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Introduction: Historical Overview of American Research Universities

Title

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<https://escholarship.org/uc/item/1t91r96f>

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Publication Date

2009-11-13



**Academic Innovation and the American Research University
Symposium**

University of California, Merced
November 13, 2009

Introduction: Historical Overview of American Research Universities

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**CHANCELLOR;
PROFESSOR OF
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SUNG-MO "STEVE"
KANG, PH.D.**

Thank you, Regent Marcus. Next I'd like to invite Shawn Kantor and Alex Whalley. They are going to be together. So they have some presentation.

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PROFESSOR OF
ECONOMICS,
SHAWN KANTOR,
PH.D.**

While this is loading up, Alex and I have recently started on this project looking at the history of higher education. And we started on this, we were interested in being in Merced, the political propaganda states that you build it and all this economic growth will come. And then you look at the literature out there and the economic research, and there's not really much out there. So we've started doing research on that.

And that led us back to think historically. We have this great higher education system, the greatest in the world. And in the United States, we have, the United States being the leading superpower, economic superpower in the world, is there any relationship between the two?

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PROFESSOR OF
ECONOMICS,
ALEX WHALLEY,
PH.D.**

So I'm going to have to speak at lightning speed here. But what we're going to talk about today is really just the emergence and the persistence of U.S. leadership in higher education. And what you'll see once Shawn pulls up the title page is that we actually have a question mark after the "Persistence." [*on the slide*] We think that's an open question and we think going forward that that's something that's going to have to be addressed.

So just in terms of the broad, the broad trends, there's been two sort of major historical episodes in U.S. educational history. The first one is the high school movement that really happened from 1910 to 1940. And what happened really is you have a really small fraction of the population going to high school in 1910, and then by 1940 the majority of Americans are actually completing high school.

The second movement is the higher education movement, and this really took off post-World War II to the present, but we want to talk a little bit about how the origins of the structure of higher education were actually founded earlier.

So just looking at the data a little bit, it's really amazing when you see these graphs. So the first year here in the sample is 1870. And this goes all the way through 2000. The top line there is the share of high school graduates out of the cohort. And you see, like I said, that the high school movement really kicks off around 1910. So you start off with about less than 10% of the population going to high school. By 1940, it's over 50%. And it kind of peaks around 1970 and stays flat after that. The college going rate is the red line that's lower there. You can see it kind of gradually increases a little bit, and then really takes off in the post-war period.

And one thing we think these trends really point out is that access to higher education is actually at a pretty high level right now. So we hear a lot of, a lot of discussion about public universities from the perspective of access. And actually, that's one thing we want to highlight here, is it doesn't seem like access is particularly bad right now, relative to the historical record.

So there's three things we kind of want to tell you today. The first thing was that, like I just said, the development of public higher education was not only about access, it's also about really changing the nature of scholarship. That's something we've really found as we've done our research.

And public higher education prospered from the professionalization of the faculty, the institution of tenure, the founding of journals in different fields-- that's one of the features that actually led to the dominance of public institutions. The land grant mission itself, which is actually very different than the way universities were organized and functioned before that time period, and especially after World War II when we see this large increase in public support for higher education.

And the third thing we really want to highlight is, you know, there's very many challenges facing higher education today. A lot of the budgetary issues already have been talked about, but one thing we think is very significant and really hasn't been addressed quite as much is the international competition that is emerging. So a lot of people see international competition as something on the, coming in the future, but actually we want to make the point that it's really here today. And that's something we actually have to think about a lot.

So just to show you sort of where the public institutions come from, where they get their mission from, one thing to look at is the actual Morrill Land Grant itself. And what you can see is that these universities are kind of uniquely focused on agriculture and mechanic arts and practical knowledge. That's something that's quite different about these universities, and they're much more scientifically focused as well. And there's also extension of funding over time. In 1890, there's a lot more funding. And in 1907 there's much more funding.

So what are the distinguishing features of U.S. higher education during the formative period? According to recent research by Claudia Goldin and Larry Katz, the emergence of the modern research university happens in this period. It's amazing how similar the patterns are, actually.

If you look at the data, the data before the Great Depression, you know, the leading institutions then are very much the leading institutions today. What happened was the scale and the size of, the expansion, the professionalism of higher education all happened before that period and that just kind of continued in the post-war period.

And then public institutions do offer much more scientifically and practically oriented curricula, and you can see that in the data. So this is very old data as well. This is 1897. And what we have on the vertical axis there is a percentage of students in Bachelor of Science or engineering degrees. And on the other axis we have the percentage of funding from higher, from public support. And so you can see there's an upward sloping line there. And so as states spend more, they actually have a more scientifically-oriented student population.

But it's not really clear that the public sector was going to be the most dominant. So this is some data from our study itself, looking at the distributions of actual endowment income for students; how wealthy these institutions are based on their endowment income.

And at this time period, there's kind of three different types of institutions. There's religious institutions which is controlled by a religious entity. There's public institutions and there's non-sectarian institutions. And those are, the non-sectarian institutions are the ones we think of the leading private institutions today: the Yales, Chicago, Stanford--these kind of schools. And so you can see that, on average, the non-sectarian institutions have the most resources from their endowment. So actually, they do have more money. But what they, they do is they don't actually spend it more on physical capital. They don't actually spend it more on buildings and land. So this is the distribution of building land per student. So it's pretty much similar across the three different types.

But one thing that is quite different is how much they spend on scientific equipment per student. It's actually quite different. The religious colleges on average spend quite a lot less. The distribution is to the left of the other two. And the publics spend the most, and the non-sectarians spend almost, almost the same amount. And what we've seen in our research is the entry and expansion of the public universities really encourages these other universities to compete, to be more like them and to offer more scientifically-grounded curriculum.

So with that I'll turn it over to Shawn [Kantor] and he'll finish it off.

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SHAWN KANTOR**

So the biggest advantage that the public sector had was the ability to harness the public treasure toward the funding of this new curriculum. And you can see what happens. This is a share of government support for higher education, a share of all government spending, and you can see how it takes off right after the post-war period; that's when you have that sharp upward trend. And then at about 1970 it starts flattening, or decreases and flattens out. The two lines here include and exclude the military. The top one is excluding the military.

So what does the modern research university look like? So U.S. higher education achieved prominence throughout the 20th century and provides historical opportunities for students today as Alex [Whalley] showed.

But we face two primary challenges, both external, and we would argue, internal. External is the international competition which I'll provide a little bit of evidence on. Internal is, I would argue, a misdirection from the original land grant mission of public universities.

So here's a graph of the shares of scientific papers produced around the world. If I had my pointer I could show you. But you see that, that blue line up on top there is the United States and you can see just in the last 20 years Oh. Oh, okay. The share of U.S. papers is decreasing. Importantly, you see that the share of papers from Asia is increasing dramatically.

Here you--well, for sake of time I'll skip over this, but this is citations. It tells you the same sort of thing.

But here's the U.S. shares of highly cited papers and you can see where you look at all papers, the top papers, top 5%, 10%. The United

States has this decrease in share of scientific knowledge that's produced worldwide.

Well, where's it all coming from? China.

The U.S.--this is, on the vertical axis, this is annual publications. The United States is producing about 340,000 publications per year. So we're off the charts here relative to the world. But you can see that China's catching up. In terms of the number of papers that's produced relative to 1981, you can see the rest of the world is flat. China's exploding. And they're not just producing these garbage little papers that we might think of. This is highly scientific papers that are being cited worldwide.

Okay. So thinking again about the modern research university of the 21st century, what does it mean to be a land grant university or any public university for that matter?

Going back to original Morrill Act, how do we promote the liberal and practical education of the industrial classes and the several pursuits and professions in life? I would argue that the modern economy is not related to agriculture and the mechanic arts any more. Instead, it's focused on information and services, commerce, human interaction.

The service sector contributes to 70% of the U.S. economy. So I would argue that we need to find new approaches to new problems as the original land grant universities did. Unfortunately, it seems that most of the debate going on today is trying to find new approaches to old problems.

So American economic success, Alex and I would argue, really depends on our focusing new problems for the modern economy. And on that

we'll close and we'll lead on to our first panel. So hopefully this is provocative enough to get you all stirred up. [*applause*]