondary training beyond high school in 2018.

Source: http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/georgia.pdf

Where Georgia jobs will be in 2018 (*http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/georgia.pdf also: HTTP://cew.georgetown.edu/jobs2018)*

FOR GEORGIA: WHERE THE JOBS WILL BE IN 2018, by OCCUPATION and EDUCATIONAL LEVEL (In 1000s)								
Occupations		High School Dropouts	High school graduates	Some college	Associate's Degree	Bachelor's degree	Graduate Degree	Total
Managerial and Professional Office	Management	12	54	58	22	108	48	302
	Business operations specialty	2	21	28	10	52	20	133
	Financial specialists	0	7	12	8	44	15	87
	Legal	0	3	4	2	5	20	33
STEM	Computer and mathematical science	1	8	18	11	56	23	118

	Architects and technicians	1	2	3	2	5	3	16
	Engineers and technicians	1	5	8	4	22	9	48
	Life and physical scientists	0	1	2	1	4	6	15
	Social scientists	-	1	1	0	5	8	14
Community Services and Arts	Community and social services	1	5	8	3	22	22	61
	Arts, design, entertainment, sports, and media	2	10	14	6	32	8	71
Education	Education	5	28	37	18	118	133	339
Healthcare	Healthcare practitioners	4	22	38	60	64	67	254
	Healthcare support	12	42	36	10	8	2	109
Food and Personal Services	Food preparation and serving	110	178	86	25	28	4	431
	Building and grounds cleaning and maintenance	57	76	22	7	9	1	173
	Personal care	15	47	32	11	16	4	125
	Protective services	4	38	37	12	17	3	112
Sales and Office Support	Sales	45	157	132	40	152	29	555
	Office and administrative support	44	269	266	72	125	24	799
Blue Collar	Farming, fishing and forestry	11	8	2	1	1	0	24
	Construction and extraction	74	84	29	6	8	2	202
	Installation, maintenance, and equipment repair	33	89	52	20	12	2	208
	Production	78	147	54	14	14	3	311
	Transportation and material moving	77	162	66	13	19	4	341
Total**		590	1463	1042	381	946	460	4882

** Total jobs shows where jobs are located by education type. Includes filled and vacant jobs.

Report of the President's Council on Jobs and Competitiveness

Another approach to looking at employment training – somewhat different from the perspective of the experience of employers and employees and from the perspective of the best interests of the individual student – is to look at this issue from the perspective of the interests of the nation and the economy. While some of the conclusions are the same, it is helpful to read conclusions of those who look at jobs in terms of the interests of the greater good. The President's task force for this came up with these key points:

> >There are 3.3 million job openings in the U.S., many going unfilled for months on end, as roughly half of employers now say they're having a hard time finding qualified workers to hire, especially in technical fields.
> >The gap between employer needs and workforce skills is starkest in the critical areas of STEM education, as technical skills become increasingly important in the workforce. Yet while demand is growing rapidly, the U.S. is on track to respond with only modest increases in the number of graduates in STEM related fields.
> > Only 1.5% of 25-34 year-olds in the workplace gained a higher education degree in a science related field, putting the U.S. in the bottom third of all OECD countries.
> >Projections indicate that by 2020 we will have 1.5 million too few college graduates as compared with employer demand.
> > Only one-quarter of America's 52 million K-12 students are performing on par with the average student in Singapore, Hong Kong, Finland, Taiwan, or South Korea, while 25% of our high school students fail to graduate. (President's Council on Jobs, n.d.)

The recommendations of the President's Council consider the issue not from projecting job openings from trending numbers, but rather from the perspective of building a "purposeful" education system focused on economic vibrancy.

Employment losses in the South and in Georgia

The nation's unemployment rates rose dramatically from 2005 to 2010. The unemployment rate went up from 5 percent to 9 percent in the South. (From SREB Fact Book 2011, page 8) In Georgia, it went from 5.2 percent to 10.2 in the same time period. (Source: US Bureau of labor Statistics: online database 2011 – note page 23 of SREB Fact Book 2011.)

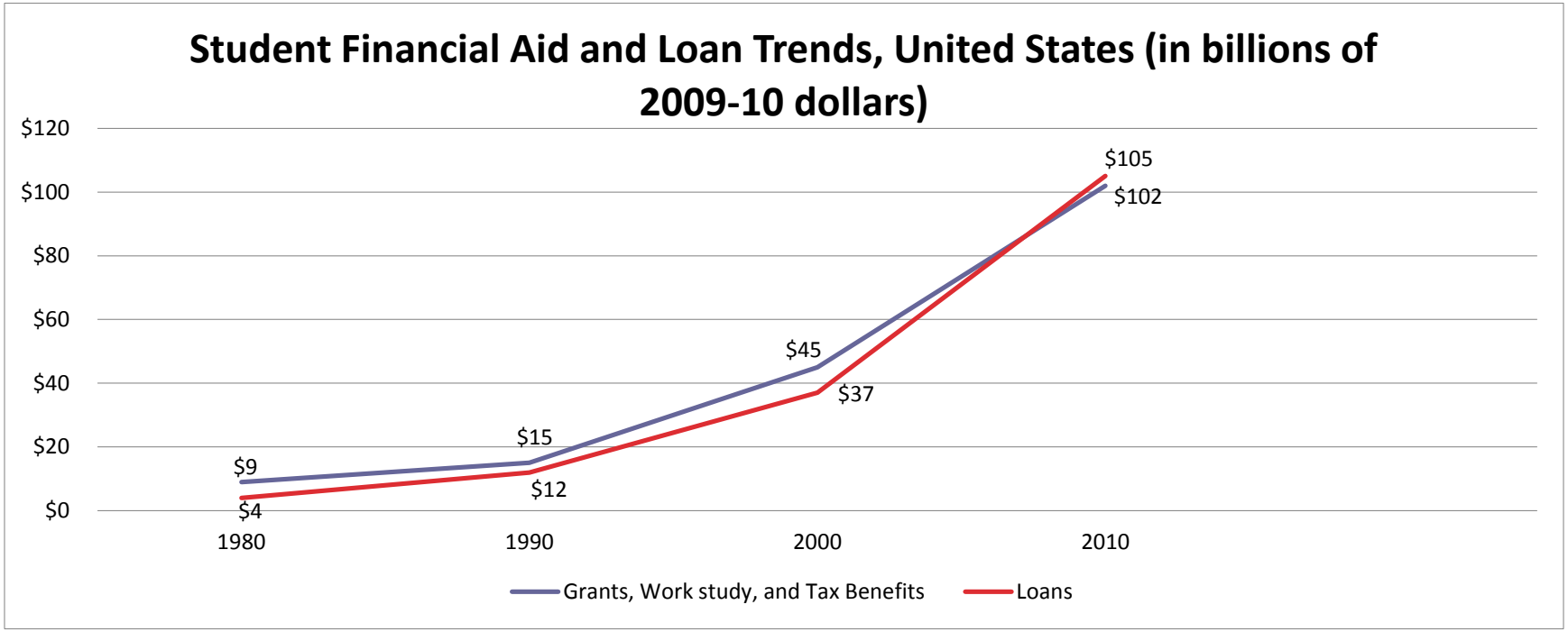
SECTORS (Nonagricultural Employment)

	Total	Mining, Logging, & Construction	Manufacturing	Trade, Transportation, & Utilities	Information	Financial, Professional, & Business Services	Education & Health Services	Leisure, Hospitality, & Other Services	Government
Southern States 2010 Employment	46,224	2,244	3,821	8,995	837	8,501	6,357	6,605	8,446
Georgia 2010 Employment	3,826	149	344	808	101	723	486	527	678
Southern States % Change 2005-10	-1.5	-21.5	-19.8	-3.9	-12.8	-0.7	13.2	1.5	6.3
Georgia % Change 2005-10	-4.4	-28.8	-23.4	-5.2	-9.7	-5.1	13.8	-0.6	4.9

Source: SREB Factbook 2011, pgs. 24 - 25.

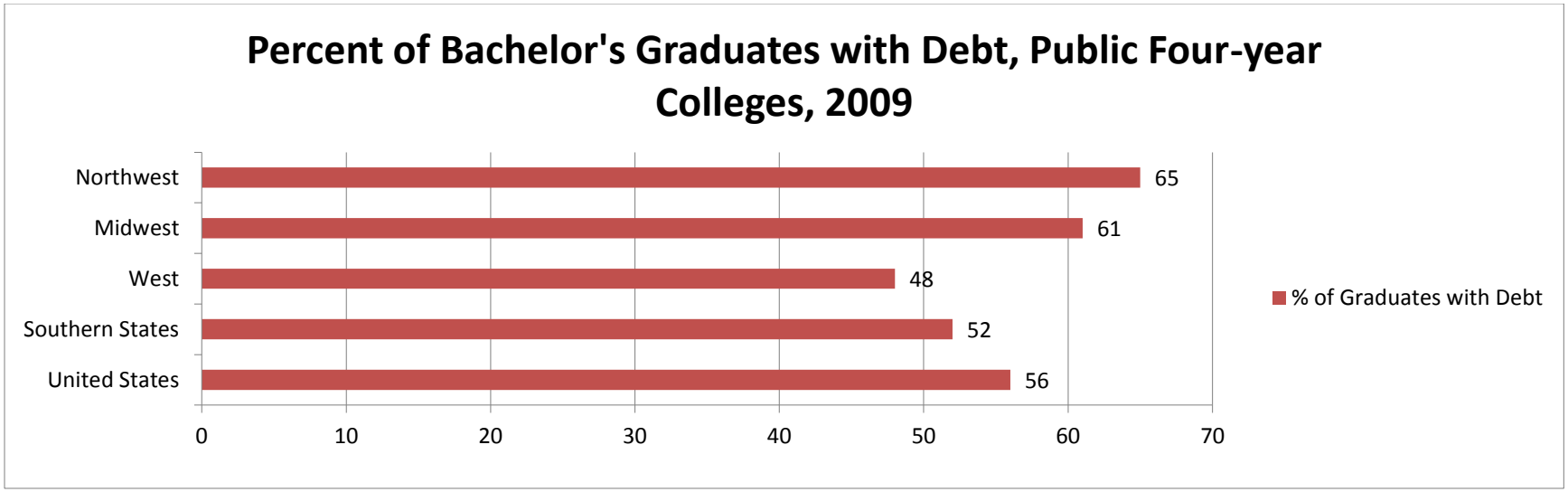
Debt

While college may increase chances of employment – and, on average, correlate with better salaries – the debt of recent graduates is staggering.



Source: SREB Factbook 2011, pg. 103

In 2009, 56 percent of the nation's undergraduates receiving bachelor's degrees at public four-year colleges graduated in debt for their college education – on average owing $20,500. In the South, 52 percent of these graduates owed for college loans, averaging $18,700 of debt. Among US regions, the West had the lowest percent of graduates with loans and the lowest loan amounts, followed closely by the South (Marks, 2011).



Source: SREB Factbook 2011, pg. 103

Colleges cannot be aloof to the impact of large Student loan burdens on the individual or on society. Debt burden is significantly impacting life choices, ranging from marriage and having children to choice of careers. These have social impact in the aggregate – beyond the obvious impact of postponed marriage and fewer births, students forego favored careers in critical vacancies like teaching and research for jobs that will better help them escape debt burden. In reaction to the private pain and societal burden, college costs are increasingly scrutinized by the public.

Some look at revenue: "At a time of diminished state funding for higher education and uncertain federal dollars, [Ohio State President Gordon] Gee says that public colleges and universities need to devise a new business model to pay for the costs of education, beyond sticking students with higher tuition and greater debt" (Martin, 2012).

But most attention is on spending: "Colleges … have only recently taken a harder look at ways to streamline their operations."

> There is a dispute about why college costs have risen so much. Before the economic crisis, some critics argue, both public and private colleges participated in a costly "arms race" to provide better amenities to lure the best students and faculty: new dormitories with one student to a room, frequent sabbaticals for professors, upscale cafeteria food, expanded counseling services and gymnasiums that rival the fanciest health clubs in Manhattan. Others say education is intrinsically expensive. Health care costs, for instance, have taken a toll, since colleges are labor-intensive. And the expense of keeping up with technology, like wireless Internet and new computers, is high…. at Ohio State, where tuition has increased by nearly 60 percent since 2002, there is a gleaming new student union, climbing walls that can accommodate 50 students at a time and $2 billion in construction projects under way. [Also] colleges can be top-heavy with administrators and woefully inefficient, some critics say, and some have only recently taken a harder look at ways to streamline their operations …[some even questioning] compensation packages" (Martin, 2012).

Indeed, higher education institutions across the spectrum are looking at creative ways to streamline within the current delivery paradigm. But increasingly the delivery paradigms themselves are under scrutiny and some say, in need for reform or replacement.

Pricing Environment

In an environment of increasing debt-financing and decreasing job prospects, students become even more cost conscious. Actual and published tuition rates are thus a key element of any environmental scan…Total Published Cost of Attendance: Georgia Privates":

Institution Name	Academic Year									% Change from 2010-2012
	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	
Agnes Scott College	$ 29,670	$ 31,850	$ 33,670	$ 36,275	$ 38,737	$ 40,910	$ 41,955	$ 43,133	$ 44,345	3%
Andrew College	$ 16,280	$ 16,936	$ 17,982	$ 18,980	$ 19,980	$ 23,170	$ 23,866	$ 24,822	$ 25,398	2%
Berry College	$ 24,500	$ 25,800	$ 27,562	$ 29,384	$ 30,496	$ 33,198	$ 36,080	$ 37,764	$ 39,668	5%
Brenau University	$ 24,500	$ 25,430	$ 26,650	$ 28,115	$ 29,750	$ 31,537	$ 32,428	$ 33,545	$ 34,940	4%
Brewton-Parker College	$ 19,128	$ 21,578	$ 23,152	$ 24,622	$ 24,380	$ 26,585	$ 25,613	$ 28,770	$ 25,860	-10%
Clarke Atlanta University	$ 22,674	$ 23,126	$ 24,162	$ 26,526	$ 27,560	$ 29,382	$ 29,382	$ 31,950	$ 33,862	6%
Emmanuel College	$ 15,170	$ 15,900	$ 16,800	$ 17,560	$ 19,034	$ 20,344	$ 20,700	$ 21,540	$ 22,950	7%
LaGrange College	$ 23,225	$ 24,249	$ 26,350	$ 27,159	$ 29,073	$ 31,168	$ 32,770	$ 34,938	$ 36,464	4%
Mercer University	$ 29,531	$ 31,125	$ 33,173	$ 35,066	$ 37,476	$ 40,351	$ 41,529	$ 43,849	$ 45,807	4%
Morehouse College	$ 27,328	$ 29,138	$ 29,732	$ 31,640	$ 33,956	$ 36,582	$ 39,122	$ 41,188	$ 43,601	6%
Oglethorpe University	$ 29,770	$ 31,400	$ 33,500	$ 35,580	$ 37,267	$ 38,680	$ 40,290	$ 41,590	$ 43,440	4%
Paine College	$ 18,004	$ 18,850	$ 19,200	$ 20,032	$ 19,530	$ 20,520	$ 21,362	$ 21,362	$ 22,620	6%
Piedmont College	$ 22,000	$ 23,450	$ 25,700	$ 25,700	$ 30,000	$ 29,500	$ 29,500	$ 29,955	$ 30,874	3%
Point University	$ 20,250	$ 21,610	$ 22,660	$ 24,615	$ 24,880	$ 28,330	$ 28,730	$ 27,060	$ 29,606	9%
Reinhardt University	$ 20,916	$ 22,700	$ 24,120	$ 24,196	$ 25,188	$ 26,926	$ 27,242	$ 27,852	$ 33,230	19%
Savannah College of Art/Design	$ 29,760	$ 31,480	$ 33,375	$ 35,830	$ 38,310	$ 40,957	$ 43,005	$ 45,521	$ 47,465	4%

Shorter University	$ 21,569	$ 22,955	$ 25,950	$ 26,900	$ 28,660	$ 27,000	$ 28,000	$ 29,400	$ 30,540	4%
Spelman College	$ 26,788	$ 28,238	$ 29,508	$ 30,955	$ 33,115	$ 35,665	$ 36,488	$ 37,974	$ 40,540	7%
Thomas University	$ 17,035	$ 19,600	$ 20,470	$ 20,470	$ 20,470	$ 22,130	$ 22,992	$ 17,110	$ 18,805	10%
Toccoa Falls College	$ 20,650	$ 21,075	$ 22,025	$ 23,240	$ 24,475	$ 25,715	$ 27,305	$ 27,847	$ 29,222	5%
Truett-McConnell College	$ 16,628	$ 18,256	$ 19,281	$ 20,678	$ 23,243	$ 23,740	$ 24,400	$ 25,300	$ 26,090	3%
Wesleyan College	$ 19,970	$ 20,650	$ 21,860	$ 24,300	$ 26,500	$ 27,300	$ 28,200	$ 29,100	$ 30,000	3%
Young Harris College	$ 19,018	$ 19,994	$ 20,772	$ 21,910	$ 23,050	$ 25,058	$ 28,683	$ 30,474	$ 32,165	6%
Average Sector Price	**$ 20,027**	**$ 21,067**	**$ 22,338**	**$ 23,694**	**$ 24,906**	**$ 26,326**	**$ 27,795**	**$ 28,637**	**$ 30,926**	**8%**

Average Net Price for Students Receiving Grant or Scholarship Aid

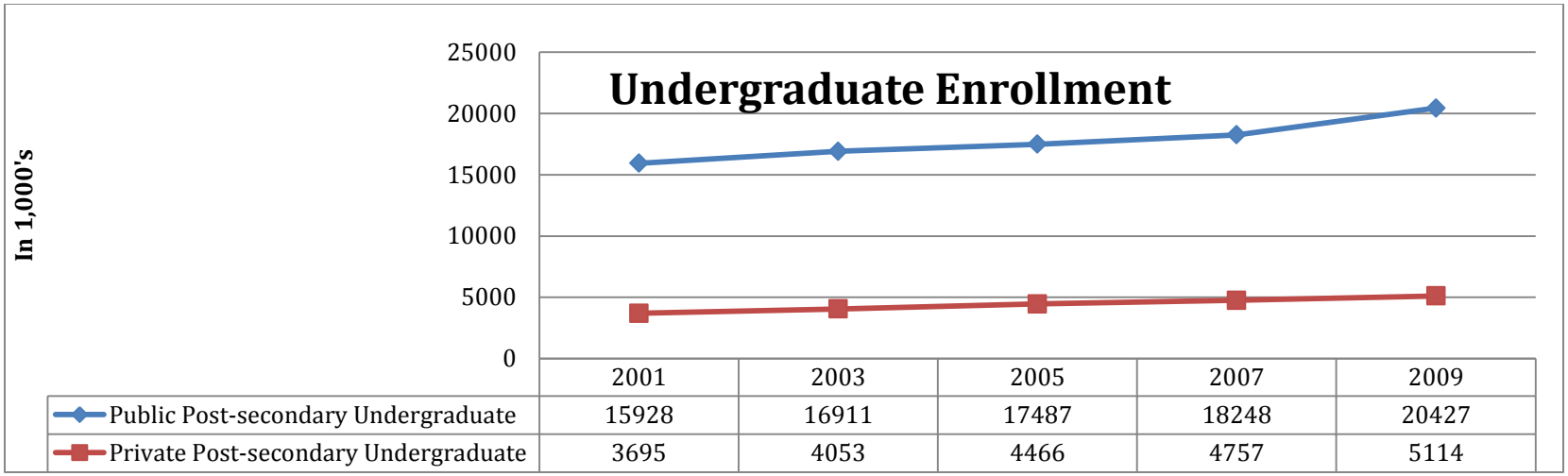
Institution Name	2008-09	2009-10	% Change
Agnes Scott College	$18,501	$19,085	**3%**
Andrew College	$15,147	$15,537	**3%**
Berry College	$18,179	$19,200	**6%**
Brenau University	$13,219	$14,600	**10%**
Brewton-Parker College	$16,372	$14,638	**-11%**
Clarke Atlanta University	$22,731	$21,727	**-4%**
Emmanuel College	$11,583	$11,311	**-2%**
Georgia Military College	$9,225	$9,212	**0%**
LaGrange College	$17,395	$17,048	**-2%**
Mercer University	$18,050	$18,461	**2%**
Morehouse College	$26,619	$23,884	**-10%**
Oglethorpe University	$17,653	$20,289	**15%**

Paine College	$13,757	$14,038	**2%**
Piedmont College	$18,657	$15,337	**-18%**
Point University	$21,293	$17,578	**-17%**
Reinhardt University	$17,713	$18,884	**7%**
Savannah College of Art and Design	$30,092	$33,016	**10%**
Shorter University	$12,336	$13,456	**9%**
Spelman College	$29,112	$26,404	**-9%**
Thomas University	$15,963	$15,035	**-6%**
Toccoa Falls College	$17,022	$16,380	**-4%**
Truett-McConnell College	$15,140	$15,822	**5%**
Wesleyan College	$13,089	$12,177	**-7%**
Young Harris College	$12,289	$13,351	**9%**

[Note: Charts omit Georgia Military Campuses as well as Shorter Adult Programs]

Preference for Public vs. Private

The downturn in the economy could explain a seeming sudden preference for public vs. private schools, which had previously been outpacing growth in the public schools.



Higher Education's Role in Economic Development

Some (e.g., Barlett & Steele, 2012) are beginning to question higher education's role in economic development.

One researcher states: "It is an article of faith among politicians, college and university presidents, and other opinion leaders that higher education institutions promote jobs and are engines for economic growth. According to that view, investing in higher education is like investing in highways, power plants, or software development – only the investment is better, with a higher rate of return. That is a nice theory, and no doubt we are better off having colleges and universities than not having them. Much innovation has been spurred by educated people who understand complex technical and scientific matters. But the evidence does not support the conclusion that more spending on higher education automatically promotes economic development" (Vedder, 2012). What does seem to impact economic development, though, is engineering programs and university-based research. "It has become almost a matter of faith in economic and innovation policy circles to point to U.S. research universities as the secret weapon in the U.S. economic competitiveness arsenal." Some claim that research may well be the most effective public service role colleges play.

In any case, the role of the Academy in innovation, in particular -- and in economic health, in general -- is well described in "University Research Funding: the United States is Behind and Falling," (Atkinson & Stewart, 2011) An expansive excerpt is found in the appendix.iv

There are other economic development issues involving higher education, even if less directly: What is the role of colleges in nurturing entrepreneurship, why are colleges producing fewer graduates in STEM disciplines, what is the role of higher education in immigration reform that will allow internationals graduating with STEM degrees to become citizens?

Other Economic Trends Impacting Higher Education

Percent Distribution of State and Local Government General Expenditures

	Education			Social Welfare	Transportation, Public Safety, Environment, and Housing	Administration	Other
	Higher Education	Elementary and Secondary Education	Total Education				
2007-2008 Southern states	10.2	24.2	34.8	25.7	24.6	4.9	7.7
2007-2008 Georgia	8.4	28.5	39.6	25.9	23.9	5.2	5.4
Percentage Point Change 02-03 to 07-08: Southern states	0.2	-0.2	0.0	0.1	0.3	0.0	-0.4
Percentage Point Change 02-03 to 07-08: Georgia	-0.4	1.4	0.9	-0.5	0.5	0.0	-0.8

Source: SREB Factbook 2011, pgs. 26 – 27.

Per Capita Income

	Per Capita Income 2010	Change				Percent of US Average			National Rank		
		Actual		Adjusted for Inflation							
		2005 to 2009	2009 to 2010	2005 to 2009	2009 to 2010	2005	2009	2010	2005	2009	2010
Southern States	$38,061	$4,962	$779	$1,098	$153	93.4	94.1	93.8	---	---	---
Georgia	35,490	3,326	1,704	-429	1,137	90.8	85.2	87.4	33	40	38

Source: SREB Factbook 2011, pg. 20

Median Annual Income and Poverty Rate

	Median Annual Income 2009	Percent Change		Percent of US Average			National Rank			Overall Poverty Rate			
		1999 to 2004	2004 to 2009	1999	2004	2009	1999	2004	2009	2009	National Rank 2004	National Rank 2009	Percent Change 2004 to 2009
Southern States	$42,664	6.7	10.3	89.1	85.1	85.7	---	---	---	15.4	---	---	0.5
Georgia	43,340	4.0	5.7	96.9	99.1	87.1	27	37	42	15.8	23	9	3.8

Sources: SREB Factbook 2011, pg. 21

Poverty Rate Data - SREB Factbook 2011, pg. 22.

ENVIRONMENT

As we are coming to the understanding that climate change is real and serious, higher education has a role to play as the one institution in society most looked to for solutions. David Orr, known as the "Wizard of Oberlin", notes "no institutions in modern society are better situated and none more obliged to facilitate the transition to a sustainable future than colleges and universities (Orr, 2002, p.96). Thus, society is increasingly looking to higher education for solutions, and some institutions are found wanting:

- Colleges are under scrutiny for "green washing" -- the practice of ascribing supposed sustainable qualities to a product or service for purposes of boosting market share (Rendell, 2012) – by only taking small-scale and gradual changes that are "far from adequate response to the urgent sustainability imperative." Institutions are accused of "Relying on small-scale 'club' activities establishing demonstrations and raising awareness is unlikely to lead to permanent change" (Bekessy, Samson, & Clarkson, 2007).
- Institutions of higher education contribute nontrivial amount of Greenhouse Gases themselves. v
- Higher education is being eyed for regulation:
    - In 2009, the Environmental Protection Agency (EPA) proposed the Mandatory Greenhouse Gas Reporting rule GHGRP, which would require any U.S. entity emitting more than 25,000 metric tons of CO2-equivalent (mTCO2e) (thus becoming a "regulated entity") to report their emissions annually to a centralized federal registry.
    - In both houses of the US Congress, bills have been proposed that require large energy consumers (over 40MW per year) to measure and then decrease their GHG emissions over time. If regulated entities do not meet targeted reductions, they are required to procure offsets equal to the amount by which they have exceeded their target.
    - In July 2011, British Columbia's Public Sector achieved mandated carbon neutrality for calendar year 2010—a significant achievement and global first. The initiative covered a range of public sector organizations...[including] post-secondary institutions. [Note particularly SMARTTool methods of emissions measurements http://www.env.gov.bc.ca/cas/mitigation/pdfs/Methodology_for_Reporting_BC_Local_Government_GHG_Emissions.pdf and findings of K-12 and Post-Secondary sector, pp. 11-13 of Engagement Report] (Climate Action Secretariat of British Columbia, 2011).

- The UK government plans to link cutting emissions to funding agreements for higher education. (St. Arnaud, Smarr, Sheehan, & DeFanti, 2009)
- In California, Assembly Bill 32 has now entered the implementation phase, requiring a reduction of GHG in the state. In 2008, for the first time, all ten campuses [in the University of California system] had their emissions measured, independently validated, and reported to the California Climate Action Registry (http://climateregistry.org/). In addition, individual campuses have developed their own climate action plans. For instance, in January 2008, UCSD became the first U.S. west coast university to join the Chicago Climate Exchange (CCX), the major North American voluntary, but legally binding, "cap-and-trade" emission trading system. (St. Arnaud et al., 2009)

The Response of Colleges

Irrespective of whether regulation comes soon or not, colleges might want to begin to measure emissions. We do not know what form regulation would take – whether it involves simple measurements or elaborate mitigation, but, one way or the other, it will involve measurement.

Of course, going beyond mere measurement to reducing energy efficiency can give financial advantage in the present. (And that advantage will be heightened in the future: It is interesting to note that Higher Education institutions can come under the double whammy of carbon taxes and purchase of offsets, as happens in British Columbia.)

GHG Inventory:

But while the STARS data collector questions are valuable for participating in ratings, perhaps the most significant step a college can first take -- even before the checklist process such as STARS-- is taking stock, specifically, of emissions:

- reduction of emissions is impossible to determine if institutions do not measure.
- emission monitoring and reduction of emissions for public institutions may become mandated. If colleges have to participate in carbon exchanges or be subject to carbon tax, the sooner colleges take stock and experiment with emissions reduction

schemes the less likely to experience economic shocks later. College administrations will become more engaged in things external to campus, like how their power is generated.

- Additionally, green rating services favor those institutions which measure and publish Scope 1, 2 and 3 emissions.

Possibly the best approach to measuring greenhouse gases is the Clean Air Cool Planet (CA-CP) campus carbon calculator:

- It is recommended by the ACUPCC;
- The CA-CP includes GHG emission factors for fuels, electricity, and other GHG sources;
- This tool follows the [standards of the] World Resources Institute/World Business Council for Sustainable Development (WRI/WBCSD), which is required by the ACUPCC. "Greenhouse Gas Emissions from U.S. Institutions of Higher Education," Parikhit Sinha, William A. Schew, Aniket Sawant, Kyle J. Kolwaite, and Sarah A. Strode O'Brien & Gere, Blue Bell, PA ISSN:1047-3289 J. Air & Waste Manage. Assoc. 60:568–573 DOI:10.3155/1047-3289.60.5.568 Copyright 2010 Air & Waste Management Association

Irrespective of the calculator used, the take-away for colleges -- and any institution or individual interesting in minimizing impact: measure and mitigate.

Funding: It's not easy being green

Going green cost money: In addition to increase in operating funds to support a sustainability office (to calculate Greenhouse Gas emissions, waste tonnage, commuters travel modes, construction waste disposed, undergraduate research totals, etc.), possibly the bigger financial commitment is needed for capital investment in: LEED buildings, stormwater mitigation, charging stations, retrofits, etc. Facing steep budget cuts and increasing costs of operation, colleges are hard-pressed to fund even the most urgently needed upgrades.

However, there is almost a social mandate for these upgrades. But not only is this good global citizenship in terms of greenhouse gas reduction, it is in the institution's interest long term. The upgrades bring long term in savings from enhanced energy efficiency and decreasing resources. (And, if Congress institutes Cap and Trade or carbon tax, the savings is further increased.)

This lamentable situation has some interesting solutions. Green Revolving Funds (GRFs) have been devised to use for such capital investments.

"Weber State University and the California Institute of Technology have successfully invested a portion of their endowment in green revolving funds for on-campus sustainability improvements, with returns replenishing not only the Green Revolving Fund (GRF), but also the endowment (Sustainable Endowments Institute, 2011).

Indeed, some boards are finding returns from the cost savings exceed what they can get from traditional (e.g., stock) mechanisms. Reports to date suggest potential for consistent annual returns ranging from 29 percent (Iowa State University) to more than 47 percent (Western Michigan University) (Sustainable Endowments Institute, 2011, p. 5).

Of course, not all of the costs associated with going green are capital expenditures which provide a good return on investment and short repayment periods. For example, **Student Affairs operations budgets** must be expanded for employee training, field experiences, orientation publications, additional clubs and sustainability events, **Additional personnel are needed** to haul out recyclables, calculate carbon emissions, measure waste diversion, keep inventories for reporting purposes, Adding courses or even whole majors to the curriculum requires expansion in **academic unit budgets**.

The lack of tangible return on investment in academic change may be one reason why, ironically, this core area of college mission is the slowest to go green.

Academics

Of course, the core mission of colleges is education. Ironically, there are fewer confirmed "best practices" related to the process of administering and measuring sustainability learning:

> "The literature on the topic of sustainability in higher education suggests that current measures of university success as they relate to best serving students appear to be nearsighted, monitoring student's current performance on academic assessment measures or career placement and not their behaviors as global citizens or his or her projected long-term impact on society." (Myers, 2012)

There is very little evidence that colleges are teaching students in ways that are truly transformational, or even, at the minimum, measuring outcomes. "The concept of projecting the long-term impact of students on society is speculative at best; but may be well worth consideration if we believe that average college students are still within their formative years and capable of incorporating care for others into their decision-making process. … If our higher education systems and the communities that surround them can behave as if they are connected to the greater wellbeing of Earth…it is likely that more of the students and graduates from those educational systems will also incorporate a systems approach to their future behavior and decision-making" (Myers, 2012, p. 32).

How does the college experience become "transformational"?

- Mitchell Thomashow, President of Unity College, says that the experience will be transformational if the campus is "a dynamic learning laboratory…where every sustainability initiative is an educational research experiment" and the entire campus (and, hopefully, community) is a living laboratory in which "students (and their families), staff and faculty are learning about sustainability through their daily life routines and habits." (Thomashow, 2009)
- He recommends that the "research experiment" approach to pedagogy include experiments both theoretical and practical " deeply intertwined in the everyday life of students and faculty. It starts before students even arrive on campus when they are

asked to consider the ecological end energy impact of what they bring to campus. It continues through freshman orientation, when they are introduced to what it means to live sustainably and consider the requisite contradictions and challenges. It continues with a freshman course that introduces basic concepts in sustainability.

- All majors [should] have some sustainability component built into the curriculum.
- These efforts are supported with residential life practices, and illustrated by immersing the students in the various sustainability experiments.
- And the campus culture needs a particular focus: "Surely discussions about material simplicity, frugality, affluence, and conservation are crucial for college campuses. Yet we often forget that the spirit of sustainability is also celebratory and evocative. We wish to call attention to the magnificence and mystery of the biosphere, the intricacy and wonder of biodiversity, and the sacredness of life."

General Inventory:

In addition to avoiding penalties of emissions regulations and gaining from the financial benefits of "counting" carbons and mitigating them, there is also reason to take stock of other aspects of sustainability – such as academics -- for purposes public accountability. How sustainable a college is depends on a range of things – from construction waste diversion to arranging for carpooling to research to reviewing stock portfolios.

The effort to inventory all of this has value intrinsic to the sustainability efforts. But, increasingly, institutions are compelled to maintain these inventories in order to inform external constituents for purposes of transparency, accountability, etc. The Sierra Club encourages such inventories because they "act as a guide for prospective students who seek a way to compare colleges based on their commitment to environmentalism. [The public posting of inventories] also serves to spur competition, create aspirational standards, and publicly reward the institutions that work hard to protect the planet."

Of course, one question is whether there is a standard way to record sustainability effort. What is emerging as the "industry" standard for this is the Sustainability Tracking, Assessment & Rating System -- STARS -- reporting system. As participating colleges fill out the STARS® rating guide and upload their report to the AASHE website, it becomes public information and can be viewed in

comparison with peer institutions. AASHE provides the STARS® rating system version 1.2 to the public as a free resource on their webpage to register various actions and plans for:

Co-Curricular Education; Curriculum (E.g., Sustainability-Related Courses, Sustainability Learning Outcomes, Undergraduate Program in Sustainability, Graduate Program in Sustainability, Sustainability Immersive Experience, Sustainability Literacy Assessment, Incentives for Developing Sustainability Courses, etc.); **Research; Buildings;** proactive **Climate** plans and activities and inventory; **Dining Services; Energy; Grounds; Purchasing; Transportation:** Campus Fleet (e.g. which use alternative fuels), Student Commute Modal Split, Employee Commute Modal Split, Bicycle Sharing, etc.,; **Waste:** Waste Reduction, Waste Diversion, Electronic Waste Recycling Program, etc.; **Water:** Water Consumption; Stormwater Management; Waterless Urinals; Building Water Metering; Non-Potable Water Usage; Xeriscaping; etc.,; **Coordination and Planning**: Sustainability Coordination; Strategic Plan; Physical Campus Plan; Sustainability Plan; Climate Action Plan, etc.; **Diversity, Access, and Affordability**: **Human Resources**: e.g., Sustainability in New Employee Orientation; Employee Sustainability Educators Program; Socially Responsible Retirement Plan, etc.; **Investments; Public Engagement:** E.g., Community Sustainability Partnerships…

Participation in STARS ® has the added advantage of eligibility for consideration in comparisons, such as the Princeton Review, Sierra magazine's Cool Schools edition , and the Sustainable Endowments Institute (publishers of the "Report Card") have joined forces with AASHE to share use of the Sustainability Tracking, Assessment & Rating System – STARS. The increased popularity of STARS as a collection device will probably also influence conventions on how data is collected – a further reason for participating.

Other Inventories: American College and University President's Climate Commitment (ACUPCC)

As mentioned above, one of the reasons for using the CA-CP calculator for determining emissions is its compatibility with the Greenhouse Gas Report (ACUPCC, 2012). This report is one of the requirements to become a so-called "signatory" school, of which there are currently 677. However, some 900 non-signatory schools also post to this inventory. In addition to the Greenhouse Gas report, the ACUPCC also collects Climate Action Plans, in which colleges give a date when they will accomplish total "climate" neutrality and specify the strategies through which this will be accomplished – primarily energy efficiency

projects such as retrofits, alternative transportation options, purchase of offsets, conservation practices, changed power mix from utility (Scope 2), and on-campus generation from renewable sources.

Politics

General Election Issues (National Association of Student Financial Aid Administrators, 2012)

Student Aid Funding:

During his almost four years as President, **Obama** has pushed (with varying degrees of success) to increase funding for the federal student aid programs. During the Obama administration, Pell Grant spending has more than doubled from $15.4 billion in the 2007-08 award year to $34.8 billion in the 2010-11 award year. It is important to note that despite Obama's vocal support for increased student aid funding, he signed three pieces of legislation into law that limited eligibility. The majority of the increase in spending was caused by factors outside Obama's influence, including more students using aid. Obama can claim some responsibility for the remaining 25 percent of the spending increase because the American Recovery and Reinvestment Act (ARRA) increased the maximum Pell Grant from $4,731 in 2008 to the current $5,550.

Romney is highly critical of this increased Pell Grant spending and maintains that it is driving up the cost of college. He notes that since 1982, the cost of college has increased by 439 percent and that federal spending on Pell Grants increased 475 percent. "A Romney Administration will refocus Pell Grant dollars on the students that need them most and place the program on a responsible long-term path that avoids future funding cliffs and last-minute funding patches," Romney's education plan states. Romney also says that the student aid programs must be simplified. "Today it is unnecessarily complex, made up of multiple need-based grant programs, competing loan programs, and duplicative tax benefits, all of which include significant administrative costs," his education plan states.

Reining in College Costs

Obama's FY 2013 budget proposes rewarding postsecondary institutions that keep costs down and penalizing institutions that rapidly increase costs. The proposal would tie campus-based aid to the institution's ability to keep costs down, serve needy students well, and provide good quality and value. Details of this proposal haven't been articulated, but the higher education community has raised questions about the possible metrics that would be used to determine if an institution should be rewarded or penalized.

Romney also points to burdensome financial aid regulations as a cause of increasing college costs. His administration would repeal "confusing and unnecessary regulations that primarily serve to drive costs higher, and replace them with common-sense reforms that ensure appropriate student outcomes."

Consumer Disclosures:

Obama has launched an initiative to create a "College Scorecard," a one-page profile of each school, providing specific metrics like earnings information, default rates, repayment rates and employment rates.

Romney states that "students should make decisions with full understanding of data points such as completion and persistence, loan repayment rates, and future earnings."

For-Profit Institutions:

Obama has tightened regulations on for-profit institutions amid some reports of deceptive recruiting practices that focus on the low-income populations and recipients of Federal military and veterans' educational benefits. The program integrity regulations promulgated by the Obama administration are generally seen as targeting the for-profit sector. In addition, Obama issued an executive order that ties military and veteran education benefits to marketing and recruitment practices at postsecondary institutions, establishes new outcome measurements and financial disclosure requirements, and enhances enforcement and compliance mechanisms.

Romney is highly critical of these additional regulations. "New forms of instructional delivery promise to provide access to new generations of students, which will be crucial to our future economic success," Romney's education plan states.

Student Loans:

Obama urged Congress to spend $6 billion for a one-year extension of the 3.4 percent interest rate on subsidized Stafford Loans. The Consumer Financial Protection Bureau (CFPB) has launched several initiatives aimed at helping private student loan borrowers.

Romney says he would reverse the nationalization of the student loan market and welcome private sector participation. Romney also suggests that Obama's efforts to provide student loan repayment relief through expanded Income-Based Repayment and loan forgiveness treats the symptom but ignores the causes of unmanageable student loan debt. Romney would tackle this issue by supporting "private-sector involvement to ensure students are clearly informed about their obligations when they apply for federal student loans, and that they receive support that goes beyond a call from a collections agent to help keep them on track to repayment."

Research: [Note: from sources other than NASFAA]

President **Obama** in February proposed a 1.5-percent increase in federal spending on basic scientific research for the coming fiscal year, with his heaviest emphasis on driving technologies calculated to have economic benefit. This proposal favors NSF funding and keeps NIH (medical research) at its current status. Mr. Obama is considered by some "an ally" of the NSF. (Basken, 2012)

[We don't have much indication of what a Romney administration might mean for research funding.]

Fiscal Cliff

"If Congress fails to head off the $109-billion in overall cuts for 2013 before January 2, part of $1.2-trillion in required cuts over the next decade, most aspects of federal spending relating to higher education would face reductions of either 8.2 percent (for discretionary programs) or 7.6 percent (for mandatory programs), including appropriations to the National Institutes of Health and the National Science Foundation… The law would raise the 1-percent origination fee for unsubsidized Stafford student loans by 7.6

percent, to about 1.1 percent of a total loan. PLUS-loan and unsubsidized-loan fees would rise slightly, from about 4 percent to about 4.3 percent of a total loan. Pell Grants would not be affected. Senior White House officials stressed that the Obama administration does not support the "deeply destructive" cuts detailed in the report, which they were required by law to publish (Gardner, 2012).

Georgia Issues

This fall (2012), the Governor's office announced plans to boost graduation rates. "As the first state in the country to obtain college completion plans from every public institution, Georgia has established itself as a national leader in efforts to significantly increase college student success," said President of Complete College America Stan Jones. "The Technical College System of Georgia and University System of Georgia have answered his challenge with an unprecedented collaboration, focusing on innovative strategies that aim to improve student readiness for college, enhance remediation for those who need it and open more articulation avenues between our systems. Now, each of the 56 college-level plans show that Georgia's higher education systems are entirely focused on building seamless pathways to improve college completion rates and produce an increasing number of graduates that will keep our state competitive in the global economy." said TCSG [Technical Colleges of Georgia] Commissioner Ron Jackson (Office of Governor Nathan Deal Office, 2012).

Following the merger plans announced at the beginning of this year, the plans take shape in ways distinctive for our region.

> The plan for the University of North Georgia, the combination of North Georgia College and State University and Gainesville State College includes five major strategies. They are improving college readiness through K through 12 partnerships and expanding access and completion. They also include reducing the time it takes to earn a college degree, developing new models of instruction and learning and transforming remediation, according to a press release. (Booth, 2012)

Under the guidelines of Deal's Complete College Georgia initiative, the state will continue to improve post-secondary education access, retention and completion by continuously directing their efforts toward these main areas:

- Development of comprehensive system-wide and campus-level completion plans

- Restructure of select TCSG programs to better support students who work [Editor's note: some institutions are planning ways of "giving those who have significant life experiences — which traditionally hinder a student's potential — the opportunity to earn college credits" (Office of Governor Nathan Deal Office, 2012)]
- Increase in articulation between TCSG and USG to build a seamless education system
- Improvement in remediation as a part of the $1 million Complete College America grant
- Creation of the R.E.A.C.H. Scholarship—a privately funded, needs-based college scholarship
- Formation of the Higher Education Funding Commission to study ways to change the funding formula to incentivize completion

(Office of Governor Nathan Deal Office, 2012)

Tuition Policy and Prices at Publics

As states fight with budget crises, the cost of public education will increase. But the recession also brings new dynamics as to just how this college price increase affects access to higher education for not only the neediest students, but also middle-class students and families battered by the recession.

State Student Aid Programs such as TEG and PELL

"The only sure observation is that there is currently no sign of decreased demand for state student financial aid, whether need- or merit-based." State legislators may have to make difficult decisions in upcoming years on how to fund these programs.

Federal Student Data Systems

Concurrently with state efforts, it is possible that we will see (e.g. IPEDS) federal data collection developed to collect longitudinal national data on students – following them across platforms to determine efficacy of certain institutions, programs, etc. to student outcomes. (Coincidentally, a bi-partisan bill – The American Dream Accounts Act -- has been introduced in the US Senate to "create Web-based accounts to track students' progress from elementary school through college, establish college-savings plans for low-income students…." (Roller, 2012).

Teacher Preparation

Issues of teacher quality and effectiveness will continue to be front and center as the federal government and states work to improve student readiness and success. Recognizing the well-documented assertion that teacher quality is the most important school-based factor affecting student learning, Education Secretary Arne Duncan's "Race to the Top" requires states applying for funds to develop longitudinal data systems that link K-12 student achievement with teacher data. Data on teacher effectiveness are to be used to identify and reward effective teachers as well as to inform professional development. States are also being challenged to use teacher effectiveness data to rate the quality of their teacher education programs so that such programs can be improved.

Race and SE Class

"The future economic vitality and productivity of Georgia and of the nation will depend on the academic preparation and support all students receive today" (Walker & Goss, 2011, p. 22).

"Active intervention is needed to support the needs of students who have less support or fewer resources at home, and leadership at multiple levels is required to ensure that excellence in teaching and rigorous curriculum are available for the lowest-achieving students, too. Without such interventions, the achievement gap will never close…and students will be denied the education they deserve" (Noguera & Wing, 2006).

"At a time when postsecondary education is more important than ever, Georgia's higher education policies and priorities are putting up barriers to make it harder for black, Hispanic and poor Georgians to get a college education" In 2005: 30 percent of black Georgia adults 25-34 had attained at least an associate degree; 14 percent of Hispanics; and 43 percent of whites. The lack of policy initiatives that connect K-12 schools and college and that most state aid in Georgia is merit-based rather than need-based. Disparities in high school graduation rates and college completion also were noted in the report "Perpetual Disparity: Performance and Policy in Georgia Higher Education" (Trevizo, 2012).

OTHER MISCELLANEOUS TRENDS

"Innovation never comes from the established institutions. It's always a graduate student, or a crazy person, or somebody with a great vision." --Eric Schmidt, Executive Chairman of Google.

Khan Academy

"[The Khan model] has students watching videos the night before class, then doing problem sets –called "modules" -- during class to make sure they understand. If they get stuck, they get one-on-one help from the teacher. Less lecturing, more interaction. What you think of as homework you do at school, and schoolwork, you do at home. It's called 'flipping the classroom'...this way students master concepts before they move on. Teachers can monitor progress real time. Teachers feel they use their time better. The passivity is taken out of the classroom. Teachers play the role of coach or mentor "which I personally believe is a higher value thing than a lecturer" (– Khan.) It's just Khan Academy math for now, but Khan believes his strategy can be used for subjects like history and science, and not just in elementary schools, but in high schools and colleges. (Gupta, 2012) [Editor's note: Khan Academy is using viewer data constantly to make changes to their software packages. "We can start fine-turning things precisely the way Amazon fine tunes things, to make their customer find the book that they want, or Netlix find the film you want…" (– Khan) This is a great example of learning analytics (see Technology Section, above) since it employs a combination of data-gathering tools and analytic techniques to study student engagement, performance, and progress in practice. The goal is not just to understand the past, but to help predict the future. Again, this technology trend area will ultimately help measure the effectiveness of various mini-approaches and paths to learning because of the enormity of the sample size.]

Badges

"Educational upstarts across the Web are adopting systems of "badges" [kind of like Boy Scout achievement patches] to certify skills and abilities. If scouting focuses on outdoorsy skills like tying knots, these badges denote areas employers might look for, like mentorship or digital video editing. Many of the new digital badges are easy to attain—intentionally so—to keep students motivated, while others signal mastery of fine-grained skills that are not formally recognized in a traditional classroom. …At the free

online-education provider Khan Academy, for instance, students get a "Great Listener" badge for watching 30 minutes of videos from its collection of thousands of short educational clips." (Young, 2012)

Disruptive Technologies

While it is not the purpose of this report to predict new models of instructional delivery and any new form higher education might take, we might still stop to consider the trend of many institutions and instructors to offer their courseware online for free (e.g. through YouTube.) As the delivery of content (from some of the best talent in the world) becomes readily available, just as the academy is considering new pedagogical approaches (such as using class time to complete assignments and leaving content for homework), it is important for educators and administrators to continue to watch the development of new sources of content (Hann, 2012).

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i Examples of Environmental Scans

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ii "Southern States", as referred to in this Environmental Scan, include: Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

iii National Employment Opportunities

Table 1. Occupations with the fastest growth				
Occupations	***Percent change***	***#new jobs (in thousands)***	***Wages (May 2008 median)***	***Education/training category***
Biomedical engineers	72	11.6	$ 77,400	Bachelor's degree
Network systems and data communications analysts	53	155.8	71,100	Bachelor's degree
Home health aides	50	460.9	20,460	Short-term on-the-job training
Personal and home care aides	46	375.8	19,180	Short-term on-the-job training
Financial examiners	41	11.1	70,930	Bachelor's degree
Medical scientists, except epidemiologists	40	44.2	72,590	Doctoral degree
Physician assistants	39	29.2	81,230	Master's degree
Skin care specialists	38	14.7	28,730	Postsecondary vocational award
Biochemists and biophysicists	37	8.7	82,840	Doctoral degree
Athletic trainers	37	6.0	39,640	Bachelor's degree
Physical therapist aides	36	16.7	23,760	Short-term on-the-job training
Dental hygienists	36	62.9	66,570	Associate degree
Veterinary technologists and technicians	36	28.5	28,900	Associate degree
Dental assistants	36	105.6	32,380	Moderate-term on-the-job training
Computer software engineers, applications	34	175.1	85,430	Bachelor's degree
Medical assistants	34	163.9	28,300	Moderate-term on-the-job training
Physical therapist assistants	33	21.2	46,140	Associate degree
Veterinarians	33	19.7	79,050	First professional degree
Self-enrichment education teachers	32	81.3	35,720	Work experience in a related occupation
Compliance officers, except agriculture, construction, health and safety, and transportation	31	80.8	48,890	Long-term on-the-job training
SOURCE: BLS Occupational Employment Statistics and Division of Occupational Outlook				

Table 2. Occupations with the largest numerical growth

Occupations	*#of new jobs (in 1000s)*	*Percent change*	*Wages (May 2008 median)*	*Education/training category*
Registered nurses	581.5	22	$ 62,450	Associate degree
Home health aides	460.9	50	20,460	Short-term on-the-job training
Customer service representatives	399.5	18	29,860	Moderate-term on-the-job training
Combined food preparation and serving workers, including fast food	394.3	15	16,430	Short-term on-the-job training
Personal and home care aides	375.8	46	19,180	Short-term on-the-job training
Retail salespersons	374.7	8	20,510	Short-term on-the-job training
Office clerks, general	358.7	12	25,320	Short-term on-the-job training
Accountants and auditors	279.4	22	59,430	Bachelor's degree
Nursing aides, orderlies, and attendants	276.0	19	23,850	Postsecondary vocational award
Postsecondary teachers	256.9	15	58,830	Doctoral degree
Construction laborers	255.9	20	28,520	Moderate-term on-the-job training
Elementary school teachers, except special education	244.2	16	49,330	Bachelor's degree
Truck drivers, heavy and tractor-trailer	232.9	13	37,270	Short-term on-the-job training
Landscaping and groundskeeping workers	217.1	18	23,150	Short-term on-the-job training
Bookkeeping, accounting, and auditing clerks	212.4	10	32,510	Moderate-term on-the-job training
Executive secretaries and administrative assistants	204.4	13	40,030	Work experience in a related occupation
Management analysts	178.3	24	73,570	Bachelor's or higher degree, plus work experience
Computer software engineers, applications	175.1	34	85,430	Bachelor's degree
Receptionists and information clerks	172.9	15	24,550	Short-term on-the-job training
Carpenters	165.4	13	38,940	Long-term on-the-job training
SOURCE: BLS Occupational Employment Statistics and Division of Occupational Outlook				

Table 3. Occupations with the fastest decline				
Occupation	***Percent change***	***#f jobs lost (in thousands)***	***Wages (May 08 median)***	***Education/training category***
Textile bleaching and dyeing machine operators and tenders	-45	-7.2	$ 23,680	Moderate-term on-the-job training
Textile winding, twisting, and drawing out machine setters, operators, and tenders	-41	-14.2	23,970	Moderate-term on-the-job training
Textile knitting and weaving machine setters, operators, and tenders	-39	-11.5	25,400	Long-term on-the-job training
Shoe machine operators and tenders	-35	-1.7	25,090	Moderate-term on-the-job training
Extruding and forming machine setters, operators, and tenders, synthetic and glass fibers	-34	-4.8	31,160	Moderate-term on-the-job training
Sewing machine operators	-34	-71.5	19,870	Moderate-term on-the-job training
Semiconductor processors	-32	-10.0	32,230	Postsecondary vocational award
Textile cutting machine setters, operators, and tenders	-31	-6.0	22,620	Moderate-term on-the-job training
Postal Service mail sorters, processors, and processing machine operators	-30	-54.5	50,020	Short-term on-the-job training
Fabric menders, except garment	-30	-0.3	28,470	Moderate-term on-the-job training
Wellhead pumpers	-28	-5.3	37,860	Moderate-term on-the-job training
Fabric and apparel patternmakers	-27	-2.2	37,760	Long-term on-the-job training
Drilling and boring machine tool setters, operators, and tenders, metal and plastic	-27	-8.9	30,850	Moderate-term on-the-job training
Lathe and turning machine tool setters, operators, and tenders, metal and plastic	-27	-14.9	32,940	Moderate-term on-the-job training
Order clerks	-26	-64.2	27,990	Short-term on-the-job training
Coil winders, tapers, and finishers	-25	-5.6	27,730	Short-term on-the-job training
Photographic processing machine operators	-24	-12.5	20,360	Short-term on-the-job training
File clerks	-23	-49.6	23,800	Short-term on-the-job training
Derrick operators, oil and gas	-23	-5.8	41,920	Moderate-term on-the-job training
Desktop publishers	-23	-5.9	36,600	Postsecondary vocational award

SOURCE: BLS Occupational Employment Statistics and Division of Occupational Outlook

iv

The excerpt documents that publicly-funded research leads to positive economic activity and virtuous job cycles. In any case, considering the impact on the economy and on other areas of the greater good, the case can certainly be made the universities ought to be engaged in research:

In developed, knowledge-based economies, innovation powers long-run economic growth. For example, two-thirds of UK private-sector productivity growth between 2000 and 2007 was a result of innovation.[5] Klenow and Rodríguez-Clare decomposed the cross-country differences in income per-worker into shares that could be attributed to physical capital, human capital, and total factor productivity, and they found that more than 90 percent of the variation in the growth of income per worker was a result of how effectively capital is used (that is, innovation), with differences in the actual amount of human and physical capital accounting for just 9 percent.[6]

Innovation is also positively correlated to job growth in the mid- to long-term. [7] Innovation leads to job growth in three fundamental ways. First, innovation gives a nation's firms a first-mover advantage in new products and services, expanding exports and creating expansionary employment effects in the short term. In fact, in the United States, growth in exports leads to twice as many jobs as an equivalent expansion of sales domestically.[8] Second, innovation's expansionary effects lead to a virtuous cycle of expanding employment. For example, in the early- to mid-1990s, the emergence of information technology as a general purpose technology drove broad-based economic growth, creating hundreds of thousands of new jobs, which, in turn, led to additional job growth in supporting industries. Finally, when innovation leads to higher productivity, it also leads to increased wages and lower prices, both of which expand domestic economic activity and create jobs.[9]

Research performed outside the private sector is essential to the U.S. innovation system. Even with robust corporate R&D investment, the private sector alone does not provide the level of innovative activity that society needs, because firms do not capture all of the benefits of innovation. A plethora of studies have found that the rate of return to society from corporate R&D and innovation activities is at least twice the estimated returns that a company itself receives.[10]

For example, Tewksbury, Crandall and Crane examine the rate of return from twenty prominent innovations and find a median private rate of return of 27 percent but a median social rate of return of a whopping 99 percent, almost four times higher.[11] *Nordhaus estimates that inventors capture just 4 percent of the total social gains from their innovations; the rest spill over to other companies and to society as a whole.*[12] *In other words, the private sector under-invests in innovation and thus, without public investment, the rates of economic growth, job creation and living standard improvement are all lower than their potential. The university system, therefore, plays a key role in filling in this gap in order to provide innovation at the social optimum.*

Recently, universities have taken on an even greater role in the American innovation system. Over the last three decades, many large corporations have shut down or repurposed central research laboratories that used to conduct R&D. For example, since its founding in 1925, Bell Labs (until 1995, a subsidiary of AT&T) made seminal scientific discoveries, created powerful new technologies, and built the world's most advanced and reliable telecommunications networks. Because so much of these results spilled over to other firms (not just AT&T) and industries, the incentive to perform this kind of foundational, generic research was based on the fact that AT&T had significant market power and was a regulated monopoly. But with the introduction of competition to the telecommunications industry in the 1980s and 1990s, Bell Labs was restructured to focus more on incremental technology improvements with shorter-term payoffs. This is reflective of an overall shift in corporate R&D, with companies in the United States expanding their investments in later-stage applied research and development much more quickly than their investments in basic, early-stage research[13]*….*

This shift to shorter-term, less fundamental R&D risks a shrinking of the knowledge pool from which firms draw the ideas and information necessary to conduct later-stage R&D and to bring innovations to the market. As U.S. companies have shifted their R&D activities upstream, universities have taken on a larger role in the innovation system. Today, universities perform 56 percent of all basic research, compared to 38 percent in 1960. [15] *Moreover, universities are increasingly passing on these results to the private sector: Between 1991 and 2009, the number of patent applications filed by universities increased from 14 per institution to 68 per institution; licensing income increased from $1.9 million per institution to $13 million per institution; and new start-ups formed as a result of university research increased from 212 in 1994 to 685 in 2009.*[16]

Overall, university research has large impacts on U.S. economic growth. In terms of its impact on product and process development in U.S. firms, Mansfield finds the social rate of return from investment in academic research to be at least 40 percent. [17] *And a study by the Science Coalition found that "companies spun out of research universities have a far greater success rate than other companies."*[18]

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8. Lori G. Kletzer, *Imports, Exports, and Jobs: What Does Trade Mean for Employment and Job Loss?* (Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 2002).
9. For a review of the literature on jobs and innovation-based productivity growth, see Daniel Castro, Robert D. Atkinson and Stephen Ezell, "Embracing the Self-Service Economy" (technical report, Information Technology and Innovation Foundation, 2010), http://www.itif.org/files/2010-self-service.pdf.
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15. National Science Board, *Science and Engineering Indicators 2010*, appendix table 4-4.
16. Richard Kordal, Arjun Sanga and Reid Smith, eds., *AUTM Licensing Activity Survey: FY2009 Summary: A Survey Summary of Technology Licensing (and Related) Activity for U.S. Academic and Nonprofit Institutions and Technology Investment Firms* (Deerfield, IL: Association of University Technology Managers, 2011); Robert D. Atkinson and Scott M. Andes, *The 2008 State New Economy Index: Benchmarking Economic Transformation in the States* (Washington, DC: Information Technology and Innovation Foundation, 2008), 64, http://www.itif.org/publications/2008-state-new-economy-index.
17. Edwin Mansfield, "Academic Research and Industrial Innovation: An Update of Empirical Findings," *Research Policy* 26, no. 7 (1998): 773-776.
18. Science Coalition, *Sparking Economic Growth: How Federally Funded University Research Creates Innovation, New Companies and Jobs* (Washington, DC: Science Coalition, 2010), 7, http://www.pagegangster.com/p/VIM3O/.

[v] "In 2005, U.S. institutions of higher education accounted for approximately 121 million MTCO2E, or nearly 2% of total annual U.S. GHG emissions. For reference, these emissions are comparable to approximately one-quarter of those from the state of California." (Sinha et al.)