THE ECONOMIC CONTRIBUTIONS OF THE UNIVERSITY SYSTEM

A Report from the Office of the University Economist

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SUMMARY OF THE EFFECTS OF A REDUCTION IN UNIVERSITY FUNDING AND THE DELAY OF THE CONSTRUCTION STIMULUS PROGRAM

The state government general fund shortfall in the current fiscal year is projected to be between about $550 million and $1 billion, after considering the transfers of monies from other funds. The high projection represents 10 percent of the state's general fund appropriations.

This shortfall will need to be eliminated through spending cuts and/or revenue enhancements. The Legislature has demonstrated a preference for spending cuts. However, unlike much of the private sector, demand does not decline for most public-sector services during a recession. In some government programs, demand rises. Thus, imposed decreases in public spending during recessions come at the same time that demand for public services is stable or rising, resulting in a reduction in the quantity and/or quality of government services. For the most disadvantaged of those consuming public services, real hardship can ensue.

Spending reductions by governments during recessions also worsen economic conditions. In addition to reducing demand for private-sector goods and services, cutting the public-sector workforce causes public-sector revenues to decline. Further, the savings to state government of not paying the former workers' salaries and benefits are partially offset by rising payments to the ex-workers for unemployment insurance and other public welfare programs.

The reduction of government spending during a recession has the effect of trying to balance the public budget on the backs of a relatively small share of the state's residents and businesses — primarily the laid-off workers, and secondarily the private-sector companies (and their employees) at which the laid-off workers shop.

The demand for university services also does not drop during recessions. Therefore, any reduction in funding for universities will have a negative and direct effect on students. Significant reductions in state funding, if not substantially offset by higher tuition, likely will result in the elimination of programs, reductions in the quality of other programs, enrollment caps, fewer course offerings, larger class size, and the loss of scholarship aid.

A reduction in state government spending for universities of around $200 million would cause direct and indirect job losses of approximately 4,000. For perspective, the Arizona Department of Commerce projects an annual average loss of 34,000 jobs in Arizona in calendar year 2008 and an additional 13,500 in 2009. Thus, a job loss of 4,000 resulting from a decline in university spending is significant relative to the overall decline in employment projected for 2009 and would noticeably worsen the state's recession.

If the employment effect from a reduction of $800 million in the remainder of state government were proportional to the effect of the reduction in employment from a cut in university spending, then a total of approximately 20,000 workers (8,000 state government and university workers and 12,000 others) would lose their jobs. Thus, the result of state spending cuts of $1 billion would be to very significantly worsen and lengthen the economic recession.

A substantial decrease in state government funding for universities will have negative consequences beyond these short-term effects. Lowered student retention and a declining number of students earning degrees will threaten the state's future economy. To remain competitive, Arizona must transition with the rest of the United States to a knowledge-based economy in which science- and technology-based jobs will be key drivers of the economy.

As demonstrated by the severity in Arizona of the current economic downturn, further diversification of Arizona's economy is desirable. Knowledge-based industries, which include high-technology manufacturing as well as services, are the activities with growth potential and the ability to drive the Arizona economy.

An essential feature of the knowledge economy is the importance of a highly skilled workforce, trained in new technologies. In particular, college graduates are of more importance in the new economy than in the old economy. A large number of college graduates with a range of skills are essential to companies in the knowledge economy. Thus, any action — such as budget cuts — that undermines the success of the state's universities also impairs the state's economy.

Spending reductions are not the only way to balance the budget. The short-term aggregate economic effect from a tax increase would be equal to that of a governmental spending decrease. However, the negative effect of a tax increase would be spread throughout the state. Individual households and businesses would suffer slightly, in contrast to the substantial negative effects on a relatively small number of individuals and businesses that would result from a government spending reduction.

For perspective, a tax increase of $1 billion that affected individuals only and was not exported (for example, to tourists) still would equate to only about $150 per Arizona resident, or $400 per household. Arizona still would rank as a low tax state at 37th, just lower than Mississippi, according to the National Tax Foundation. A tax increase of this magnitude would offset only one-third of the state tax cuts implemented between 1993 and 2008 and would be considerably less than the federal tax rebates distributed in May.

The delay in the construction stimulus package that already passed the Legislature also will harm the state's economy in the short term. One way that state and local governments can improve economic conditions in the local economy is to finance capital outlays for physical infrastructure projects through long-term debt. The use of long-term debt postpones the vast majority of the debt repayment to a period after the end of the current economic downturn. Yet the benefits of the construction funding begin to accrue as soon as the funding is released.

The delay will not help to resolve the projected budget deficit for the current fiscal year since debt service during this year would be only $1 million. The delay, however, will prevent $210 million from entering the Arizona economy during the year. If the planned cash flow of $515 million in the next fiscal year also did not occur, the negative effects would be much larger. Employment, for example, would be 8,000 less than if the stimulus package had proceeded as originally planned. Thus, the stimulus package alone would offset a significant portion of the forecasted job losses during 2009.

SHORT-TERM EFFECTS OF A REDUCTION IN UNIVERSITY FUNDING OF $200 MILLION

Background

Arizona's economy currently is in recession, in large part due to the real-estate bust. The economic downturn in the state likely will be prolonged and worsened by what appears to be increasing evidence of a deepening national and even global downturn.

During a recession, the demand for goods and services provided by many private-sector companies declines, as consumers experience job losses, wage reductions, investment losses, or simply become more cautious in their spending. As a result, companies need fewer employees and employment in the private sector falls.

Unlike much of the private sector, the demand for most public-sector services does not decline during a recession. For example, children continue to attend school, workers continue to use roads and highways, households continue to produce trash and wastewater, and needs for fire protection do not abate. In some government functions, the demand for public services is countercyclical, rising during an economic recession. The demand for public safety rises since crime tends to increase during hard economic times. The demand for unemployment benefits, food stamps, and other public assistance is higher during recessions due to increases in the number of unemployed and to reductions in income among those still working.

To appreciate the severity of the current economic downturn, following a significant budget deficit in the prior fiscal year, projections of the state government's general fund budget deficit in the current fiscal year range from $800 million to $1.3 billion. Some of this deficit will be made up by monies currently in other funds. In addition to the $120 million balance in the rainy-day fund, the Governor's budget management plan released on October 1, 2008 assumes that $50 million is available to transfer from other funds, and at least $75 million is available from revenue enhancements. Considering these funds, the range of the general fund shortfall is reduced to between about $550 million and $1 billion.

If the state government shortfall (after fund transfers) turns out to be the high figure of $1 billion, this represents 10 percent of the state's general fund appropriations for the current fiscal year. The general fund budget for fiscal year (FY) 2009 is just short of $10 billion, with the universities/Board of Regents portion close to $1.1 billion.

The shortfall will need to be eliminated through spending cuts and/or revenue enhancements. The Legislature has demonstrated a preference for spending cuts. However, imposed decreases in public spending during recessions come at the same time that demand for public services is stable or rising, resulting in a reduction in the quantity and/or quality of government services. For the most disadvantaged of those consuming public services, real hardship can ensue.

Spending reductions by governments during recessions not only negatively affect those being served, but also worsen economic conditions. The spending cuts take the form of reductions in government employment and in government purchases of goods and services from the private sector. The latter obviously has a detrimental effect on those private-sector companies selling

directly to the public sector. Governor Napolitano's directive of October 8, 2008 to freeze contracts in excess of $50,000 is the first step in this process.

Government workers laid off during a recession have little hope of finding another job in Arizona in the near term. If unemployed workers leave Arizona to seek employment opportunities in a state less hard hit by the recession, then all of the expenditures that the former workers made at private-sector companies will be lost to the Arizona economy, as will the sales taxes and other public-sector taxes and fees paid by the former workers.

If unemployed government workers remain in Arizona, their spending will decline, negatively affecting the companies at which the former workers shop, and also adversely affecting the collection of sales taxes, on which Arizona's governments are disproportionately dependent. Thus, in addition to reducing demand for private-sector goods and services, cutting the public-sector workforce will cause public-sector revenues to decline.

Further, laid-off government employees will be eligible for unemployment insurance payments and may qualify for other public welfare, such as food stamps. Thus, the savings to state government of not paying the former workers' salaries and benefits will be partially offset by rising payments to the ex-workers for unemployment insurance and other public welfare programs.

The reduction of government spending during a recession has the effect of trying to balance the public budget on the backs of a relatively small share of the state's residents and businesses — primarily the laid-off workers, and secondarily the private-sector companies (and their employees) at which the laid-off workers shop.

The Effects on Universities

Declines in funding for universities will result in short-term negative effects similar to those of spending cuts elsewhere in state government. As with most government functions, the demand for university services does not drop during recessions. In fact, university enrollments tend to rise at a slightly accelerated pace during recessions as some unemployed workers use their free time to further their education. Thus, any reduction in funding for universities will have a negative and direct effect on students. Significant reductions in state funding, if not substantially offset by higher tuition, likely will result in the elimination of programs, reductions in the quality of other programs, enrollment caps, fewer course offerings, larger class size, and the loss of scholarship aid.

Laid-off university employees face the same dilemma as other unemployed government workers. They are likely either to remain unemployed until the recession ends or to leave the state. Private-sector companies serving laid-off university employees and selling goods and services directly to the universities are negatively impacted in the same way as companies doing business with the rest of the public sector.

Because 45 percent of the state's general fund is protected from budget reductions, any state government spending reductions are likely to disproportionately affect the universities, which are not protected. Thus, if the shortfall is $1 billion, instead of a 10 percent reduction in the overall

general fund, the reduction would have to be more than 18 percent of the unprotected appropriations. This would equate to a funding decrease of approximately $200 million to the university system. Even before considering such a possible funding reduction during FY 2009, the share of general fund appropriations going to the universities (including the Board of Regents) has dropped from nearly 15 percent in FY 1992 to less than 11 percent.

In order to assess the economic effects of a reduction in university spending of $200 million, the IMPLAN model was used. It measures the effects of an economic change on three measures: gross domestic product by state, labor income, and employment. The effects consist of the direct effects on the universities and the multiplier effects — the effects, primarily on the private sector, that occur as the decline in spending ripples through the economy.

The IMPLAN results should be viewed as illustrative only, since the specific means by which the universities would reduce spending by $200 million is unknown. In particular, the distribution of the cuts between employee compensation and other types of expenditures is highly speculative. Thus, the labor income and employment effects might be substantially different than those shown in the following table. The effects shown in the table are annual declines in economic activity that will persist until the spending cuts are offset by a subsequent increase in state government funding.

A reduction in state government spending for universities of around $200 million would result in direct and indirect job losses of approximately 4,000. For perspective, the Arizona Department of Commerce projects an annual average loss of 34,000 jobs in Arizona in calendar year (CY) 2008 and an additional 13,500 in CY 2009. Thus, a job loss of 4,000 resulting from a decline in university spending is significant relative to the overall decline in employment projected for 2009 and would noticeably worsen the state's recession.

If the employment effect from a reduction of $800 million in the remainder of state government were proportional to the effect of the reduction in employment from a cut in university spending, then a total of approximately 20,000 workers (8,000 state government and university workers and 12,000 others) would lose their jobs. Thus, the result of state spending cuts of $1 billion would be to very significantly worsen and lengthen the economic recession.

ILLUSTRATIVE EFFECTS OF A $200 MILLION REDUCTION IN UNIVERSITY SPENDING

	Gross Product (in Millions)	Labor Income (in Millions)	Employment
Direct Effects	$109	$103	1,598
Multiplier Effects	191	105	2,426
Total	300	208	4,024

Spending Reductions Compared to Revenue Increases

Spending reductions are not the only way to balance the budget. The Governor's Budget Management Plan released on October 1, 2008 includes revenue enhancements, though no details are presented in the plan. In any case, nontax revenue enhancements will not be adequate to close most of the likely shortfall (after fund transfers) in the state government general fund.

Conceptually, additional funding also would be available by increasing tax rates, though politically this option has not been raised as a possible solution to the budget deficit. An increase in taxes was one of the methods used to balance the budget during the lengthy economic decline of the late 1980s and early 1990s, another economic downturn disproportionately caused by the boom-bust cycle in real estate.

The overall tax burden in Arizona currently is well below the national average. The relative tax burden on individuals is even lower, given that some taxes on businesses are high relative to other states. Assuming that little of any tax increase would be levied on businesses, the short-term aggregate economic effect from a tax increase would be equal to that of a governmental spending decrease. In order to reduce the effect on lower-income individuals, any tax increase could be made to be highly progressive.

The primary negative effect of a tax increase that largely spares lower-income households would be that middle- and upper-income households would have less money to spend in the private sector. But the effect would be spread throughout the state. Individual households and businesses would suffer slightly, in contrast to the substantial negative effects on a relatively small number of individuals and businesses that would result from a government spending reduction. Further, individuals — whether state government employees or the disadvantaged who are highly dependent on public assistance — would not be devastated in the tax increase option.

For perspective, a tax increase of $1 billion that affected individuals only and was not exported (for example, to tourists) still would equate to only about $150 per Arizona resident, or $400 per household. According to the National Tax Foundation rankings for 2008, even with an increase of this magnitude Arizona still would retain its low-tax status. Assuming no changes in the tax burdens of other states, Arizona's rank would be 37th, one spot lower than Mississippi. A tax increase of this magnitude would offset only one-third of the state tax cuts implemented between 1993 and 2008. If the shortfall turns out to be only $550 million, then the tax increase would be less than $100 per Arizona resident and about $225 per household.

Even at the higher figure, such a tax increase would be considerably less than the rebate in federal taxes that most Arizonans received in May. Further, any increase in Arizona taxes would be deductible from the federal income tax, lowering the after-tax impact on disposable incomes.

SHORT-TERM EFFECTS OF DELAYING THE CONSTRUCTION STIMULUS PROGRAM

The national and state economies are highly cyclical. When a cyclical economic downturn occurs, the federal government historically has made an effort to offset some of the negative economic effects by stimulating the economy. Methods of spurring on the economy have varied, but a stimulus frequently employed has been an increase in federal government spending. In the past, the federal government experienced budget surpluses during economic expansions that funded these countercyclical spending increases. More recently, however, the federal government has run deficits even during economic expansions, limiting its ability to stimulate the economy during downturns.

State and local governments have a limited ability to stimulate the economy due to balanced-budget requirements. An adequately funded rainy-day fund helps to smooth out the cyclical variations but does not act as a true stimulus. One way that state and local governments can improve economic conditions in the local economy is to finance capital outlays for physical infrastructure projects through long-term debt. The use of long-term debt postpones the vast majority of the debt repayment to a period after the end of the current economic downturn. Yet the benefits of the construction funding begin to accrue as soon as the funding is released.

Using long-term debt to finance infrastructure that will be used for many years results in intergenerational equity, by spreading both the benefits and costs of the infrastructure across current and future taxpayers. Further, investments in projects that yield clear economic benefits that offset the prevailing cost of capital are economically efficient. Borrowing when interest costs are low, as in a recession, is optimal. Construction costs also are lower during recessions.

Public-sector debt in Arizona as a share of gross product currently is relatively low compared to other states and compared to prior years in Arizona. Adding a moderate amount of long-term debt will not impair the state's economic growth.

In the case of the stimulus package passed by the Legislature in spring 2008, the benefits take the form of contracts with construction companies that are experiencing a lull in operations due to the general economic malaise. The work for the universities means that these companies will not need to lay off additional employees, and some unemployed workers may be rehired. These workers therefore will be paying more in income taxes than if they were not working. They also will be spending more, supporting other local companies as well as contributing additional tax revenues via the sales tax. In addition to the benefits from employing more workers, a sizable portion of the construction funding will be used for purchases of materials, benefiting other local companies. In this way, the stimulus monies ripple through the economy, creating an economic benefit greater than the original amount of the stimulus package.

As passed by the Legislature in spring 2008, the stimulus package was $1 billion, with the funds to be released primarily over three years (FYs 2009 through 2011). A little more than one-fourth of the funds were scheduled to be issued during FY 2009, with a cash flow of $210 million planned. A little more than half of the bond issuance and cash flow was scheduled for FY 2010, with the remaining issuance and nearly all of the remaining cash flow occurring in FY 2011. In

contrast, the debt service was scheduled to be only $1 million in FY 2009 and $13.5 million in FY 2010. After that, payments would rise to $41 million in FY 2011 and $56 million in FY 2012. Even these higher payments represent only a fraction of 1 percent of the state government budget.

Not moving forward with the construction stimulus package that already passed the Legislature will not help to resolve the projected budget deficit for the current fiscal year (FY 2009), since debt service during this year would be only $1 million. The delay, however, will prevent $210 million from entering the Arizona economy during FY 2009.

Using the IMPLAN model, the total effects of the construction stimulus package aggregate to nearly $1.4 billion in gross product, $1.0 billion in labor income, and 22,200 jobs. In order to determine the effects on an annual basis requires using the scheduled cash flows by year and making an assumption as to the length of each project. The stimulus monies are planned to be spent on a mix of new construction and renovation to existing buildings. An average project is assumed to take two years to complete.

By delaying the stimulus package, the cash flow of $210 million in FY 2009 will not occur. Assuming that only half of these funds would be actually spent in material purchases and employee wages in FY 2009, this would have a direct effect of reducing the state's gross product by $62 million, lowering labor income by $53 million, and reducing employment by nearly 1,100. Including the multiplier effects, the reduction is $144 million in gross product, $106 million in labor income, and more than 2,300 in employment. If the planned cash flow of $515 million in FY 2010 also did not occur, the negative effects would be much larger. Employment, for example, would be 8,000 less than if the stimulus package had proceeded as originally planned. Thus, the stimulus package alone would offset a significant portion of the state's job losses forecast by the Arizona Department of Commerce during CY 2009.

Economic forecasts suggest that the Arizona economy likely will remain weak through most of calendar year 2009, but then begin a recovery. Thus, government revenues are likely to begin to recover during FY 2010, but another budget deficit may be present. The scheduled $13.5 million in debt repayment from the stimulus package still will be very small compared to the size of the overall budget. By mid-2010 (the beginning of FY 2011), however, the economy is expected to be expanding at a healthy pace. The state government budget is likely to look much better in FY 2011. The higher debt repayment in that year and in subsequent years will be very small compared to the size of the overall budget.

LONG-TERM EFFECTS OF A FUNDING REDUCTION FOR UNIVERSITIES

A substantial decrease in state government funding for universities will have negative consequences beyond the short-term effects discussed above. Unless largely offset by very substantial increases in tuition, such large cuts would result in elimination of programs, reductions in the quality of other programs, enrollment caps, fewer course offerings, larger class size, and the loss of scholarship aid. This set of conditions almost certainly would lead to lowered student retention and a declining number of students earning degrees.

Assuming that enrollment and/or graduation rates are negatively affected by a reduction in state funding, then the state's future economy is threatened. Underlying this statement are the economic changes occurring worldwide. In particular, as previously third-world countries such as China and India industrialize, Arizona no longer can compete on the basis of low costs — a primary strategy of its economic development during the 20th century. Instead, to remain competitive, Arizona must transition with the rest of the United States to a knowledge-based economy in which science- and technology-based jobs will be key drivers of the economy.

As demonstrated by the severity in Arizona of the current economic downturn, further diversification of Arizona's economy is desirable. A high-growth state like Arizona is disproportionately reliant on growth-related pursuits, which tend to be highly cyclical. In contrast, basic economic activities — those that sell goods and services to consumers outside Arizona — frequently have different cycles than those of the population-serving industries and thus help to smooth out the overall economic cycle. Traditional basic activities include agriculture, mining, manufacturing, and tourism, but most of these activities are in the mature or declining stages of their life cycle and cannot be expected to be economic drivers in the 21st century. Instead, knowledge-based industries, which include high-technology manufacturing as well as services, are the activities with growth potential and the ability to drive the Arizona economy.

An essential feature of the knowledge economy is the importance of a highly skilled workforce, trained in new technologies. In particular, college graduates are of more importance in the new economy than in the old economy. A large number of college graduates with a range of skills is essential to companies in the knowledge economy and is a strong asset in the attraction of such companies to the state. Thus, any action — such as budget cuts — that undermines the success of the state's universities also impairs the state's economy.

Beyond the traditional economic impact discussed above, higher education provides three basic benefits to individuals and society that will be lessened by a reduction in public funding. First, a college education enables the individual achieving the academic success to realize a considerable financial benefit — those with college degrees earn substantially more than those with less educational attainment. In turn, an individual with higher earnings spends more, benefiting private-sector companies that provide goods and services. Further, an individual with higher income and higher spending pays more in taxes, benefiting the public sector and other taxpayers.

The earnings of an individual with a bachelor's degree average $17,000 per year higher than those with only a high school diploma, even after netting out the cost of tuition and foregone

earnings while in college. Over a working life of 44 years, this cumulates to $750,000. If just 1,000 individuals earned a bachelor's degree instead of stopping their education earlier, at the end of their working life earnings in Arizona would be nearly $750 million higher.

Approximately 18,500 individuals per year graduate from the state's universities with a bachelor's degree; another 7,600 receive a higher degree. If reductions in university funding cause the number of graduates to fall rather than rise, then a negative impact on the state's economy would occur comparable to the positive effect of increasing the number of degree holders.

Second, a concentration of highly educated, high-income earners causes wages of other workers to be higher. Enrico Moretti has demonstrated that a 1 percent increase in the proportion of college-educated workers in an area raises wages by 1.9 percent among those with less than a high school degree, 1.6 percent among high-school graduates, 1.2 percent among those with some college, and 0.4 percent among college graduates (beyond the increase in wages realized by new university graduates).

Based on the size of the Arizona workforce and existing earnings per worker, overall earnings in Arizona would be $2.1 billion (1.7 percent) per year higher if a 1 percentage point increase in the share of workers with a university degree were achieved. Funding reductions at universities will make this increase of more than 30,000 university graduates unlikely. Instead, the share of the Arizona population with a university degree may fall, preventing the state from achieving a gain in prosperity for all.

An increase in university graduates could be achieved by attracting migrants to Arizona with higher educational attainment as well as by increasing the number of graduates from the state's universities. As a desirable and growing state, a significant portion of Arizona's workforce was not educated in Arizona, instead moving to the state after completion of their education. A heavy dependence in the future on imported labor, however, is a risky strategy given the competition for highly qualified workers. Further, if a high percentage of those growing up in Arizona do not achieve high educational attainment, Arizona runs the risk of creating an underclass. In addition, it will not have a workforce attractive to knowledge-based companies and will not be perceived as being a desirable location by highly educated potential migrants.

Third, university research produces economic benefits through the economic impact of financial grants and awards that originate from outside the state. Further, university research leads to private-sector startups, spinoffs, and the licensing of university technology by the private sector. University research also leads to other spillovers and a large multiplier effect. Reduced spending for universities almost certainly will cause research funding from other sources to decrease. Empirical evidence from Jaffe indicates that for every $10 million spent to support public research, up to $40 million of private research and development expenditures take place. So, reductions in public research may impede private-sector R&D investments that will be essential to diversifying the Arizona economy.