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The Regional Economic Impacts of the Bucks for Brains Program

a report for
The Kentucky Council on Postsecondary Education

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In this report we provide estimates of some of the economic and fiscal impacts of the so-called *Bucks for Brains* program, with emphasis on the University of Kentucky and the University of Louisville.¹ We focus on the external funding attracted by *Bucks for Brains*-supported scholars at the universities, and investigate the ripple effects of the new money on our regional economies and our tax base. We find that:

1. Over the first decade, UK and UL scholars, sponsored in part by the program, have attracted \$442 million in funding from federal and other out-of-state sponsors.
2. The combined external funds attracted by *Bucks for Brains* scholars are associated with \$762.5 million in sales to establishments statewide (including the university revenues) over the decade. Total associated statewide employee compensation is \$278.8 million. And this employee compensation is associated with \$19.5 million in Kentucky income and sales taxes, as well as \$3.3 million in local occupational taxes. The external funding is now supporting over 2,100 jobs per year statewide.

¹ The economic benefits of higher education extend beyond simply attracting more money, and include more educated citizens, patents, commercialization of ideas, better job opportunities, and enhanced quality of life. See the study: Siegfried, John J., Allen R. Sanderson, and Peter McHenry, "The Economic Impact of Colleges and Universities," *Economics of Education Review* 26 (2007): 546-558, for a recent criticism of estimates from economic impact studies of spending on higher education. In this current study we try to avoid many of the problems discussed in the Siegfried et al. study. However, this current study still suffers from the basic problem discussed in Siegfried et al. that economic impact studies of higher education fail to capture the primary benefit of additional spending on higher education—more educated citizens and the benefits they provide for the state.

Background

The *Bucks for Brains* program was authorized in 1997, and state government invested \$350 million between fiscal years 1998 and 2007². The primary goal of the program was to stimulate university research, external funding, and economic development in the state. The universities matched the public funding with private contributions, invested the dollars, and used the investment income to endow professorships and provide research support. It is important for readers to understand that the state and matching private contributions have not been spent; rather, they have been invested, and only the return on the investment has been spent to support the research agenda. The contributions are all still there, as part of the universities' foundation assets. The assets are managed under the title Research Challenge Trust Fund (RCTF), the legal name of the *Bucks for Brains* program.

The University of Kentucky and the University of Louisville have pursued somewhat different paths to obtain matching money and in their strategies for deploying the investment proceeds. It is beyond the scope of the present report to analyze the institutional decisions³. Generally speaking, it seems clear that UL has targeted its RCTF dollars more towards health-related fields, while UK has used the dollars more widely around the institution, in terms of colleges and departments.

The University of Louisville, relatively new to the funded research mission, used its RCTF funds primarily to recruit new faculty in a few health-related fields. For example, 35 of the current 49 endowed chairholders are in the School of Medicine. Nearly all of the chairs in Medicine are held by faculty who came to the university after the RCTF program was established. These faculty often came with major research grants from the National Institutes for Health (NIH), and most have continued to win NIH funding since. Consequently, the University of Louisville raised its NIH funding from \$7.8 million in FY97 to \$51.5 million in FY06, perhaps the greatest percentage growth of any university in the United States during the period. Most of the other chairholders are in engineering and business, with one each in nursing, dentistry, education, law, libraries, and the provost's office.

The University of Kentucky, already an established competitor for federal research funds in 1997, used its RCTF funds to attract and retain top scholars and to deepen the research infrastructure on campus. UK used its RCTF funds to recruit top scholars through endowed chaired professorships, to retain top scholars through endowed professorships, as well as for student fellowships and scholarships, and for research infrastructure. UK has posted strong growth in overall external funding, from NIH, but also from the National Science Foundation and many other federal agencies and national sponsors. As

² In 1998 Kentucky legislators invested \$110 million in general fund appropriations to support Bucks for Brains at the state's research and regional universities. They followed commitment with an additional \$120 million in 2000 and another \$120 million in 2005. Of the total state funds, \$200 million have been allocated to the University of Kentucky, \$100 million to the University of Louisville, and \$50 million to the state's six comprehensive universities.

³ See www.research.uky.edu/ca/rctf/index.html for some details about the RCTF program at UK, and <http://louisville.edu/bucksforbrains/> for the UL program.

with UL, some of this funding was attracted directly to RCTF-funded chairs, while in other cases the RCTF scholar helped attract the funding as a co-investigator and/or simply as a colleague. In this analysis, we are excluding external funding attracted to UK and UL faculty who are not RCTF funded, but who benefit from collaboration with RCTF-funded scholars. It is beyond the scope of this analysis to fully assign causality for the growth in external funding.

External funding to RCTF-funded Scholars

We have organized data on the amount of external funding attracted by UK and UL scholars that have RCTF funding, by principal investigator and by year. These will be considered the ‘direct impacts’ in our economic analysis to follow. Raw data on funding by scholar, sponsor, and year was provided by the research administration offices of the two universities. These data are ‘awards’, i.e., counted the year the grant was awarded, not necessarily the year the dollars were expended. External funds include those from federal government agencies, as well as out-of-state industries, foundations, and other universities. Excluded are grants from Kentucky state and local governments, in-state companies, foundations, and universities⁴.

The University of Kentucky had a total of 134 RCTF-funded scholars who have received external funding, totaling \$250 million over the FY00 to FY07 period. The University of Louisville had a total of 44 scholars, attracting about \$166.6 million over FY98 through FY07. We were not able to obtain data for UK scholars in FY98 and FY99, so we estimated it using growth rates for NIH funding to UK in those years, resulting in external funding estimates of \$11.3 million and \$13.4 million, respectively. Thus, we have a total of \$275.1 million to UK and \$166.6 million to UL over the decade considered.

Economic impacts

We use the IMPLAN modeling system to estimate the full economic impacts of the new external funds coming to UK and UL. IMPLAN is a well-established regional input-output modeling system, used by thousands of clients, and whose characteristics have been extensively studied and vetted in the academic literature⁵. We use a version purchased in April, 2007, containing the latest estimates of activity by county in Kentucky and surrounding counties in southern Indiana. In the estimates below we use a state-level version of the model. Alternatively, one could look at the economic impact of UK on the Lexington economy, and the economic impact of UL on the Louisville

⁴ Data used here on external funding for the University of Louisville are not yet as accurate as those for the University of Kentucky. We are in the process of subtracting grants from in-state sponsors to RCTF-funded scholars. Entries in the table are estimates based on all funding adjusted using a rough estimate of the external-internal mix.

⁵ IMPLAN, like nearly all regional input-output modeling systems, is limited in certain well-understood ways. For example, IO models have a linear, fixed coefficient, production recipe, meaning they implicitly assume a company would buy the same mixture of inputs to produce \$1 million, \$10 million, or \$100 million of output. Similarly, wage rates are assumed to be constant, and labor can be purchased in fixed ratios as needed for any production level. Moreover, for less populated areas there is little publicly available data on industry activity and IMPLAN ‘estimates’ activity based on proxy data and assumed relationships. There is a vast academic literature on these and other limitations. The tool is considered fairly reliable for relatively small perturbations around current levels of activity, but unrealistic for very large changes to the economy.

economy⁶. Effectively this means we are simulating the combined impact of external dollars to UK and UL on vendor and retail purchases throughout the state, ignoring the fact that the two universities are seventy miles apart and operate in two different markets.

We estimate the ripple effects by simulating an increase in new revenues to the input-output sector denoted Colleges and Universities, one of 500 industries detailed in our modeling system. The system does not explicitly distinguish between new revenues from federal research grants, tuition, gifts, etc. So, we are implicitly assuming that the new dollars hitting the university from research grants get spent on average like other dollars received by the university⁷.

Estimated Economic and Fiscal Impacts of External Funds Attracted by Bucks for Brains Scholars

fiscal years	1998	1999	2000	2001	2002
External dollars attracted					
University of Kentucky	\$11,263,867	\$13,371,312	\$18,126,426	\$27,332,956	\$33,694,231
University of Louisville	\$459,750	\$1,823,395	\$3,282,150	\$14,018,037	\$17,771,984
Total	\$11,723,617	\$15,194,707	\$21,408,576	\$41,350,993	\$51,466,215
Total economic impacts statewide, including universities					
Total output of establishments	\$20,238,172	\$26,230,224	\$36,957,063	\$71,383,133	\$88,844,775
Total jobs	338.5	438.8	618.2	1,194.1	1,486.2
Total employee compensation	\$7,399,789	\$9,590,693	\$13,512,804	\$26,100,187	\$32,484,779
Fiscal impacts					
Kentucky state income and sales tax revenues	\$517,985	\$671,349	\$945,896	\$1,827,013	\$2,273,934
Local occupational tax revenues, Fayette and Jefferson counties	\$93,524	\$119,375	\$167,125	\$311,299	\$386,961
Total state and local payroll-based taxes	\$611,509	\$790,723	\$1,113,021	\$2,138,312	\$2,660,896

Estimated Economic and Fiscal Impacts of External Funds Attracted by Bucks for Brains Scholars

fiscal years	2003	2004	2005	2006	2007	Cumulative
External dollars attracted						
University of Kentucky	\$23,727,916	\$32,945,098	\$36,395,747	\$39,234,494	\$38,994,348	\$275,086,395
University of Louisville	\$16,540,135	\$24,285,768	\$25,133,523	\$28,330,814	\$34,983,890	\$166,629,446
Total	\$40,268,051	\$57,230,866	\$61,529,270	\$67,565,308	\$73,978,238	\$441,715,841
Total economic impacts statewide, including universities						
Total output of establishments	\$69,513,678	\$98,796,141	\$106,216,363	\$116,636,216	\$127,706,690	\$762,522,455
Total jobs	1,162.8	1,652.6	1,776.7	1,951.0	2,136.2	
Total employee compensation	\$25,416,649	\$36,123,348	\$38,836,443	\$42,646,308	\$46,694,063	\$278,805,062
Fiscal impacts						
Kentucky state income and sales tax revenues	\$1,779,165	\$2,528,634	\$2,718,551	\$2,985,242	\$3,268,584	\$19,516,354
Local occupational tax revenues, Fayette and Jefferson counties	\$298,817	\$423,527	\$456,799	\$500,515	\$542,082	\$3,300,024
Total state and local payroll-based taxes	\$2,077,982	\$2,952,161	\$3,175,350	\$3,485,757	\$3,810,666	\$22,816,379

Most readers will focus on the total cumulative impacts, that is, the estimates in the bottom right hand corner of the table. We estimate that the combined external funds

⁶We actually did the calculations both ways, and there was little difference in the total state impact, so to keep things simple we just report the estimates using the state-level model.

⁷ With some accounting research at the institutions we could modify the model to more accurately reflect actual spending profiles related to research dollars, to the extent they differ from average university spending profiles.

attracted by *Bucks for Brains* scholars are associated with \$762.5 million in sales to establishments statewide (including the university revenues) over the decade. Total associated statewide employee compensation is \$278.8 million. The external funding is now responsible for over 2,100 jobs statewide. The employee compensation is associated with \$19.5 million in Kentucky income and sales taxes, as well as \$3.3 million in local occupational taxes.

We estimated the tax revenues using effective tax rates. An effective tax rate is calculated as total tax collections divided by total compensation for the relevant jurisdiction. For example, Kentucky state government collected an average of \$2.8 billion in individual income tax receipts during fiscal years 2001 to 2005, while employee compensation in the state averaged \$74.5 billion. The ratio, 3.78 percent, is a good way to predict state income tax receipts from new employee compensation in the state. A similar calculation was made for state sales and use taxes.

Local occupational taxes are also an important consideration. Jefferson County levies a city-county tax of 1.4 percent on all wages earned in the county, and the public school system levies a tax of 0.75 percent on all wages of residents working in the county. Fayette County levies a tax of 2.5 percent on all wages earned in the county, and the public school system levies a tax of 0.50 percent on all wages of residents working in the county. We divided the historical collections data from these jurisdictions by the employee compensation in the respective metropolitan areas to obtain an effective local occupational tax rate.

Caveat. Note that these estimates of fiscal impacts are not adjusted for any other public funds used to support the RCTF scholars. Not only did the state government invest \$300 million directly into the endowments of the University of Kentucky and the University of Louisville, it also made a number of large investments in research buildings and facilities. It is beyond the scope of this report to net all these public funds out and derive a clean return on public investment ratio.