Sacred Heart University
John F. Welch College of Business

CONNECTICUT ECONOMIC OUTLOOK for 2015-2017:
A Perspective from Sacred Heart University Students in Business Economics

Final Research Project for EC492 – Economic and Financial Forecasting,
taught by Dr. Lucjan T. Orlowski - Professor, Department of Economics and Finance

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The State of Connecticut was severely negatively impacted by the financial crisis, to greater effect than many states. In the current climate, the United States is making a moderate recovery that is at times, not reflected at the state level. Our objective in producing this report is to apply our skills learned in our undergraduate Economic Forecasting at Sacred Heart University in Fairfield, Connecticut, to compare various economic factors and trends in Connecticut, to the overall economy of the United States. This analysis examines the real Connecticut economy, structural changes to the economy, labor market developments, state budget outlook, the housing market, and finally the financial sector of the state. Six groups of students were assigned particular sectors of the economy to examine through statistical investigation and literary research. This analysis and research contribute to the forecasts developed in this paper.

One of the main questions in the State is whether Connecticut’s growth rates will track with the forecasted national rates. The recent developments in lowered oil prices and dollar appreciation have raised concern about a decline in GDP growth for the United States. Connecticut’s real economy will continue to see growth, albeit at a rate slower than the United States Economy. We anticipate that Connecticut’s real gross state product in 2015 will grow by 0.78%, a number that lags behind anticipated growth of the United States GDP at 2.0%. This growth rate is identical to
our model’s growth rate for 2014, indicating that Connecticut’s growth has peaked and will remain constant for 2015. In 2016, our model anticipates a growth rate of .8%. The leading index for Connecticut has remained constant at 1.67 from 2013-2014, consistently below the leading index for the United States. While the average median income in the state has been consistently higher than the national level, growth in Connecticut has consistently lagged behind the United States GDP growth by percent since the financial crisis. This consistent lag indicates a concerning trend for CT, one where the national recovery and expansion has outpaced the state’s.

Structural changes to the economy remain an interesting and important factor to examine. Over the last ten years, unemployment rates have fluctuated from a low of 5% in 2005-2008 to a peak of 9% during the recession. Since August 2008 the unemployment rate has fallen steadily to 6.4% where it stands now. Connecticut’s unemployment rate unfortunately remains above the national average of 5.5%, placing us 42nd in overall unemployment rankings. Many once large sectors of the state economy have lost jobs and failed to recover, while other markets have seen consistent growth and show promise. The financial and manufacturing industry lost 12,000 and 45,000 jobs respectively since the recession and have failed to recuperate in any meaningful way. The Private Service Providing sector has seen consistent increases in employment over the last years, indicating potential as one of the few growing markets in the statement. Private educational services in the state have added nearly 8,000 jobs and continue to indicate strong growth potential. Without doubt, educational services, primarily those provided by the post-secondary educational institutions, represent the comparative advantage of
Connecticut’s economy. We therefore believe that the continuous growth and academic strength of these institutions shall be emphasized and protected in the State budgetary and economic development policies.

While salvage of financial sector employment is not unlikely, a recovery of manufacturing jobs seems implausible without a momentous and focused effort by state policy makers and businesses to encourage growth. Once again, in Connecticut we see a disconcerting trend in that the State is lagging behind many states who have returned to post recession employment levels. Once positively intentioned economic and tax policies appear to be failing and discouraging growth of the financial sector and business. Policymakers need to address these underperforming components of GDP if we wish to track well with national growth.

These factors beg the question of anticipated employment levels in the future. To this end, external research was considered to discern important factors in the labor market and a forecast was created. A study done by Deutsche Bank indicated that 39% of the decline in labor force was due to baby boomers transitioning to retirement. Additionally, many of the new jobs in the State are being filled are in low skill, low pay areas, indicating that while the numbers may indicate improvement, income and tax revenue growth will not increase significantly. NEEP forecasts for 2017-2018 indicate gains in employment of 1.1% and .3% for the State, levels that fall below the national levels of 1.5% and .3%. Our forecast indicates that unemployment will remain relatively stagnant due to total labor force and total non-farm employment dropping at similar rates. We anticipate modest recovery of job rates, but at a slower pace than that of the United States.
With the economic downturn and slow recovery, an important consideration is the State budget and revenue outlook. Our forecast finds that both GDP and HPI played critical roles in forecasting total state revenue, and that state revenue is in fact increasing. Both a decrease in unemployment and an increase in non-farm jobs indicate an upswing in total revenue. This, coupled with Governor Malloy’s proposed tax increase on the wealthy, changes to the lottery, and budget cuts represent potential for steady revenue increases while decreasing expenditures. The State’s outlook remains positive despite difficulties in neighboring states, and positive changes to the State’s budget could reflect a healthier Nutmeg State in the future.

The housing market continues to represent a weak component of the Connecticut economy. Home prices in the State are close to double national averages for comparable properties, and tax rates are prohibitively high relative to major cities in other states. Home ownership has plummeted from 70.5% in 2009 to 67.4% in 2014 while rental vacancy rates have seen a steady decline in the same time span. While on a national level, mortgage delinquencies have fallen for a multitude of reasons, we do not necessarily believe that this indicates potential for positive growth in Connecticut’s housing market. Ultimately, the Connecticut housing market will continue to decline until prohibitive tax rates and home prices are addressed in a manner that makes the state more affordable to own a home in.

Finally, we examine the financial sector of the Connecticut economy. Despite the state being home to many major financial institutions including banks and insurance companies, the state’s banking sector continues to lag behind national
performance. ROA for Connecticut banks during Q4 of 2014 was .93%, relative to US banks ROA of 1.00%. ROE was marginally higher in Connecticut than the national ROE, but metrics experienced high volatility at the state level. While Connecticut has enjoyed a higher interest margin than the national average at 3.28%, Connecticut’s growth of net interest has only been 1.075% for 2005-2014 while the US banking systems growth of 45.79% during the same period completely dwarfs the states net interest growth. Connecticut banks’ equity to capital ratio’s also remain low at 10% relative to the national ratio of 11%, contributing to the volatility in profitability measures.

It is imperative that Connecticut’s banks add to their equity capital and increase their solvency. Not only will they be less susceptible to economic shocks, but they will be able to expand their balance sheets and increase their ROA while still complying with solvency regulations. This course of action, in addition to the imminent increase in interest rates from the Federal Reserve, would result in large increases in profits, a boon to both the banking sector, and the state economy as a whole due to reinvestment and asset creation.

As students entering the work force, we feel that the recognition of these issues and steps to remedy them should be the top priority of policy makers and industry leaders. The outlook for Connecticut is positive, but as our analysis shows, not optimal. The large structural changes to the job market, demographic shift, and incomplete return to pre-crisis unemployment rates have stifled state growth relative to national levels. Government revenue and the State budget have positive potential, and remain a strength. Unfortunately, prohibitive costs continue to be a
problem in the housing market, and discourage home ownership and potentially permanent residency in the State. Finally, and perhaps most importantly, the financial sector of the State economy is underperforming despite great potential. Policy makers and industry leaders must make conscious decisions to create jobs and innovate in the manufacturing sector, make a commitment to strong bank solvency and profitability, and enact tax and home ownership policies that make Connecticut more appealing to live in in the long term. By focusing on labor diversity, strengthening existing institutions, and encouraging permanent residence in the State, we believe that Connecticut can once again be a leader and exemplar for economic growth in the U.S.
I. Outlook for the Real Economy of Connecticut

by Kyle Czarnecki, Anthony Dolisi, Scott Gaffney

Introduction:

Nearly seven years after the onset of the Financial Crisis, how have the United States economy and the Connecticut state economy fared? While the Federal Reserve continues to maintain its zero lower bound interest rate policy, the price of oil remains under $60 per barrel and the dollar is strong, the once powerful economic recovery and job creation in this nation has begun to lose some steam as many economists project GDP growth for the United States in 2015 at just 2.0%. While this is happening at home, central banks in Europe and Japan are undergoing their own periods of liquidity injections to fight off deflation and unemployment. These policies will only push foreign currencies even lower against the dollar, which is one of the major factors as to why so many believe the economic recovery going on in the United States will not be able to continue at the same pace as it has for the past few years. While this is going on in the greater economy, our outlook for the real economy of the state of Connecticut will seek to determine if the effects of our national economic slowdown has had any effect on the economic well-being of the state.

Data Analysis:

Our forecast of the gross state product for the state of Connecticut includes the following variables:
**Initial Claims**

“Initial Claims” is a weekly recorded variable that is concluded on each Saturday, the variable is not seasonally adjusted. The variable measures the amount of individuals seeking to receive state jobless benefits. This helps us see which direction the economy is heading. The higher initial claims the weaker the economy is. At a national level, the rate of this measure will impact the appreciation and deprecation of the country’s currency against other major currencies. As this number is measured weekly, we utilize an annual initial claims data to see the difference year to year for the Connecticut and Macro economy.

![Graph of Initial Claims and Initial Claims in Connecticut](image)

**Leading Index**

The “Leading Index” is a monthly recorded variable that is seasonally adjusted. The leading index predicts the six-month growth rate of the state’s coincident index. The data includes several other variables such as state-level housing permits, state initial
unemployment insurance claims, delivery times from the Institution for Supply Management (ISM) manufacturing survey, and the interest rate spread between the 10-year Treasury bond and the 3-month Treasury bill. As this number is measure monthly, we utilize an annual Leading Index to see the difference year to year for the Connecticut and Macro economy.

Median Income

“Median Income” is a yearly recorded variable that is not seasonally adjusted. Median Income is released by the Census Bureau and they use the linear interpolation methodology which assumes a constant density population within an income interval. The nature of the linear interpolation removes the error when comparing the Connecticut economy to the Macro economy.
Connecticut vs. National

For all the above variable sets, we first depicted a percentage change to show the change in the recent years to articulate our forecast in the coming years. We can note that initial claims has been on a downward trend and as initial claims in Connecticut was 4,723 in 2013 and decreased to 4,226 showing slight improvement in the jobless claims in the state. United States initial claims were 341,827 in 2013 and 306,568 in 2014 also showing improvement. The percentage change from 2013 and 2014 is both approximately down 10% for Connecticut and the United States. The Leading Index for Connecticut was 1.67 in 2013 and 1.67 for 2014, showing that the Connecticut economy was not growing at the same rate of the United States economy. The Leading Index for the United States was 1.45 in 2013 and increased up to 1.74 for 2014. Median Income for the United States was 51,758 for 2012 and 51,939 for 2013 against Connecticut’s 65,181 for 2012 and 67,781 in 2013 showing a strong increase in Median Income for the residents of Connecticut.
Regression Model & Results:

To forecast the Connecticut state real gross state product, the following model was developed:

$$\Delta CTGDP_t = \beta_0 + \beta_1 Initial\_Claims_t + \beta_2 \Delta Leading\_Index_t + \beta_3 \Delta Median\_Income_t + AR(1) + AR(2) + MA(1) + \epsilon_t$$

The regression estimation yields:

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After testing for the optimal level or ARMA, we concluded that an ARMA (2,1) model was best for our model, as we were able to achieve our most stable covariance proportion
in our final forecast. At this level of ARMA, all variables are significant at 1%. Using this model, we were able to achieve a covariance proportion of .9475, maximized against a Thiel Inequality proportion of .225, a Bias proportion of .003, and a Variance proportion of .0493. Another promising indication is the root mean squared error of the forecast, which is minimized at just 1.19. The model is very robust as adjusted $R^2$ is over 94%, explaining that nearly 95% of the variation in Connecticut’s state product is explained by the included variables. Although the model suffers from a deal of negative serial autocorrelation, as the Durbin Watson statistic is approximately 3.11, we believe variables such as a high covariance proportion indicate that this is not a big problem. Our model is seen in the graph below for periods up to 2013:
With our newly developed forecast, we can now look to see how the Connecticut economy will fare in 2015 as depicted in the graph above.

**To summarize, our models project that the gross state product for the state of Connecticut will grow at 0.78% in 2015. This is compared to projections for the United States economy as a whole of 2.0% GDP growth.** Our analysis also shows growth of 0.78% in 2014, indicating that what little growth that there has been in the state recently has peaked and remained constant. Looking back to 2013, the real state product only grew by 0.9%. Since the trough of the Financial Crisis, Connecticut’s growth has lagged behind national growth by nearly a whole percentage point. United States GDP grew by 2.3% in 2013, and 2.4% in 2014, yet Connecticut seems to continue to fall short.

In this section we have examined the effects of median household income, leading index, and initial claims on real economy of the state of Connecticut, the following sections should further elaborate as to why we are seeing a stagnation of growth in the state compared to the greater economy as a whole.
II. Structural Changes in the Connecticut Economy: A Ten-Year Perspective

by John Brownell, Steven Sullivan

When looking into the structural changes of the Connecticut economy over the past ten years there are a variety of factors that each play a role in these activities. One of the most elementary factors found in these movements is the amount of jobs and type of jobs that are held in the observed region. Of course the most comprehensive look into this is the unemployment rate which plays a huge part in conditions of the economy as a whole. From public spending to welfare checks the unemployment rates compounding effects can change an economic climate faster than many would assume. Now when this climate becomes volatile on its own, the unemployment rates take a back seat to the industrial and structural bodies that pedal the economy. Some industries take a harder hit than others but all seem to feel the shock of unexpected volatility. Due to the recent volatility felt across the nation during the recent financial crisis, a look into the employment rates of the Connecticut economy during these years should display these affects mentioned. With all of this in mind we will further observe the total unemployment rate along with a variety of industries that have been affected.
The unemployment rate in Connecticut has fluctuated over the past ten years in response to national and local economic conditions. From 2005 to 2008 the state unemployment rate sat comfortably at 5% and below. When the U.S. financial crisis hit beginning in 2007 the unemployment rate began to creep up as Connecticut industries were directly affected. In a two year span from January of 2008 until January of 2010 the rate of unemployment rose from 5% to 9%, signifying intense acceleration in job loss and recession. It was the first time that unemployment in Connecticut had reached 9% since 1976 to put into perspective how bad things got.

The economic recovery in Connecticut was not rapid but has instead been a slow comeback. Unemployment stalled around the 8% to 9% levels for nearly four years from
2009-2013. However, beginning in August 2008, unemployment has slowly but consistently dropped to the 6.4% rate Connecticut currently stands at.

In terms of how Connecticut compares to the rest of the country, its unemployment rate remains above the national average of 5.5%. Connecticut has maintained an average above the unemployment rate consistently over the past several years. As of March 2015, Connecticut’s 6.4% unemployment ranks 42nd in the country which speaks to how the state has struggled to create jobs and adapt to challenging economic issues.

A large section of the Connecticut economy is made up from financial activities. This segment is divided into two major categories, the finance sector and the insurance
sector. Connecticut, and Hartford in particular, has long been known as the insurance
capitol of the world with thousands of the state’s jobs coming from major insurance
companies. Heavy reliance in these segments of the economy caused Connecticut jobs to
be significantly impacted by the U.S. financial crisis.

From early 2008 until the beginning of 2010, over five thousand financial
activities jobs were lost in Connecticut. Those numbers flat lined for a brief period and
then continued to decrease over the period ranging from 2011 to the close of 2014. In
that three year stretch this sector of the Connecticut economy lost over six thousand more
jobs. This brings the total amount of jobs lost to over twelve thousand in financial
activities in the six years following the US financial crisis.
A smaller yet vital part of the Connecticut economy is the jobs that are in the manufacturing industry. These jobs tend to be held by the middle class citizens making them a prime economic driver for the state. The manufacturing industry also has a great impact on the states GDP, which has been said to be growing half as fast as the rest of the nation. This slow growth has forced the hands of these manufactures to turn towards more technology so that they may keep pace. This mentality of focusing on efficiency has further depleted the industry that had been struggling for many years prior.

The jobs in this industry have seen deterioration for over 20 years now, with a vast fall off occurring recently. From June 2008 till February 2010 the decline was the sharpest the state has ever experienced. During this time period upwards of 45,000 jobs in this industry evaporated. The highly volatile times of the recession certainly made their mark with little to no lag I might add. Since this drop there have been no signs of a recovery that would return us to the levels prior to the downturn. With this recent record and the continued demand for more use of technology in the field, a salvage of this industry seems highly unlikely.
Educational services in Connecticut have been consistently on the rise since 2002 and have added nearly eight thousand jobs since 2005. This is a sign that private education in Connecticut is highly valued and is continuing to grow. Connecticut is home to some of the top private schools in the country. These include esteemed preparatory high schools and prestigious universities. The northeast has long been a hotbed of education and Connecticut plays a fundamental role in that reputation.

This education services section is comprised of privately owned educational establishments. Educational jobs from public universities in the state are included in the public sector jobs section. Besides employment by universities and colleges, other educational servicing businesses have also flourished in the last decade. These including standardized testing facilities and academic tutoring institutions. The role of education in
the private sector of the Connecticut economy has a firm holding and looks to continue to expand in the years to come as education remains of utmost significance.

The Private Service Providing sector of Connecticut’s economy is an interesting one when observing the impact of the volatile times. This part of the economy is one that is not state controlled; it is run by either individuals or companies for profit. Due to this focus on profit times of uncertainty with consumer spending influences this industry to cut jobs. In contrast presumed stability or increases in consumption causes this job market to expand. These two tendencies make this particular sector of the economy highly volatile on its own.
When you introduce a recession to this discussed marketplace the impacts are abundant. In the 90’s Private Service Providing jobs were experiencing a steady climb, adding over 150,000 jobs to the state’s economy in just eight years. This increase continued to sustain its self until the times of the recession hit. Once the collapse happened this sector began to fold with the rest of the nation, laying-off thousands of citizens it had quickly grown to employ. Unfortunately this drop occurred much faster than any of these companies could have ever anticipated and stuck around longer than estimated because of conservative spending by all. Being an industry that offers normal goods the continued low spending rates caused a lag to the recovery. Nevertheless once 2010 came and spending forecast strengthened these jobs began to become abundant. Allowing for a return to the levels prior of the downfall by the year 2013. This aspect of Connecticut’s economy has shown constant elevations in the latest years, endorsing it as one of the few flourishing job markets in the state.
The Real Gross Domestic Product for Connecticut is a key gage of how many of the state’s products and services are being bought or used. For years this aspect of the economy was thriving due to many of the job sectors we covered previously. The financial services and unemployment rate were found to be the main performers for this upswing in GDP. Unfortunately today we cannot say the same for the two.

The recession of 2008 hit the financial and insurance business the hardest around the nation. For Connecticut this was and continues to be the heart of the state’s economy and the industry was crippled along with the nation. This sector in other states seemed to recover to relatively normal rates but the same cannot be said for this state. This once advantageous piece of the GDP now seems to be holding back the state as whole due to their continual decline. A reason for this poor recovery has several officials pointing back
to the government, the once well intentioned economic development and tax policies are now failing. A refocusing on promoting this main driver of the total GDP should be on the forefront of policy maker’s agenda if they plan to address this decline in the state's production.

In order to properly forecast where employment is headed in Connecticut we must take into consideration the factors that affect jobs in the state. It is clear that government tax policies have not made it favorable to do business in Connecticut as compared to other states. Jobs in manufacturing and financial services have diminished since the recent financial crisis and the prospect of gaining these jobs back is not all that promising. If government policies remain the same it will continue to be unfavorable for businesses to remain in Connecticut. Small businesses and companies in other industries will look to relocate in order to align themselves with more favorable policies that relay to profitability. It seems fair to project the unemployment rate in Connecticut will remain in a disadvantageous position to that of the national average unless changes are made to make job creation in the state more desirable for businesses.
III. Labor Market Developments
   by Kenneth Byram, Vincent Iannitelli, Margaret McCabe

The following report contains an economic forecast of the Connecticut job market for the period April 2015 – December 2017. It includes a summary of the job market since the Great Recession as well as expert opinions and research on the outlook of the economy. Finally, our own research was conducted to determine our overall conclusion of the Connecticut Job Market from 2015-2017.

Today jobs are harder to obtain than they were in previous periods. There has been a persistent drag on the Connecticut labor market throughout the years since the recession in 2008. Throughout the years, Connecticut’s labor market has been lagging behind the United States in recovery since the recession began. There has been modest recovery in the unemployment rate of Connecticut, especially when compared to the United States as a whole.

The graph below shows the percent changes in total non-farm employment for Connecticut and the United States since the start of the recession in March 2008 through March 2015.
As you can see in the graph, there are more negative percent changes to the Connecticut total non-farm employment as well as more overall volatility than the United States. There is also a more consistent upward movement for the United States when compared to Connecticut. This displays that since the severe loss of jobs during the recession, the United States has recovered at an accelerated pace and Connecticut is still trying to catch up.

According to the Connecticut Economic Digest published in March 2015, during the periods of March 2008 and February 2010, Connecticut lost 119,000 seasonally adjusted total non-farm jobs. Over the 61-month recovery period since then, 92,700 positions have been recovered, or 77.9%. Meanwhile the United States has regained all jobs lost in the period of January 2008 through February 2010 at a recovery rate of 128% and is now in an expansionary phase. In total, CT employed 1,670,300 jobs as of July 2014. This is quite alarming when we see that this job total
matches the amount in August of 1988. So one can come to the conclusion that over a 26 year period there hasn’t been any job growth.

From a study done on labor force participation by Deutsche Bank, demographics explain 39% of the decline in the labor force since 2008. The study suggests that there won’t be a meaningful increase in labor force participation as long as the baby boomers are transitioning into retirement. A good portion of the new jobs being filled are in lower paying, low skilled areas like leisure, health care, retail trade and business support service. The addition of jobs of this nature won’t contribute much for additional employment and income growth or tax revenue to aid in balancing the state’s budget. For the years of 2017 and 2018, NEEP forecasts a moderate recovery in employment, which in part will be driven by national job expansion. National employment should grow 1.3% and 0.5% in the final two years of the forecast while in Connecticut the gains are just below at 1.1% and 0.3% respectively.

Increasingly, when looking at population growth for the state, NEEP projects only about a 0.2% increase per year (7,400 people), which is much lower than the national average of 1.0%. This is because of the limited growth, limited job opportunities and higher living costs forecasted for the state.

In order to entirely determine the job market outlook for 2015 through 2017, research was conducted via E-views. The variables that were examined are as follows: the unemployment rate for Connecticut and the United States, the total labor force for Connecticut, and finally the total non-farm employment for
Connecticut. All variables contain data from January 1990 through March 2015 and were collected from the Connecticut Department of Labor Databank.

A major assumption was made in order to evaluate the change in employment based off of total non-farm employment: the change in employment resulted from an *involuntary* leave from the job market. This assumption allows us to view the change in employment as a true reflection of the fluctuations in available jobs and the job market as a whole. The growing or declining population over the years will also affect the change in employment over the years, but this too will be assumed to be a minimal effect since the total labor force has not drastically fluctuated since January 1990.

These variables will be forecasted in order to determine the overall direction of the job market. First each of the forecasts will be examined for accuracy, and then compared amongst the other forecasts. All forecasts will be examined and discussed in order to determine the final conclusion of the Connecticut job market.

The unemployment rate is the number of unemployed people as a percentage of the labor force. The seasonally adjusted unemployment rate eliminates the influence of regularly recurring seasonal fluctuations which can be ascribed to weather, crop-growing cycles, holidays, vacations, regular industry model changeover periods, etc., and therefore, more clearly shows the underlying basic trend of unemployment. The unemployment rate for January 1990 until March 2015 for both Connecticut and the United States is graphed below. The Connecticut unemployment rate has recovered since the recession in 2008, but has not recovered at the pace that the United States has recovered.
The Connecticut vs. United States Unemployment Rate

The total labor force is defined as the all persons sixteen years of age and over who are classified as employed, unemployed and seeking employment, or involved in a labor-management dispute. The labor force does not include persons who never worked a full-time job lasting two weeks or longer and “discouraged workers” who have been unemployed for a substantial length of time and are no longer actively seeking employment.

The total non-farm employment is the total number of persons on establishment payroll employed full or part time who received pay for any part of the pay period which includes the 12th day of the month. Temporary and intermittent employees are included, as are any workers who are on paid sick leave, on paid holiday, or who work during only part of the specified pay period. The
difference between the total labor force and the total non-farm employment, factoring out the minimally effective total farm employment, would reflect the unemployed of Connecticut. The graph of both variables (total non-farm employment of Connecticut and total labor force of Connecticut) is displayed below.

**Total Non-Farm Employment of CT and Total Labor Force of CT:**

You can see in the graph that after the recession in 2008, the difference between the total labor force and the total non-farm employment separated drastically, resulting in the amount of people in need of jobs growing as the number of jobs available decreased; therefore increasing the unemployment rate. Since the recession, Connecticut has had a modest recovery, slowly reclosing the gap that the recession created.

Using E-views, the unemployment rate was forecasted using a trend function \((URCT c @trend @trend^2 @trend^3)\) and the resulting graph was overlapped with the actual data. Period 302 through 304 represents April 2015 through December 2017, which no actual data has been recorded for.
The trend line relatively follows the total direction of the data, but isn't a strong enough forecast to rely upon. However some observations can be made about the forecast. The unemployment rate appears to be increasing at a decreasing rate, almost entirely plateauing over the next few years. This however is contradicted by the actual data displaying a decreasing unemployment rate as the forecasted data increases in the latest recorded periods.

The next step is to forecast the total labor force of Connecticut and the total non-farm employment of Connecticut and compare the fluctuations over the April 2015 through December 2017 period. The graph of this is depicted below. Based off knowledge of the Connecticut job market and economy since the recession, the research of experts, and the results of E-views research, the outlook for 2015-2017 will continue at a modest recovery pace. The job market will continue to recover,
but at a slower pace than the United States, and the economy will continue to bounce back at a modest and gradual pace.

**Forecast of Total Labor Force and Total Non-Farm Employment of CT**

According to the above graph, the total labor force of Connecticut is starting to decline over the forecasted periods, but at the relatively same rate that the total non-farm employment is decreasing. Therefore the unemployment rate would remain at the same level it is with only modest recovery. This evidence collected from E-views supports and properly reflects the research conducted on the past and present job market, as well as the outside expert opinions found on the future of the job market. This finding would also support the unemployment rate forecast that displayed a plateaued rate, since the total labor force and total non-farm employment are decreasing at the same rate the unemployment rate would remain stagnant.
Based off knowledge of the Connecticut job market and economy since the recession, the research of experts, and the results of E-views research, the outlook for 2015-2017 is modest recovery. The job market will continue to slowly recover, but at a slower pace than the United States, and the economy will slowly continue to bounce back at a modest and gradual pace.
IV. State Budget Revenue Outlook
by Matthew Cole, Jonathan Flood

State revenue forecasts are commonly the subject of much speculation and discussion amongst economists, policy-makers, and lay people alike. Here, we propose a methodical approach to forecast the Connecticut state budget using factors that economic theory suggests will impact Connecticut tax revenues. Regression analysis was performed and analyzed using these variables while qualitative factors were also taken into consideration.

Dependent Variable: TOTAL_TAXES
Method: Least Squares
Date: 04/28/15 Time: 12:36
Sample: 1998 2013
Included observations: 16

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-1799291.</td>
<td>2280256.</td>
<td>-0.789074</td>
<td>0.4467</td>
</tr>
<tr>
<td>TOTAL_WAGES</td>
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<td>0.032845</td>
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<td>0.6222</td>
</tr>
<tr>
<td>CTSTHPI</td>
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<td>0.0006</td>
</tr>
<tr>
<td>CT_UNEMPLY</td>
<td>-441061.1</td>
<td>140370.4</td>
<td>-3.142124</td>
<td>0.0094</td>
</tr>
<tr>
<td>CT_GDP</td>
<td>153.9924</td>
<td>57.47735</td>
<td>2.679185</td>
<td>0.0214</td>
</tr>
</tbody>
</table>

R-squared: 0.956323
Adjusted R-squared: 0.940440
Mean dependent var: 11778344
S.D. dependent var: 2225371.
Akaike info criterion: 29.49828
Schwarz criterion: 29.73972
Hannan-Quinn criter. 29.51065
Durbin-Watson stat: 1.920324

Figure 1 Regression analysis output from Eviews8 modeling total state revenue (TOTAL_TAXES) as a function of total wages (TOTAL_WAGES), CT HPI (CTSTHPI), CT unemployment rates (CT_UNEMPLY), CT GDP (CT_GDP), and a constant.

\[ rev_t = \beta_0 + \beta_{wage}wage_t + \beta_{hpi}hpi_t + \beta_{unemp}unemp_t + \beta_{ctgdp}ctgdp_t + \epsilon_t \]

Figure 2 Equation representation of the linear regression model utilized
Multiple regression analysis is useful to estimate the relationships between suspected factors influencing the state economy of Connecticut and the total revenue of the state. Here, using the least squares method, we took a closer look at the association between state revenue and Connecticut total wages, Home Price Index, unemployment rates, and GDP. This low frequency analysis yielded some unsurprising results while providing an interesting deviation from expectations.

The regression suggests that Connecticut State GDP is a significant driver of state revenue, coming inline with expectations that the health of the state's budget is closely aligned to the state's total economic output. Furthermore, we see from our model that Connecticut unemployment rates and HPI share a significant (P = 0.009, P<0.001) yet inverse association with state revenue, suggesting that a greater proportion of utilized workforce and housing prices can lead to increases in state budgets. HPI can also be seen as a proxy for cost of living, suggesting that increases in living related personal expenditures do not necessarily yield state revenue surplus. Lastly, and possibly most surprisingly, is the inverse yet non-significant relationship between total wages and state revenue provided by the model. It was expected that there would have been a strong, as well as positive, relationship between total state wages and state revenue due to the presence of a comparatively heavy income tax in place in Connecticut, as well as the presumed increased disposable income. Although non-significant, this variable is theoretically important and together, these factors show indications of well representing total Connecticut revenue with a reported prob(f-stat) < 0.000001 and an adjusted R² of 0.9404 suggesting that the model is comprehensive enough to account for over 94% of the variability in Connecticut revenues over the past 16 years.

Null Hypothesis: TOTAL_TAXES has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

<table>
<thead>
<tr>
<th>Augmented Dickey-Fuller test statistic</th>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.202198</td>
<td>0.9628</td>
</tr>
</tbody>
</table>

Test critical values:

1% level -3.959148
In order to determine whether the state’s revenue has been stagnant over the past 16 years or not we ran an Augmented Dickey-Fuller test (Figure 3). The results indicated that at the 95% confidence level Connecticut state tax revenue has a unit root as we fail to reject the null hypothesis (Pval=0.9628, Figure 3). This coupled with a graphical representation of the state revenue over time displays sufficient evidence that the state’s revenue is not stagnant but is in fact increasing. This information is also useful to determine appropriate steps to further run different forecasting methods.

Connecticut has experienced unemployment rates trending downward from a high of 9.2% in early 2011 to 6.4% in March of 2015 (Bureau of Labor Statistics, 2015). A continuation of this trend through 2015 and into the next year is a strong indication of increases of incoming taxes. Meanwhile, the total number of non-farm jobs has increased 1.6% from March 2014 to March 2015 (Bureau of Labor Statistics, 2015). This again provides another piece of evidence suggesting an upswing in total revenue as more Nutmeggers gain employment.

However, there is evidence suggesting that total state revenue may actually decrease. Evidence for this hypothesis is given by increasing HPI in Connecticut over the last quarter of 2014 (0.6%, Federal Housing Finance Agency, 2015). According to our model, this could be responsible for a decrease in total state revenues of 0.1% or 30 million dollars (Figure 1). Considering the small fraction of revenue this is likely to affect we consider this to be a weak indication of a reduction in total state revenue. Some state economists suggest that the state is displaying some worrying indicators in the midst of good news. For instance increasing employment and consumer spending is indicative of a positive economic outlook for the state and the state’s budget as well. However, the sluggishness of wage recovery to the highs
before the ‘great recession’ can raise some red flags, possibly telltale of a less fundamentally sound economic recovery.

Connecticut policy makers will also undoubtedly affect the budget projections as well as revenues. Governor Malloy, who pledged not to increase taxes during his campaign, has recommended that would raise state tax and fee receipts by $1.8 billion over the next two years (Phaneuf, 2015). This includes a $540 million raise in income tax on the wealthy and an overhaul of the sales tax. This new plan would increase taxes on corporations as well as hospitals and allow the Connecticut Lottery to launch Keno, a gambling game, in both bars and restaurants (Phaneuf, 2015). This program alone is projected to bring in $43.6 million over the next two years. However, in order to begin this program the state must enter into negotiations with tribes currently running casinos in the southeastern portion of the state. Governor Malloy also recommended in February that the state cut hundreds of millions in social services. These two together could help to alleviate budget pressures while adding to Connecticut’s revenue stream (Phaneuf, 2015).

Considering the available information concerning Connecticut’s economic, political, and financial environment, there exists evidence suggesting that the state will continue to generate increasing tax revenues throughout the near future. This coupled with Governor Dan Malloy’s plan to add new revenue streams while reducing expenditure, suggests that the Constitution State’s economic outlook is positive despite hardships in adjacent states. If the predictions mature to fruition, this holistic bolstering of the Connecticut economy will translate to larger state revenues into the future. It is our prediction that this trend will continue on the heels of the economic recovery from the 2008 recession experienced by Connecticut, The United States and the world economy as a whole.


Phaneuf, K. (2015) Defing Malloy, Legislators pitch a $1.8 billion revenue increase. *CTMirror*
V. The Housing Market: Is a Rebound Sustainable?

by Adria Abboud, Kimberly Ball, James Cooksey

The Connecticut House Price Index measures the movement of single-family house prices in the state of Connecticut. The Connecticut House Price Index peaked in Q1 of 2007 at 474.21. Today it is measured at 393.83 with a percentage decline of 16.9. On the other hand, the Case-Schiller Index is the leading measure of the United States real estate prices. The Case-Schiller Index peaked in April 2006 at 206.61. Today it is measured at 175.80 with a percentage decline of 14.9.
To further our research, we examined a comparative analysis of property taxes on a $300,000 home in six cities across the United States. We found that Hartford, CT has a property tax of $5,443, while Orlando, FL has a property tax of $3,660 and Chicago, IL, has a property tax of $4,020. Seattle, WA has a property tax of $2,661, while Memphis, TN has a property tax of $2,932. In addition, Houston, TX has the lowest property tax of the group at $1,996.

Privately owned housing starts fluctuated from -12.8% to +21.0% between 2009 and 2014 according to the FRED website. From the years 2005 to 2010, there was a major decrease in housing starts. The year 2005 began with a 762 unit housing start and dropped down to 162 at the end of 2009. Overall, there has been a positive 19.4% change in the past five years.

<table>
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<th>Year</th>
<th>Units</th>
<th>Change in Growth</th>
</tr>
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<tbody>
<tr>
<td>2009</td>
<td>171</td>
<td>-</td>
</tr>
<tr>
<td>2010</td>
<td>207</td>
<td>+21%</td>
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<tr>
<td>2011</td>
<td>172</td>
<td>-16.9%</td>
</tr>
<tr>
<td>2012</td>
<td>194</td>
<td>12.8%</td>
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<tr>
<td>2013</td>
<td>234</td>
<td>20.6%</td>
</tr>
<tr>
<td>2014</td>
<td>204</td>
<td>-12.8%</td>
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</table>
Starting in at its peak in 2003, the home ownership rate in CT has dropped tremendously, and has continued to plummet. Between 2009 and 2014, the home ownership rate has fluctuated from -1.8%, up to +0.3%. In addition, the recession of 2008 did not seem to affect the home ownership rate as much as it did in previous years. Overall, there has been a 3.1% decrease in home ownership over the past five years.

- **Table:**
  
<table>
<thead>
<tr>
<th>Year</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>2010</td>
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<tr>
<td>2011</td>
<td>70.6%</td>
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<tr>
<td>2012</td>
<td>68.8%</td>
<td>-1.8%</td>
</tr>
<tr>
<td>2013</td>
<td>68.5%</td>
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</tr>
<tr>
<td>2014</td>
<td>67.4%</td>
<td>-1.1%</td>
</tr>
</tbody>
</table>

Source: US. Bureau of the Census

Shaded areas indicate US recessions - 2015 research.stlouisfed.org
Rental vacancy rate has swayed from +2.5% in 2010 all the way down to -1.9% in 2014. This market seems to be extremely unsteady and constantly changing. After the recent economic crisis, the rental vacancy rate increased, which was to be expected. Over the past five years, there has been a 2.5% decrease in the rental vacancy rate overall. Today, the rental vacancy rate is at its lowest since the early 2000’s.

<table>
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<th>Years</th>
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<tbody>
<tr>
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<td>-</td>
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<tr>
<td>2010</td>
<td>10.7%</td>
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<tr>
<td>2011</td>
<td>9.5%</td>
<td>-1.2%</td>
</tr>
<tr>
<td>2012</td>
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<td>-2.1%</td>
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<tr>
<td>2013</td>
<td>7.7%</td>
<td>+0.3%</td>
</tr>
<tr>
<td>2014</td>
<td>5.8%</td>
<td>-1.9%</td>
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Between 2009 and 2014, the home vacancy rate for Connecticut has teetered from +0.5% in 2011 all the way down to -0.4% in 2014. The consistent up down pattern shown on the FRED graph proves that this market is not stable or consistent. After the recent financial crisis, the home vacancy rate increased until 2011, which was to be expected due to mortgage defaults. Overall, there has been a decrease of .3% in home vacancy over the past five years.

<table>
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<td>2010</td>
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<td>2012</td>
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<td>2013</td>
<td>1.8%</td>
<td>+0.1%</td>
</tr>
<tr>
<td>2014</td>
<td>1.4%</td>
<td>-0.4%</td>
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</table>
Due to the lack of data on mortgage delinquencies in CT, data was used from the entire U.S. in its entirety. The delinquency rate on single-family residential mortgages has fluctuated from +1.69% in 2010 down to -1.76% in 2014. The FRED graph shows that the delinquency rate has hovered around 2-3% from 1990-2005, but over the past five years the mortgage delinquency has decreased 1.94%. The graph shows that mortgage delinquencies skyrocketed starting in 2005, and finally topped out starting in 2011. This is due to the fact that banks were giving out large mortgages to people who couldn’t afford them.

Based on our findings, we do not believe that there will be rebound in the Connecticut housing market anytime soon. One of the factors causing the struggle to
rebound in the housing market is high property tax rates. Connecticut has some of the highest property taxes in all of the United States. In our analysis, the next highest city property tax was Seattle, WA, and residents pay around $1,400 less in taxes than in CT. We believe that due to the high taxes, home ownership rate has decreased over time, since people could live in another state, buy the same type of property, and pay much less in property taxes. Since people aren’t buying houses as often due to property taxes, housing starts have decreased dramatically since the early to mid-2000’s after bottoming out in 2011, and slowly increasing since. The rental vacancy rate has decreased more than the home vacancy rate in the past 5 years, which is an indicator that people are renting places to live instead of buying. A reason why rental vacancy is decreasing at a faster rate than the home vacancy rate may be due to the housing prices in CT. The average housing price in the United States is twice as less the average house price in Connecticut as shown in the comparison of the Case Schiller and CT Housing Price Indices. The housing market will not have a rebound if a family can buy a home for an average price that is less than half of what they would have to pay in Connecticut. The only aspect that could lead to a rebound is the decrease in mortgage delinquencies, but other factors could have contributed to this decrease. Banks have been putting stricter guidelines into who they give out mortgages to due to the recent financial crisis. Due to stricter guidelines, they have been giving out fewer mortgages, only to qualified persons; this may be the main reasons why the mortgage delinquency rate has gone down since 2010. Overall, we conclude that there will be no rebound in the housing market soon due to housing prices that are double the national average, and some of the highest property taxes in the nation.
<table>
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<th>Years</th>
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VI. The Financial Sector: Connecticut’s Comparative Advantage?

by Raymond Satagaj, Emma Trapani

The state of Connecticut has become the hub for financial service companies. With its ideal location next to Manhattan, it allows companies to be near the city without the costs. Between the cities of Stamford and Greenwich, Connecticut is home to major financial institutions such as UBS, RBS, GE and ING. It is also home to the insurance capitol of world, Hartford. Their success is attributed to the services that Metro North provides with commuter rails running from Hartford, to Stamford, Greenwich and Manhattan.

Prime location and easy access is not the only attribute Connecticut has to offer. Since 2008, the gross domestic product has risen about $20,000 and is at an all time high since 2000. Their employment rate makes up 60% of the population which is currently at 3.57 million. Such high employment rates are attributed to the incentive and certification programs that Connecticut provides for financial institutions.
**Growth in Commercial Banks National vs. State**

**Total Assets for Commercial Banks**

For commercial banks across the United States, total assets were at 15 billion in 2014 compared to 1984 when it was at 2 billion. Over a 30 year span we see a very steady increase in assets.
Total assets for commercial banks in Connecticut doesn’t have such a steady increase. In this chart we see that there was an increase from 1984 to 1989 and by 1996 there was a sharp decrease. However, from 2003 and on the total assets seem to level out. By 2014 there were 27 million dollars’ worth of total assets for commercial banks in Connecticut. This is less in 1989 when it was at 40 million.

For the state of Connecticut there is an overall decrease in assets but nationally there was an increase.

**Net income for Commercial Banks**

For commercial banks in Connecticut there is a steady pattern of net income increasing one year and decreasing the next. In 2008 there was a huge decrease in net income during the financial crisis. By 2009-2010 when quantitative easing and other recovery methods were implemented net income steadily increased.
Net income for commercial banks follows the same pattern as Connecticut but on a much larger scale. In the fourth quarter of 2014 we see net income increase to almost 140 million, a slight decrease from 2013.

Based on net income we see that nationally it has increased but for Connecticut it has decreased.

**Interpretation**

Over a 30 year span of time, nationally we see commercial banks succeeding. There is an increase in total assets and net income. Methods such as quantitative easing during the financial crisis of 2008 has directly attributed to the success of national
commercial banks. The decline of interest rates and credit rates during this time helped banks lend more and net more money. On a state level, even though there were efforts to increase both assets and income, this strategy wasn’t as positive.

The United States responded to the success of commercial banks by creating the Troubled Asset Relief Program. This program was created to strengthen the financial sector by purchasing assets and equity from financial institutions. Alongside this program the IMF has also created a crisis program that supports everyone. They increased their lending capacity and approved how they lend money. They do this by creating a credit line for those who are strong financially, they created a precautionary liquidity line which meets the liquidity needs of any country in risk of a crisis, and they put emphasis on social protection and made lending terms more flexible. The implantation of these programs has continued the success of national commercial banks.

**Profitability and Solvency of Commercial Banks**

When exploring the role of Connecticut commercial banks, it’s imperative that we stress the importance of the efficiency and profitability of these banks. Economic growth will derive from the banking system’s ability to dynamically convert savings into investments. In this sense, prosperity for the banking sector will coincide with prosperity for the entire economy of Connecticut. We will use the Return on Asset and Return on Equity metrics in order to analyze the profitability of the commercial banking sector in Connecticut. First looking at the ROA of Connecticut Banks, there has been a constant upward trend since the recent low point in Q4 2008. This upward trend was most likely brought upon by the Federal Reserve’s decision to keep interest rates incredibly low, thus
enabling banks to borrow at near zero rates (however, it also stifles insurgent growth in net interest margins and profits). As of Q4 2014, ROA is at 0.93%. The national average of ROA for US banks was 1.00% for Q4 2014 (Exhibit 1). Connecticut should be disappointed to find itself as a laggard, especially if they consider the financial sector their competitive advantage. Return on Equity for Connecticut commercial banks sit slightly above the nationwide ROE, however it is by the closest of margins. For both of the metrics, we note the incredible amount of instability for Connecticut banks.

Exhibit 1: RoA of US and Connecticut Banks

Source: Fred Database
When turning our attention to the net interest of commercial banks in Connecticut we see that Connecticut has a more favorable net interest margin than the nationwide margin. Connecticut currently enjoys a 3.28% margin, compared to 3.11% for the US banks. (Exhibit 3) However, when we take a look at the total net interest income of the Connecticut banks compared to the national banks we can see that the growth of net interest income has not been there for Connecticut banks. It has leveled off in the past decade, only growing 1.075% between 2005 and 2014. The entire US banking system had a 45.79% growth in net interest income in that same period (exhibit 4). This begs the
question, if Connecticut is experiencing a more favorable net interest margin, why are the profits being stifled?

*Exhibit 3: Net Interest Margin of US and Connecticut banks*

*Exhibit 4: Net Interest Income of US and Connecticut banks*
If we look at the driving forces of bank profitability, literature often agrees that a combination of internal and external forces affect profits. Externally, GDP and inflation are related to profitability. At a microeconomic, bank-specific level the acting forces are a combination of; size, operating efficiency, capital, credit risk, asset management, and portfolio composition (Ramlall, 2009). For purposes of this discussion we will disregard the external factors and decide which internal driver to focus on. Various studies have postulated that capital is strongly and positively related to profitability (Bikker and Hu, 2002; Carbo Valverde and Rodriguez Fernandez, 2007). With this knowledge, we can analyze the capital structure and solvency of Connecticut banks compared to the national banks. Looking at total equity capital of Connecticut banks over the past thirty years, we see a volatile pattern (exhibit 5). Capital in Connecticut banks is currently on a one-year upward trend, however it needs to continue to follow that upward trend, something Connecticut banks have failed to do in the past. The national equity capital in commercial banks has been steadily increasing for the past three decades. Connecticut banks have much more unsteady capital flow, they need to address that and continue to build their capital equity. When we look at the equity capital to total assets ratio, Connecticut’s ratio is at 10%, lower than the US total ratio of 11.1% (exhibit 6). This explains some of the volatility we have seen in the profitability metrics explored earlier (ROA and ROE). It is imperative that Connecticut becomes more solvent and adds to their equity capital.

Conclusion
If Connecticut wants to boost their economy they should stimulate their banking sector, as banks play a major role in economic activity. Connecticut banks need to add capital. This will positively benefit the banking sector in a slew of ways. First off, it will protect the banks from economic shocks, as research concludes banks with sufficient capital resources in relation to their assets are better prepared to counteract monetary policy and macro economic shocks (Altunbas et al, 2004). Once the banks add equity capital they are able to add more assets while still complying with solvency regulations. Adding more assets will become quite lucrative once the interest rates are increased by the Federal Reserve, this is feasible due to the counterparty risk improvements recent regulations have induced. Once this happens the net interest margin will increase, therefore the more assets a bank holds, the more they can exploit that spread on net interest margin and the higher profits they will reach. This encourages banks to take their reserves and invest them, thus stimulating the economy as a whole in Connecticut.

Exhibit 5: Total Equity Capital of US and Connecticut Banks
Exhibit 6: Equity Capital to Total Assets of US and Connecticut banks

Source: Federal Reserve Bank of St. Louis - FRED Database
Works Cited

