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## *Fetzer Initiative on Economic Opportunity White Paper*

### **UW-Madison and the State of Wisconsin**

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**September 10, 2018**

#### **Abstract**

The higher education landscape has changed considerably over the past few decades. As government funding for health care has increased in virtually every state in the United States, support for higher education has taken a backseat. The purpose of this white paper is to discuss the relationship between the state of Wisconsin and the University of Wisconsin-Madison. The paper begins by first reviewing economic arguments behind why states have traditionally supported higher education. There are several myths and misconceptions surrounding the economics of higher education and section II attempts to place them in the current context and address them. Section III explores whether UW-Madison is currently subsidized by the State of Wisconsin. Section IV discusses the concept of capital-skill complementarity and how it relates to Wisconsin's investment in Foxconn. Section V concludes with some policy suggestions – both what UW-Madison can do to better to serve the State of Wisconsin and what the State of Wisconsin can do to ensure that UW-Madison is successful.

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## Executive Summary:

This paper examines the role played by the State of Wisconsin in the University of Wisconsin-Madison's functioning. Decades of investment by the State have built one of the world's greatest universities. The funding landscape has changed considerably with State support representing an important but smaller fraction of the budget. This paper begins by addressing some myths and misconceptions surrounding higher education and ends with some policy recommendations.

**Is UW-Madison currently subsidized by the State of Wisconsin?** The current State contribution to UW-Madison is just sufficient to offset the differential cost of an out-of-state student relative to an in-state student. State residents receive the benefit of attending UW-Madison at a highly discounted price. The subsidy is tantamount to a voucher given by the State to the residents of Wisconsin which entitles state residents to send their children to UW-Madison.

**Why is this a critical time to invest in UW-Madison?** Skilled labor makes capital more productive. For the State to get the most out of its large capital investments in projects such as Foxconn and to prepare for the modern economy, it will need to maintain and grow its skilled workforce and enhance the research enterprise. The success of these capital investments will depend critically on investments in UW-Madison.

**What more can UW-Madison do to better serve the State of Wisconsin?** UW-Madison can develop and adopt a more modern and effective budget model. It has an archaic budget model wherein decisions made decades ago have an outsized impact on allocations today. The modern economy, decreased state support for higher education, and the increasingly competitive higher education landscape requires UW-Madison to move more nimbly and rationally at the margin.

**What more can the State of Wisconsin do to set UW-Madison up for success?** The state can give the UW System bonding authority as well as project management capability – the ability to tap capital markets to raise resources and manage projects internally. UW-Madison is the only major public university without access to capital markets. Giving the UW System this additional but important flexibility costs the State nothing but has the potential to increase GDP in the State of Wisconsin in the next biennium by a little more than \$1.8 billion and by \$1.32 billion in each subsequent biennium.

## I. Why Should a State Subsidize Higher Education?

As state support for UW-Madison as a fraction of the overall budget has declined, much as in the rest of the country, it is useful to step back and examine the changing role of state government in higher education. Why should a state government subsidize higher education?

*Promoting Equality of Opportunity:* The most important reason why states support higher education is that a college degree is one of the best vehicles for upward mobility. It has the ability to move individuals or families out of poverty and help *any* individual to realize the American Dream.

**Equity** arguments aside, there are two popular **efficiency** reasons for state governments to subsidize higher education:

*Human Capital Externalities:* This is the notion that the benefit to society from educating individuals exceeds the benefit to the individual.<sup>2</sup> Consequently, the social return to educating an individual exceeds the private return. In Wisconsin, the notion that the boundaries and benefits from a University go beyond the classroom has been traditionally labeled the Wisconsin Idea!

*Borrowing Constraints:* Another traditional reason for states to subsidize higher education is the inability to borrow against future income to finance education. With the proliferation of loans, this argument has assumed less potency.

Absent state subsidies and in the presence of human capital externalities or borrowing constraints, private markets will not lead to an efficient outcome. Individuals left to themselves may invest too little in education since they do not necessarily internalize the impact of their education on society. Hence state support for higher education improves efficiency and equity – a policymaker’s dream! While some subsidy is clearly warranted, the important question is how large these subsidies ought to be.

Does UW-Madison receive too much in subsidies? Before discussing the extent to which UW-Madison is subsidized by the State of Wisconsin, the paper discusses a few myths and misconceptions regarding higher education and brings evidence to bear to address these issues.

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<sup>2</sup> Human capital externalities (or human capital spillovers) can take several different forms. The externality that is the focus of this paper is that educated workers can make other workers more productive. When an individual decides whether to go to college, he does not take into account the impact of his education on others. Consequently, the benefit to society (social or external return) can be higher than the benefit to the individual in the form of higher earnings in the future (private return).

## II. Dispelling Some Myths

**Myth 1: The cost of a college education has risen without reason:** For most families, college represents a significant expense. Prices of different goods and services rise at different rates. The main cost for a university is high skilled labor, and the cost of high skilled labor in the last 40 years has risen at a much faster rate than inflation. As a result, the cost of educating students has risen much faster than inflation. Several recent papers demonstrate that **the primary driver of the cost of college is the increase in the wages of highly educated workers outside the education sector**. The skill premium (return to obtaining a college degree over a high school diploma) has risen substantially in the last few decades and this is the most important factor accounting for the rise in college costs.

Some place blame on increased federal support for higher education and the proliferation of subsidized college loans, while others point to increases in administrative costs as possible explanations for the rise in college tuition. The latter is, in some measure, a response to increased federal regulatory mandates. Recently, Jones and Yang (2016) show that the ratio of college expenditures per student to GDP per capita has risen from 0.338 in 1961 to 0.415 in 2010. They demonstrate that the primary driver is the rise in the relative productivity of college educated workers outside the education sector, which raises the relative wage of high skilled workers and the cost of college relative to GDP per capita. The reason for this is that high skilled workers are used more intensively in the education sector than other sectors. Without the rise in relative productivity and the resulting increase in relative wages of high skilled workers, the cost of college would still have increased due to the rise in overall productivity, but at a slower pace than GDP per capita.

**Myth 2: There isn't a substantial benefit from a college education:** The same forces that increased the cost of college have also increased the benefit – and remarkably these forces have increased the benefits substantially more than costs. Calculating this with precision is not easy because it involves forecasts into the future. The benefit also varies across individuals, depending on their preparedness for college. Regardless of the methodology or data, estimates point to a significant benefit from college education over a lifetime. Avery and Turner (2012) find that the average lifetime value of a college degree net of tuition and opportunity costs has increased from around \$200,000 in 1965 to about \$600,000 in 2010 for men, and it has increased from around \$100,000 to about \$400,000 for women (see Figure 1)<sup>3</sup>.

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<sup>3</sup> Opportunity costs refer to foregone earnings when an individual decides to spend a few years obtaining a college degree and hence foregoes the opportunity to work during those years

In 2010, the average American who graduated from college could expect to earn \$500,000 more in lifetime income net of college costs over graduating with a high school diploma.

Present Discounted Value of College Degree Net of Tuition, 1965–2010

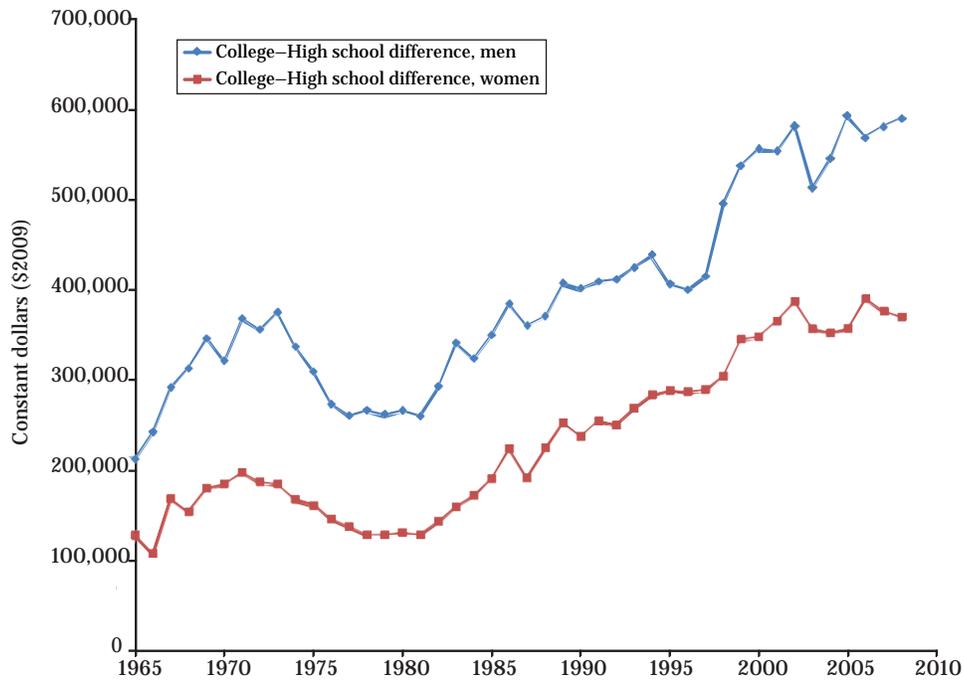


Figure 1. Source: Avery and Turner (2012). The value in each year is the difference in the present discounted value of lifetime earnings between college graduates and high school graduates.

In another study, Zimmerman (2014) controls for non-random selection (i.e. controls for the fact that the average student who gets admitted into college is not randomly drawn from the population) by comparing students with grades just above a threshold for college admission with those just below. After accounting for all direct and indirect costs to students and society (including the deadweight loss of taxation in raising the subsidy for a public university), Zimmerman finds that, for those academically marginal students, the net return to college admission is over \$26,000. The internal rate of return, the discount rate at which the net return will be zero, is at least 13.5%, well above the interest rate for education loans.<sup>4</sup>

<sup>4</sup> The interest rate for direct unsubsidized loans first disbursed between July 1, 2017 and July 1, 2018 is 4.45% for undergraduates and 6% for graduates and professionals. See <https://studentaid.ed.gov/sa/types/loans/interest-rates>

**Myth 3: College debt is a serious problem:** Student loan debt is lower than is widely perceived. Consider students who first enrolled in college in 2003–04. Dynarski (2014) showed that six years later, in 2009, 44 percent had no borrowing and another 25 percent had borrowed \$10,000 or less (as shown in Figure 2). That is, 69% of undergraduates borrowed \$10,000 or less. Another 29% had borrowed between \$10,001 and \$50,000. Only 2% had borrowed \$50,001 or more. Similarly, a Federal Reserve Report on the Economic Well-Being of U.S. Households in 2016 found that among respondents who have at least some debt outstanding for their own education, the average debt burden is \$36,299, and the median debt is \$19,000. Among those who have borrowed, 44.3% have paid off their loans, 45.4% have outstanding debt but are not behind, and only 10.3% are behind. The widely cited *New York Times* story about a 26-year-old graduate from NYU struggling with nearly \$100,000 in student loans is not common, but an extreme exception.<sup>5</sup>

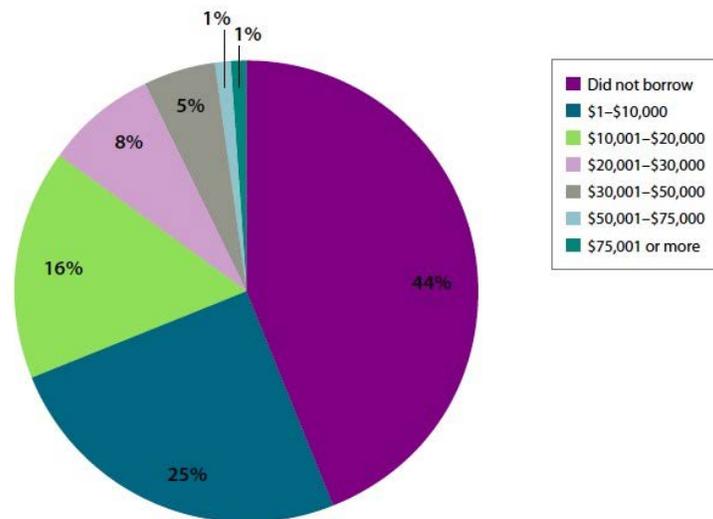


Figure 2. Total Borrowing among Undergraduates First Entering College in 2003-2004. Source: Dynarski (2014).

If completing a four-year degree results in lifetime earnings rising on average by \$500,000, a \$36,299 debt is not a heavy burden to take on. **Would society feel bad for a 25-year-old who inherited a home worth \$500K that carried with it a \$36K mortgage?**<sup>6</sup> We would by no means consider that a crisis. The distinction is that a home is much more liquid and can be sold under financial hardship, but a college education cannot be.

<sup>5</sup> <https://www.nytimes.com/2010/05/29/your-money/student-loans/29money.html>

<sup>6</sup> I owe this analogy to my colleague Chris Taber.

**Myth 4: Borrowing constraints impede low income families from attending college:** Children from lower income families attend and graduate from college at lower rates than children from higher income families. The notion that the inability to borrow against future income prevents children from low-income families from attending college has been debunked by Nobel Laureate James Heckman in a series of papers. In work with Pedro Carneiro, he demonstrates that fewer than 8% of families are borrowing constrained. One critical finding is that high school graduates from low income families are less likely to attend college, not because they cannot secure enough loans for college, but mainly because of their lower readiness for college resulting from fewer investments at younger ages. It is worthwhile pointing out that even in studies that assign an increasing role of family income on college enrollment, the effect of borrowing constraints is usually small. Using data on individuals born in the early 1980s, Johnson (2013) found that the removal of education-related borrowing constraints would raise bachelor's degree completion by only about 2.4 percentage points. While more recent evidence suggests that borrowing constraints play a more significant role, the correct response to this market failure is not to lower tuition for all students but rather to provide targeted need-based financial assistance.

**Myth 5: The higher education sector is not competitive:** There is a perception among some that the higher education sector is not competitive. This is a mischaracterization of the industry. The higher education sector includes public schools, not-for-profit schools, and for-profit schools competing. It competes in the international market and schools fail from time to time. Competition for faculty, staff, and students is global, and competition is intense. Unlike a firm, competition among educational institutions is not typically for profits but rather for status, and this does not lead to efficiency in the same way that competition for profits would. Hoxby (1997) shows the competition among U.S. colleges has increased dramatically since 1940 when higher education has been transformed from a series of local autarkies to a nationally and regionally integrated market. Colleges compete for students via tuition and subsidies in ways similar to the competition between firms in other industries. With the increase in international students and the integration of higher education globally, the competition is only getting stronger. Colleges not only compete against each other but also compete with firms outside the education sector in attracting and retaining high skilled workers. As mentioned earlier, Jones and Yang (2016) demonstrated that this competition for high skilled workers, combined with the rise in the wages of those workers, is the single most important factor accounting for the rise in college costs in the last 50 years.

### III. Valuing the Subsidy from the State of Wisconsin

Economists often disagree on whether, and to what extent, governments ought to intervene in any economic activity, and higher education is no exception. Higher education has a “public good” component to it which rationalizes some government subsidies. In addition, the fact that children cannot be responsible for debts undertaken by their parents on their behalf makes it difficult for the private marketplace to completely solve these issues. Consequently, *even* Chicago economists such as Nobel Laureates Gary Becker, Milton Friedman, James Heckman and Robert Lucas recognize the inability of the free market to reach an efficient outcome in the presence of externalities or borrowing constraints and make the case for some sort of government intervention to improve efficiency. It is no surprise that every country in the world and every state in the United States subsidizes higher education. Rather than getting into a discussion of this, it is useful to value the subsidy received by UW-Madison from the State of Wisconsin.

#### **Does UW-Madison Receive Too Much in Subsidies?**

The State contributed \$445 million to UW-Madison’s budget in 2017-18.

How would one value this contribution from the State? One way to value the extent to which the State of Wisconsin subsidizes UW-Madison is to consider the following hypothetical. Imagine we were to charge all in-state students the higher out-of-state tuition rate (the implicit assumption is that UW-Madison would be able to find enough students to fill these slots with out of state students – a reasonable assumption).

Consider the following:

- a. In Fall 2017, 3,746 Wisconsin residents and 594 Minnesota Compact (who pay a slightly higher tuition) freshmen enrolled at UW-Madison, resulting in a total of 4,340 students paying the lower in-state tuition rate.
- b. The difference between in-state and out-of-state tuition in 2017-18 was \$24,250 for the academic year.
- c. The average in-state undergraduate student takes 4.07 years to graduate
- d. The product of items a, b and c above is \$428 million.

The value of the subsidy provided to UW-Madison in-state students is \$428 million.

Admittedly, this is a very simplistic calculation which ignores several details such as effective prices (tuition less financial assistance), payments made by graduate students, summer tuition revenue and many other finer points. In one important respect though, this calculation under-estimates the subsidy to in-state students since out-of-state tuition is also below the market price. But the salient message is the following and helps place the State of Wisconsin's important contribution to UW-Madison in perspective. To a first approximation, the contribution by the State of Wisconsin to UW-Madison is just sufficient to offset the differential cost of an out-of-state student relative to an in-state student. This is an important contribution that helps state residents send their children to a great university at a substantially lower price than that paid by their out-of-state counterparts. But it is important to remember that state residents who are able to attend UW-Madison at a substantially lower price receive a large *private* benefit in the form of significantly higher lifetime earnings. Viewed from this perspective, the State of Wisconsin currently provides virtually NO subsidy to UW-Madison itself (though it is very important to recognize that substantial investments over the last several decades built this great university today). Rather, **the existing subsidy is tantamount to a voucher given by the State to residents of Wisconsin, and this voucher entitles state residents who send their children to UW-Madison to pay the lower in-state rate.**

Ten years ago, UW-Madison received roughly the same dollar amount of support from the State, and the number of students paying in-state tuition was not very different. However, the differential between out of state and in state tuition was only \$14,000, which was about 33% lower than the number today. Consequently, about two-thirds of state support was a direct subsidy to in-state students while one-third was a subsidy to UW-Madison to cover activities like agricultural extension, nurse and doctor training, etc. As the differential between the in-state (heavily subsidized price) and out-of-state (approaching but still less than the average cost of each student) tuition has risen, the state subsidy to UW-Madison has all but vanished. For all the talk of the Wisconsin Idea, it is not being priced in the current state subsidy to UW-Madison!

## IV. Looking Forward

The State of Wisconsin has chosen to make a substantial investment to bring Foxconn to Wisconsin. Foxconn plans to create up to 13,000 new jobs and invest \$10 billion in the state. Foxconn specializes in the design, manufacturing and assembly of global computer and high-tech consumer electronics products and is well known as the assembler of iPhones. Foxconn plans to build a new high-tech manufacturing and technology campus to build liquid crystal displays (LCD). The campus plans to employ thousands of engineers and skilled workers and be operational in 2020.

For such a large capital investment to be successful, the State of Wisconsin should give the necessary tools to the UW System to produce the needed skilled labor. It is useful to review the concept of **capital-skill complementarity**. In 1969, Zvi Griliches advanced the hypothesis that capital and skilled labor are relative complements. Capital tends to be more complementary to skilled labor than unskilled labor. Capital-skill complementarity is a simple and powerful concept which suggests that when new technologies are embodied in the form of capital, they tend to displace unskilled labor and raise the productivity of skilled labor. Indeed, this complementarity has been identified as the leading contributor to the rise in the return to skill or the return to college over the past few decades. There is every reason to expect this phenomenon of capital-skill complementarity to hold true for Wisconsin in the years to come. If so, capital deepening via investments and the development of new technologies will increase the relative demand for skilled labor. To raise the productivity of capital investments, we need to enhance our skilled workforce. This raises several questions:

- a. Will Wisconsin be a substantial research collaborator to Foxconn?
- b. Will Wisconsin be in a position to produce sufficient skilled labor to meet the growing demands of employers in the state?
- c. Will Wisconsin be able to leverage its investment in Foxconn to create a supply chain and a hub of skilled labor?

UW-Madison will need to play an important role for the State to harness its talent. Investments in capital projects such as Foxconn without complementary investments in skills will result in the State not getting the most of its substantial capital investment. To be clear, the path forward is not vast increases in subsidies for UW-Madison. However, to enhance Wisconsin's growth prospects, UW-Madison needs greater flexibilities.

The State of Wisconsin would benefit considerably if UW-Madison were given the freedom to operate like a business. This will ensure that the residents of the State can make the most of the investment in UW-Madison.

One argument against UW-Madison's desire to expand its budget through higher tuition, general purpose revenue (GPR), or other sources is this: Wisconsin's families are managing with a fixed budget. **Why can't UW-Madison "manage" with a fixed budget?**

- a. First, these types of comments suggest an acute misunderstanding of how growth occurs for any entity. **To grow, one needs to invest.** This is true whether the entity is a country, a state, a firm or an individual. UW-Madison is no exception.
- b. Second, it raises the question, is UW-Madison worthy of the investment? After all, the state of Wisconsin has numerous choices of where to invest taxpayer dollars (roads, K-12 education etc.). The answer is a resounding YES. **Regardless of how the impact of UW-Madison on the State is measured, the economic impact is large.** While imperfect, these multiplier effects that measure UW-Madison's impact are much larger than the impact of pretty much any other alternative use of scarce taxpayer dollars.
- c. Third, if UW-Madison is indeed worthy of additional investments, the relevant and important question is **who exactly should pay for this investment?** Should it be the State (GPR), in-state students (tuition), out-of-state students (tuition), alumni or UW-Madison itself (creation of new programs)? This is a difficult question and the answer is the outcome of a political process.

For the State's economy to grow at a faster rate, it is important to recognize that if these critical investments are not made, especially at a time when other universities are undertaking these investments, the State of Wisconsin is sure to fall behind.

## V. What More Can UW-Madison Do for the State?

UW-Madison operates under restrictions faced by none of its peers. The tuition freeze was largely a response to “*reserve fund-gate*”. In 2013, the UW System had one of its worst moments when members of the state legislature *discovered* that the System held \$1 billion in reserves (though unrestricted reserves were \$648 million) while simultaneously requesting tuition increases. From a budgetary and relationship standpoint, this has proven to be very costly. The reserves represented a substantial sum relative to the UW System’s budget. Making matters worse, the previous UW System President (and previous UW-Madison Chancellor) did not have an immediate clear response at the Joint Finance Committee meeting on what the reserves were intended for. **This is not the Pentagon, where a billion dollars would be a rounding error!** While the previous UW Administration (UW System President and UW-Madison Chancellor) later took the view that the reserves were mostly earmarked for planned expenses in the future, members of the state legislature felt that they were not forthcoming and deliberately hid this information. The ensuing breakdown in trust resulted in UW-Madison receiving a substantial budget cut and a 6-year tuition freeze.

The previous UW Administration could well have spent down some of these reserves. At Madison, a forward-looking Administration could have used them for much-needed investments in key areas of student demand. An effective organization builds reserves during good times for use during lean times. Instead, the UW System added to its reserves during the 2011-13 biennium when it weathered budget cuts. **The irony is that if the UW System had invested in high priority areas by drawing down its reserves, been on top of its balance sheet, and articulated the need for reserves, it could well have had much more resources today and been in better financial condition.** Instead, this episode created the misconception among State residents that the UW System had more resources than they knew what to do with and that its programs were not worthy of investment.

Shared sacrifice is an important prerequisite for a great public institution to work seamlessly. Indeed, the idea of shared risk is one of the unique features of the Wisconsin Retirement System which has led to its success. UW-Madison could do more to better manage and grow its resources, students could pay modest tuition increases to continue to enjoy a quality education and the State could be more supportive by awarding UW-Madison and UW System greater autonomy. The notion that UW-Madison does not care about access to education is untrue. Earlier this year, Bucky’s Tuition Promise was unveiled which makes UW-Madison tuition-free for Wisconsin students whose family income is below the median. All that said, UW-Madison can do more.

### *Develop & adopt a sensible budget model*

A well-functioning enterprise should have a clear and transparent budget model. Budgets need to reflect priorities. Budgets should ensure that there are incentives in place for UW-Madison to be more responsive to workforce needs and student demand. This would help to drive growth for the state's economy and increase utility for our students and their families. Such market responsiveness is sometimes derided as purely vocational by advocates of traditional liberal arts education. But even if one believes that the social value of liberal arts majors is not always reflected in market outcomes, there is still good reason to pursue a sensible budget framework. By doing so, UW-Madison would generate more revenues by allocating resources to programs with higher economic feasibility. This margin could be reinvested in improving the quality of education, access and affordability for residents, and also help subsidize those activities that are necessary and important, but not intrinsically currently economically viable.

While budgets for each College at UW-Madison are adjusted somewhat each year, decisions reached long ago have an outsized impact on current allocations of GPR and tuition revenues across Colleges. A sensible budget model would discourage departments from reducing teaching in high demand areas or offering unnecessary courses, while simultaneously encouraging them to grow their student numbers, encourage timely graduation, and increase growth in their research portfolios. A good internal budget model would carefully balance incentives against ability to drive strategy, correct for market failures, and provide for the common good through infrastructure and needed investments.

The modern economy, decreased state support for higher education, and the increasingly competitive higher education landscape requires UW-Madison to move more nimbly and rationally at the margin. The allocation of resources across Colleges at UW-Madison is very uneven and to a first approximation, was set many decades ago. While they have been fine-tuned somewhat, no major changes have been made. While student demand need not be perfectly aligned with budgets, UW-Madison needs to move away from a legacy budgeting model in which budgets are uncorrelated with activity and largely a function of history. Such a model does not serve anyone well and results in inefficiencies. The allocation of GPR and tuition revenues across colleges should be based on and move slowly with student demand – credit hours and degrees granted. The new budget model should make allocation of resources across Colleges transparent, make resources flow as objective measures of activity change, and generate resources through reallocation that can be used by campus leadership for investment in new strategic initiatives.

## What More Can the State Do for UW-Madison?

There is bipartisan support for a tuition freeze. Because voters like lower prices on goods and services and higher education is no exception, it is difficult to move away from a tuition freeze that is politically popular. Much less contentious is the ability to borrow against future income, especially if that future income is a virtually guaranteed income stream. Given the constraints facing UW-Madison and the UW System, the authority to tap capital markets to finance building projects using program revenue and manage projects internally is a flexibility that the State of Wisconsin should consider giving to the UW System.

### *Bonding Authority & Project Management Flexibilities*

UW-Madison is currently the only major public university that does not have access to capital markets to issue debt for construction projects. It is also one of the most restricted in terms of how it is allowed to deliver those projects, holding to a management process that primarily uses outdated project delivery methods that the state's Department of Administration (DOA) is allowed to use. To compound the problem, DOA is generally under-resourced for project management which leads to delays, cost increases, and a host of related problems with delivering the building and facilities needed to run a modern, world-leading university.

This is problematic for all concerned. The State issues and backs all debt for its capital budget, including the UW System (which is roughly half of state construction). This means that borrowing to finance other capital needs for the state (transportation, etc.) is constrained to roughly half the level that it would otherwise be able to achieve. Wisconsin has held overall general obligation debt relatively flat at approximately \$8 billion<sup>7</sup> in recent years. If the state wants to stay at that level, new borrowing is therefore limited by the amount of principal repayment occurring each year, roughly \$500-700 million<sup>8</sup> every two-year budget cycle. Given that there are a lot of capital needs in the state, this means the amounts available for the UW System are limited.

**Borrowing by the State for infrastructure projects is different from borrowing to finance buildings for the UW System in one important respect.** Borrowing for infrastructure projects in the State are paid off using future tax revenues – either by increased taxes or

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<sup>7</sup> See slide 5 in Wisconsin DOA Capital Finance Office (2017).

<sup>8</sup> See table 6 in Wisconsin Legislative Fiscal Bureau (2017).

a reallocation away from some government expenditure toward repayment of loans. In contrast, borrowing by UW-Madison could be paid off by future program revenue. Setting up new programs that are self-sustaining requires buildings. Allowing UW-Madison to borrow against future revenues for new initiatives has the ability to substantially impact economic activity in the State.

The state's reluctance to grow total debt extends to both general fund supported borrowing and to what is referred to as "program revenue" supported bonding, where the university would pay the costs. This reluctance in large part is because the state currently issues those program revenue bonds as general obligation bonds of the state, meaning that the full faith and credit of the state backs every bond. Other states allow the revenues of the university to serve as the ultimate backstop of university debt. This approach makes sense and allows the state to direct its limited access to debt to those projects that require future tax revenues, rather than also supporting those projects that can cover costs on their own. As a consequence, rational economic activity does not occur, and the university's ability to respond to business opportunities and develop academic requirements is constrained.

Allowing UW-Madison and the broader UW System to issue their own debt makes economic sense. The University has a strong balance sheet and could easily secure a top credit rating if allowed to do so. Total debt capacity for the state and the university at any particular credit rating would likely be higher with both parties issuing their own debt in the credit markets. This is a primary reason why every other state in the nation already pursues this strategy with its flagship public university system.

The project management problem is no less significant operationally. It currently takes UW-Madison, working through the state's Department of Administration, 6-8 years to build a new building while peer institutions do it in 2-3 years. This has an overall gating effect on construction activity and constrains the strategic flexibility the university has to respond to emerging needs from students, employers, or the research enterprise. Worse, total costs for eventually delivering those buildings wind up being much higher due to cost escalation and expensive change orders arising from poor coordination. The current project management regime is a material drag on efficiency. Access to capital markets without changes to project management to enable speedier and more efficient project delivery will not provide the flexibility our modern economy requires, so these two proposals must necessarily be linked together.

A concrete example will help illustrate this point. A new UW-Madison Chemistry Building, relieving a key constraint on throughput for STEM majors, could have been built many years ago (perhaps using some of its reserves!) if UW-Madison had access to capital markets and project management capability. The inability to construct this in a timely manner meant that UW-Madison was been unable to expand its STEM majors, even though it has high demand and authority from the Regents to expand the number of out-of-state students. This leads to lower revenues and constraints on growth for UW-Madison, the UW System, and importantly for the State and its modernizing economy.

Looking ahead, imagine that UW-Madison would need to expand its engineering program to help support the new Foxconn facility and associated industries. Now imagine taking 6-8 years to get that building done. This is generally how things have historically operated in our state-run capital projects system, but Foxconn and the modern economy move at a different pace. If reform does not happen soon, we risk being left behind as the pace of acceleration continues to increase.

Other universities have borrowed significant sums of money, some with great fanfare. In 2011, Ohio State University issued bonds with a 100-year duration to raise \$500 million for construction projects. There are several other examples of state universities borrowing to finance large capital and infrastructure projects with varied durations. Borrowing rates depend on credit scores; and borrowing comes with the usual risks associated with the ability to pay back the loan especially during economic downturns.

Universities will need to designate the revenue source to be used as collateral when borrowing large sums of money. They could use GPR, tuition, or specific program revenue. The choice of collateral will affect the credit rating and hence the borrowing cost. Sometimes, borrowing against anticipated revenue from new activity may not go as planned and in that case, the risk gets shifted onto other sources of revenue. For example, UC-Berkeley took out \$445 million in bonds from 2009 to 2013 to rebuild its football stadium. Due to optimistic projections, revenues fell short and interest payments had to be covered by other traditional sources of revenue at Berkeley. (This should not be a problem at UW-Madison given how much we love the Badgers, how strong demand for tickets is, and how good they are!). For a large university with a diversified revenue base and dependable steady stream of revenue, the risks are lower since it is not difficult to secure and maintain a good credit rating<sup>9</sup>.

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<sup>9</sup> For evidence of this fact, look no further than the fact that no major university has defaulted on a bond issuance in recent memory. University credit ratings, like those of state governments as a whole, are generally very high, and similar to those of the states they serve.

For the State of Wisconsin, the lack of access to capital markets means that total construction activity is reduced relative to what it would otherwise be. For UW-Madison, this likely means that \$700 million in projects that could be done if it had access to capital markets won't get done in the next biennium. For the total UW System, the corresponding number would likely be \$1.2 billion. These numbers are based on past UW System requests as well as bonding authority sought by other state universities.

**What are the economic implications of giving UW System bonding authority as well as project management capability?**

First, bonding authority and project management capabilities will allow for an expanded student body and a greater number of college graduates staying in the state. Second, these flexibilities will allow the UW System to expand and increase the number of researchers using the increased revenue from an expanded student body. Third, these flexibilities will result in greater human capital spillovers which occur with expansions of universities. Finally, there is the short-run boost from increased construction activity from tapping capital markets.

Before presenting an estimate of the economic impact, it is instructive to review the logic behind the exercise and compare with the best available evidence. Lack of resources represents a constraint on UW-Madison's and the UW System's growth, and in turn the growth rate of the state economy. Access to capital markets will lead the UW System to expand, leading to more college graduates, some of whom will stay in Wisconsin. In addition, increases in the flow of graduates in Wisconsin will lead to higher growth in the regional and State economy in the long run.

Valero and Van Reenen (2016) present a comprehensive analysis of data from 78 countries and find that university expansions result in a significant boost in national income. They also look at state level data in the United States and find that increases in university numbers significantly raise future GDP per person. This result is robust even after controlling for population and geographical factors. Interestingly, university expansions increase output and value added not only in their own region but this effect "spills over" to neighboring areas. They also find that expansions in research-oriented universities matter for economic growth. Adding researchers leads to greater innovation at the Universities; and increasing the number of college graduates leads to greater innovation in the workforce.

Several estimates and data sources provide estimates to calculate the economic effects associated with bonding authority and project management flexibilities. The ability to borrow will help expand the student body in the UW System – particularly in the high demand STEM majors. Bound et al (2004) present estimates of the association between the increase in the number of bachelor’s degrees awarded in a state and the corresponding increase in the number of college graduates that working in that state. More college graduates working in a state will lead to a higher stock of human capital in the state as they make workers more productive through human capital externalities. Estimates for externalities come from Lucas (1988) and Moretti (2014). Andersson et al (2009) estimate the impact of additional post-graduate researchers in a university on local productivity. Finally, the multiplier used to estimate the effect of construction activity on Wisconsin’s GDP comes from Nakamura and Steinsson (2014).

Assuming it takes two years for construction to take place and four years to expand the student and research populations, these flexibilities for the UW System are estimated to boost Wisconsin’s GDP in the next biennium by a little more than \$1.8 billion. This solely represents the short-term effect arising from increased construction activity. It will take some time (two biennia) to realize the full effect of bonding authority and project management capability. In the long run, Wisconsin’s GDP is estimated to increase by \$1.32 billion in each biennium thereafter relative to status quo. This is a substantial increase in economic activity, but the best part about giving UW System access to capital markets is this: it does not cost students or taxpayers a dime!

## References

- Avery, Christopher, and Sarah Turner. 2012. "Student Loans: Do College Students Borrow Too Much--Or Not Enough?" *Journal of Economic Perspectives*, 26 (1): 165-92.
- Bound, John, Jeffrey Groen, Gabor Kezdi and Sarah Turner. 2004. "Trade in university training: cross-state variation in the production and stock of college-educated labor." *Journal of Econometrics*, 121 (1-2): 143-73.
- Carneiro, Pedro and James J. Heckman. 2002. "The Evidence on Credit Constraints in Post-Secondary Schooling." *The Economic Journal*, 112 (482): 705-34.
- Dynarski, Susan. 2014. "An Economist's Perspective on Student Loans in the United States." *Brookings ES Working Paper Series*.
- Griliches, Zvi. 1969. "Capital-Skill Complementarity." *The Review of Economics and Statistics*, 51 (4): 465-468.
- Hoxby, Caroline M. 1997. "How the Changing Market Structure of U.S. Higher Education Explains College Tuition." *NBER Working Papers 6323*, National Bureau of Economic Research, Inc.
- Johnson, Matthew T. 2013. "Borrowing Constraints, College Enrollment, and Delayed Entry." *Journal of Labor Economics*, 31 (4): 669-725.
- Jones, John Bailey and Fang Yang. 2016. "Skill-Biased Technical Change and the Cost of Higher Education." *Journal of Labor Economics*, 34 (3): 621-62.
- Lucas, Robert E. 1988. "On the Mechanics of Economic Development." *Journal of Monetary Economics*, 22 (1): 3-42.
- Moretti, Enrico. 2004. "Estimating the Social Return to Higher Education: evidence from longitudinal and repeated cross-sectional data." *Journal of Econometrics*, 121(1-2): 175-212.
- Nakamura, Emi, and Jón Steinsson. 2014. "Fiscal Stimulus in a Monetary Union: Evidence from US Regions." *American Economic Review*, 104 (3): 753-92.
- Zimmerman, Seth D. 2014. "The Returns to College Admission for Academically Marginal Students." *Journal of Labor Economics*, 32 (4): 711-54.

CROWE Report: UW-Madison and the State of Wisconsin

Valero, Anna and Van Reenen. 2016. "The Economic Impact of Universities: Evidence from Across the Globe". NBER Working Paper No. 22501.

Wisconsin DOA Capital Finance Office. 2017. "Bond Programs". November Presentation.

Wisconsin Legislative Fiscal Bureau. 2017. "State Level Debt Issuance." Informational Paper 77.