The Impact of Construction on the Wisconsin Economy

January 5, 2015

Prepared for the AGC of Wisconsin Skill, Integrity Responsibility Council, Inc.

by

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The AGC of Wisconsin Skill, Integrity Responsibility Council, Inc (SIR Council) is a not-for-profit 501 c(4) issue advocacy organization working to educate and inform Wisconsin residents about the construction industry's perspective on issues that affect our economic development and job growth. The SIR Council was supported in this effort by the AGC of Wisconsin Skill, Integrity and Responsibility Council; AGC of Wisconsin Industry Advancement Program; AGC of Wisconsin Construction Education Foundation, Inc.; AGC of Wisconsin Municipal/Utility Industry Advancement Program.

The Impact of Construction on the Wisconsin Economy
Study Outline

I. Executive Summary:

The Construction sector is an important component of the Wisconsin economy, accounting for a significant amount of the state's Gross Domestic Product. Although the employment levels have declined since the so-called Great Recession, the sector continues to employ a large number of workers in relatively high paying jobs. Moreover, as the economy continues to expand, there is an opportunity for this sector to play an important role in fueling the expansion. The "ripple effects" emanating from the Construction sector have a significant impact on other important sectors in the state economy in terms of state output, employment and income levels and hence growth in Construction sectors permeates throughout the state economy.

This study documents and quantifies the overall significance of Construction to the Wisconsin economy. After considering recent trends in the Wisconsin economy in general, and the Construction sector specifically, three hypothetical case studies are conducted that demonstrate and document how initial Construction activity in different types of Construction projects works its way through the broader state economy, thereby generating expanded economic benefits to the state as a whole. These benefits are quantified in terms of output created, jobs generated, and earnings produced. Tax revenue effects are also briefly considered.

Key findings of this report include:

- The Construction sector directly produced $9.0 billion of real GDP in 2013. This was 3.4% of total state real GDP of $264.1 billion.
- Construction employment totaled 152,909 jobs in 2012. Although Total Wisconsin Employment has rebounded from the Great Recession, Construction employment continued to decline modestly over the period 2011-12.
- The average wage and salary payment per Construction employee in 2012 was $52,773, which was 22.4% above the state average for private compensation.
- There has been significant improvement in the labor market since the end of the Recession in June 2009. The state unemployment rate dropped from just over 9% during mid-2009 to under 6% by spring 2014. Yet this remains above pre-recession levels.
- Construction of a $10 million new nonresidential building has the following economic impacts which are summarized in Table E1:
    - Every $1 spent directly on this type of construction project produces an overall economic impact of approximately $1.94. So a $10 million investment translates into $19.4 million in total economic impact.
    - Every $1 million spent directly on this type of construction project generates nearly 14 jobs throughout the economy. So a $10 million investment translates into 139 jobs, including 68 jobs in the Construction sector and an additional 71 jobs elsewhere in the economy.
    - Every $1 million spent directly on this type of construction project generates about $82 thousand in state and local tax revenues. A $10 million investment leads to $825 thousand in tax revenue.
    - The Total Value Added above and beyond purchased inputs from the project is $9.5 million, with 79% of that coming in the form of Labor Income.

- Construction work on a $1 million remodeling project for a nonresidential building has the following economic impacts which are summarized in Table E1:
    - Every $1 spent directly on this type of construction project produces an overall economic impact of approximately $1.96. Hence a $1 million investment translates into $1.96 million in total economic impact.
    - The $1 million spent directly on this type of construction project generates just under 15 jobs throughout the economy, including just over 7 jobs in the Construction sector and about the same number of jobs elsewhere in the economy.
    - The $1 million spent directly on this type of construction project generates nearly $87 thousand in state and local tax revenues.
    - The Total Value Added above and beyond purchased inputs from the project is $1 million, with approximately 79% of that coming in the form of Labor Income.

- Construction work on a $3 million water treatment facility construction project has the following economic impacts which are summarized in Table E1:
    - Every $1 spent directly on this type of construction project produces an overall economic impact of approximately $1.96. Hence a $3 million investment translates into $5.88 million in total economic impact.
    - The $3 million spent directly on this type of construction project generates just under 42 jobs throughout the economy, including slightly fewer than 20 jobs in the Construction sector and about 22 jobs elsewhere in the economy.
    - The $3 million spent directly on this type of construction project generates just over $245 thousand in state and local tax revenues.
    - The Total Value Added above and beyond purchased inputs from the project is $2.98 million, with again approximately 79% of that coming in the form of Labor Income.

Table E1: Total Economic Impact of Hypothetical Construction Projects

	Case Study 1: $10 Million New Building Project			**Case Study 2: $1 Million Remodeling Project**			**Case Study 3: $3 Million Water Treatment Project**		
Industry	**Total Economic Impact**	**Total Job Increase**	**Total Tax Revenue Generated**	**Total Economic Impact**	**Total Job Increase**	**Total Tax Revenue Generated**	**Total Economic Impact**	**Total Job Increase**	**Total Tax Revenue Generated**
Construction Sector	$10.2 million	68.1	x	$1.0 million	7.4	x	$3.1 million	19.7	x
All Other Sectors	$9.4 million	70.9	x	$0.94 million	7.4	x	$2.8 million	22.2	x
Total[a]	**$19.4 million**	**139.0**	**$824.7 thousand**	**$1.96 million**	**14.8**	**$86.9 thousand**	**$5.9 million**	**41.9**	**$245.2 thousand**

[a]The column summation may not equal total due to rounding errors.

Clearly Construction is an important sector in the state in terms of its contribution to state output and jobs, and it can provide much needed stimulus to the Wisconsin economy in light of the modest pace of economic expansion. This is true for various types of potential construction

projects. Three distinct case studies were developed in this report, focusing on three unique subsectors of the construction sector. The impacts were found to be similar across all projects with each $1 million in spending leading to between $940 thousand and $960 thousand in additional spending in the economy. Other types of construction activity that would be found in these subsectors outlined in Table D1 would be expected to have similar impacts. Not surprisingly, the employment effects are also similar but there are some minor differences due to the varied nature of these subsectors. For example, the new construction projects (Case studies 1 and 3) create slightly few jobs (approximately 14 jobs) per $1 million spent whereas the remodeling project creates nearly 15 jobs per $1 million spent. The difference is due primarily to the increased share of construction jobs that are immediately generated from the remodeling project compared to the other cases of new construction. The induced job effects are nearly identical per $1 million spent.

These hypothetical case studies provide insights into the overall scale of impacts that projects of this nature would generate. Furthermore, within reason, these results are scalable. That is, one could examine a project that has twice the spending level of the case study, and as long as the project is within the same construction subsector, the impact on the state economy would be found to be twice as large.

There is one very important caveat. The economic model that is used to generate these impacts assumes that there exist no capacity constraints that would prevent the economy from expanding by the full impact. During periods in which there is significant slack in the economy such as 2009, it is unlikely that even much larger projects would generate bottlenecks that would prevent the full scalable impact from being realized. However, we caution that as the state economic recovery continues, there is an increased likelihood that bottlenecks will emerge and these will dampen the expansionary impacts of very large projects.

II. Introduction

The Construction sector, like Manufacturing, has consistently been an important component of most modern economic systems. This is true at both national and regional levels, and it is certainly true in Wisconsin. Construction has long been a source of well-paying, family supporting jobs, and has offered an alternative career path for those less interested in pursuing academic higher education. The value of this type of contribution has been made painfully clear over the past six years, which have been characterized by wholesale job loss during the "Great Recession" followed by a weak recovery that has been disappointing in terms of both the number and quality of jobs created.

This report provides a formal and detailed evaluation of the economic impact of the Construction sector on the Wisconsin economy. Two broad approaches are employed: The first is historical and descriptive. The report examines annual data on the absolute and relative size of the Construction sector in Wisconsin over time in terms of Real Gross Domestic Product (RGDP), employment, and wages. This provides insight into how the industry has fit and now fits into the Wisconsin economy. This is supplemented with a review of monthly data on the U.S. and Wisconsin labor markets. The higher frequency data allows for a closer look at the state of the business cycle that has had a major impact on the broader economic landscape in recent years.

The second approach is prospective and examines inter-industry linkages. The study evaluates the specific economic impacts on income, employment output that new construction projects can have on the state economy. This provides insights into the Construction sector's potential additional contribution to the slowing building economic recovery in the Wisconsin economy.

In the course of examining these economic impacts, this report provides a decomposition of overall economic impacts into two major components: 1) the immediate economic effects in terms of the output, employment and income that are generated by the initial spending on construction projects; 2) the additional economic effects or "ripple effects" that occur as the initial spending works its way through the other sectors of the economy. It is these ripple effects that cause the cumulative economic influence of a given construction project to multiply well beyond the initial spending itself.

The analysis presented here is confined to an evaluation of the economic stimulus from the project itself. It does not attempt to measure possible broader economic benefits associated with activities that take place in any new facility, nor does it capture enhancements to productivity from improvements in public or private infrastructure. If these other sources of economic growth are important, this analysis will understate the total economic impacts.

In general, this report establishes that Construction is one of a number of mid-sized industrial sectors that make up the core of the Wisconsin economy. This is shown using several standard measures of economic activity. For example, the Construction sector directly produced $9.0 billion of Real Gross Domestic Product (RGDP) in Wisconsin in 2013. This was 3.4% of the total state real GDP for that year of $264.1 billion. Construction was also a mid-sized component

of the overall Wisconsin labor market. The sector contained 152,909 jobs in 2012[1]. Of those jobs, 63% were classified as wage and salary jobs. These were, on average, well-paying jobs; the average annual pay in 2012 of these wage and salary construction jobs was $52,773, which was 22.4% above the state average of $43,105.

These figures should be interpreted within the context of the current state of the business cycle. The most recent monthly economic indicators reveal that the national economy began to expand as of June 2009, and the labor market began to rebound several months later. In general, the economy continues to improve, albeit at a modest pace. The situation has been less favorable in the Construction sector, which has lagged in this recovery.

A generally similar pattern emerges for the Wisconsin economy. Based on employment figures the state's economy bottomed out in 2010, and has experienced modest employment growth since then. In contrast, the Construction sector has continued to decline through 2012, with reductions of 1.2% in 2011 and a drop 0.5% in 2012. Thus the Construction sector has not taken its traditional role as a prime driver in the broader economic recovery.

Moving beyond this snapshot of the existing situation, this report shows that three different types of construction projects have significant extended economic effects on the Wisconsin economy. These include:

- A $10 million new nonresidential building construction project produces Total Output Spending Effects of $19.4 million, Total Employment Effects of 139 jobs, and Total Value Added effects of $9.5 million, including $7.5 million in Labor Income.

- A $1 million remodeling project on an existing nonresidential building produces Total Output Spending Effects of $1.96 million, Total Employment Effects of 14.8 jobs, and Total Value Added effects of just under $1.0 million, including approximately $801 thousand in Labor Income.

- A $3 million water treatment construction project produces Total Output Spending Effects of $5.9 million, Total Employment Effects of 41.9 jobs, and Total Value Added effects of $2.9 million, including approximately $2.3 million in Labor Income.

[1] The employment data included in this report come from the U.S. Bureau of Economic Analysis (BEA). Alternative sources of employment data can be obtained from the U.S. Bureau of the Census, County Business Patterns (CBP), and the U.S. Bureau of Labor Statistics (BLS). The BLS are a primary source for high frequency (monthly) employment data. We employ BEA data because it is consistent with the data used in the IMPLAN software from which the three case studies are generated. The BEA does make some adjustments in its employment estimates that are not done by BLS. Since BLS employment estimates are derived from data reported to the state unemployment insurance legislation as well as federal workers covered by federal unemployment compensation programs, it excludes workers not covered by those programs. The BEA adjusts for potential under-reporting to those programs, and also makes adjustments for employees not covered by those programs. As a result, the BEA estimates of employment are somewhat higher than comparable BLS estimates. However, the general trends over time tend to be similar across the two series. For a more detailed explanation, see: http://www.bea.gov/faq/index.cfm?faq_id=104.

Using information on the income generated by these projects, this report estimates that state and local tax revenues associated with these projects would be: $824,728 for the $10 million new building project, $86,937 for the $1 million remodeling project, and $245,192 for the $3 million water treatment project.

Overall, these findings support the conclusion that the Construction sector represents an important component of the Wisconsin economy based on its share of state output and on the number of well-paying jobs that exist in the sector. In addition, construction activity also has important economic development impacts for the state.

III. Size of Construction Sector in Wisconsin

One way to evaluate the role of Construction in the Wisconsin economy is to examine the magnitude of activity in that sector, and to note its size relative to other major sectors in the state. This can be done using several conventional measures of economic activity relating to output, employment and income. Each of these is evaluated in turn.

A. Real Gross Domestic Product for Wisconsin

Real Gross Domestic Product (RGDP) is the most widely used and recognized measure of total output of a given economy. It can be calculated in several ways. For example, RGDP represents the inflation adjusted value of the final output produced by productive activities within the economy. Alternatively, it can be defined as the aggregate income earned by all factors of production in the economy.

The U.S. Bureau of Economic Analysis (BEA) regularly publishes quarterly estimates of Real Gross Domestic Product for the U.S. economy as a whole. The BEA also publishes, on an annual basis, a similar measure for each state, which is known as Real Gross Domestic Product by State.[2] Accompanying the overall totals are estimates of the breakdown of RGDP by major industrial sector.

As it applies to Wisconsin, RGDP represents the total dollar sum of all domestic output produced in the state, after subtracting the value of intermediate inputs purchased from other sectors in the state, or imported from outside the state. In effect, it is the total "value added" obtained by summing across all industries in the state economy.

In practice, however, the calculation of RGDP by state is done using a different approach.[3] Instead, BEA derives RGDP for states using a methodology that is consistent with its approach to deriving RGDP at the national level. This assumes that total output is comprised of the sum of incomes to factors of production, plus the cost of production.

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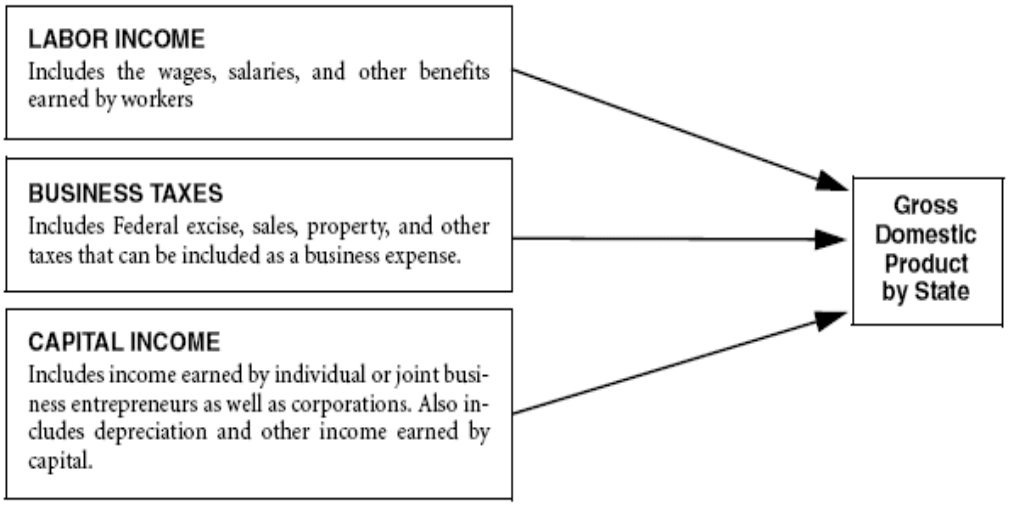
[2] BEA: GDP by State Estimation Methodology – 2006 http://www.bea.gov/regional/pdf/gsp/GDPState.pdf

[3] Actually calculating RGDP by summing value added in this fashion would be prohibitively expensive on an ongoing basis. This is because it would require extensive and repeated surveys of all state industries.

This approach is illustrated in Figure 1, which shows that RGDP comes from three broad sources: 1) worker earnings, 2) payments to capital (including interest, dividends and profits) and capital depreciation, and 3) indirect business taxes at the federal, state and local levels. Combining these more easily calculated components leads to the most comprehensive measure of output that is available for tracking state economic activity.

Figure 1: Estimation of GDP for States

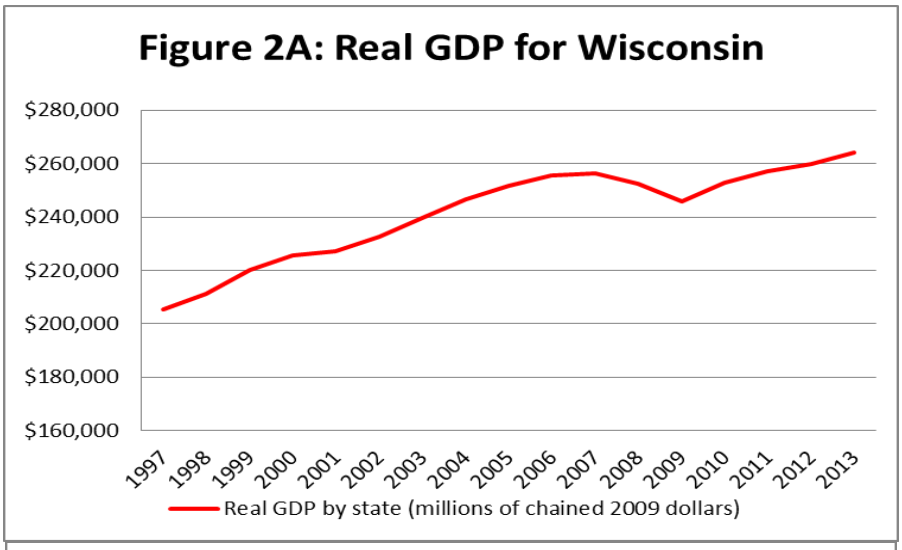


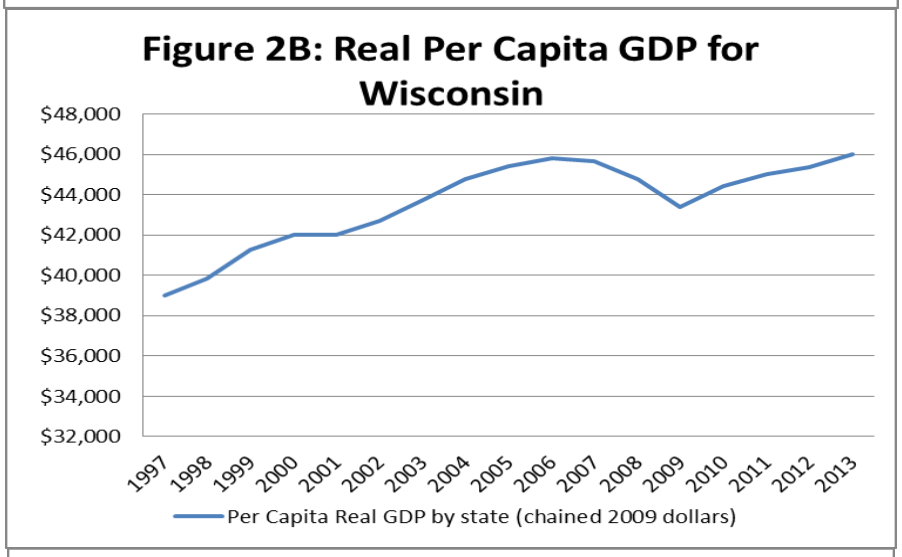
Information on recent trends in Wisconsin's total RGDP is provided in Figure 2. Figure 2A shows what has happened to Aggregate RGDP[4] and Figure 2B shows per capita RGDP,[5] both over the 1997-2013 time period. These illustrate that the Wisconsin economy has generally grown over time, although somewhat unevenly as a consequence of the effects of business cycles. Total RGDP (expressed in 2009 dollars) grew from $205.4 billion in 1997 to $264.1 billion in 2013, for an overall growth rate of 28.6%, or 1.4% per year on an annualized basis. Over the same period, per capita RGDP (also expressed in 2009 dollars) grew from $39,011 in 1997 to $45,993 in 2013. This is an expansion of nearly 18.0% over the 16 year period, or an annualized growth rate of 0.8%.

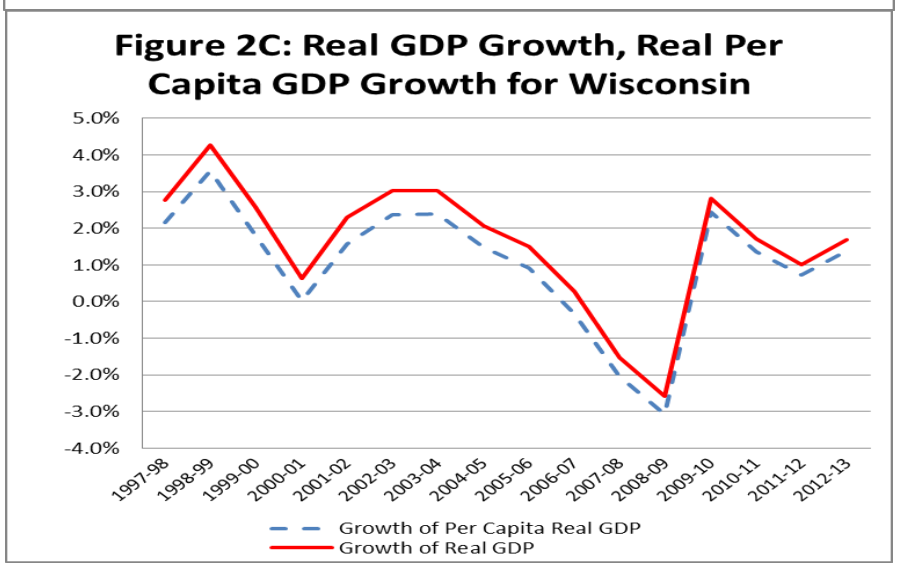
The very notable exception to this story of continuous growth was 2008-09, when both total and per capita RGDP declined notably. From its peak in 2007 of $256.3 billion RGDP fell to $245.9 billion by 2009, a decline of 4.1%. Per capita RGDP peaked in 2006 at $45,830, and by 2009 had declined 5.4% to $43,374. From the trough in 2009 to 2013, overall RGDP rebounded 7.4% to $264.1 billion and per capita RGDP rose 6.0%. It took until 2011 for RGDP to surpass its previous peak in 2007 and until 2013 for per capita RGDP to surpass its previous peak in 2006.

[4] An annual measure of state level RGDP is available back as far as 1989. However, effective 1997, the U.S. Bureau of Economic Analysis introduced a new data series based on modified methodology, and discontinued its original series. To avoid the complications of patching these two series, only data from the new series are provided.

[5] Real Per Capita Gross Domestic Product RPGDP is calculated by dividing Real Gross Domestic Product by the statewide population. This allows for population growth over the time period. Estimates of annual population are reported in the BEA Regional Economic Information System (REIS) database state profiles, and are derived from the U.S. Bureau of the Census, midyear population estimates for each year.



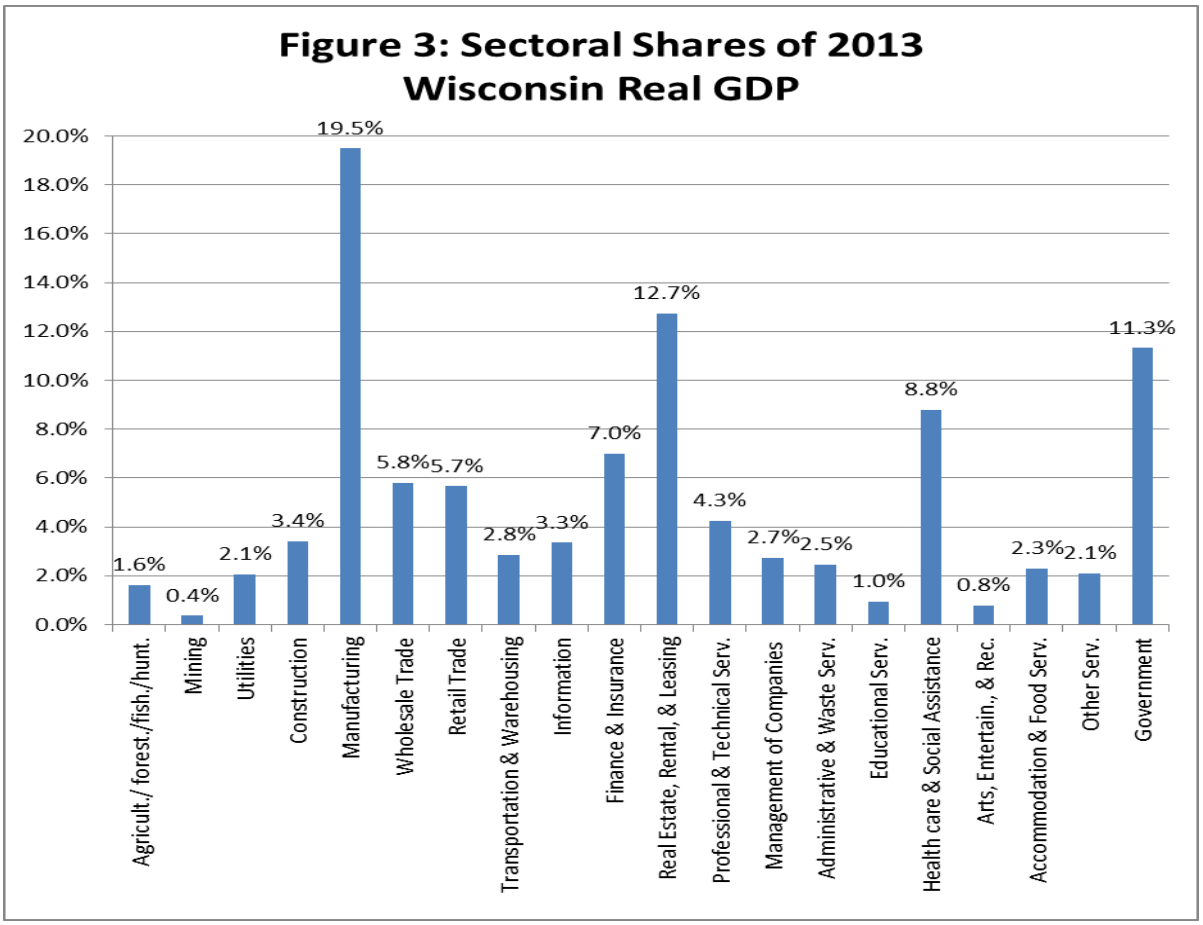




Source: U.S. Bureau of Economic Analysis

The patterns in the year-to-year growth rates for both measures are shown in Figure 2C. This shows that growth varied considerably across years, primarily due to the state of the business cycle. Total growth was a moderate 2.8% in 1998 and a robust 4.3% in 1999. The relatively short (8 month) recession in 2001 caused RGDP growth to slow nearly to a halt (just 0.6% for that year). This was followed by a moderate rebound throughout the 2000s, where growth mostly fluctuated in the 2-3% range before tapering off during the two years immediately prior to the onset of the latest recession. With the onset of the "Great Recession" total RGDP declined first 1.5% during 2008 and 2.6% during 2009. Except for a brief spurt to 2.8% in 2010, post-recession growth rates have been below 2 percent, driving home the anemic nature of the recovery.

Per capita RGDP closely followed the pattern in overall RGDP, as might be expected in a state with a relatively slowly changing population level. Annual growth rates varied from as high as 3.6% during 1999 to a low of essentially zero percent during the 2001 recession. During the recovery years of the 2000s per capita Real GDP grew between 1.5% and 2.4%, before tapering off prior to the recession and then tumbling 2.0% and 3.1% during the primary Great Recession years. During the post-recession period only 2010 had per capita RGDP growth over 2%.



Source: US Bureau of Economic Analysis

To augment these aggregate patterns in Wisconsin RDGP, the shares of Wisconsin RGDP produced by each major industrial sector are provided in Figure 3. The data are for 2013 and the sectors are based on the North American Industry Classification System (NAICS).[6] In Figure 3, Manufacturing stands out as the largest industrial sector in the Wisconsin economy. It accounted for 19.5% of the overall 2013 state output. This is in spite of the secular decline that has occurred in the role of manufacturing both in the State of Wisconsin and elsewhere throughout the U.S.[7]

The rest of the productive activity in the state was widely spread across the other sectors of the economy. There were only two other private industrial sectors that accounted for more than 8% of state RGDP in 2013.[8] The bulk of the other sectors had shared of greater than 2% and less than 8%. There were twelve of these. The remaining four sectors all had less than 2% each. The largest shares after Manufacturing were the Real Estate, Rental & Leasing sector,[9] and the Health Care & Social Assistance sector. The largest sector after that was Finance & Insurance which saw its relative importance decline as a consequence of the financial-sector driven recession. The Construction sector accounted for 3.4% of Wisconsin RGDP in 2013. As such, it was a mid-sized contributor to total RGDP: it ranked ninth of twenty sectors overall and was the fifth largest in the twelve sectors with shares between 2% and 8% of RGDP. Then again, Construction's share in 2013 was only a little more than half of what it had been in the late 1990s, highlighting the significant relative decline in this sector.

B. Employment in the Wisconsin Construction Sector the sector,

Total employment is the alternative measure of economic activity used in this report. The employment data used here come from BEA reports on annual wage and salary employment plus employment of the self-employed by NAICS sector.[10] These data cover the period 1998 – 2012[11].

The historical patterns in employment in Wisconsin over this time period are shown in Figure 4. Figure 4A shows the time path for total employment and Figure 4B shows employment in the Construction sector. These reveal patterns that are loosely similar to those for RGDP. Total employment as shown in Figure 4A experienced a moderate upward movement until 2000. There

[6] For information on the NAICS system see http://www.census.gov/eos/www/naics/.
[7] The Manufacturing share of RGDP was 20% or more up until 2008.
[8] The Governmental Sector contributed 11.3% of RGDP. This includes Federal (civilian and military), State and Local government activities
[9] The size of the Real Estate, Rental and Leasing sector is due to technical issues with respect to the way that owner-occupied housing is treated by the BEA's accounting system. Specifically, if an individual owns a residential property and rents it to another person, that rent shows up as an ongoing transaction that is captured in income accounting. However, with an owner occupant there is no formal transaction because the owner as renter is implicitly paying rent to him/herself as property owner. Thus, the BEA treats the transaction exactly this way; a property owner is considered a business that is renting housing to him or herself. The owner, as a business, is providing "housing services" to him/herself as renter. As a result BEA generates an imputed rent estimate to capture this economic activity. Such an imputation is necessary and appropriate if one is to be consistent in the treatment of renters and homeowners in the economy.
[10] These figures are a part of the State Personal Income data base. The employment figures used here come from BEA Table SA25.
[11] The most recent year for this employment data series is 2012. In addition, this is consistent with the base year of data used for the economic impact analysis provided later in this report.

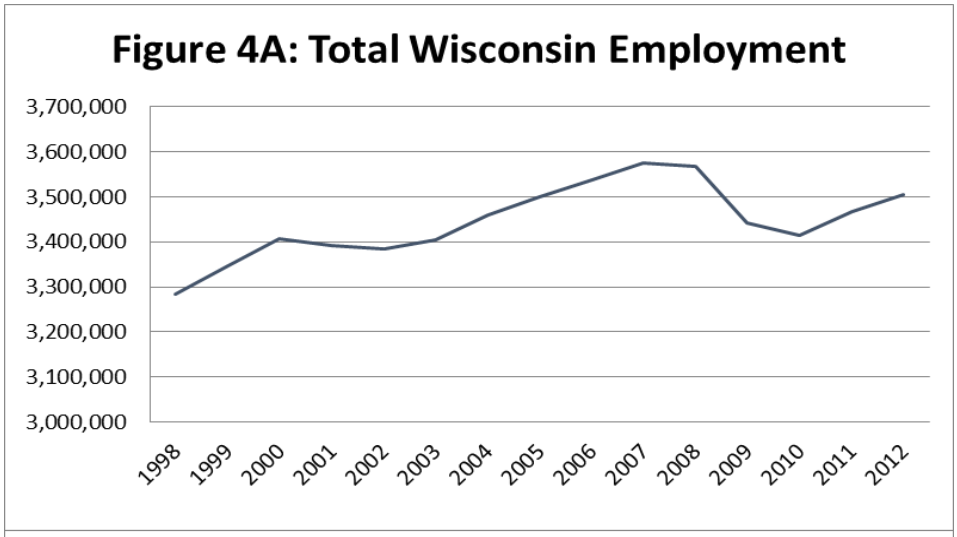
was a slight dip during 2001 and 2002 which was related to the recessionary period, followed by a very modest advance in 2003. The situation improved over the 2004-2007 timeframe, before slipping in 2008 and then dropping substantially as the economic crisis unfolded in 2009. The state employment level bottomed out in 2010 and showed solid gains during 2011-12 that paralleled those of the 2004-07 period. Nevertheless, 2012 total employment remained 2% below the peak of 2007.

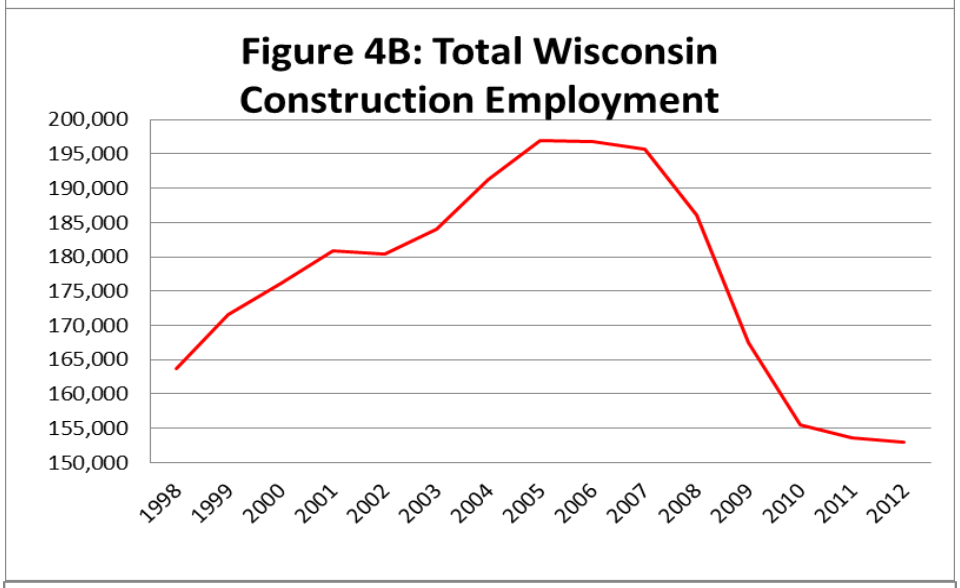
Construction employment over the 1998-2012 time period, as shown in Figure 4B, had more pronounced movements, both good and bad. With the exception of 2002, employment rose consistently from 1998 through 2005. Annualized growth rates over that period were generally above 2%, and in some years well above that rate. Only in 2002 was there slight evidence of the recession early in the decade. In fact, Construction sector employment rose 20.2% from 1998 to its peak in 2005.

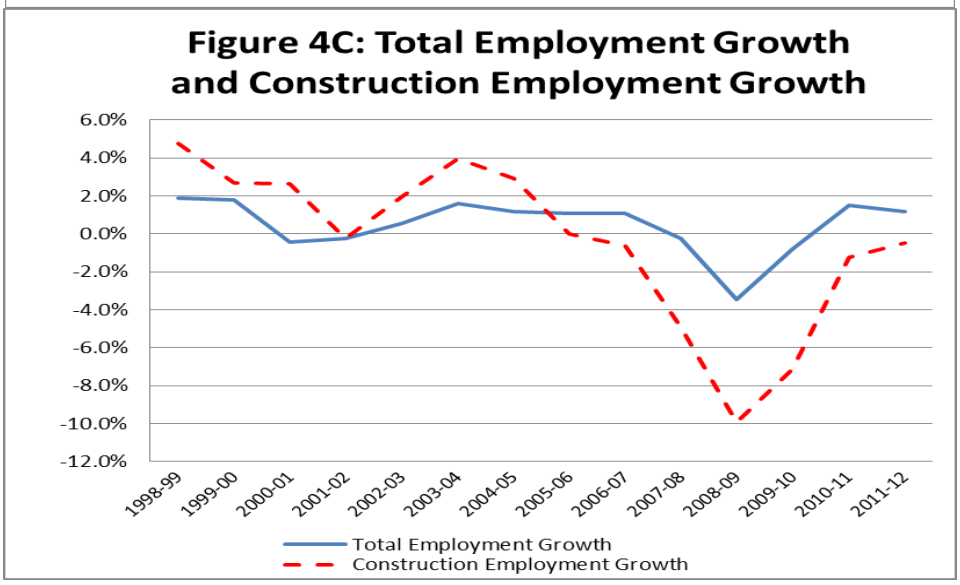
But then growth stalled during 2006-07, before plunging during the 2008-10 time period. The cumulative decline from 2007 to 2010 was 20.5%. In other words, all of the gains from 2008 until the Great Recession were more than wiped out during those three years. In addition, unlike total employment, Construction sector employment continued to decline during 2011-12.

The specific details on year-to-year employment growth rates for both measures are shown in Figure 4C. While the patterns are loosely consistent, there are notable differences. Total employment growth rates were mostly positive but always below 2%. Growth was very slightly negative during 2000-01, 2001-02, and during 2007-08. It then became substantially negative during 2008-09 and remained slightly negative the following period. Modest positive growth resumed after that.

For Construction employment, growth rates were consistently positive and greater than those for the overall economy up until 2005-06. Only once during this period did the pace fall below 2% (the slight negative during 2000-01 recession). But then Construction employment growth went modestly negative for two years before plunging during the 2008-10 period when the full brunt of the recession was realized. Construction employment fell at rates of 4.9%, 9.9%, and 7.2% during those years. Overall, the patterns shown by Figure 4C illustrate how Construction can be a strong engine of employment growth in Wisconsin, but at the cost of accentuating business cycle employment swings. Indeed, one reason for the sluggish overall employment growth in Wisconsin during recent years is that Construction employment remained in contraction mode.

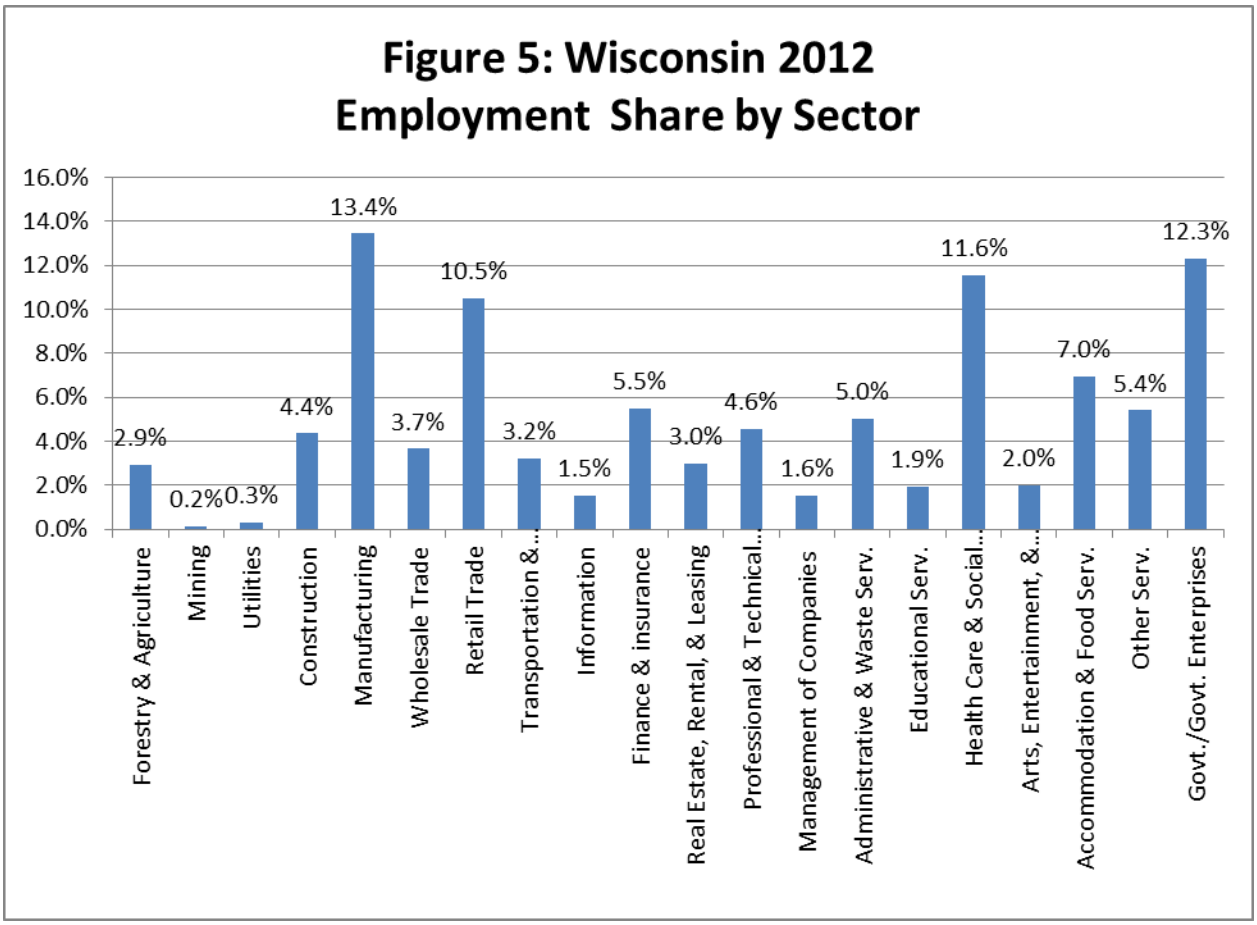






Source: U.S. Bureau of Economic Analysis

As with RGDP, it is instructive to look beyond these aggregate patterns in Wisconsin total employment and to examine its relative distribution across sectors. Given the substantial differences in annual growth rates between Construction employment and total employment, it is likely that sectoral shares vary somewhat across time. So selection of a particular year for examination can influence the results of this analysis. This is something to keep in mind, given that the 2012 base year for this discussion was a time of modest expansion for the state as a whole but Construction remained in contraction mode. So the 2012 share should provide a fairly conservative estimate of the relative share of Construction employment in Wisconsin.



Source: U.S. Bureau of Economic Analysis

Figure 5 shows the share of 2012 Wisconsin total employment generated by each major sector. This shows that Manufacturing is the industrial sector with the largest employment share in the Wisconsin economy. Manufacturing accounted for 13.4% of the overall 2012 state employment. Next in line was the Government sector at 12.3%. Focusing on the private sector, Health Care (11.6%) and Retail Trade (10.5%) are the largest employers after Manufacturing, and the only other sectors with shares in excess of 10%. Construction (4.4%), falls right in the middle of a

group of six sectors with employment shares between 4% and 7%.[12] The ten other sectors each make up less than 4% of total Wisconsin employmemt during 2012. Only three of those surpass a 2% share.

C. Wages and Salaries in the Construction Sector

Employment totals and the share distributions are very informative regarding the economic impact of various industries. But employment totals alone do not provide the complete picture. This is because the different skill levels required for the different jobs types in the different sectors result in different average compensation levels.

The Construction sector does reasonably well on this front, because construction jobs tend to be relatively high skilled and high paying. Figure 6 provides an overview of the wage profile. It shows average wage and salary income in Wisconsin for the year 2012 by major NAICS sector.[13] Several interesting insights are evident.

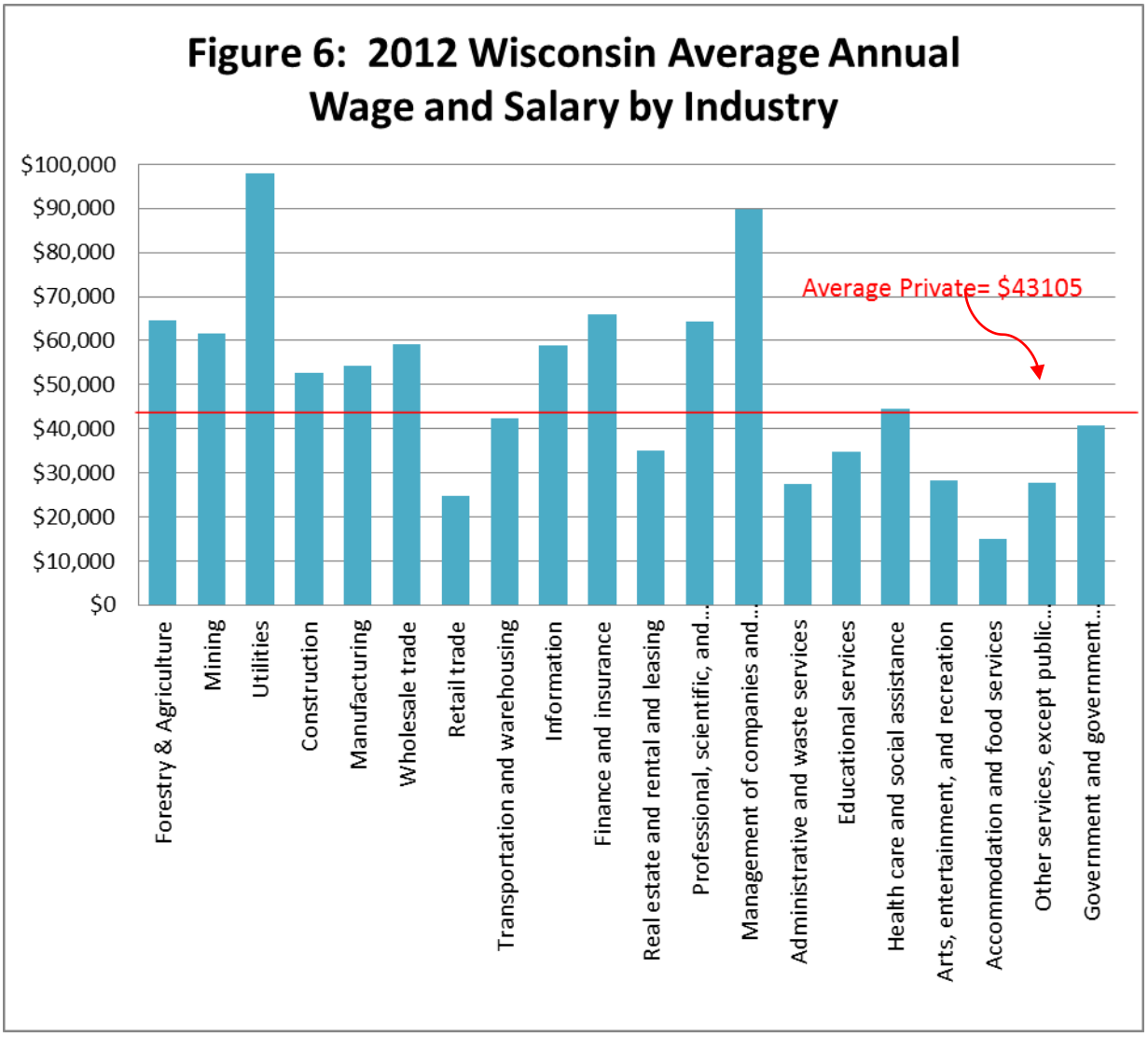
The first thing that stands out is that the Utilities and the Management sectors towered above all others in terms of average annual compensation. They had average wage and salary income of $97,978, and $89,815, respectively. No other sector exceeded $70,000, much less $80,000. Both of the two top sectors more than doubled the average private industry wage and salary income of $43,105. However, as shown previously in Figure 3, these sectors only contributed about 2.1% and 2.7%, respectively, to the state's output. Further, as shown previously in Figure 5, Utilities and Management combined contributed less than 2.0% to total employment. So overall, this high pay was concentrated in the hands of a relatively small group of Wisconsin workers.

After these sectors, the average annual wages were spread widely across the income spectrum. There were eight sectors with compensation in a range from about $65,000 to a bit above $50,000. Construction and Manufacturing, with average compensation of $52,773 and $54,245, respectively, provided the lower bound for this group. Indeed, the similarity in average annual wage structure between Construction and Manufacturing is striking. Both pay high relative wages, but certainly not the highest.

As a group, these eight sectors pay above average annual wages. Elsewhere, Health Care, pays about average while Government and Transportation & Warehousing pay slightly below average wages. The remaining seven sectors pay well below average annual compensation, ranging from a high of $35,025 in Real Estate to a low of $14,859 in Accommodations & Food Services.

[12] Interestingly, the employment shares of the Construction sector are more stable than the share of RGDP. The Construction share of employment in 2012 was 4.4%, which was the lowest figure for the years covered in this report. The average construction employment share over the 1998-2012 period was 5.1%. It fell below 5% in 2009 and has remained there. The peak was 5.6% in both 2005 and 2006.

[13] The average wage and salary income is derived by dividing the Bureau of Economic Analysis total for wage and salary disbursements (Table SA07) by wage and salary employment (Table SA27). This calculation omits self-employed workers, but increases the likelihood that the jobs in the sample are full-time.



Source: US Bureau of Economic Analysis

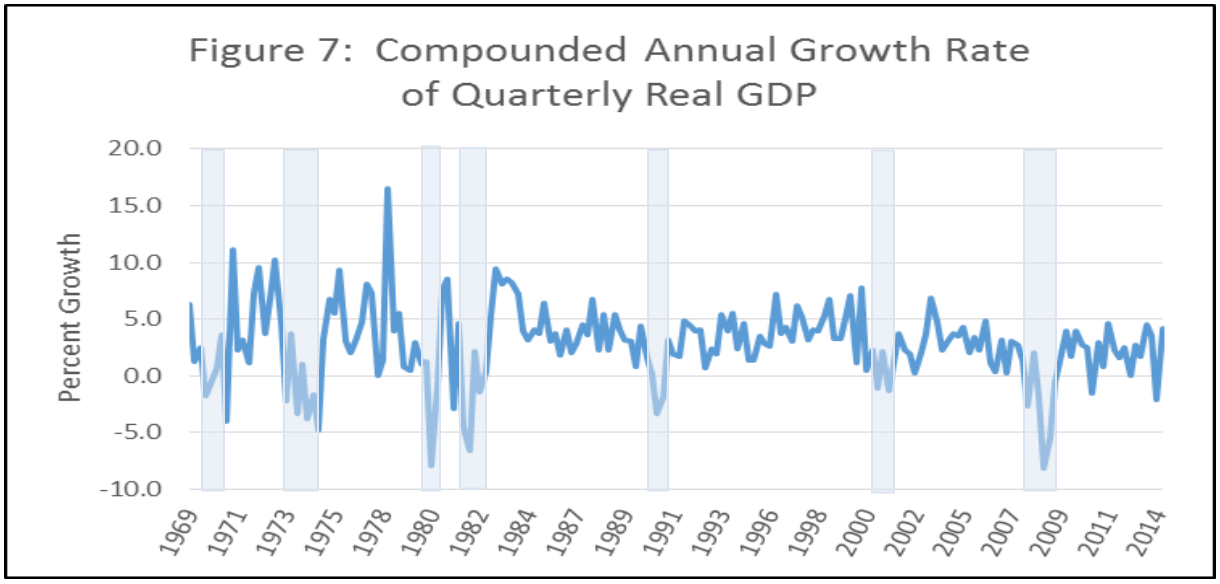
IV. Recent Business Cycle Indicators

A. The National Economy

All of the sectoral share analysis must be interpreted within the context of business cycle conditions. Most relevant was the "Great Recession" that ran from December 2007 through June of 2009. This recession was severe both in terms of its length and depth. Prior to 2007, the typical post-war recession was 10 months in length. In contrast, the 2007-09 recession lasted 18 months, making it the longest recession we have experienced in the post-war period. In addition, the subsequent recovery has been substandard by historical standards.

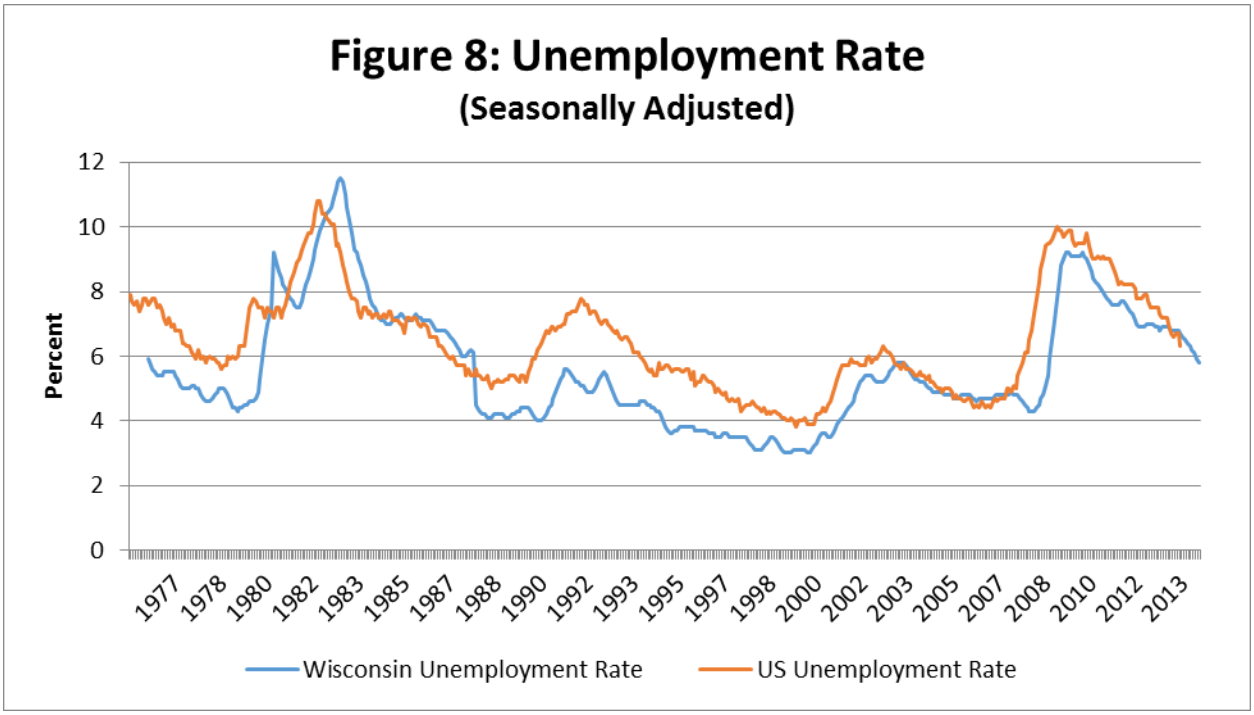
Figure 7 shows historical data on the annualized rate of change of U.S. RGDP. During the Great Recession, this measure bottomed out at -8.2% in the fourth quarter of 2008 and did not turn

positive until the third quarter of 2009. There were two quarters of relatively strong growth (3.9%) during the fourth quarter of 2009 and the second quarter of 2010. But otherwise, RGDP growth remained below 3% during the first two years of the recovery. Another brief spike (4.6%) occurred during the final quarter of 2011. But this proved to be a false hope, as growth languished once again throughout 2012. It has only been since the second half of 2013 that RGDP growth would be considered healthy by historical standards.



Source: US Dept. of Commerce – Bureau of Economic Analysis
(recessions shown as shaded areas)

The business cycle had pronounced effects on the labor market as well. Figure 8 shows historical data on the national unemployment rate. During the Great Recession, unemployment peaked at 10.0% in October of 2009. This was the worst labor market reading since the early 1980s. The national unemployment rate did not fall below 9.0% until October of 2011. It took almost another year for this measure to fall below 8.0%, and it wasn't until December 2013 that it fell below 7.0%. Even by the middle of 2014 unemployment remained above 6.0%, well above what most analysts would consider normal or acceptable. Thus, the national economy of which Wisconsin is a part was struggling during the focus periods of this report.



Source: US Bureau of Labor Statistics

B. The Wisconsin Economy

Real GDP data at the state level are only published on an annual basis, so quarterly growth rates cannot be calculated. But the annual growth rates that are available show a weak recovery similar to the national economy. Immediately after the recession there was a brief spurt of 2.8% growth during 2010. Otherwise, annual growth has remained below 2.0%.

In terms of the unemployment measure, Figure 8, shows that Wisconsin's unemployment rate stood at 4.6% in November 2007, just prior to the onset of the recession. This rate peaked at 9.2% over several months during mid-2009 and again in January of 2010, after which it began to show slight improvement.[14] Wisconsin unemployment dropped below 8.0% in November 2010 and below 7.0% as of February 2012. Progress then mostly stalled until the summer of 2013. Since then steady progress has been made, with recent readings below 6.0%. Substantial improvement has occurred, although labor market conditions have not yet returned to pre-recessionary levels.

[14] The early improvement came from a reduction in the labor force as opposed to a true improvement in labor market conditions. More recent improvements have been driven by actual job growth.

V. Inter-Sectoral Linkages of the Construction Sector

Economic systems involve complex interactions among different sectors of the economy, and tracking these interactions can be challenging. Each sector in an economy supports many other sectors through numerous interrelated channels. For example, a construction project in Wisconsin uses inputs from firms in many other industries. Some of the inputs are purchased from firms located in Wisconsin (e.g., retail firms, wholesale firms, manufacturing firms). Those supplier firms, in turn, also use inputs to create their products, and these are purchased from still other sectors, many of which are also part of the Wisconsin economy.

In addition, the incomes created in these various sectors lead to spending on a wide range of goods and services by the recipients of that income. This, in turn, generates new rounds of spending, income and employment. A true accounting of the overall economic impact of productive activity in the Construction sector requires careful consideration of this wide array of inter-sectoral relationships and subsequent spending.

There are a number of different approaches to tracking these inter-sectoral relationships. One of the most popular is Input-Output or I-O modeling, a technique first developed by Wassily Leontief, who was awarded a Nobel Prize in Economics for his work.[15] Leontief's I-O modeling was done at the national level. But economists subsequently adapted the approach for analysis at the regional and local levels.

Modern regional I-O models allow the investigator to document the inter-linkages across key sectors within a state economy. This makes it possible to show how a change in one sector translates into overall growth in state output, income and employment. In other words, it becomes possible to estimate the "ripple effects" that cause a particular sector to have a greater impact on the state economy than purely descriptive data would imply.

Ideally, a customized state-level I-O model would be constructed so that it exactly matches the unique industrial interactions within the state. This approach would require that all of the relevant industries be carefully identified, and that extensive surveys of each sector be conducted. These would be used to determine both the spending patterns between sectors in the state and the spending directed outside the state. However, few applications of I-O modeling justify the cost associated with such an endeavor.

A widely used and more cost effective alternative approach is to employ a regional I-O model that has been adapted from a fully specified national model. Two models of this type have been extensively tested and used for state and sub-state regional impact analysis. These are the Regional Input-Output Modeling System, or RIMS-II Model, and the IMPLAN Model. The former was developed by the U.S. Bureau of Economic Analysis, which continues to maintain the model.[16] The latter was originally developed by the U.S. Department of Agriculture, and is

[15] The theoretical underpinnings of an I-O model are derived from an accounting identity that states that the sum of all inputs used by all sectors in the economy must equal the sum of all outputs produced by those sectors, after taking into account imports into the region, and exports outside of the region.

[16] https://www.bea.gov/regional/rims/rimsii/

now maintained by the Minnesota IMPLAN Group.[17] Both of these commercial models are based on the BEA National Input-Output tables for the U.S., and both are customized to varying degrees to specific states or sub-state regions.

The IMPLAN model is used for this analysis. There are several reasons. First, it is a well documented and widely accepted model. Second, it has reasonable subsector detail for Construction.[18] Third, the IMPLAN model is regularly updated, whereas the RIMS II is no longer updated due to federal budget cuts. An overview of the IMPLAN model, and a summary of the underlying assumptions that form the foundation for the impact analyses are provided in the technical appendix.

In what follows three hypothetical case studies are presented. These are used to identify and quantify the stimulative effects that different types of construction projects would have on the Wisconsin economy.

These are:

- Construction of a new nonresidential building. The project cost is assumed to be $10 million.
- Construction work associated with a much smaller remodeling project for a nonresidential building. The project cost is assumed to be $1 million.
- Construction of a municipal water treatment project. The project cost is assumed to be $3 million.

Each of these projects focuses primarily on a different construction subsector, and each has its own set of ripple effects on the Wisconsin economy. The focus here is on the economic impacts on output, employment and value added.

The economic effects captured by I-O analysis can be grouped and presented in several ways. Perhaps the most intuitive is to consider the initial effects associated with a project, the subsequent induced effects, and the overall total effects. The initial effects include the immediate increase in economic activity as measured by the cost of the project itself. They also include the activity that results because suppliers to the construction firms directly involved in the project must also engage in spending to generate the inputs they provide.

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[17] http://www.implan.com

[18] IMPLAN has 7 different construction sub-sectors, not just a single aggregate construction sector. They specifically defined as follows: Sector 34 – Construction of new nonresidential commercial and health care structures; Sector 35 – Construction of new nonresidential manufacturing structures; Sector 36 – Construction of other new nonresidential structures; Sector 37 – Construction of new residential permanent site single- and multi-family structures; Sector 38 – Construction of other new residential structures; Sector 39 – Maintenance and repair construction of nonresidential maintenance and repair; and Sector 40 – Maintenance and repair construction of residential structures. We employ Sector 34 for the $10 million building project; Sector 39 for the $1 million building renovation project and Sector 36 for the $3 million water treatment project. A detailed description of the specific U.S. Census sectors that are included in each IMPLAN construction sector is provided in Appendix Table D1.

The induced effects of a project include the additional spending that occurs beyond the inter-sectoral interactions just described. This is additional spending that is generated by those who receive personal income as a consequence of the project. Household income rises for construction workers and all others whose industries contribute to the overall product. This leads to additional spending in the state economy by members of those households, which, in turn, creates still more spending. The total effects of the project are determined by combining the initial and induced effects into a multiplier known as Type SAM (Social Accounting Matrix) multiplier.[19]

This three-way classification scheme made up of immediate, induced and total effects is used throughout the case studies. For each case study, the three effects are presented in aggregate and in terms of their distribution across broad 2-digit NAICS sector codes.[20]

A. Case Study #1: New Nonresidential Building Construction Project - $10 Million

The first case study considers the short run economic impacts of building a $10 million new nonresidential building (IMPLAN Sector 34). It is assumed that the budget for this project is $10 million. The subsequent economic impacts are analyzed in terms of the effects on Output, Employment and Value Added. Note that since IMPLAN Sector 34 includes 11 different types of building activity (see Appendix Table D1), the project describes impacts from a wide range new commercial buildings. It includes impacts from new buildings in the educational, public safety, health care, and amusement, social and recreation sectors, to name just a few.

1. Output Impact: Overall Economic Impact

The predicted impact of this project on output is summarized in Table 2, which shows the total dollar value of the immediate, induced and total effects, both for the overall Wisconsin economy and by industrial sector.[21] The bottom line of Table 2 reveals that the initial $10 million spending produces a cumulative total impact of $19.4 million, or about 1.94 times the initial $10 million in spending. An estimated $14 million comes from a combination of the initial construction spending and the associated inter-industry support spending. Another $5.4 million in spending comes from the induced effects, as the individuals, households, and in some cases

[19] Input-Output models have been used to derive different types of multipliers. These vary according to the type of spending that is considered as a result of the project. Type I multipliers consider only the direct and indirect components of spending, which we term initial spending in this study. Type II also take into account the additional spending that results subsequent to the initial round of spending as those who get jobs and/or increased income spend those earnings. That "induced spending" increases output and employment and generates further value added. Finally, Type SAM (Social Accounting Matrix) multipliers, extend Type II multipliers and consider transfers among institutions (e.g., tax payments, social security, etc.) and households that result from initial spending. We employ SAM multipliers with households and state and local government spending effects in this study. We do not consider spending by the military or the federal government in the SAM multipliers since it is not clear whether that spending actually takes place in Wisconsin.

[20] Note that IMPLAN model allows for impacts across 440 different industry classifications. For ease of interpretation, impacts are combined into 20 broad 2-digit NAICS industry classifications.

[21] Although the IMPLAN Input-Output model was derived using 2012 data for Wisconsin, all dollar figures are expressed in 2014 dollars.

state and local governments who receive personal income or tax revenue from the project spend it for various purposes.

The sectoral distribution of these effects provides a more complete picture of how the project affects the Wisconsin economy.[22] Examining the immediate effects, the largest impact by far ($10.1 million) is found in the Construction sector, because it is the locus of the initial $10 million outlay.

Moving beyond Construction, the positive figures throughout the immediate effect column demonstrate that at least some new output is created in all conventional sectors as the various inter-sector demands are satisfied. Then again, the distribution of this added output is far from even. After Construction, there are two sectors that stand out in terms of size of immediate effects experienced. These are Manufacturing ($1.11 million), Professional Services[23] ($864 thousand). No other sector reaches the half million dollar level, but two exceed a quarter million. These are the Finance and Insurance sector ($442 thousand) and the Wholesale Trade sector ($342 thousand). Together, these four sectors account for $2.76 million or 70% of the $3.95 million in additional immediate inter-industry effects beyond the initial $10 million spent in Construction. Much of what remains is concentrated in a group of three sectors with immediate effects ranging between $160 thousand and $200 thousand. These are: Information ($197 thousand), Real Estate, and Rental/Leasing ($178 thousand), and Transportation and Warehousing ($161 thousand).

Examining the major immediate impact sectors from a broader perspective reveals that they are prominent components of the Wisconsin economy. The combined State RGDP share of the top eight sectors (taken from Figure 3) is just under 59%. This demonstrates that a $10 million infrastructure construction project has substantial impacts on many of the more significant sectors in the state economy.

Most of these sectors share an additional attribute, they tend to pay well. Based on data provided earlier in Figure 5, it is evident that six of these top eight sectors (Construction, Manufacturing, Professional Services, Finance and Insurance, Wholesale Trade, and Information) have average wages well above the overall Wisconsin state average. So this type of construction project has significant impacts on many of the industries in the state that tend to provide higher quality family-supporting jobs.

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[22] Since we use Type SAM multipliers, IMPLAN creates an artificial sector (Owner Occupants) to account for the transactions between owner occupants of housing and the other institutions in the economy. In addition, it is worth noting that owner-occupied housing receives unique treatment as a result of the manner in which BEA treats this classification of housing. Specifically, when housing is owned by a household and rented to another household, the market transaction is reflected in the accounting of economic activity from that sector. Likewise, the income derived from the rented home is captured. However, when that same homeowner occupies the owned housing unit, there is an internal transaction that is not captured, since the homeowner is essentially renting to him/herself. Thus, the BEA has developed the concept of imputed rent to capture this economic activity and IMPLAN uses the BEA approach to separately evaluate the impacts of project spending on owner-occupants. While no labor income or employment is derived from this special sector, there is value added, derived from imputed income as well as indirect business taxes, paid primarily in the form of property taxes.

[23] The subsector within Professional – Scientific and Technical Services sector that generates the largest overall impact is the Architectural and Engineering Services sector.

Shifting to the induced effects, it is clear that the $5.4 million impact from subsequent spending is somewhat larger than the $4 million of immediate inter-industry effects (i.e., those above and beyond the initial $10 million project outlay). These effects are also spread more broadly across all industrial sectors. This is because these represent the additional spending derived from households who receive income or state and local governments who receive tax payments. This subsequent spending tends to span a very wide range of goods and services.

That said, it remains clear that a subset of sectors tends to experience the bulk of the induced effects. There are four sectors that have induced effects in excess of $450 thousand. These are: Health and Social Services ($908 thousand), the artificial Owner-Occupied Housing sector ($620 thousand), Finance and Insurance ($571 thousand), and Retail Trade ($480 thousand). Collectively, this group accounts for 48% of the total induced effects. If we consider those additional sectors with at least a quarter million dollars of impact, we can also identify Government ($381 thousand), Manufacturing ($353 thousand), Real Estate, and Rental and Leasing ($301 thousand), Accommodation and Food Service ($267 thousand) and Wholesale Trade ($251 thousand). This brings the combined group total to just over two-thirds of the overall induced effect.

According to the data in Figure 3, the top three conventional sectors in this group account for 21.5% of Wisconsin State RGDP; adding in the additional five conventional sectors brings the total to 73.1% of RGDP. Using the wage data in Figure 5, this broader group contains two conventional sectors that pay above average wages (Finance and Insurance, Manufacturing), one that pays average wages (Health and Social Services) or near average wages (Government), and one that pays below average wages (Retail Trade).[24] All in all, these data demonstrate that the induced effects of this construction project impact major industrial sectors in the state, and ones that mostly pay average wages or better.

Lastly, all of the above can be summarized by examining the distribution of the $19.4 million in total effects. The final column of Table 2 shows that all major sectors are impacted, and most are significantly affected. Only five sectors have total output effects of less than a quarter of a million dollars. On the other hand, four sectors have total output effects in excess of $1 million, and another four have effects greater that a half of a million dollars.

This sectoral distribution of the total effects generally reflects what has been described above for the immediate and induced effects. Construction, of course, shows the largest impact, mostly because of the initial $10 million expenditure itself. There is an additional $167.0 thousand in output in Construction that occurs because of inter-sector supply effects and subsequent induced effects. So the vast majority of the project's impact on Construction occurs right up front.

[24] The Owner-Occupied sector does not have wages or employment because of its nonconventional nature.

Table 2: Output Impacts - $10 Million New Building Construction Project				
NAICS - 2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	$8,212	$35,968	$44,180
21	Mining	$12,929	$2,490	$15,419
22	Utilities	$80,608	$125,078	$205,685
23	Construction	$10,049,140	$118,062	$10,167,202
31-33	Manufacturing	$1,113,032	$352,477	$1,465,509
42	Wholesale Trade	$342,210	$250,477	$592,687
44-45	Retail Trade	$54,750	$480,026	$534,777
48-49	Transportation and Warehousing	$161,025	$115,983	$277,008
51	Information	$196,486	$198,215	$394,701
52	Finance and Insurance	$442,441	$571,197	$1,013,638
53	Real Estate, and Rental and Leasing	$178,271	$301,236	$479,507
54	Professional Services - Scientific and Technical	$864,336	$177,390	$1,041,726
55	Management of Companies	$77,587	$44,974	$122,562
56	Administrative & Waste Services	$166,767	$125,296	$292,063
61	Educational Services	$1,382	$91,339	$92,721
62	Health and Social Services	$42	$907,925	$907,966
71	Arts - Entertainment and Recreation	$14,370	$63,394	$77,763
72	Accommodation and Food Service	$64,629	$267,330	$331,959
81	Other Services	$146,069	$201,921	$347,990
NA	Government	$21,362	$381,060	$402,421
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$619,814	$619,814
	Total[b]	**$13,995,647**	**$5,431,651**	**$19,427,298**

[a]Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.
[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

After Construction, the four sectors with the largest total effects are Manufacturing ($1.47 million), Professional Services ($1.04 million), Finance and Insurance ($1.01 million) and Health and Social Services ($908 thousand). Collectively, these five sectors account for just over 75% of the total impact. These sectors make up the core of the Wisconsin economy. They account for 43% of Wisconsin's 2013 State RGDP.

The clear conclusion is that this hypothetical project has pronounced impacts on sectors that are at the heart of the state economy. In addition, four of these key sectors tend to pay above average wages. In other words, the economic impact of this project is not only quantitatively significant, it is also qualitatively favorable. Given this, it is clear that a construction project of this sort would produce significant positive results for the economy of the State of Wisconsin.

2. Employment Impact: Jobs Created

Examining the employment impacts of this project provides another perspective on the contribution of the project to the state's economy. While the employment impacts might be expected to be similar to the output impacts, some differences emerge, primarily because the labor intensity of the production process varies across industrial sectors.[25]

The employment effects of this $10 million construction project are summarized in Table 3 in terms of jobs created as a consequence of the immediate, induced and total effects. Job creation is presented in terms of both sectoral and economy-wide totals. The bottom row of Table 3 shows that 139 jobs ultimately result from the project. About 67 of these come from immediate employment effects in the Construction sector. Another 25.9 jobs come from the inter-sectoral effects, as other sectors of the economy supply goods and services to Construction. The induced effects from subsequent rounds of spending yield another 45.7 jobs.

Looking beyond Construction, most of the inter-sectoral job creation effects come in Professional Services (7.6 jobs), Manufacturing (4.0 jobs), Administration & Waste Services (3 jobs) and Other Services (2.1 jobs). Collectively, these four non-Construction sectors account for nearly two-thirds of inter-sectoral employment effects (i.e., beyond the initial hiring in Construction).

In terms of compensation, most of these jobs occur in sectors where the average annual compensation is on the high side. This is true for Construction, Professional Services, and Manufacturing. Of the top sectors for job creation, Administrative & Waste Services and Other Services provide average annual compensation that is below the state average. In fact, only 9.8 of the 93.3 total immediate effect jobs are created in below average paying industries; almost all the other jobs occur in relatively higher paying sectors.

The 45.7 jobs from the induced effects are spread more widely across sectors. That said, nearly 36 percent of the induced jobs created are found in two sectors, the Health and Social Services (8.8 jobs) and Retail Trade (7.6 jobs) sectors. The former is a relatively high paying sector and the latter is a relatively low paying sector. Beyond these two, the next most important sector for induced job creation is Government (5.5 jobs), with just over half being educational jobs and the remainder being non-educational state and local jobs. Following this is the Accommodation and Food Service sector (5 jobs), and Other Services (3.4 jobs). Accommodation and Food Service, Other Service and the Government sectors tend to provide below average annual compensation.

Examining the complete picture, just under 49% of the total job creation occurs in the Construction sector, and nearly all of this is due to the initial $10 million in construction spending. Another six sectors experience total job creation of 5 jobs or more. These are Professional Services (9.1 jobs), Health and Social Services (8.8 jobs), Retail Trade (8.5 jobs),

[25] For example, the Manufacturing sector is more capital intensive and less labor intensive than most service sectors. Hence it takes relatively less labor to produce a unit of output in manufacturing than it does in the service sector. So for a given increase in sectoral demand, there is likely to be a greater employment effect in services than in manufacturing.

Accommodation and Food Service (6.2 jobs), Government (5.7 jobs), and Other Services (5.5 jobs).

With the exception of Professional Services, the remaining sectors are either at or below the average annual compensation levels. Thus, the primary non-Construction sectors that experience job growth focus on the lower end of the income distribution of workers. However, given the dominance of Construction in this list, the job count remains weighted toward the higher end of the compensation scale.

Table 3: Employment Impacts - $10 Million New Building Construction Project

NAICS - 2 digit	Industry	Immediate Effect	Induced Effect	Total Impact
11	Agriculture, Forestry, Fishing and Hunting	0.1	0.2	0.3
21	Mining	0.0	0.0	0.1
22	Utilities	0.1	0.2	0.2
23	Construction	67.4	0.7	68.1
31-33	Manufacturing	4.0	0.8	4.8
42	Wholesale Trade	1.7	1.3	3.0
44-45	Retail Trade	0.9	7.6	8.5
48-49	Transportation and Warehousing	1.2	1.0	2.2
51	Information	0.5	0.6	1.1
52	Finance and Insurance	1.9	2.3	4.2
53	Real Estate, and Rental and Leasing	0.9	1.9	2.8
54	Professional Services - Scientific and Technical	7.6	1.5	9.1
55	Management of Companies	0.4	0.2	0.6
56	Administration & Waste Services	3.0	2.0	5.0
61	Educational Services	0.0	1.4	1.4
62	Health and Social Services	0.0	8.8	8.8
71	Arts - Entertainment and Recreation	0.3	1.3	1.6
72	Accommodation and Food Service	1.2	5.0	6.2
81	Other Services	2.1	3.4	5.5
NA	Government	0.2	5.5	5.7
NA	Owner-Occupied (Non-NAICS sector)[a]	0.0	0.0	0.0
	Total[b]	**93.3**	**45.7**	**139.0**

[a]Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.

[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

3. Value Added Decomposition

A third approach to examining the effects of this construction project is to consider the Value Added that is created. Recall that Value Added reflects the additional value that is imparted by a sector as it converts inputs into a product or a service. It is comparable to what is measured by Gross Domestic Product for the state. Also recall from Figure 1 that Value Added can be calculated as the sum of Labor Income, Capital Income, and Business Taxes.

IMPLAN follows this convention. It defines Value Added as the sum of Labor Income, Other Property Type Income, and Indirect Business Taxes. Labor Income is defined to include compensation to employees and proprietor income. Other Property Type Income includes corporate income, rental income, interest income and corporate transfer payments. Indirect Business Taxes include sales taxes, excise taxes, property taxes, severance taxes, licenses, fees and other miscellaneous taxes that are not based on income.

Table 4 shows both the total Value Added associated with this $10 million project and the decomposition into the underlying components. The breakdown by industrial sector is also shown. For ease of presentation, this discussion focuses on the total impact of each component. However, the division of the total impact into the underlying immediate and induced effects is provided in Tables C1-C4 in the Appendix. An additional feature of Table 4 is that average income per job created is calculated in the final column.[26]

This hypothetical $10 million construction project generates $9.51 million in total value added. A total of $7.54 million or 79.3% comes in the form of Labor Income. Another $1.5 million or 15.7% of the total value added is Property Income. The final $474.6 thousand is attributable to Indirect Business Taxes. Each of these is discussed in turn.

Beginning with the Labor Income figures, it is both obvious and of no surprise that the dominant portion of Labor Income is generated in the Construction sector. The Construction labor income of $4.2 million is 55.3% of Total Labor Income. However, there are also substantial income impacts in several other sectors. Two sectors have Labor Income totals in excess of a half of a million dollars. These are Professional Services ($565.2 thousand), and Health and Social Services ($508.6 thousand). Five others are in the range of $200 thousand to just over $300 thousand. These include Government ($312.9 thousand),[27] Manufacturing ($307.2 thousand), Finance and Insurance ($265.2 thousand), Retail Trade ($254.6 thousand), and Wholesale Trade ($232.3 thousand).

Looking at the Labor Income from a slightly different perspective, the average annual income per job is $54,260 measured on a new income-to-new jobs basis. By sector, this figure ranged from a high of $147,697 in Utilities to a low of $18,543 in Real Estate and Rental and Leasing.

[26]This is calculated by dividing the Labor Income totals by the total number of jobs created. This calculation likely overstates the average income somewhat, because it assumes that all new income is associated with new jobs. It is possible that some of the additional labor income accrues to those already working in existing jobs. But it does provide a useful benchmark for the sake of comparison across sectors.

[27] This is primarily payments to state and local government workers.

This is generally consistent with what was shown in Figure 6.[28] More relevant, however, are the income figures for the sectors where the majority of the activity occurs.

Of the top ten Labor Income sectors, seven have average annual compensation substantially above the overall average shown in Table 4. These are: Wholesale Trade ($76,765), Manufacturing ($63,668), Finance and Insurance ($63,316), Professional Services ($62,424), Construction ($61,236), Health and Social Services ($57,859), and Government ($54,795). The other three sectors have average annual compensation substantially below the overall average. These are: Other Services ($38,245), Administration & Waste Services ($31,368), and Retail Trade ($30,125). On balance, these average annual income figures demonstrate that the construction project generates a substantial number of relatively high paying jobs, while not neglecting workers in lower paying job categories.

The Other Property Income derived from the project is an indication of the profitability of the sector, and not surprisingly, it varies somewhat across sectors. Three sectors reported Other Property Income totals in the range of a quarter million dollars; the artificial Owner-Occupied Housing sector ($397.1 thousand), Finance and Insurance ($318.2 thousand) and Real Estate, and Rental and Leasing ($247.8 thousand). The only other industry exceeding $100 thousand was Manufacturing ($139.9 thousand). Interestingly, two sectors show negative profitability, one of which is the Construction industry (i.e., -$219 thousand) which indicates the industry lost money (that is, costs exceeded revenues) in the reference year[29]. Thus, although the Construction sector generated sizeable levels of labor income, and created significant output and employment both directly and indirectly as a result of this project, the industry as a whole was not profitable in the reference year. The only other sector to show a loss in the reference year is the Other Services sector.

The final component of Value Added is Indirect Business Taxes (IBT). When examining the IBT effects, it is important to remember that this category does not include all revenues that are ultimately derived from the construction project. It includes mostly sales taxes, excise taxes, property taxes and fees. It does not include income-based taxes. So, for example, the IBT category does not include payroll tax payments or income tax payments.

The IBT component is the smallest part of Value Added, totaling $474.6 thousand, the majority of which is derived from Indirect and Induced Effects (see Appendix Tables). Most of this is concentrated in a few sectors, as there are only five that exceed $50,000. Leading the sectors that contribute most to IBT is Construction ($75.7 thousand), followed by Wholesale Trade ($70.4 thousand), and Real Estate ($69.4 thousand). The artificial Owner-Occupied Housing sector contributes $58.5 thousand to IBT, and Retail Trade generates $58.0 thousand. Collectively these five sectors account for $332.1 thousand or 70% of the IBT effects.

[28] One reason why these figures tend to exceed those of Figure 5 is that these include benefits along with wages.
[29] The latest version of IMPLAN uses 2012 U.S. Bureau of Economic Analysis data to derive the transactions matrix from which the Input-Output model is derived. These transactions are then inflated to 2014 dollars.

Table 4: Value Added Decomposition $10 Million New Building Construction Project						
NAICS-2 digit	**Industry**	**Total Labor Income**	**Total Other Property Type Income**	**Indirect Business Taxes**	**Total Value Added**	**Labor Income Generated per Job Created**
11	Agriculture, Forestry, Fishing and Hunting	$18,995	$834	-$102	$19,727	$58,264
21	Mining	$3,472	$5,999	$208	$9,679	$58,939
22	Utilities	$36,352	$69,480	$23,655	$129,487	$147,697
23	Construction	$4,169,757	-$219,002	$75,743	$4,026,499	$61,236
31-33	Manufacturing	$307,151	$139,914	$7,740	$454,805	$63,668
42	Wholesale Trade	$232,285	$78,467	$70,432	$381,184	$76,765
44-45	Retail Trade	$254,559	$70,873	$57,959	$383,391	$30,125
48-49	Transportation and Warehousing	$115,465	$27,363	$5,349	$148,177	$52,810
51	Information	$71,209	$96,188	$27,018	$194,414	$66,124
52	Finance and Insurance	$265,199	$318,165	$12,780	$596,144	$63,316
53	Real Estate, and Rental and Leasing	$51,812	$247,758	$69,435	$369,005	$18,543
54	Professional Services - Scientific and Technical	$565,237	$84,787	$12,122	$662,146	$62,424
55	Management of Companies	$63,955	$8,113	$2,115	$74,183	$109,883
56	Administration & Waste Services	$157,182	$32,312	$3,190	$192,684	$31,368
61	Educational Services	$48,657	$4,622	$1,941	$55,219	$35,293
62	Health and Social Services	$508,598	$57,988	$13,751	$580,337	$57,859
71	Arts - Entertainment and Recreation	$33,987	$3,208	$2,296	$39,490	$21,516
72	Accommodation and Food Service	$116,709	$34,439	$17,780	$168,928	$18,933
81	Other Services	$209,004	-$4,077	$14,765	$219,692	$38,245
NA	Government	$312,971	$42,505	-$2,117	$353,359	$54,795
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$397,141	$58,495	$455,636	NA
	Total[b]	**$7,542,555**	**$1,497,076**	**$474,555**	**$9,514,186**	**$54,260**

[a]Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.

[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Looking at overall total Value Added shows Construction dominating with $4.0 million. Only three other sectors generate one half million dollars or more in value added: Professional Services ($662.2 thousand), Finance and Insurance ($596.1 thousand) and Health and Social Services ($580.3 thousand). There are five other sectors with total value added above $350 thousand. These are the artificial Owner-Occupied Housing sector ($455.6 thousand), Manufacturing ($454.8 thousand), Retail Trade ($383.4 thousand), Wholesale Trade ($381.2 thousand) and Real Estate ($369 thousand).

Taken as a whole, all of the preceding analysis shows that the impacts of a $10 million project extend well beyond the construction site. A significant new construction project also helps to create output and jobs for residents throughout the state, and, as will be discussed later in this report, the economic activity that they generate in turn also creates new tax revenues.

B. Case Study #2: Building Remodeling Project: $1 Million

New construction is not the only type of project that might reasonably be expected to occur. Existing infrastructure must also be maintained to preserve its value. The second case study considers the economic impacts of a public building remodeling project of $1 million (IMPLAN Sector 39). While much smaller in magnitude, this project still has directly identifiable, tangible, short run economic effects. As with the previous case study, the focus is on the impacts on Output, Employment and Value Added. This IMPLAN sector actually covers maintenance and repair in 39 different Census industrial sectors (see Appendix Table D1). These include renovation of a range of different nonresidential buildings and structures, along with maintenance and repair of public infrastructure including sewerage and water treatment facilities, waste disposal facilities, harbor and port facilities, sewers, and water mains and related facilities to name just a few.

1. Output Impact: Overall Economic Impact

The output effects of this remodeling project are shown in Table 5. Not surprisingly, the overall impact of the more modest remodeling project is substantially smaller than that of the first case study. The bottom line of Table 5 indicates a total output effect of $1.96 million. This includes the initial $1 million, another $379.1 thousand in immediate inter-sectoral effects, and $576.2 thousand of subsequent induced effects.

The total "ripple effects" of this project are comparable to the other project in relative magnitude. They are, however, a little more weighted toward induced effects over immediate inter-sector effects. On a proportional basis, induced spending makes up a slightly greater portion of overall stimulated spending for this smaller hypothetical project.

The sectoral distribution of immediate effects also generally follows a pattern that is similar to the first case study. Construction has the largest impact, due to the dominance of the initial $1 million in spending. In this case, Construction only sees $4,466 in additional *intra*-sector effects. Following Construction, the largest immediate effects accrue to Professional Services ($77.5 thousand), and Manufacturing ($74.8 thousand). Immediate impacts drop off somewhat with additional output in Retail Trade ($33.1 thousand), Finance and Insurance ($32.5 thousand),

Wholesale Trade ($26.7 thousand), and Transportation and Warehousing ($22 thousand). Notable in this list is the more prominent role of Retail Trade, which follows logically from the nature of remodeling construction compared to new construction. For the first case study, a mere 1.3% of the immediate effect beyond the initial construction spending of the project came from the Retail Trade sector. In contrast, 8.7% of the immediate inter-sectoral spending comes from the Retail Trade sector in this smaller renovation project.

Collectively, these seven sectors account for $271.0 thousand of immediate inter-sectoral effects. This is 71% of the immediate effects beyond the initial $1 million in spending. These six sectors are the source of 41.5% of 2013 Wisconsin RGDP. Of this group, five sectors (Construction, Manufacturing, Professional Services, Finance and Insurance, and Wholesale Trade) tend to pay average annual compensation that is well above the statewide benchmark. The other two tend to pay either near average (Transportation and Warehousing) or below average (Retail Trade) compensation.

The $576.2 thousand of induced effects from subsequent spending have a notably different sectoral distribution. The largest induced effects occur in Health and Social Services ($96.4 thousand), the artificial Owner-Occupied Housing sector ($65.8 thousand), Finance and Insurance ($60.7 thousand), Retail Trade ($51.0 thousand), Government ($40.1 thousand), and Manufacturing ($37.4 thousand). All of these sectors figure prominently in the induced effects of the previous case study as well. Notably absent from this list, however, is Construction, which experiences a very modest induced effect associated this project. This, too, is consistent with the previous case study.

This same group of six sectors also captures the bulk of the induced effects. In sum, the group accounts for $351.4 thousand or 61% of total induced effects and it accounts for a substantial share of state RGDP as well. Based on the data in Figure 3, this group is responsible for 52.3% of total 2013 RGDP. In terms of compensation, this group is spread across the compensation spectrum, but weighted more toward the higher end. There are two relatively high paying sectors (Finance and Insurance, Manufacturing), two that are at or near average paying sector (Health and Social Services, Government), and one low paying sector (Retail Trade).[30]

In terms of total effects, these results create few surprises. There are five sectors that experience total effects in excess of $90 thousand. Construction dominates the list because of the $1 million in initial spending. Manufacturing is the only other sector with total effects in excess of $100 thousand. Those with impact in the $90-$100 thousand range are Health and Social Services ($96.4 thousand), Professional Services ($96.3 thousand) and Finance and Insurance ($93.1 thousand).

All told, these five sectors account for 72.4% of the total effect from the remodeling project, and they are the source of 43% of 2013 Wisconsin RGDP. All five in the group are relatively high paying sectors. So even though the overall economic effects of this project are smaller, they are targeted toward economically meaningful sectors and to relatively high income job sectors of the Wisconsin economy.

[30] Recall once again that the Owner-Occupied sector does not have employment because of its nonconventional nature.

Table 5: Output Impacts - $1 Million Building Remodeling Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	$1,059	$3,819	$4,877
21	Mining	$15,093	$264	$15,357
22	Utilities	$7,168	$13,275	$20,443
23	Construction	$1,004,466	$12,461	$1,016,928
31-33	Manufacturing	$74,746	$37,406	$112,152
42	Wholesale Trade	$26,707	$26,586	$53,293
44-45	Retail Trade	$33,115	$50,979	$84,094
48-49	Transportation and Warehousing	$22,005	$12,309	$34,314
51	Information	$16,385	$21,030	$37,415
52	Finance and Insurance	$32,467	$60,653	$93,120
53	Real Estate, and Rental and Leasing	$20,177	$31,968	$52,145
54	Professional Services - Scientific and Technical	$77,524	$18,809	$96,333
55	Management of Companies	$4,341	$4,774	$9,115
56	Administration & Waste Services	$15,679	$13,286	$28,965
61	Educational Services	$161	$9,703	$9,864
62	Health and Social Services	$3	$96,410	$96,412
71	Arts - Entertainment and Recreation	$1,121	$6,732	$7,853
72	Accommodation and Food Service	$4,756	$28,385	$33,141
81	Other Services	$19,921	$21,436	$41,357
NA	Government	$2,219	$40,127	$42,346
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$65,830	$65,830
	Total[b]	**$1,379,113**	**$576,241**	**$1,955,354**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.

[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

2. Employment Impact: Jobs Created

The employment effects of this $1 million remodeling project are summarized in Table 6. Given the relatively small size of the project, it is not surprising that the job creation is modest. As a result, care must be taken in interpreting the individual sectoral totals, because some job growth estimates amount to less than 0.1 created job. These increments are reflected in the column totals of Table 6, but round to zero for the individual sectors. Given this, the most meaningful and reliable information is the total job growth across all sectors and the sectoral effects mentioned briefly below should be interpreted with considerable caution.

The summary figures in Table 6 show that the remodeling project ultimately generates a total of 14.8 jobs. Ten of these come from immediate effects and the remaining 4.8 are induced through subsequent rounds of spending. Of these immediate jobs, 7.3 are Construction jobs specific to the project, and the remainder come from a combination of immediate inter-sectoral demand the project generates (2.7 jobs). The primary source of immediate job creation is derived from the Professional Services (0.7 jobs) and Retail Trade (0.5 jobs) sectors. These two sectors, along with Construction, are responsible for 13.4% of state RGDP. Construction and Professional Services are relatively higher paying sectors, and Retail Trade is a lower paying sector.

The total induced effect is just under 5 jobs. The primary measureable impacts appear in Health and Social Services (0.9 jobs) and in Retail Trade (0.8 jobs). Smaller induced job creation comes from three sectors; Government, Accommodation and Food Service, and Other Services. The remaining sectors account individually for no more than 0.2 additional jobs created. In general, this induced job creation tends to be skewed toward the lower paying end of the compensation spectrum. The core job creation does occur in economically meaningful areas of the economy, however, as these five sectors account for 30.2% of 2013 Wisconsin RGDP.

Combining all of the above, the final column of Table 6 shows that a little over half of the total job creation comes in the form of the 7.4 project-based jobs in Construction. A total of 1.3 jobs emanate from the Retail Trade sector, and slightly less than one job each come from the Health and Social Services sector and the Professional Services sector. The two sectors where there is at least one job created account for 9.1% of state RGDP. One is relative high paying (Construction) and the other is relatively low paying (Retail Trade). All things considered, it is clear that the measurable reach of this more modest project into the broader Wisconsin labor market is more limited than with the first case study.

Table 6: Employment Impacts - $1 Million Building Renovation Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	0.0	0.0	0.0
21	Mining	0.0	0.0	0.0
22	Utilities	0.0	0.0	0.0
23	Construction	7.3	0.1	7.4
31-33	Manufacturing	0.2	0.1	0.3
42	Wholesale Trade	0.1	0.1	0.3
44-45	Retail Trade	0.5	0.8	1.3
48-49	Transportation and Warehousing	0.2	0.1	0.3
51	Information	0.0	0.1	0.1
52	Finance and Insurance	0.1	0.2	0.4
53	Real Estate, and Rental and Leasing	0.1	0.2	0.3
54	Professional Services - Scientific and Technical	0.7	0.2	0.8
55	Management of Companies	0.0	0.0	0.0
56	Administration & Waste Services	0.3	0.2	0.5
61	Educational Services	0.0	0.1	0.1
62	Health and Social Services	0.0	0.9	0.9
71	Arts - Entertainment and Recreation	0.0	0.1	0.2
72	Accommodation and Food Service	0.1	0.5	0.6
81	Other Services	0.2	0.4	0.6
NA	Government	0.0	0.6	0.6
NA	Owner-Occupied (Non-NAICS sector)[a]	0.0	0.0	0.0
	Total[b]	**10.0**	**4.8**	**14.8**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.

[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

3. Value Added Decomposition

Table 7 shows the total Value Added associated with this $1 million project, along with the decomposition into the underlying components. As with the previous case study, figures are provided in total and by industrial sector. For ease of presentation, only the total effects of each component are shown.[31] In addition, given the previously mentioned relatively large rounding errors associated with computing employment levels, no average annual labor income levels per job are provided for this case study.

As shown in Table 7, the $1 million spent on this remodeling project generates just over $1 million in net Value Added. A total of $801.5 thousand or 79% of the total accrues as Labor Income and another $163.5 thousand or 16.1% is Property Income. The remaining 4.9% or $49.4 thousand is attributable to Indirect Business Taxes.

More than half of the $801.5 thousand in Labor Income from this project is created in the Construction sector. The $455.2 thousand in Construction Labor Income is more than eight times the $54 thousand that is associated with the sector with the next largest impact (Health and Social Services). This is followed by the Professional Services sector ($51.9 thousand). After that, the Labor Income effects taper off fairly rapidly. Only two other sectors have effects over $30 thousand (Retail Trade and Government).

The Other Property Income derived from the project is more modest in magnitude and the sectoral effects are mostly quite small. Of the total $163.5 thousand in Other Property Income, just over $97 thousand (59.4%) is found in three sectors; the artificial Owner Occupied sector, the Finance and Insurance sector, and the Real Estate, and Rental and Leasing sector. Again, the Construction sector shows negative Other Property Type Income, reflecting the loss in the industry over the 2012 reference period on which the IMPLAN I-O model is based.

The Indirect Business Taxes component of Value Added is the smallest by far, totaling only $49.4 thousand. Needless to say, the sectoral effects are mostly minor, with no sector having as much as $10 thousand in IBT, and only five sectors in excess of $5 thousand. The largest source of IBT is the Retail Trade sector with just over $9 thousand.

Combining all the components into the $1.0 million in Total Value Added, it is clear that Construction is the primary sector, even given the absence of profitability in the sector. About 44% of the Value Added ($443 thousand) accumulates in Construction, and this is just over seven times the total of the next most significant sector, Professional Services ($62.9 thousand). After that are Health and Social Services and Retail Trade, both of which individually total in the neighborhood of $60 thousand of Value Added. These are followed by Finance and Insurance ($55.3 thousand) and the artificial Owner-Occupied Housing ($48.4 thousand). These Value Added figures confirm the earlier conclusion that the economic effects of this more modest project are much more limited than with the previous case study.

[31] This added detail is provided in Appendix Tables C5-C8.

Table 7: Value Added Decomposition for $1 Million Building Remodeling Project					
NAICS-2 digit	**Industry**	**Total Labor Income**	**Total Other Property Type Income**	**Indirect Business Taxes**	**Total Value Added**
11	Agriculture, Forestry, Fishing and Hunting	$2,117	$59	-$9	$2,167
21	Mining	$2,687	$8,462	$206	$11,356
22	Utilities	$3,608	$6,876	$2,341	$12,825
23	Construction	$455,158	-$18,014	$5,850	$442,994
31-33	Manufacturing	$20,915	$10,308	$582	$31,805
42	Wholesale Trade	$20,886	$7,056	$6,333	$34,275
44-45	Retail Trade	$40,543	$10,404	$9,118	$60,065
48-49	Transportation and Warehousing	$14,204	$3,350	$578	$18,132
51	Information	$6,963	$8,902	$2,427	$18,292
52	Finance and Insurance	$24,440	$29,649	$1,199	$55,288
53	Real Estate, and Rental and Leasing	$6,534	$25,275	$7,347	$39,157
54	Professional Services - Scientific and Technical	$51,925	$9,767	$1,257	$62,950
55	Management of Companies	$4,757	$603	$157	$5,517
56	Administration & Waste Services	$15,257	$3,428	$316	$19,001
61	Educational Services	$5,177	$490	$207	$5,873
62	Health and Social Services	$54,006	$6,157	$1,460	$61,623
71	Arts - Entertainment and Recreation	$3,436	$326	$233	$3,995
72	Accommodation and Food Service	$11,654	$3,437	$1,775	$16,866
81	Other Services	$24,235	$295	$1,993	$26,523
NA	Government	$32,945	$4,505	-$221	$37,229
NA	*Owner-Occupied (Non-NAICS sector)*[a]	$0	$42,180	$6,213	$48,393
	Total[b]	**$801,447**	**$163,517**	**$49,362**	**$1,014,326**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.
[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

C. Case Study #3: Water Treatment Construction Project: $3 Million

As rural and suburban areas in the state grow, new public works facilities are often required. In this case study, we investigate the economic impact of a new $3 million water treatment construction project (IMPLAN Sector 36). This IMPLAN sector actually covers construction of a number of nonresidential structures identified in 26 different Census industrial sectors (see Appendix Table D1). Again, we focus on the impacts of the project on Output, Employment and Value Added.

1. Output Impact: Overall Economic Impact

The output effects of this new infrastructure project are shown in Table 8. The total output from the project amounts to $5.9 million which includes $1.3 million in immediate impacts beyond the initial $3 million spending on the project and an additional $1.6 million in induced spending in subsequent rounds of spending. Not surprisingly, the overall output multiplier representing the "ripple effects" of the project, is similar in relative magnitude to the first two case studies.

When considering the immediate effect of the project, the top two sectors after Construction are Professional Services with $309.5 thousand in output followed by Manufacturing where industry output is $282.3 thousand. After that, sectoral output drops significantly, with only one other sector (Finance and Insurance) recording output derived from the project of at least $100 thousand. Still, the immediate spending is non-trivial (i.e., more than $50 thousand) in six other industry sectors, and after the initial $3 million spending, output in the top ten sectors totals $1.1 million.

The induced effects resulting from subsequent spending of employees in the various sectors is more evenly distributed across sectors than the immediate effects of the project. The strongest induced spending takes place in the Health and Social Services sector ($271.9 thousand) followed by the artificial Owner-Occupied sector ($185.8 thousand), Finance and Insurance ($171.2 thousand), and Retail Trade ($143.9 thousand). Just over $100 thousand in induced spending takes place in the Government ($113.1 thousand) and Manufacturing ($105.5 thousand) sectors. Collectively, these six sectors account for just under $1 million dollars in induced spending, or 61% of the $1.6 million in total induced output.

Although the largest total impact is obviously in the Construction sector ($3.1 million of total impact or 51.8% of the total output), the overall impact of this project is spread widely across other sectors of the state economy. Specifically, the total impact of the project generates at least a quarter million dollars in output in four other sectors. The total impact is $387.9 thousand in Manufacturing, $362.6 thousand in Professional Services, $281.3 thousand in Finance and Insurance and $271.9 thousand in Health and Social Services. These four sectors represent 22.2% of the total output generated by the project and three of the four (Manufacturing, Professional Service, Fire and Insurance) are above average in terms of average labor compensation. Still, another 22.8% of the overall impact of the project is seen in the 10 next largest sectors.

To conclude, this hypothetical $3 million project creates an overall impact of nearly $5.9 million. The impact is especially strong in sectors that compensate employees above the statewide average but it is also broadly felt across most other sectors in the state economy.

Table 8: Output Impacts - $3 Million Water Treatment Project

NAICS-2 digit	Industry	Immediate Effect	Induced Effect	Total Impact
11	Agriculture, Forestry, Fishing and Hunting	$1,978	$10,772	$12,750
21	Mining	$24,533	$744	$25,277
22	Utilities	$23,296	$37,434	$60,730
23	Construction	$3,014,928	$35,136	$3,050,065
31-33	Manufacturing	$282,332	$105,519	$387,851
42	Wholesale Trade	$84,179	$74,963	$159,142
44-45	Retail Trade	$43,813	$143,854	$187,668
48-49	Transportation and Warehousing	$58,069	$34,735	$92,804
51	Information	$53,931	$59,314	$113,245
52	Finance and Insurance	$110,177	$171,159	$281,336
53	Real Estate, and Rental and Leasing	$65,770	$90,113	$155,883
54	Professional Services - Scientific and Technical	$309,537	$53,064	$362,601
55	Management of Companies	$23,091	$13,466	$36,558
56	Administration & Waste Services	$64,617	$37,476	$102,093
61	Educational Services	$479	$27,420	$27,899
62	Health and Social Services	$11	$271,925	$271,936
71	Arts - Entertainment and Recreation	$3,554	$18,999	$22,553
72	Accommodation and Food Service	$15,389	$80,086	$95,474
81	Other Services	$70,003	$60,484	$130,488
NA	Government	$8,191	$113,117	$121,308
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$185,766	$185,766
	Total[b]	**$4,257,878**	**$1,625,548**	**$5,883,426**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.

[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

2. Employment Impact: Jobs Created

The employment effects of this $3 million water treatment project are summarized in Table 9. As with the second case study, the employment impacts are modest and in line with the size of the project. Nevertheless, the project generates nearly 42 additional jobs, with more than half created outside the Construction sector. The job effects in the other sectors must be interpreted very cautiously since employment changes may be relatively small.

Table 9 reveals that the project generates immediate job growth of just over 28 jobs, with 19.2 jobs (about 69%) created in the Construction sector. The majority of the job growth outside the Construction sector takes place in three sectors. There are 2.7 jobs generated in the Professional Services sector; 1.2 jobs are created in the Administration & Waste Services sector; and 1 job is created in Manufacturing. The remaining sectors account for just under 4 total jobs as a consequence of the immediate spending on the project.

The total induced effect from the hypothetical project creates just under 14 jobs with one or more jobs created in each of five different sectors. These five sectors account for 9.1 jobs collectively and include the Health and Social Services (2.6 jobs), Retail Trade (2.3 jobs), Government (1.6 jobs), Accommodation and Food Service (1.5 jobs) and Other Services (1 job) sectors. It is important to note that the induced job creation in three of these sectors (Retail Trade, Accommodation and Food Service and Other Services) are in areas with compensation levels that are lower than the statewide average. The remaining 4.6 jobs that are induced by subsequent rounds of spending are spread more evenly in the remaining sectors in the economy.

Combining the immediate and induced effects, the total employment effect is 41.9 jobs, with nearly half (47%) in the Construction sector, and the remaining jobs created in the other sectors of the economy. Three or more jobs are created in Professional Services and Retail Trade, followed by Health and Social Services (2.6 jobs), and between one and two jobs in jobs in each of the following six sectors (Other Services, Accommodation and Food Services, Administration & Waste Services, Government, Manufacturing, and Finance and Insurance). Collectively these six sectors account for 9.4 additional jobs. Thus, the measurable job growth resulting from this project is taking place in industrial sectors that span the range of average compensation levels, from relatively lower paying sectors (e.g., Accommodation and Food Services, Retail Trade, Other Services) to higher paying sectors (e.g., Manufacturing, Finance and Insurance, Professional Services).

Table 9: Employment Impacts - $3 Million Water Treatment Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	0.0	0.1	0.1
21	Mining	0.1	0.0	0.1
22	Utilities	0.0	0.0	0.1
23	Construction	19.5	0.2	19.7
31-33	Manufacturing	1.0	0.2	1.2
42	Wholesale Trade	0.4	0.4	0.8
44-45	Retail Trade	0.7	2.3	3.0
48-49	Transportation and Warehousing	0.4	0.3	0.7
51	Information	0.1	0.2	0.3
52	Finance and Insurance	0.5	0.7	1.2
53	Real Estate, and Rental and Leasing	0.3	0.6	0.9
54	Professional Services - Scientific and Technical	2.7	0.4	3.2
55	Management of Companies	0.1	0.1	0.2
56	Administration & Waste Services	1.2	0.6	1.8
61	Educational Services	0.0	0.4	0.4
62	Health and Social Services	0.0	2.6	2.6
71	Arts - Entertainment and Recreation	0.1	0.4	0.5
72	Accommodation and Food Service	0.3	1.5	1.8
81	Other Services	0.8	1.0	1.8
NA	Government	0.1	1.6	1.7
NA	Owner-Occupied (Non-NAICS sector)[a]	0.0	0.0	0.0
	Total[b]	**28.3**	**13.7**	**41.9**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.

[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

3. Value Added Decomposition

The project's Total Value Added along with the decomposition of the valued added into its underlying components is summarized in Table 10. Similar to the two other hypothetical projects, a more detailed description of each of the individual components of value added is found in appendices (C9-C12). For the sake of brevity, only the total effects associated with each component are presented in Table 10. Given the relatively large rounding errors associated with the computation of employment levels, no average annual labor income levels are presented for this case study.

The $3 million water treatment project creates approximately $2.9 million in net Value Added. The vast majority (approximately $2.3 million or 78.9%) is paid out as Labor Income, followed by Other Property Type Income ($467.9 thousand or 16.3%). The remainder of Value Added accrues to Indirect Business Taxes ($138.7 thousand or 4.8%).

Of the $2.3 million in Labor Income, more than half (53.3%) is paid in the Construction sector. There is $197.0 thousand paid in the Professional Services sector and $152.3 thousand paid in Health and Social Services. Seven other sectors pay out between $55 thousand and $100 thousand in Labor Income (Government, Retail Trade, Manufacturing, Other Services, Finance and Insurance, Wholesale Trade and Administration & Waste Services). Collectively, the top 10 non-Construction sectors ranked by Labor Income, account for 38.8% of the overall Labor Income resulting from the hypothetical project. The remaining 10 sectors account for just 7.9% of the total Labor Income.

The Other Property Income category shows a negative value for the Construction sector. As was true in the other case studies, this means that the Construction sector had costs that exceeded revenues for the reference period of 2012. The highest figure for this category of Value Added was for the artificial Owner-Occupied sector which totaled $119 thousand, or about a quarter of Other Property Type Income. Finance and Insurance accounted for $89 thousand (19%) within this category of Value Added, and Real Estate, Rental and Leasing accounted for $75.0 thousand or 16% of the total. The remaining sectors are all below $40 thousand but collectively, the next 10 highest sectors makeup 46% of the Other Property Income category.

The Indirect Business Taxes component of Value Added is much smaller in magnitude than the other sources of Value Added. It totals just over $138.7 thousand with the majority (nearly $95 thousand) concentrated in just five sectors (Real Estate, Retail Trade, Wholesale Trade, the artificial Owner-Occupied category, and Construction).

When considering Total Value Added, the largest share accrues to Construction as a result of the Labor Income paid in that sector. Nonetheless, there are nine other sectors with Value Added in excess of $100 thousand as a result of this project. Collectively, these nine sectors account for about 45% of the total.

Of the remaining 11 sectors, three have Value Added in excess of $50 thousand, and four more have Value Added between $20 thousand and $50 thousand. Thus, nearly all sectors contribute to the value of output derived from this hypothetical project.

Table 10: Value Added Decomposition for $3 Million Water Treatment Project					
NAICS-2 digit	**Industry**	**Total Labor Income**	**Total Other Property Type Income**	**Indirect Business Taxes**	**Total Value Added**
11	Agriculture, Forestry, Fishing and Hunting	$5,480	$274	-$36	$5,718
21	Mining	$5,028	$12,599	$346	$17,972
22	Utilities	$10,745	$20,445	$6,954	$38,144
23	Construction	$1,205,465	-$54,942	$16,349	$1,166,872
31-33	Manufacturing	$76,899	$37,887	$2,095	$116,881
42	Wholesale Trade	$62,371	$21,069	$18,912	$102,351
44-45	Retail Trade	$89,847	$24,128	$20,343	$134,318
48-49	Transportation and Warehousing	$38,498	$9,001	$1,626	$49,125
51	Information	$20,850	$27,209	$7,489	$55,549
52	Finance and Insurance	$73,843	$89,088	$3,596	$166,527
53	Real Estate, and Rental and Leasing	$20,049	$74,972	$21,543	$116,564
54	Professional Services - Scientific and Technical	$196,959	$29,881	$4,151	$230,991
55	Management of Companies	$19,076	$2,420	$631	$22,127
56	Administration & Waste Services	$55,394	$11,643	$1,072	$68,110
61	Educational Services	$14,642	$1,386	$584	$16,612
62	Health and Social Services	$152,325	$17,369	$4,118	$173,812
71	Arts - Entertainment and Recreation	$9,777	$964	$660	$11,402
72	Accommodation and Food Service	$33,573	$9,902	$5,112	$48,588
81	Other Services	$76,752	$600	$6,347	$83,698
NA	Government	$93,589	$12,991	-$689	$105,892
NA	*Owner-Occupied (Non-NAICS sector)*[a]	$0	$119,028	$17,532	$136,560
	Total[b]	**$2,261,162**	**$467,914**	**$138,737**	**$2,867,813**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.
[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

VI. State and Local Government Tax Revenues from Construction

In addition to making a significant contribution to the overall Wisconsin state economy, the Construction sector also makes a significant contribution to funding state and local governments in Wisconsin. Detailed calculation of these revenues by type of tax and level of government is a complex and substantial undertaking that is beyond the scope of the present report.

Nevertheless, it is possible to combine the results of the Value Added analysis with some outside information and plausible assumptions to produce reasonable estimates of the expected tax revenue effects of the construction projects considered in the case studies. This is because the Value Added analysis provides information on the Total Labor Income and the Total Other Property Income that are created by the projects, and it also provides Indirect Business Tax information. Details on the calculation procedures employed in this report are provided in Appendix B.

The Indirect Business Tax values figure directly into the tax revenue calculation. This is because IBT includes sales taxes, excise taxes, property taxes, severance taxes, licenses, fees and various other miscellaneous taxes that are not based on income. While the bulk of these are state and local taxes, some federal taxes are also included in the total. Once these federal taxes are removed, however, the adjusted IBT figure provides an estimate of the total value of non-income based taxes.

The relevant income-based taxes are primarily of two types: the individual income tax and the corporate income or profits tax. The relevant bases of these two taxes are contained in the Total Labor Income and Other Property Income components of Value Added. This information is extracted from the IMPLAN social accounting system, and estimated tax revenue calculations are made using a combination of information about Wisconsin tax provisions and several plausible assumptions about the relation between Federal and Wisconsin income taxes.

The corporate income tax estimate is the more straightforward. Corporate income is a component of the Other Property Income total. The underlying IMPLAN social accounting system identifies the portion of Other Property Income that is attributable to corporations. This corporate income measure can then be multiplied by an estimated effective average tax rate to determine corporate income tax revenues.

The individual income tax calculation is more complicated, and only an overview is provided here.[32] The process involves combining estimates of income from dividends, interest, rents and royalties, etc., with estimates of proprietor income and employee compensation income. The result is an estimate of total employee compensation. Several additional adjustments are made to get a figure consistent with Wisconsin Adjusted Gross Income, which is the base of the state's individual income tax. This income figure is multiplied by the 2010 Wisconsin effective average individual income tax rate to get the individual income tax revenue estimate.

[32] The detailed procedures are described in Appendix B.

Table 8 summarizes the tax revenue effects that result from these calculations. Estimates are provided for each of the case study construction projects. As might be expected, the tax revenues generated are directly linked to the size of the project.

Table 8: Wisconsin State and Local Tax Revenues Associated with Case Study Projects

Revenue Source	Case Study 1	Case Study 2	Case Study 3
	$10 Million New Building Project	$1 Million Remodeling Project	$3 Million Water Treatment Project
Individual Income Tax	$359,702	$38,378	$108,508
Corporate Income Tax	$36,266	$3,961	$11,335
Sales, Property & Other Taxes	$428,760	$44,599	$125,349
Total Tax Revenue	**$824,728**	**$86,937**	**$245,192**

The $10 million new nonresidential building construction project ultimately generates nearly $825 thousand in total tax revenues. In other words, if this project were funded by public dollars roughly 8.25% of those tax dollars would ultimately return in the form of subsequent tax revenue generated by the economic impact of the project. The single largest source of tax revenue from this construction project is the individual income tax, which produces almost 44% of the total. A slightly larger share of 52% comes from the combination of sales, property and other taxes. The corporate income tax provides only about 4% of the tax revenue.

Case Study 2 produces only a slightly different result. Here the total tax revenues generated are nearly $87 thousand, or about 8.7% of the initial $1 million outlay. So the return of public dollars spent is comparable to the other project. The relative mix of taxes is also similar. Sales and property taxes account for about 51% of the total new tax collections. The individual income tax contributes 44%, and the corporate tax revenues are a bit under 5% of the tax revenues from this project.

This broad consistency continues with Case Study 3. Total tax revenues generated of $245 thousand are about 8.2% of the initial $3 million outlay. Sales and property taxes account for about 51% of the total new tax collections, and the individual income tax contributes 44%. The remaining portion of new tax revenues come from the corporate tax.

VII. Conclusions

The national economy has been improving over the past several years. However, the pace of economic expansion has been modest. Annual RGDP growth has mostly fluctuated between 1.6% and 2.5% in recent years. So far in 2014, national economic growth has been erratic. A harsh winter restrained growth considerably during the first quarter. The more recent experience has been more encouraging, as both RGDP growth and the pace of job creation have accelerated. So the national economy appears to be finally regaining some strength.

Wisconsin's RGDP has also experienced somewhat sluggish growth since emerging from the Great Recession. Annual RGDP grow was between 1% and 2.8% over the 2010 – 2013 period. The Wisconsin state unemployment rate has gradually improved, falling from a peak of 9.1% at the beginning of 2010 to less than 6% by the middle of 2014. The pace of job growth in the state has been modest, but may be accelerating. The U.S. Bureau of Economic Analysis (BEA) indicates that about 63,370 jobs were added between the end of the recession in 2009 and 2012. More recent data released by the U.S. Bureau of Labor Statistics (BLS) suggests continued improvement in 2013 and 2014 as well.

The Great Recession hit both the national and state economies hard, and the Wisconsin Construction sector even harder. This is not surprising given the major role that the housing market played in precipitating the economic decline combined with the substantial cuts in public spending resulting from the economic slowdown. Employment in the Wisconsin Construction sector plunged during the Great Recession itself, and has continued to decline even as the recovery has slowly taken hold. The Wisconsin Construction sector lost nearly 44,000 jobs between 2006, and 2012. There are indications that this decline may be finally bottoming out. Construction job losses in 2012 were at the lowest level since 2007. In addition, more recent data from the U.S. BLS indicates the Construction sector saw positive job growth in 2013.

A growing Construction sector is important for several reasons. First, this is a significant sector in the state economy, with the output accounting for 3.4% of the overall state RGDP. Second, Construction jobs are relatively well-paying and family supporting jobs, with average wage and salary payments more than 22% above the state average. In this way, Construction is very similar to Manufacturing. Third, the interconnections between the Construction sector and other sectors of the economy create beneficial spillovers throughout the state economy. Finally, to the extent that Construction creates or improves public infrastructure, it can lead to productivity gains in the broader state economy.

In this study, we documented the magnitude of economic spillovers resulting from three hypothetical projects that were of varying dollar magnitudes and spanned three different subsectors of the broader Construction sector. They included a $10 million New Building project; a $1 million Remodeling project; and a $3 million Municipal Water Treatment construction project. The findings from each of these policy simulations suggest that, regardless of the subsector, construction spending has important implications for statewide growth of output, jobs, income, and tax revenues. For the sake of comparison, we summarized the project results in terms of the various impacts per $1 million spent in each subsector. Specifically, each $1 million in spending generated the following outcomes:

- *New Building project:* $1.94 million in total output; 13.9 jobs and $754.2 thousand in labor income; $82.5 thousand in state and local tax revenues.
- *Remodeling project:* $1.96 million in total output; 14.8 jobs and $801.5 thousand in labor income; $86.9 thousand in state and local tax revenues.
- *Water Treatment project:* $1.96 million in total output; 14 jobs and $753.7 in labor income; $81.7 thousand in state and local tax revenues.

Several points can be made regarding these findings. First, the impacts across the three different subsectors are similar when presented on a per $1 million basis. This is not surprising, and in fact is what one would expect after reviewing the inter-industry relationships embedded in the IMPLAN model. Modest differences in subsector inter-industry relationships produce modest differences in project outcomes per million dollar spent.

Second, even though the base year for the latest version IMPLAN is 2012 these findings are still a reasonable reflection of what might be expected from a project undertaken in the near future. The primary source of changes in spillover effects between one year and the next are potential bottlenecks and supply constraints. During 2012 there was considerable slack in the Wisconsin economy. Although there have been improvements in the state economy since 2012, the Wisconsin economy remains below full employment. Thus, we believe that the economic expansion suggested by these case studies would be representative of similar projects in the foreseeable future.

Third, these findings are, within reason, scalable to larger projects. Specifically, a $20 million New Building project is likely to create twice the impacts of the $10 million New Building project presented here. That is not to say that a very large project would not eventually create bottlenecks in various sectors of the economy that would diminish the various multipliers presented in this report. However, given the current state of the economy, it is doubtful that such a limit would be reached even if the initial project was two to three times the level of spending presented in the first case study.

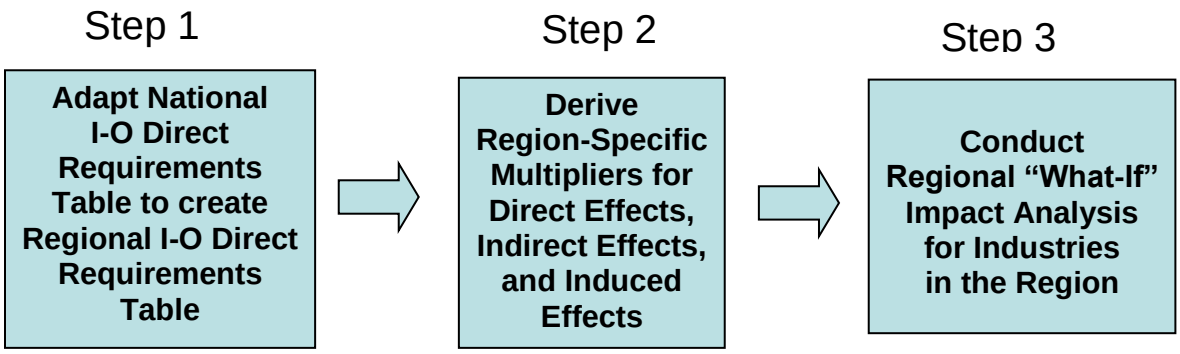
Finally, job growth continues to be a pressing need for Wisconsin, and enhancing Construction spending can fuel job growth. Construction spending creates family supporting middle-class jobs. This is true whether the construction involves publicly funded projects to municipal infrastructure or private projects related to new business location. This spending fuels the broader economy both through inter-sectoral linkages inherent in the production process and through subsequent rounds of spending by recipients of those jobs. An additional bonus is that new tax revenues are generated by the activity and these can be used to support other needed spending, or to support tax cuts, both of which can further stimulate the state economy.

VIII. Technical Appendix

A. Overview of the Regional I-O Model

The Regional I-O model is derived in a multi-step process outlined in Figure 11. Once the region is defined, the industries that operate within that region are identified, and an adjusted Direct-Requirements table is constructed from the national version of that table. This is Step 1.

Figure 11: Overview of Development of Regional Input-Output Model



This Direct-Requirements table shows how a sector makes use of commodities produced within the region, as compared to commodities that come from outside the region. For example, a sector like Construction might use domestically produced manufactured products such as manufactured steel at the national level, but for a particular region (e.g., the state of Wisconsin), the manufactured steel might be imported from another state (e.g., Pennsylvania). Thus, a regional Direct-Requirements table for Wisconsin would not have domestically produced steel, whereas the national Direct-Requirements table would. This adjustment is needed so that correct domestic (i.e., within region) impacts can be derived.

A second adaptation is needed to further regionalize the Direct Requirements table. Specifically, it must be determined whether each of the regional domestic industries is a net importer or exporter from the region. Again, using the Construction sector as an example, perhaps some windows are manufactured in Wisconsin but less than would be needed by the Construction sector. In that case, the Construction Sector purchases a fraction of their windows domestically, and a fraction of them from outside the region. On the other hand, other industries are net exporters. For example, perhaps the demand for doors can be completely satisfied by Wisconsin manufacturers. In that case, the surplus (i.e., doors produced in Wisconsin minus the doors consumed by the domestic sectors) would be exported outside the state. Thus, an accurate assessment of importing and exporting from the region is needed so as to construct an accurate Regional I-O Direct Requirements Table.

In Step 2, the underlying regional production relationships that are defined by the Regional I-O Direct Requirements table are used to mathematically derive multipliers. IMPLAN allows for several different types of multipliers. These include Type I multipliers that account for what are typically known as the Direct and Indirect effects. The Direct Effects for a construction project includes all of the initial spending associated with the project itself.

The Indirect Effects represent the spending that is created by the purchase of inputs for the project. However, Type I multipliers do not account for Induced Effects. Induced Effects result when those working in the Construction sector, and those working in the sectors that supply the Construction sector, spend their new income. This leads to another round of spending that further stimulates the state economy.

To examine those impacts, one must consider either Type II multipliers, or Type SAM (Social Accounting Matrix) multipliers. Type II multipliers add in the Induced Effects, but they ignore the inter-institutional transfers that can exist between households and the government. Examples of inter-institutional transfers include social security tax payments and income tax payments. Thus, Type SAM multipliers are typically lower than Type II multipliers, but they more accurately reflect the true inter-sectoral relationships that exist in the state economy. Type SAM multipliers for both output and employment are derived by IMPLAN.

This study uses IMPLAN type SAM multipliers adjusted to include only induced spending by households and state and local governments. These are the groups most likely to spend income locally within the state. Other groups, e.g., corporations, federal government, are more likely to spend outside the state. Thus including these latter groups in the induced effects analysis would be inappropriate.

Finally, in Step 3, various "what-if" scenarios can be investigated. This is how the three case studies outlined in this report are evaluated. The inter-industry linkages are revealed by examining the underlying components that make up the final demand multiplier. IMPLAN covers approximately 440 sectors in the economy, but for ease of presentation, these are aggregated into 20 conventional 2-digit NAICS sectors.

B. Tax Revenue Calculations

Estimating the tax revenue effects of the case study construction projects begins with the Value Added figures. This is because the Value Added analysis provides information on the Total Labor Income and the Total Other Property Income that are created by the projects, and it also provides Indirect Business Tax information.

Indirect Business Taxes include sales taxes, excise taxes, property taxes, severance taxes, licenses, fees and various other miscellaneous taxes that are not based on income. So they cover all of the important sources of state and local tax revenue besides those based on income. Most of the IBT dollars are state and local taxes. There are federal taxes, however, which must be removed. Once these federal taxes are removed, the adjusted IBT figure provides an estimate of the total value of non-income based taxes.

Removing the federal tax component is a straightforward proposition. The underlying social accounting system upon which the IMPLAN model is based provides information on the IBT that pertains to the federal government. In this case, the figure is 9.65% of IBT. This relatively modest federal share is not surprising. These are mostly excise taxes on goods such as gasoline and tires. These are dwarfed in magnitude by sales and property taxes that are associated with Wisconsin state and local government. As a result, 90.35% of the Total IBT generated by each project is estimated to be state and local tax revenue associated with non-income taxes. This includes sales taxes, property taxes, various licenses and fees, etc.

The income-based taxes that need to be estimated are the individual income tax and the corporate income or profits tax. The relevant bases of these two taxes are contained in the Total Labor Income and Other Property Income components of Value Added. The IMPLAN social accounting system provides information on relevant income flows, and these can be used to estimate revenues from the respective taxes. Doing so requires a combination of information about Wisconsin tax provisions and several plausible assumptions about the relation between Federal and Wisconsin income taxes.

The corporate income tax estimate is the more straightforward. Corporate income is a component of the Other Property Income total. The underlying IMPLAN social accounting system indicates that in-state corporate profits are 32.78% of total Other Property Income. Applying this figure provides the total corporate income associated with the each of the case studies. The rest of Other Property Income is dividends, interest, rents and royalties, etc. that go into the individual income tax calculation.

In principle, corporate income tax revenue is 7.9% of the corporate income total, because that is the flat statutory tax rate. Of course, the true situation is likely somewhat more complicated. For example, there may be some adjustments to the tax base prior to applying the tax rate. Unfortunately, no reasonably usable information could be obtained regarding income base adjustments. In addition, the effective average tax rate is generally lower than the statutory rate. Data for both 2007 and 2008 from the Wisconsin Department of Revenue (the most recent available) indicated that the effective average tax rate on corporate income tax returns was

7.39%.[33] This likely overstates the true effective rate somewhat, because it is calculated using only returns with tax liability. However, given the relatively modest role of the corporate income tax plays in state and local budgets, any overstatement is likely to have a modest impact on the overall results presented below.

This leaves the personal income tax estimate as the final component of the tax revenue calculation. This is more complicated for several reasons. First, the relevant income is found in both the Total Labor Income and Other Property Income Components of Total Value Added. Second, Total Labor Income includes Total Employee Compensation, which is made up of both wage and salary income and other labor income in the form of various benefits such as health insurance, pension plan contributions, etc. which are not taxable. Third, not all of the relevant taxable income is readily identifiable at the level of detail needed to do a precise calculation. Therefore, a reasonable approximation procedure is employed.

The first step involves splitting Total Labor Income into the Employee Compensation and Proprietor Income components. This is done using underlying IMPLAN Social Accounting information that indicates that, on average, 89.30% of Total Labor Income is Total Employee Compensation, and the rest is Proprietor Income which is a separate part of the individual income calculation. The second step involves adjusting Total Employee Compensation to remove the nontaxable Other Labor Income. The Social Accounting System shows that, on average, 74.79%, of Total Employee Compensation is Wage and Salary Compensation (including the employee share of FICA). This is the Wage and Salary Component of the income tax base.

Next, other components of the income tax base are calculated. The non-corporate component of Other Property Income includes income from dividends, interest, rents, royalties, and other relevant forms of individual income. The previously identified Proprietor Income figure represents another primary source of total individual income, which is sometimes referred to as "Schedule C" income. Combining these three sources of income gives an incomplete total income figure, but this is an estimate that includes the bulk of individual income.

A similar incomplete or partial total income figure can be estimated from Internal Revenue System data on the income reported on 2010 Federal Income Tax return by Wisconsin residents. This is the combination of Wage and Salary Income, Interest Income, Dividend Income, and Proprietor (Schedule C) Income. Relating this to Federal Adjusted Gross Income (FAGI) provides an indication of the magnitude of missing income. In this case, the figure was 80.36%. Using this figure, the incomplete total income figure described above can be converted into an estimate of the implied FAGI.

Information is available from the Wisconsin Department of Revenue on Wisconsin Adjusted Gross Income (WAGI), the corresponding measure on Wisconsin Individual Income Tax Returns.[34] The difference between FAGI and WAGI traces to different treatment of certain

[33] Wisconsin Department of Revenue, "The Wisconsin Corporate Income and Franchise Taxes," available at: http://www.revenue.wi.gov/ra/CorpIncFranchTax20100714.pdf

[34] See http://www.revenue.wi.gov/ra/10intxst.pdf. Year 2010 is used for Federal and State data because it is the most recent data available at the state level.

income items between the federal and state tax statutes. For 2010, the ratio of WAGI to FAGI is 94.18%. Using this figure, the implied FAGI figure can be converted into a WAGI figure. Finally, the 2010 effective average tax rate on WAGI of 4.48% can be applied to WAGI to determine the total individual income tax revenues. These calculations are shown in Table B1.

Table B1: Wisconsin State and Local Tax Revenues Associated with Case Study Projects

	Case Study 1	Case Study 2	Case Study 3
	$10 Million New Building Project	**$1 Million Renovation Project**	**$3 Million Water Treatment Project**
A. Aggregate Value Added Data			
Total Labor Income	$7,542,555	$801,447	$2,261,162
Total Other Property Income	$1,497,076	$163,517	$467,914
Indirect Business Taxes	$474,555	$49,362	$138,737
Total Value Added	**$9,514,186**	**$1,014,326**	**$2,867,813**
B. Non-Income Taxes			
Indirect Business Taxes	$474,555	$49,362	$138,737
State & Local Share	90.35%	90.35%	90.35%
State & Local IBT Tax Revenue	**$428,760**	**$44,599**	**$125,349**
C. Corporate Income Taxes			
Total Other Property Income	$1,497,076	$163,517	$467,914
Corporate Income Share	32.78%	32.78%	32.78%
Corporate Income	$490,742	$53,601	$153,382
Effective Corporate Tax Rate	7.39%	7.39%	7.39%
Corporate Income Tax Revenue	**$36,266**	**$3,961**	**$11,335**
D. Individual Income Taxes			
Total Labor Income	$7,542,555	$801,447	$2,261,162
Employee Compensation Share	89.30%	89.30%	89.30%
Total Employee Compensation	$6,735,502	$715,692	$2,019,218
Wage & Salary Share	74.79%	74.79%	74.79%
Wage & Salary Income	$5,037,482	$535,266	$1,510,173
Interest, Dividend, Rent Income	$1,006,334	$109,916	$314,532
Proprietor Income	$807,053	$85,755	$241,944
Partial Total Income	$6,850,870	$730,937	$2,066,649
Federal Partial Total Income to FAGI	80.36%	80.36%	$80.36
Implied Model FAGI	$8,525,223	$909,578	$2,571,738
WAGI to FAGI Ratio	94.18%	94.18%	94.18%
WAGI	$8,029,055	$856,641	$2,422,063
Effective Average Tax Rate on AGI	4.48%	4.48%	4.48%
Individual Income Tax Revenue	**$359,702**	**$38,378**	**$108,508**

C. Detailed I-O Tables

Table C1: Labor Income Impacts - $10 Million New Building Project					
	Industry	**Immediate Effect**	**Induced Effect**	**Total Impact**	**Labor Income Generated per Job Created**
11	Agriculture, Forestry, Fishing and Hunting	$3,052	$420	$3,472	$58,264
21	Mining	$14,129	$22,223	$36,352	$58,939
22	Utilities	$4,124,986	$44,771	$4,169,757	$147,697
23	Construction	$254,191	$52,961	$307,151	$61,236
31-33	Manufacturing	$134,118	$98,167	$232,285	$63,668
42	Wholesale Trade	$27,091	$227,469	$254,559	$76,765
44-45	Retail Trade	$65,587	$49,877	$115,465	$30,125
48-49	Transportation and Warehousing	$32,714	$38,494	$71,209	$52,810
51	Information	$115,793	$149,406	$265,199	$66,124
52	Finance and Insurance	$25,925	$25,887	$51,812	$63,316
53	Real Estate, and Rental and Leasing	$474,048	$91,189	$565,237	$18,543
54	Professional Services - Scientific and Technical	$40,487	$23,468	$63,955	$62,424
55	Management of Companies	$91,855	$65,328	$157,182	$109,883
56	Administration & Waste Services	$703	$47,954	$48,657	$31,368
61	Educational Services	$20	$508,578	$508,598	$35,293
62	Health and Social Services	$6,431	$27,556	$33,987	$57,859
71	Arts - Entertainment and Recreation	$22,632	$94,077	$116,709	$21,516
72	Accommodation and Food Service	$88,588	$120,417	$209,004	$18,933
81	Other Services	$12,576	$300,395	$312,971	$38,245
NA	Government	$0	$0	$0	$54,795
NA	Owner-Occupied (Non-NAICS sector)[a]	**$5,538,636**	**$2,003,919**	**$7,542,555**	NA
	Total[b]	$3,052	$420	$3,472	$54,260

[a]Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.
[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Table C2: Total Other Property Type Impacts - $10 Million New Building Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	-$529	$1,363	$834
21	Mining	$5,176	$823	$5,999
22	Utilities	$27,314	$42,165	$69,480
23	Construction	-$228,243	$9,240	-$219,002
31-33	Manufacturing	$112,453	$27,461	$139,914
42	Wholesale Trade	$45,306	$33,161	$78,467
44-45	Retail Trade	$5,771	$65,102	$70,873
48-49	Transportation and Warehousing	$15,617	$11,747	$27,363
51	Information	$49,754	$46,434	$96,188
52	Finance and Insurance	$140,649	$177,516	$318,165
53	Real Estate, and Rental and Leasing	$80,416	$167,342	$247,758
54	Professional Services - Scientific and Technical	$52,808	$31,980	$84,787
55	Management of Companies	$5,136	$2,977	$8,113
56	Administration & Waste Services	$16,794	$15,518	$32,312
61	Educational Services	$100	$4,522	$4,622
62	Health and Social Services	$12	$57,976	$57,988
71	Arts - Entertainment and Recreation	$313	$2,895	$3,208
72	Accommodation and Food Service	$6,741	$27,697	$34,439
81	Other Services	-$2,867	-$1,210	-$4,077
NA	Government	$198	$42,306	$42,505
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$397,141	$397,141
	Total[b]	**$332,918**	**$1,164,157**	**$1,497,076**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.
[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Table C3: Total Indirect Business Tax Impacts - $10 Million New Building Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	$63	-$165	-$102
21	Mining	$181	$27	$208
22	Utilities	$9,334	$14,322	$23,655
23	Construction	$74,697	$1,046	$75,743
31-33	Manufacturing	$6,207	$1,533	$7,740
42	Wholesale Trade	$40,667	$29,766	$70,432
44-45	Retail Trade	$5,942	$52,018	$57,959
48-49	Transportation and Warehousing	$2,321	$3,028	$5,349
51	Information	$15,281	$11,737	$27,018
52	Finance and Insurance	$5,186	$7,594	$12,780
53	Real Estate, and Rental and Leasing	$23,228	$46,207	$69,435
54	Professional Services - Scientific and Technical	$8,778	$3,344	$12,122
55	Management of Companies	$1,339	$776	$2,115
56	Administration & Waste Services	$1,832	$1,358	$3,190
61	Educational Services	$23	$1,917	$1,941
62	Health and Social Services	$1	$13,750	$13,751
71	Arts - Entertainment and Recreation	$382	$1,914	$2,296
72	Accommodation and Food Service	$3,482	$14,299	$17,780
81	Other Services	$7,675	$7,090	$14,765
NA	Government	-$353	-$1,764	-$2,117
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$58,495	$58,495
	Total[b]	**$206,265**	**$268,290**	**$474,555**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.
[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Table C4: Total Value Added Impacts - $10 Million New Building Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	$3,245	$16,482	$19,727
21	Mining	$8,409	$1,270	$9,679
22	Utilities	$50,777	$78,710	$129,487
23	Construction	$3,971,441	$55,058	$4,026,499
31-33	Manufacturing	$372,851	$81,954	$454,805
42	Wholesale Trade	$220,091	$161,093	$381,184
44-45	Retail Trade	$38,803	$344,588	$383,391
48-49	Transportation and Warehousing	$83,525	$64,652	$148,177
51	Information	$97,749	$96,665	$194,414
52	Finance and Insurance	$261,628	$334,516	$596,144
53	Real Estate, and Rental and Leasing	$129,569	$239,436	$369,005
54	Professional Services - Scientific and Technical	$535,634	$126,512	$662,146
55	Management of Companies	$46,961	$27,222	$74,183
56	Administration & Waste Services	$110,481	$82,203	$192,684
61	Educational Services	$826	$54,394	$55,219
62	Health and Social Services	$33	$580,304	$580,337
71	Arts - Entertainment and Recreation	$7,125	$32,365	$39,490
72	Accommodation and Food Service	$32,854	$136,073	$168,928
81	Other Services	$93,396	$126,296	$219,692
NA	Government	$12,421	$340,938	$353,359
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$455,636	$455,636
	Total[b]	**$6,077,819**	**$3,436,367**	**$9,514,186**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.
[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Table C5: Labor Income Impacts - $1 Million Building Remodeling Project				
	Industry	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	$494	$1,623	$2,117
21	Mining	$2,643	$44	$2,687
22	Utilities	$1,249	$2,359	$3,608
23	Construction	$450,435	$4,723	$455,158
31-33	Manufacturing	$15,296	$5,620	$20,915
42	Wholesale Trade	$10,467	$10,420	$20,886
44-45	Retail Trade	$16,385	$24,157	$40,543
48-49	Transportation and Warehousing	$8,911	$5,293	$14,204
51	Information	$2,878	$4,084	$6,963
52	Finance and Insurance	$8,575	$15,865	$24,440
53	Real Estate, and Rental and Leasing	$3,787	$2,747	$6,534
54	Professional Services - Scientific and Technical	$42,257	$9,668	$51,925
55	Management of Companies	$2,265	$2,491	$4,757
56	Administration & Waste Services	$8,330	$6,927	$15,257
61	Educational Services	$83	$5,094	$5,177
62	Health and Social Services	$1	$54,004	$54,006
71	Arts - Entertainment and Recreation	$510	$2,926	$3,436
72	Accommodation and Food Service	$1,664	$9,989	$11,654
81	Other Services	$11,452	$12,783	$24,235
NA	Government	$1,334	$31,611	$32,945
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$0	$0
	Total[b]	**$589,018**	**$212,429**	**$801,447**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.

[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Table C6: Total Other Property Type Impacts - $1 Million Building Remodeling Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	-$86	$145	$59
21	Mining	$8,375	$87	$8,462
22	Utilities	$2,401	$4,475	$6,876
23	Construction	-$18,997	$983	-$18,014
31-33	Manufacturing	$7,394	$2,914	$10,308
42	Wholesale Trade	$3,536	$3,520	$7,056
44-45	Retail Trade	$3,490	$6,914	$10,404
48-49	Transportation and Warehousing	$2,104	$1,247	$3,350
51	Information	$3,976	$4,926	$8,902
52	Finance and Insurance	$10,799	$18,850	$29,649
53	Real Estate, and Rental and Leasing	$7,516	$17,759	$25,275
54	Professional Services - Scientific and Technical	$6,374	$3,393	$9,767
55	Management of Companies	$287	$316	$603
56	Administration & Waste Services	$1,783	$1,645	$3,428
61	Educational Services	$10	$480	$490
62	Health and Social Services	$1	$6,156	$6,157
71	Arts - Entertainment and Recreation	$18	$307	$326
72	Accommodation and Food Service	$496	$2,941	$3,437
81	Other Services	$424	-$129	$295
NA	Government	$54	$4,451	$4,505
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$42,180	$42,180
	Total[b]	**$39,956**	**$123,561**	**$163,517**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.

[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Table C7: Total Indirect Business Tax Impacts - $1 Million Building Remodeling Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	$9	-$18	-$9
21	Mining	$203	$3	$206
22	Utilities	$821	$1,520	$2,341
23	Construction	$5,739	$111	$5,850
31-33	Manufacturing	$419	$163	$582
42	Wholesale Trade	$3,174	$3,159	$6,333
44-45	Retail Trade	$3,594	$5,524	$9,118
48-49	Transportation and Warehousing	$257	$321	$578
51	Information	$1,182	$1,245	$2,427
52	Finance and Insurance	$392	$806	$1,199
53	Real Estate, and Rental and Leasing	$2,444	$4,904	$7,347
54	Professional Services - Scientific and Technical	$903	$355	$1,257
55	Management of Companies	$75	$82	$157
56	Administration & Waste Services	$172	$144	$316
61	Educational Services	$3	$204	$207
62	Health and Social Services	$0	$1,460	$1,460
71	Arts - Entertainment and Recreation	$30	$203	$233
72	Accommodation and Food Service	$256	$1,518	$1,775
81	Other Services	$1,240	$752	$1,993
NA	Government	-$34	-$187	-$221
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$6,213	$6,213
	Total[b]	**$20,879**	**$28,483**	**$49,362**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.
[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Table C8: Total Value Added - $1 Million Building Remodeling Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	$417	$1,750	$2,167
21	Mining	$11,221	$134	$11,356
22	Utilities	$4,472	$8,354	$12,825
23	Construction	$437,177	$5,817	$442,994
31-33	Manufacturing	$23,109	$8,696	$31,805
42	Wholesale Trade	$17,176	$17,099	$34,275
44-45	Retail Trade	$23,469	$36,595	$60,065
48-49	Transportation and Warehousing	$11,272	$6,861	$18,132
51	Information	$8,036	$10,256	$18,292
52	Finance and Insurance	$19,767	$35,521	$55,288
53	Real Estate, and Rental and Leasing	$13,747	$25,410	$39,157
54	Professional Services - Scientific and Technical	$49,534	$13,416	$62,950
55	Management of Companies	$2,628	$2,890	$5,517
56	Administration & Waste Services	$10,285	$8,716	$19,001
61	Educational Services	$95	$5,778	$5,873
62	Health and Social Services	$2	$61,621	$61,623
71	Arts - Entertainment and Recreation	$558	$3,437	$3,995
72	Accommodation and Food Service	$2,417	$14,448	$16,866
81	Other Services	$13,116	$13,407	$26,523
NA	Government	$1,354	$35,875	$37,229
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$48,393	$48,393
	Total[b]	**$649,853**	**$364,473**	**$1,014,326**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.

[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Table C9: Labor Income Impacts - $3 Million Water Treatment Project				
	Industry	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	$903	$4,577	$5,480
21	Mining	$4,902	$125	$5,028
22	Utilities	$4,094	$6,651	$10,745
23	Construction	$1,192,148	$13,317	$1,205,465
31-33	Manufacturing	$61,047	$15,853	$76,899
42	Wholesale Trade	$32,991	$29,379	$62,371
44-45	Retail Trade	$21,679	$68,168	$89,847
48-49	Transportation and Warehousing	$23,562	$14,936	$38,498
51	Information	$9,330	$11,520	$20,850
52	Finance and Insurance	$29,075	$44,769	$73,843
53	Real Estate, and Rental and Leasing	$12,304	$7,745	$20,049
54	Professional Services - Scientific and Technical	$169,683	$27,275	$196,959
55	Management of Companies	$12,049	$7,027	$19,076
56	Administration & Waste Services	$35,854	$19,540	$55,394
61	Educational Services	$246	$14,396	$14,642
62	Health and Social Services	$5	$152,320	$152,325
71	Arts - Entertainment and Recreation	$1,518	$8,259	$9,777
72	Accommodation and Food Service	$5,390	$28,183	$33,573
81	Other Services	$40,680	$36,071	$76,752
NA	Government	$4,483	$89,106	$93,589
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$0	$0
	Total[b]	**$1,661,944**	**$599,218**	**$2,261,162**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.

[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Table C10: Total Other Property Type Impacts - $3 Million Water Treatment Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	-$134	$409	$274
21	Mining	$12,353	$246	$12,599
22	Utilities	$7,825	$12,620	$20,445
23	Construction	-$57,716	$2,774	-$54,942
31-33	Manufacturing	$29,667	$8,220	$37,887
42	Wholesale Trade	$11,145	$9,924	$21,069
44-45	Retail Trade	$4,618	$19,510	$24,128
48-49	Transportation and Warehousing	$5,483	$3,518	$9,001
51	Information	$13,317	$13,892	$27,209
52	Finance and Insurance	$35,892	$53,195	$89,088
53	Real Estate, and Rental and Leasing	$24,914	$50,059	$74,972
54	Professional Services - Scientific and Technical	$20,309	$9,572	$29,881
55	Management of Companies	$1,529	$891	$2,420
56	Administration & Waste Services	$7,003	$4,641	$11,643
61	Educational Services	$28	$1,357	$1,386
62	Health and Social Services	$3	$17,365	$17,369
71	Arts - Entertainment and Recreation	$97	$867	$964
72	Accommodation and Food Service	$1,605	$8,297	$9,902
81	Other Services	$964	-$364	$600
NA	Government	$446	$12,545	$12,991
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$119,028	$119,028
	Total[b]	**$119,347**	**$348,567**	**$467,914**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.
[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Table C11: Total Indirect Business Tax Impacts - $3 Million Water Treatment Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	$14	-$50	-$36
21	Mining	$338	$8	$346
22	Utilities	$2,668	$4,286	$6,954
23	Construction	$16,037	$312	$16,349
31-33	Manufacturing	$1,636	$459	$2,095
42	Wholesale Trade	$10,003	$8,908	$18,912
44-45	Retail Trade	$4,755	$15,589	$20,343
48-49	Transportation and Warehousing	$718	$907	$1,626
51	Information	$3,978	$3,511	$7,489
52	Finance and Insurance	$1,320	$2,276	$3,596
53	Real Estate, and Rental and Leasing	$7,721	$13,822	$21,543
54	Professional Services - Scientific and Technical	$3,150	$1,000	$4,151
55	Management of Companies	$398	$232	$631
56	Administration & Waste Services	$666	$406	$1,072
61	Educational Services	$9	$576	$584
62	Health and Social Services	$0	$4,118	$4,118
71	Arts - Entertainment and Recreation	$87	$574	$660
72	Accommodation and Food Service	$829	$4,284	$5,112
81	Other Services	$4,224	$2,123	$6,347
NA	Government	-$161	-$528	-$689
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$17,532	$17,532
	Total[b]	**$58,392**	**$80,345**	**$138,737**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.
[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Table C12: Total Value Added Impacts - $3 Million Water Treatment Project				
NAICS-2 digit	**Industry**	**Immediate Effect**	**Induced Effect**	**Total Impact**
11	Agriculture, Forestry, Fishing and Hunting	$782	$4,936	$5,718
21	Mining	$17,593	$379	$17,972
22	Utilities	$14,587	$23,557	$38,144
23	Construction	$1,150,469	$16,403	$1,166,872
31-33	Manufacturing	$92,350	$24,531	$116,881
42	Wholesale Trade	$54,140	$48,212	$102,351
44-45	Retail Trade	$31,052	$103,266	$134,318
48-49	Transportation and Warehousing	$29,764	$19,361	$49,125
51	Information	$26,625	$28,924	$55,549
52	Finance and Insurance	$66,287	$100,240	$166,527
53	Real Estate, and Rental and Leasing	$44,939	$71,626	$116,564
54	Professional Services - Scientific and Technical	$193,143	$37,848	$230,991
55	Management of Companies	$13,976	$8,151	$22,127
56	Administration & Waste Services	$43,523	$24,587	$68,110
61	Educational Services	$283	$16,329	$16,612
62	Health and Social Services	$9	$173,803	$173,812
71	Arts - Entertainment and Recreation	$1,702	$9,700	$11,402
72	Accommodation and Food Service	$7,823	$40,764	$48,588
81	Other Services	$45,869	$37,830	$83,698
NA	Government	$4,768	$101,124	$105,892
NA	Owner-Occupied (Non-NAICS sector)[a]	$0	$136,560	$136,560
	Total[b]	**$1,839,683**	**$1,028,130**	**$2,867,813**

[a] Owner-occupied housing is not a NAICS industry like the rental housing sector. Rather, owner-occupants essentially rent housing to themselves. To be consistent in its treatment of rental housing and owner-occupied housing, IMPLAN uses the BEA approach to derive imputed rent estimates for owner-occupied housing and then separately tracks the impact of spending on that sector. See footnote #22 for a more detailed discussion.

[b]The column summation may not equal total due to rounding errors.

Source: IMPLAN

Appendix D: Definition of IMPLAN Construction Sectors

Table D1: Mapping of Census Construction Sectors to Combined IMPLAN Construction Sectors
IMPLAN Sector 34 *Construction of new nonresidential commercial and health care structures*
All other commercial buildings
Amusement, social, & recreation buildings
Commercial warehouses
Educational buildings
Farm buildings, nonresidential
Health care & institutional buildings
Hotels & motels
Office buildings
Other building construction
Public safety buildings
Religious buildings
IMPLAN Sector 35 *Construction of new nonresidential manufacturing structures*
Manufacturing & light industrial buildings
Manufacturing & light industrial warehouses
IMPLAN Sector 36 *Construction of other new nonresidential structures*
Airport runways & related work
Billboards
Blast furnaces, petroleum refinery, chemical comp
Bridges, tunnels, & elevated highways
Conservation & development construction
Dam & reservoir construction
Dry/solid waste disposal
Fencing
Harbor & port facilities
Heavy military construction
Highways, streets, & related work
Marine construction
Mass transit construction
Oilfields
Other nonbuilding construction
Outdoor swimming pools
Pipeline construction other than sewer & water
Power & communication trans lines
Power plants
Private driveways & parking areas
Recreational facilities
Sewage & water treatment plants
Sewers, water mains, & related facilities
Ships
Tank storage facilities other than water
Water storage facilities

Table D1: Mapping of Census Construction Sectors to Combined IMPLAN Construction Sectors (continued)
IMPLAN Sector 37 *Construction of new residential permanent site single- and multi-family structures*
All other residential buildings
Apartment buildings, condos, & coops
Single-family houses
IMPLAN Sector 38 *New residential additions and alterations, nonfarm*
Apartment buildings, condos, & coops
Single-family houses
IMPLAN Sector 39 *Maintenance and repair construction of nonresidential structures*
Airport runways & related work
All other commercial buildings
Amusement, social, & recreation buildings
Billboards
Blast furnaces, petrol refinery, chemical comp
Bridges, tunnels, & elevated highways
Commercial warehouses
Conservation & development construction
Dam & reservoir construction
Dry/solid waste disposal
Educational buildings
Farm buildings, nonresidential
Fencing
Harbor & port facilities
Health care & institutional buildings
Heavy military construction
Highways, streets, & related work
Hotels & motels
Marine construction
Mass transit construction
Manufacturing & light industrial buildings
Manufacturing & light industrial warehouses
Office buildings
Oilfields
Other building construction
Other nonbuilding construction
Outdoor swimming pools
Pipeline construction other than sewer & water
Power & communication trans lines
Power plants
Private driveways & parking areas
Public safety buildings
Recreational facilities
Religious buildings

Table D1: Mapping of Census Construction Sectors to Combined IMPLAN Construction Sectors (continued)
IMPLAN Sector 39 (continued) *Maintenance and repair construction of nonresidential structures*
Sewage & water treatment plants
Sewers, water mains, & related facilities
Ships
Tank storage facilities other than water
Water storage facilities
IMPLAN Sector 40 *Maintenance and repair construction of residential structures*
Apartment buildings, condos, & coops
Single-family houses

IX. Principle Investigators

Mr. David Clark

Mr. Clark manages business operations at C3 and is an economist and statistical analyst who has 28 years experience in applied statistical analysis. He holds BS degrees in Applied Mathematical Economics and Psychology from the State University of New York - Oswego (1980) and MS (1983) and PhD (1985) degrees in Economics from State University of New York - Binghamton. He is a Professor of Economics at Marquette University. He teaches undergraduate and graduate level economics and forecasting courses. He has published over 20 academic papers that utilize applied econometric methods. In addition, he has served as a consultant to private business, Argonne National Laboratory, Pacific Northwest National Laboratory and Wisconsin REALTORS® Association. Mr. Clark directed and participated in major studies sponsored by the U.S. Department of Energy, U.S. Environmental Protection Agency, the National Science Foundation, and the Federal Railroad Administration. He completed, with Mr. Steven Crane, two studies on the impact of the Wisconsin Minimum Markup Law on retail gasoline markets for the Coalition for Lower Gasoline Prices, as well as a study examining the Economic Impact or the Real Estate Industry on the State of Wisconsin for the Wisconsin REALTORS® Association.

Mr. Steven Crane

Mr. Crane is an economist with 31 years experience in academics and applied statistical analysis. He holds Bachelor of Science degrees in Accounting and in Economics from St. Louis University (1976) and MS (1979) and PhD (1981) degrees in Economics from University of Colorado. He directed the Center for Applied Economic Analysis at Marquette University for five years until 1997. The Center conducted applied econometric analyses and forecasting projects for private sector firms. Mr. Crane is a retired Associate Professor of Economics at Marquette University where he taught both undergraduate and graduate Economics and forecasting courses. He has published more than fifteen articles in peer-reviewed academic articles and he has served as a consultant to urban planners and firms in the private sector. At C3, Mr. Crane directs the Industry Association Services, which generates quarterly/monthly economic outlooks and conducts monthly sentiment surveys for industry trade associations. He also provides economic commentary for various construction-related trade magazines and has led in the development of customized Excel-based programs for industry and trade associations. Mr. Crane co-authored with Mr. David Clark, two studies for the Coalition for Lower Gasoline Prices as well as a study examining the Economic Impact of the Real Estate Industry on the State of Wisconsin for the Wisconsin REALTORS® Association.