

COMPETITIVENESS: FACTORS THAT CONTRIBUTE TO ECONOMIC
GROWTH IN STATES WITH SPECIAL REFERENCE TO STATE AND
LOCAL SPENDING AND TAXES

MICHAEL J WASYLENKO

Professor of Economics
Maxwell School
Syracuse University

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Competitiveness: Factors that Contribute to Economic Growth in States with Special Reference to State and Local Spending and Taxes

Executive Summary

Strengths

Connecticut has inherent economic strengths. It is an advanced state economy with a per capita Gross State Product that is 31% higher than the U.S. average and one of the highest in the nation.

It has a highly educated workforce; 39.6 percent persons between the ages of 25 and 60 have a bachelor's degree or higher and ranks second to Massachusetts.

21 percent of Connecticut's workforce is employed in the high-productivity, high-earnings knowledge-based industries, where Connecticut's workers annual earnings average \$105,000 in 2013. (19 percent of the U.S. workforce is in knowledge-based industries; the figure is 25 percent for Massachusetts. The comparable earnings figure in these same industries for the U.S. overall is \$77,000.)

Knowledge industries are located throughout the MSAs in Connecticut. All three of Connecticut's MSAs have about 21 percent of their employment in knowledge-based industries.

Since 2012 the Hartford-West Hartford-East Hartford MSA has had a higher employment growth rate for knowledge-based industries than the other two MSAs in Connecticut.

The high earnings industries also have a large multiplier and create as many as five local service jobs for each high earning job. Moretti (2010).

At the same time, Connecticut has a diverse economy, and with exceptions, its economy is structured like New York and Massachusetts.

Vulnerabilities

As a relatively small state economy, national trends in trade, automation or recession can buffet Connecticut's industries and affect livelihoods in Connecticut more than in larger states.

Connecticut's economy has grown more slowly than neighboring states since 2007. It experienced a larger downturn in its economy during the 2008/2009 recession than the nation overall, and Connecticut's economic recovery from the recession has not kept pace with the national recovery.

The lagging recovery in Connecticut is broadly present across industry groups, although professional business services; and education, health and social assistance show signs of stronger growth since 2013. And the sluggish economic growth pattern is similar across its three

metropolitan areas. Whatever has caused the low growth rate in Connecticut since 2007 appears to affect the entire State and does not appear to be confined to a particular area or industry.

Competitiveness

State and metropolitan areas compete on fiscal grounds most often with nearby or neighboring states. Put another way, businesses come to the Northeast for its workforce and largely go to other regions for the workforce in those regions.

The implication for fiscal variables is that differences in taxes or public services have the most effect on business expansion and locations decisions when competition is between nearby states and not when competition is across regions of the country.

Findings in this report and others in the tax study show that Connecticut is not a high tax state relative to its income or fiscal capacity. It is also not a high business tax state.

Connecticut has a relatively high property tax, and its individual income tax is higher than the average for states.

Do Taxes and Expenditures Matter for Economic Growth?

Empirical estimates done for this report find that high property taxes and individual income taxes depress growth. Connecticut has relatively high property taxes and higher than average individual income taxes. The estimates also show that states that spend more on elementary and secondary education have higher economic growth.

Simulations indicate that the property tax and the individual income tax have modest effects on growth. Reducing reliance on those taxes would help growth but that fiscal reform by itself would not have a dramatic effect on a lagging economy. At the same time, doing nothing to reform those two taxes would continue to hinder growth.

Simulations of tax effects suggest that cutting property and /or individual income taxes and increasing other own source revenue to pay for the cuts might increase growth by as much as 0.2 percentage points, depending on the size of the tax changes.

Cutting property taxes and paying for the cuts by increasing revenues from the individual income would have a neutral to negative effect on economic growth.

Some combinations of tax cuts and spending cuts might hurt growth. Cutting property and/or individual income taxes and paying for the cuts by reducing spending on elementary and secondary education would harm growth.

Based on data collected for this report, Connecticut has very high electrical energy prices. Energy costs are high in the Northeast states in general, so while the high costs may be problematic, high costs for energy may be endemic to the region and structural in nature.

Connecticut has underfunded public employee pension systems. Although not confirmed in the statistical analysis on growth, that situation is unlikely to help future growth, because to some it represents an unfunded liability and higher taxes in the future.

Conclusions

In a recent report, Mirrlees (2011) and his fellow commission members reiterate long understood principles of tax design. They emphasize “looking at the fiscal system as a whole rather than at its individual components.” (Page 26) The system should be progressive, neutral and a system. (page 471.)

To the extent that a tax system such as Connecticut’s discourages income growth, reform of the system should broaden bases and lower tax rates to reduce the disincentives that occur when there are high nominal tax rates for some taxes and low rates elsewhere in the system. Balanced tax systems generally create the best environment for growth.

Connecticut has underfunded public employee pension systems. That situation is unlikely to help future growth, because to some it represents an unfunded liability and higher future taxes.

The Northeast Corridor of the United States has a high concentration of knowledge workers. Connecticut has a substantial share of its economy in knowledge-based industries. These high earnings industries have large multiplier effects and produce a large number of local service jobs.

The literature on job growth has found that most growth occurs when states retain and grow their existing industries. While economies do evolve, most economic growth or decline stems from a state’s current employers and expansion in existing industries.

An important finding in the literature on state and regional growth is that knowledge workers learn from one another and through their interactions create new ideas that enhance economic growth. Knowledge-based industries rely on a continuing flow of highly educated and innovative workers to a state or region.

Connecticut should adopt policies that attract and retain knowledge workers. It already has attractive coasts and recreation. An area that can give Connecticut a competitive edge over its neighboring states is in a lower cost for housing. Local governments might examine local zoning laws to insure orderly land use but not restrictive zoning that may drive land and housing prices upward. And it should consider strategic investment in its university laboratories and STEM disciplines to enhance knowledge creation and the supply of knowledge workers.

Competitiveness: Factors that Contribute to Economic Growth in States with Special Reference to State and Local Spending and Taxes

1. Introduction

Policy makers, economists, and other professionals have had interest in job and income growth since at least Adam Smith. There is a substantial literature that focuses on the determinants of differential employment and income growth among states and urban areas. Studies published before 1995 on differential job growth among states have analyzed growth with data that range over short time periods. That limits the conclusions on whether the factors found to influence growth do so consistently over long periods of time. Similarly, looking at growth in states and cities over long time periods introduces national and global economic forces that may lift and/or harm growth in all states and cities or help some more than others. The results gleaned from these studies risk finding that growth is due to policies adopted in states or localities when in fact the growth is due to national and international economic forces over which an open economy such as a state has no control (Matthews/OECD, 2011). Not accounting for these larger national or international forces can lead to false conclusions about the causes of differential growth rates among states. (Barro and Redlick, 2011). To complicate matters further, economic growth is not steady over time and innovation plays a large role in the overall growth rate of the U.S. economy. (U.S. Bureau of Labor Statistics March 26, 2015.)

Briefly, economic growth has two main components: the amount of growth that can be attributed to labor and to capital productivity, as well as a residual or unexplained component, known as multifactor productivity, that results from innovation and new ideas. By their nature, innovations and new ideas that lead to large productivity gains are not predictable.

Within regions, multifactor productivity or unexplained growth often arises from agglomeration economies, generally attributed to knowledge workers sharing ideas and inventing new products and services (Jacobs 1969; Matthews/OECD, 2011). Illustrations of these effects include Silicon Valley for information technology and scientific research as well as the Boston area for life sciences research (Porter, 2012). These highly productive areas result from a complicated set of forces that are largely idiosyncratic and not readily duplicated in other regions. There are other examples of large cities/areas that specialize in knowledge workers in a common industry – e.g., New York City financial sector; Hartford financial services; Connecticut pharma; Houston Oil and Gas; Dallas and Austin information electronics; and Maryland's health sector. Rothenberg Pack (2002) explains in her book that growth in metropolitan areas can be explained by a standard set of variables, but a large component of the growth differential among areas is due to agglomeration effects that tend to be idiosyncratic and not explained by policy interventions.

Automation of production and import competition has also increased over time and has altered the composition of employment in the United States and its regions (Autor and Dorn, 2013 and Autor, Dorn and Hansen, forthcoming). Thus, job losses in traditional heavy manufacturing due to automation showed up in the 1980s, but with smaller effects over time. The effects of production automation on manufacturing job losses has had the largest effects in the 1980s and smaller effects over time, with the smallest effects in the 2000s. Automation or technology has also reduced the demand for clerical jobs as well as for jobs that involve routine tasks. On the other hand, the demand for workers in the non-manufacturing sector that require manual work, communication skills, personal service and abstract reasoning has increased (Srivastava, 2015). Overall, employment in the non-manufacturing sector has not declined; instead, as a consequence of automation in the service sector, jobs have grown in low-wage services sectors and in high-wage sectors that require abstract reasoning.

Two further observations stem from this change in the mix of jobs. The first is that states with high concentrations of manufacturing jobs affected by automation and/or import competition and globalization may exhibit more overall job/income losses than states with a lower shares of manufacturing jobs. The job losses may have little to do with state fiscal policies. States have limited power to redress job changes that result from globalization or automation. But sorting out the reasons for slower job growth – external forces or state policies – only can be done at times with the benefit of hindsight. Moreover, a state may undertake policies with the intention of offsetting job losses only to find that the job effects of external forces cannot be reversed and spend valuable resources to no effect.

A second observation is that jobs in high-wage industries exhibit slower growth, while lower-wage jobs tend to grow at a faster pace because the industries are labor intensive. The implication, and one noted previously by Rothenberg Pack (2002), is that higher employment growth and higher per capita income growth are not necessarily related. Places that create high-wage jobs will generally have slower employment growth and high per capita income growth. The opposite is true when places create primarily lower wage jobs. Moretti (2010) has observed, however, that higher wage jobs have larger local multipliers and create more jobs in services than lower-wage jobs. Strong income growth creates higher demand for services, and Moretti estimates multiplier effects and suggests that five service jobs are created for every high-wage job created.

One implication for state policy makers is to focus the discussion on whether economic progress means per capita income growth, job growth, or both, and to address the types of jobs to be created. The appropriate policy instruments for job creation may depend on the types of jobs one wants to create. Once the type of growth is considered, a next consideration is whether or not state/local policy has any effect on the growth outcome.

The remainder of this report focuses on the question of the factors that contribute to, or inhibit, economic growth with special reference to state and local tax and spending policies. The next section of this report will review the recent empirical literature on the forces that create jobs and income growth in states and areas. A third section will focus on Gross State Product (GSP) growth by industry in Connecticut, and then examine the presence and growth of knowledge-

based, high-earnings industries in Connecticut. A fourth section examines the business climate in Connecticut, followed by a section that reports a new set of empirical estimates for the effects of public expenditures and taxes on GSP growth in states from 1990 to 2013. A final section contains conclusions.

2. Results on Job and Income Growth in Regions and States from Earlier Studies

There is a robust literature on the forces behind economic growth for both national and subnational – regions and states – economies, as well as a related literature on convergence of incomes among nations due to transmission of innovation and technology across countries. Nations with higher per capita incomes tend to grow more slowly than nations with lower per capita incomes. Convergence may be relevant when examining economic growth at subnational levels. Barro and Sala i Martin (1990) as well as Rothenberg Pack (2002) find evidence for income convergence among states, and there is a large literature on convergence among regions of the United States due to labor mobility within the country and related convergence of workers' wages among regions. An implication for Connecticut with its high per capita income is that it may realize lower growth than other states due to convergence of incomes over time.

There is also a large literature on fiscal competitiveness in states and regions, which is summarized below. Much of the literature focuses on tax and expenditure policy and whether states with higher taxes have lower employment and income growth. An important question is whether taxes and expenditure patterns “cause” slower growth or are simply coincident with it. Findings that there is no or limited association between taxes and growth may be correct, but a finding that there is an association should be subjected to rigorous testing for causality and the more recent literature uses techniques that attempt to uncover cause and effect.

The literature published before 1995 is summarized in Wasylenko (1997). The conclusions from that body of work are that researchers do not consistently find that taxes and expenditure policies in states deter employment and per capita income growth in states. The conclusions drawn from that body of work are that tax and expenditure policies do not influence growth. The results and conclusions from the studies in the pre-1995 period depend on the time period analyzed; the type of analytical techniques used; and what industries are examined. Carroll and Wasylenko (1994), for example, analyze employment growth by industry and test whether the influence of fiscal variables changes between the 1970s period and the 1980s period. They find that in the 1970s manufacturing jobs grow more slowly in states with higher state and local taxes especially when the funds are used to finance public welfare, but that these results do not hold for the 1980s. They also find that fiscal policy has no effects on non-manufacturing industries in either the 1970s or the 1980s.

Where agglomeration economies could be measured, researchers consistently find that they influence job creation and that policy has limited influence on creating agglomeration economies in a region and that existing regional patterns of agglomeration matter. If a place exhibits agglomeration economies, the best practice is to nurture it, but it is difficult to create

agglomeration where none exists (Porter, 2012). More will be said on agglomeration below when the post-1995 literature is reviewed.

However, when one examines business location choices or employment growth within an urban area, as opposed to across regions or states, they consistently find that taxes and expenditures patterns make a difference for business locations and employment growth. Places with more favorable fiscal environments within a metropolitan grow more quickly. The reasoning behind the findings is that within an urban area, there is likely to be less variation in the other factors and variables (wages, labor force availability, energy costs) that matter for businesses, and differences in fiscal policies then become the main differences between sites within a local area. Within this local framework, fiscal variables influence business expansion and location decisions.

The findings that taxes do not affect growth in states should not be interpreted as, “any fiscal policy is as good as any other.” Poor tax and expenditure policy can hurt a state’s economic prospects. What the empirical literature tells us is that there is not so much bad fiscal policy in states that it shows up in the empirical work or in the statistics on location decisions and employment growth.

2.1 Methods Used in Recent Studies

Studies performed since the mid-1990s focus attention on fiscal forces as well as other variables than influence growth, and in some studies, the fiscal variables receive less emphasis than other forces. Compared to earlier work, the later studies use longer time series data and pay closer attention to identifying cause and effect when studying fiscal policy and its influence on employment and income growth. Below the recent literature is discussed according to the policy being analyzed. For example, some studies examine policies on the borders of states – one state having changed its policy is compared to others that have not changed – and examine the differential growth across the state lines. Others examine agglomeration effects. We summarize the findings for each type of study in the tables that follow each section, and then discuss the limitations of the studies, if any. While tax and expenditures are a focus of this report, a logical extension is to ask what other factors, according to the growth studies, make a difference to growth and how can Connecticut capitalize on its current strengths and improve fiscal and other aspects of its economy to stimulate growth.

2.2 Method to Analyze Expenditures and Taxes

Helms (1985) modeled state and local expenditures and taxes within a balanced budget framework and that has become a standard method for analyzing how expenditures and taxes affect economic growth. Carroll and Wasylenko (1994) and two newer papers that are reviewed here use Helms' framework.

Briefly, Helms structures the fiscal issue within a budget model of taxes and expenditures. The state and local budget equation is written as the state and local budget deficit (or surplus) equal to the sum of various state and local revenues sources (denoted by subscript i) less the sum of state and local spending on different services (denoted by j):

$$Deficit (surplus) = \sum_i REV(i) - \sum_j EXP(j)$$

Revenues include all taxes, user charges, grants from federal government, and expenditures include all state and local expenditure items. Using a budget framework means that the expenditure and tax variables are not independent of one another or that to maintain the budget framework, we cannot change one fiscal variable in the equation without an offsetting change in another fiscal variable. To perform appropriate empirical analysis, one of the expenditure items or revenue items must be excluded from the model and then the results are interpreted in terms of the left out variable. For example, it is common in the papers to omit public welfare expenditures from the list of expenditure items in the statistical model. Thus, if there is a finding that personal income taxes have a negative coefficient means that personal income taxes spent on public welfare - the left out category - has a negative effect on the dependent variable. To look at the net effect of increasing personal income taxes to finance another expenditure item, raise the tax by one dollar and increase the expenditure item of interest by one dollar and compare the coefficients of the particular tax and expenditure items.

2.3 A Note on Industry Classification

Effective in 1997, the U.S. changed its industry classification. Post 1997, industry groups are classified according to the North American Industry Classification System (NAICS) and no longer according to the Standard Industry Classification (SIC).¹ The implication is that, when data on employment or Gross State Products for individual industries cross 1997, the industry-level employment or income figures pre-1997 and post-1997 are not necessarily comparable. So, researchers who use long time periods in their analysis generally analyze total employment for states, Gross State Product for the states, or per capita income. They do not analyze individual industries to avoid the inconsistent classification of industries pre- and post- 1997.

¹ NAICS was initially developed and subsequently revised to produce common industry definitions for Canada, Mexico and the United States. (naics@census.gov).

2.4 Recent Studies of Expenditure, Taxes, and Growth

Two recent studies examine a comprehensive set of expenditure and tax variables and test their influence on economic growth in states. Recent work has focused on analyzing Gross State Product or total employment for states over a multiple set of time periods along the lines of Carroll and Wasylenko (1994) and is summarized in Table 1 below.

Reed (2008) examines per capita income growth in states over a five time periods between 1970 and 1999. When using state and local taxes to represent fiscal variables, he finds that taxes deter income growth and the coefficients on taxes are statistically significant across a number of different empirical specifications. When he includes productive and public welfare expenditures in his equations along with taxes, as suggested in Helms (1985), Reed finds in some specifications that higher taxes spent on productive expenditures deter per capita income growth, while the higher taxes spent on public welfare foster growth. The latter results are unexpected, given the findings of the past literature (Reed 2008, page 74).

Gale, Krupkin and Rueben (2015) use similar data to estimate per capita income growth, new firm formation, and the employment to population ratio in states between the 1977 and 2011 at various points in the 1977 to 2011 time period. They also follow Helms' (1985) specification of the tax and expenditure variables. In addition to a measure of aggregate tax burden, they disaggregate the tax variable into major taxes – sales, individual, corporate and property taxes.

As a results of their analysis, Gale, Krupkin and Rueben take issue with Reed that taxes are important drivers of income and employment growth in states (though, again, note that Reed addressed the period 1970-1999). By extending the time periods through 2006 or 2001, they reject Reed's findings that there is a robust and consistent relationship between taxes and state personal income growth. Thus, they argue that, as a policy guide, state economic growth is not tied to state tax policy (Gale, Krupkin and Rueben, 2015 pp. 13-14). However, they do find that evidence that property taxes and social welfare spending are negatively correlated with growth.

Table 1
Expenditure and Tax Analyses/Recent Evidence

Author	Measure of Growth /Dependent Variable	Tax Variable/Results	Expenditure Variable Result
Reed (2008)	Difference in state real per capita personal income over five year period. Analyzes the period from 1970 to 1999.	Taxes as a ratio to income have a negative and statistically significant effect on per capita income growth. Same for non-tax revenues.	Expenditures are split between productive and welfare expenditures. Tax effects are negative when revenues are spent on productive expenditures. Tax effects on income growth are sometimes positive when taxes are spent on welfare expenditures.
Gale, Krupkin, Rueben (2015)	Difference in state real per capita personal income over five-year period. Also examines firm formation per capita and change in employment-population ratio. Analyzes the period from 1977 to 2011.	Taxes as a percentage of income negatively influence income growth in some of the equations and for some time periods. Increases in individual and corporate income taxes are associated with increases in income growth. Property taxes consistently have a negative and statistically significant effect on personal income, firm formation and employment growth.	Public welfare expenditures have a consistently negative effect on employment growth and real per capita personal income growth.

2.5 Taxes across State Borders

The research reviewed in this section addresses more specifically whether tax policy “causes” growth or business locations. Running social experiments on firms in treated and non-treated groups is not possible, so researchers have looked to other methodologies, mainly natural experiments.² In this case, the studies examine neighboring states, where one or more have undergone policy changes (treated group) and compare the growth or business outcomes in the treated states to the growth or business outcomes in neighboring states that have not undertaken a change in policy (non-treated group). Generally, research in this area examines growth in neighboring counties in the treated states and compares it to the growth in border counties in the non-treated states.

The results of these border studies need careful interpretation, however. Note that the studies typically examine firm location patterns in smaller geographic areas in counties on one side of a state border and compare them to location patterns in counties on the other side of the state border. Finding fiscal effects on location or growth within geographically small areas is consistent with the literature that examines location within metropolitan areas and finds taxes and expenditures matter within the urban area because other factors that could affect firm choice or employment growth do not vary much with the urban area. The issue for the border studies is: do the results scale to a broader population or affect employment and income in the state overall. More specifically in the context of state employment and income growth, are the effects in border counties indicative of what happens in the entire geographic area of the state or are we finding results at the border that, while large in those locations, do not materially move the income or employment of the state in general.³

Two studies recent studies serve to illustrate how counties in one state have different tax or business climate conditions than neighboring counties in another state can be used to study the effects of tax policy on employment or location outcomes. The first examines the effects of state tax reciprocity for the personal income tax on the location of new establishments in bordering state locations (Rohlin, Rosenthal and Ross, 2014). Tax reciprocity allows the employee to pay tax in the state of residence rather than the state of employment. Where one state has a higher personal income tax rate, tax reciprocity allows the firm to locate in the high personal income tax state that may have other features that are favorable to business and the employee to live in the lower personal income tax state. Thus, we should observe in the data that a high personal income tax does not deter new business location, when a reciprocal personal income tax

² A natural experiment can occur when two or more units that are otherwise identical have one trait or environmental condition that is different. The clearest example is when analysts examine educational or other achievements of identical twins that are for some reason raised in two different households in an attempt to determine the role that biology as opposed to environment play in the twins’ achievement (nature versus nurture). In fiscal analysis, analysts look at neighboring counties that have close to identical economic conditions but where the level of taxation may be different.

³ For a discussion of the limitations of randomized control trials and quasi experiments, see Deaton (2010) and pages 447 to 452 therein.

agreement exists between two states. They find that new establishments in fact favor high personal income tax locations when reciprocal agreements are in place and avoid the states with high sales and corporate income taxes. They also find that the results are more pronounced in more densely populated locations.

The second looks at employment and income growth in five-year intervals from 1970 to 2010 in border counties for states that have increased their corporate income tax rates compared to states that have not increased their corporate tax rates (Ljungqvist and Smolansky, 2014). In states that have increased their corporate tax rates, income and employment grow more slowly compared to border counties in states with no corporate income tax rate increases. They then examine states that have reduced their corporate tax rate, and compare the employment and income growth in border counties in these states to employment and income growth in border counties in states that have not reduced their corporate income tax rates. They find no growth advantages in border counties when states reduce their corporate tax rates. The asymmetry in the effects on income and employment growth when states increase corporate rates compared to when they reduce corporate rate raises interesting questions for tax policy.

Table 2		
Tax Effects Across State Borders		
Author	Measure of Growth /Dependent Variable	Tax Variable/Results
Rohlin, Rosenthal, Ross (2014)	Newly created enterprises situated within commuting distance of the state border. 2002 and 2005	Tests whether reciprocity for personal income tax influences location of new enterprises. A set of results indicates that with a reciprocity agreement in place – workers pay taxes where they live and not where they work – new enterprises locate in the high personal income tax state, and try to avoid the states with higher corporate and sales taxes. The results are more pronounced in more densely populated areas.
Ljungqvist and Smolansky (2014)	Income and employment growth in counties over five-year intervals from 1970 to 2010. Examines counties on the borders of states that have raised their tax rates and compares them to border counties in another state that has not raised its tax rate.	In states that increased their corporate tax rates, employment in counties on the state border grew more slowly than counties on the other side of the border in states that had not increased their corporate income taxes. However, in states that reduced their corporate income taxes, the border counties did not have an increase in employment or income compared to border counties in states with unchanged corporate income tax rates.

2.6 Agglomeration Economies

The importance of agglomeration economies has received attention as a driver of economic growth in the urban and regional literature for some time. Agglomeration economies take two basic forms: localization economies or firms that benefit from knowledge spillovers from firms in the same industry; and urbanization economies – urban diversity, urban size, knowledge - where firms benefit from workers and managers interacting across industries to spread existing knowledge and create new knowledge (See Jacobs 1969.). Both types of agglomeration occur in

larger cities and the advantages of agglomeration drives further growth in regions or cities. The distinction between the agglomeration economics is important. Some researchers find that localization economies are important to retaining firms but do not lead to growth, whereas the agglomeration that comes with urban diversity, talent and knowledge spillovers offers a dynamic growth environment.

Glaeser and Gottlieb (2009) review this literature. One point of special note is that agglomeration economies lead to growth and enhanced productivity, and that in turn leads to higher wages. The advantages of agglomeration and the higher wages induce further in-migration of knowledge workers who demand more housing and land; and create more congestion adding to commuting times. Larger numbers of workers, congestion, and higher housing/land prices then present limits to the agglomeration advantages. Once the added costs of housing and congestion exactly offset the higher wages in the region, the area reaches an equilibrium where further growth requires another significant advance in productivity gains. An important point here and one often not mentioned in studies of economic growth is the role that housing prices can play for future economic growth. Glaeser and Gottlieb note that whether or not employment growth increases housing prices depends on the elasticity of supply of housing and of land, in particular. A shortage of available land in a city area will increase the cost of land; drive households farther from the city area; and increase congestion and commuting costs. Furthermore, zoning laws and land regulations can also restrict available land and drive up the costs of land to offset the higher wages that derive from agglomeration economies.

Turning to the empirical literature, Glaeser, Kallal, Scheinkman and Shliefer (1992) find evidence of knowledge spillovers when they examine employment growth for major industries in 170 cities from 1956 to 1987. Henderson, Kuncoro, and Turner (1995) examine employment growth between 1970 and 1987 in five mature manufacturing industries for 224 metropolitan areas. They find that localization or within-industry agglomeration economies play an important role for growth. They then examine employment growth for three knowledge-based industries. Two observations: only about a third of the original 224 metropolitan areas have knowledge-based industries; and growth in employment in these industries depends more on urban diversity or Jacobs-type knowledge spillovers than on localization economies.

Rosenthal and Strange (2003) examine firm births in relation to agglomeration economies. Firm births are more likely to occur nearer to small firms in the same industry. They also find evidence that the benefits of agglomeration for new firms attenuate with distance from other firms; the benefits are strongest when firms locate within five miles of one another.

Moretti (2012) devotes a significant portion of his book to a discussion of the literature on agglomeration and applies it to newer industries in the innovation sector – information technology, life sciences, medical devices, robotics, new materials, and nanotechnology, for example. Agglomeration economies play a significant role in attracting more knowledge-based companies to an area. He also argues that the knowledge spillovers require close proximity and

attenuate with distance. Knowledge workers need to find one another quickly and interact frequently for more than brief periods of time to create meaningful knowledge spillovers.

Of substantial interest for development and growth is how the agglomeration of knowledge industries come into being and what policy makers can do to jump start the knowledge-based sectors. Another way to ask the question from a policy perspective is: “Can we create incentives – tax or otherwise – to attract knowledge-based industries?” Moretti makes two points: tax or other incentives targeted at attracting specific firms or industries rarely work to the advantage of the state or locality. He points to the large subsidies paid to automobile companies to locate businesses in a state and the high cost per job created.

Another approach to attract industries is through place subsidies, where states or cities and even the federal government target a particular area for investment. Examples include the Appalachian Regional Commission that directed investment in the Appalachian area; the Tennessee Valley Authority; and Empowerment Zones. Moretti (2012) notes that the latter two are successful for two reasons: the investment amount is large and sustained for 25 years or more in the case of TVA, and the subsidy is not targeted at a particular industry but to all businesses in the case of Empowerment Zones. Generally though, place subsidies do not have sustained funding and as a result do not produce the desired growth results.

Further Moretti (2012) reasons that formation of a high-tech sector involves a complex ecosystem. The presence of universities by itself will not result in a high-tech industry sector, although they can be an important part of the system. Moretti notes that the Silicon Valley and the Boston-Cambridge areas have a system of diverse enterprises; faculty who innovate and have the entrepreneurial drive to start companies with venture capitalists. Faculty return to research while the venture capitalists hire managers and hire knowledge workers often from universities in the area. Larger companies then buyout the successful ventures and grow the company, which in turn attracts more knowledge workers. The system feeds itself.

Connecticut has a number of highly rated research universities; it also has other high-tech industries that benefit from agglomeration. The report turns to an analysis of the Connecticut economy.

Table 3
Agglomeration Economies

Author	Measure of Growth /Dependent Variable	Results
Glaeser, Kallal, Scheinkman, and Shleifer (1992)	Employment growth and wage growth in five largest industries for 170 cities between 1956 and 1987.	Cities that have more variety of industries and more competition among firms in a given industry tend to grow faster. Also, knowledge spillovers among workers – a main feature of agglomeration economies - tend to occur among industries rather than strictly within a given industry.
Henderson, Kuncoro, Turner (1995)	<p>1987 Employment in five mature manufacturing industries in 224 metropolitan areas, given 1970 levels of employment in those same areas.</p> <p>Then 1987 employment in three high-tech manufacturing industries in fewer than half of the 224 areas that have those industries.</p>	<p>Within industry agglomeration economies are important for the mature manufacturing firms. No evidence of the Jacobs-type knowledge spillover agglomeration effects are found or these five industries.</p> <p>For 1987 employment size in the three high-tech industries, Jacobs–type knowledge spillovers among industries played a much stronger role than localization or within industry agglomeration economies.</p>
Rosenthal and Strange (2003)	Births of new establishments and new establishment employment in 1997.	Localization economies – within industry – spillovers found to influence the birth and establishments and employment. Two caveats: the degree of the agglomeration are strongest when like firms are located within five miles of one another and the effects are strongest for smaller establishments and less important for large establishments.

3 Connecticut's Economic Structure and its Growth⁴

Connecticut has a population of 3.6 million residents and has a real per capita GSP in 2014 of \$64,676 (measured in 2009 dollars) that is 31 percent higher than the United States average. Table 5 displays the per capita real (2009 dollars) GSP in 1997 and 2014 for the five highest states in 2014, excluding the District of Columbia and the natural resource states; namely, Alaska, North Dakota and Wyoming, because their resource-based economies lack economic comparability with Connecticut and other states.) In 1997, Connecticut and Delaware rank ahead of New York and Massachusetts in real per capita GSP. By 2014, New York ranks first among the non-natural resource states, and Delaware falls behind Massachusetts. New York and Massachusetts have annual average real per capita GSP growth rates of 1.6 and 1.7 percent, respectively, while Connecticut grows at an annual rate of 1.0 percent, which is slightly below the United States annual average growth rate of 1.1 percent over the 1997-2014 period.

Table 4
Real Per Capita GSP for Selected States by Rank (2009 dollars)

State	1997	2014	Annual Growth Rate
New York	\$49,004	\$64,818	1.6%
Connecticut	\$54,753	\$64,676	1.0%
Massachusetts	\$47,224	\$63,005	1.7%
Delaware	\$57,351	\$60,551	0.3%
New Jersey	\$49,678	\$56,405	0.7%
United States	\$40,818	\$49,469	1.1%
Rhode Island	\$37,744	\$47,901	1.4%
New England	\$45,693	\$58,071	1.4%

Source: U.S. Bureau of Economic Analysis
<http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=1#reqid=70&step=1&isuri=1>

⁴ This section complements the September 16, 2015 Tax Panel presentation on Connecticut's Economy by Manisha Srivastava.

To some extent, the slower growth rates in a higher income state may be a regression to the mean phenomena or convergence in per capita GSP over time. It may also be due to a different mix of industries among the three states. For example, Connecticut may be saddled with slower growing industries while New York and Massachusetts have faster growing industries.

To understand the difference in industry mix among the three states, Table 5 displays location quotients based on the 2014 employment share in each (2-digit NAICS) industry sector compared to the employment share in the same sector for the nation as a whole. As an example, a location quotient of .90 in an industry sector means that a state has a lower share of employment in that sector than the nation as a whole. A location quotient of 1.10 means it has a 10 percent higher share of employment in the sector than the nation as a whole.

Based on location quotients displayed in Table 5, the three states have similar employment structures, and their differences are limited to a few industry sectors. Connecticut has a greater share of employment in manufacturing in 2014 than the nation as a whole, while both Massachusetts and New York have lower concentrations in manufacturing than the nation as a whole. All three states have higher concentrations of employment in educational services as well as in health care and social assistance than the nation as a whole, and the employment concentrations in these two industry sectors are similar among the three states. All three states have above average concentrations in finance and insurance, and Connecticut has a higher concentration of employment in this industry sector than the other two states. The same applies to management and enterprise, where Connecticut enjoys a higher concentration of employment than the nation, Massachusetts, and New York. New York dominates the other two states in real estate and rental and leasing.

An important observation is that Massachusetts and New York have higher concentrations of employment in professional, scientific and technical services (NAICS 54) and in the information sector (NAICS 51) compared to the nation, and Connecticut lags the nation in these two emerging economic growth areas. The industry sector named “professional and technical services” contains scientific research and development as well as a range of professional services from law to architecture and other knowledge-based industries, but there is more to knowledge-based industries than these two sectors.

Table 5
Industry Sector Location Quotients:^a
Connecticut, Massachusetts and New York 2014

Industry Sector (NAICS)	Connecticut	Massachusetts	New York
Base Industry: Total, all industries	1.00	1.00	1.00
11 Agriculture, forestry, fishing, and hunting	0.34	0.23	0.32
21 Mining, quarrying, and oil and gas extraction	0.05	0.04	0.08
22 Utilities	0.88	0.77	1.06
23 Construction	0.75	0.83	0.86
31-33 Manufacturing	1.07	0.81	0.57
42 Wholesale trade	0.89	0.84	0.89
44-45 Retail trade	0.98	0.90	0.94
54 Professional and technical services	0.93	1.34	1.16
55 Management of companies and enterprises	1.21	1.16	1.01
56 Administrative and waste services	0.82	0.79	0.82
61 Educational services	1.74	1.99	1.86
62 Health care and social assistance	1.19	1.27	1.18
48-49 Transportation and warehousing	0.78	0.68	0.81
51 Information	0.95	1.24	1.49
52 Finance and insurance	1.56	1.16	1.37
53 Real estate and rental and leasing	0.77	0.83	1.40
71 Arts, entertainment, and recreation	1.02	1.02	1.17
72 Accommodation and food services	0.81	0.91	0.87
81 Other services, except public administration	1.16	1.06	1.27

^a Note: Location Quotient: Ratio of analysis-industry employment in the analysis area to base-industry employment in the analysis area divided by the ratio of analysis-industry employment in the base area to base-industry employment in the base area.

Source: 2014 BLS http://data.bls.gov/location_quotient/ControllerServlet

Another observation is that examining average real per capita GSP growth rates over a decade or more, as in Table 5, will mask episodic growth spurts and declines that underlie the annual average calculated over the entire period. In particular, while a trend over 13 years indicates that Connecticut's growth has not kept pace with real per capita GDP growth in the United States, it would be interesting to know whether the differences occur in a particular time period and/or stem from a few particular industries.

3.1 Annual Growth in Connecticut and Major Industry Sectors

To address the above questions, annual growth rates of real per capita GSP in Connecticut are compared to the growth pattern for the United States as a whole. The graphs (Figure 1) below trace real per capita GDP growth for the United States (blue dashed line) and Connecticut (red line) over the 2001 to 2013 time period. Based on the data that form the basis of the graphs, growth in real per capita GSP in Connecticut exceeds the rate of growth in the United States until the 2007/2009 down turn. Connecticut suffers a deeper recession than the U.S. overall and it does not rebound to the same extent as the United States in the post-recession period from mid-2009 forward.⁵

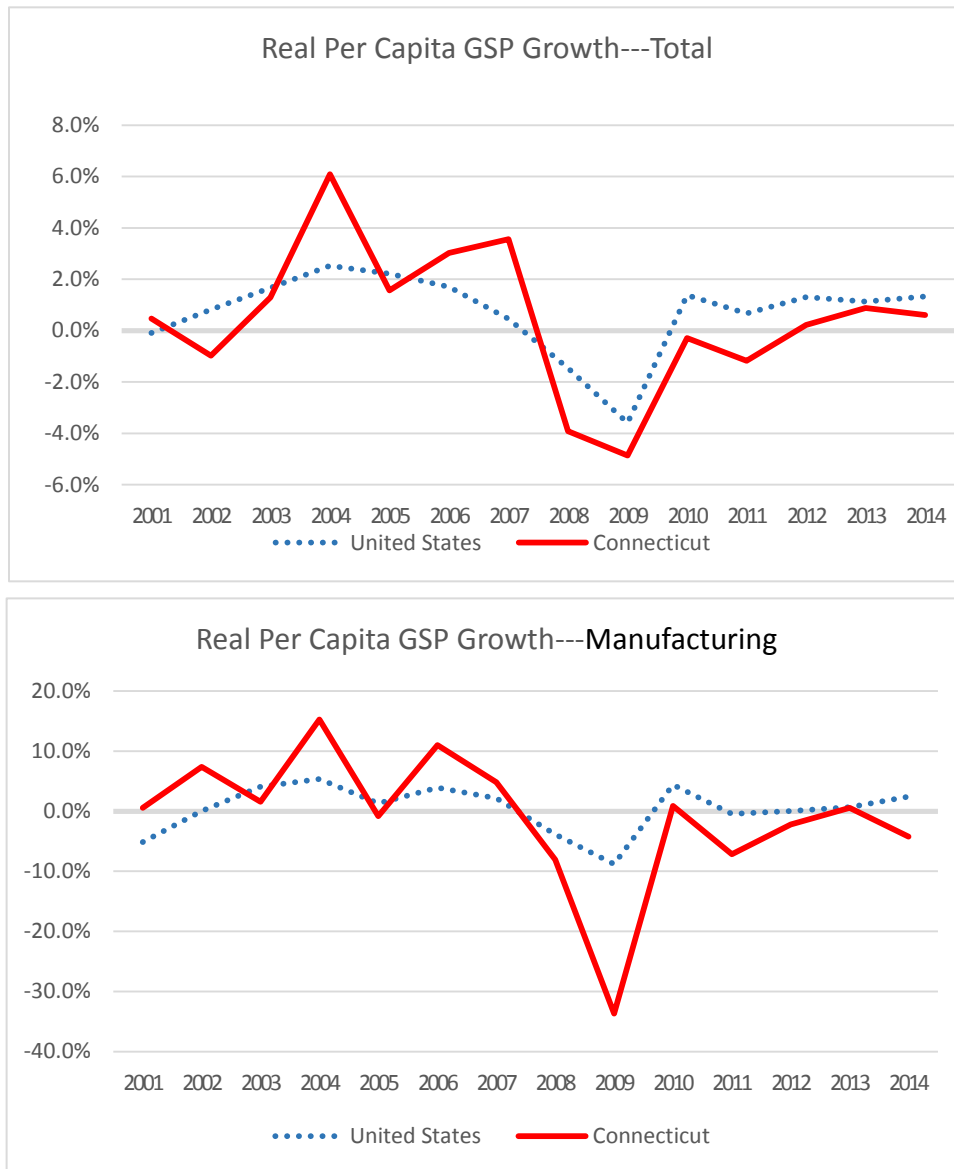
We next examine real per capita GSP for each of Connecticut's major industry sectors: manufacturing; finance, insurance, real estate, rental and leasing; professional and business services; educational, health care and social assistance; and government. Prior to 2008, with the exception of professional and business services, real per capita GSP growth rates in the other four sectors exceed - for manufacturing and government - or keep pace with the U.S. average growth rate. During the recent recession, Connecticut experienced a much sharper decline in real per capita GSP growth rates in the industry sectors examined here except for professional and business services. Connecticut lags the U.S. in growth during the post-recession period, and its strongest growth lies in professional and business services, and government, where the recent annual growth rates are as high as 6 percent. Finance, insurance, real estate, rental and leasing initially exhibit a sharp recovery in Connecticut after suffering a larger decline than the nation in 2008. Since 2010, the Connecticut's growth rate in this important sector and has been near zero.

While there are areas of recent strong growth, the graphs in Figure 1 reveal a sluggish recovery for Connecticut overall.

⁵ The National Bureau of Economic Research puts dates on business cycles. According to NBER, the recession began in December 2007 and reached its lowest point in June 2009. The recovery thus began in the third quarter of 2009. See <http://www.nber.org/cycles.html>

Figure 1⁶

Growth in Real Per Capita GSP for Connecticut and the United States: Total and for Selected Industries 2001-2014



⁶ Source: Real per capita GDP is in chained 2009 dollars from the U.S. Bureau of Economic Analysis.

<http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=1#reqid=70&step=1&isuri=1>

Figure 1 (continued)

Growth in Real Per Capita GSP for Connecticut and the United States: Total and for Selected Industries 2001-2014

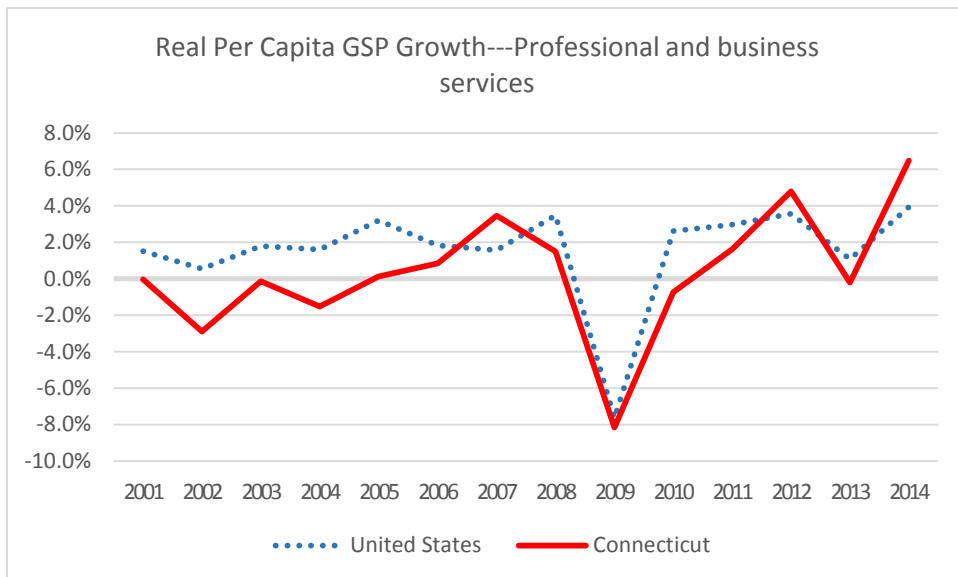
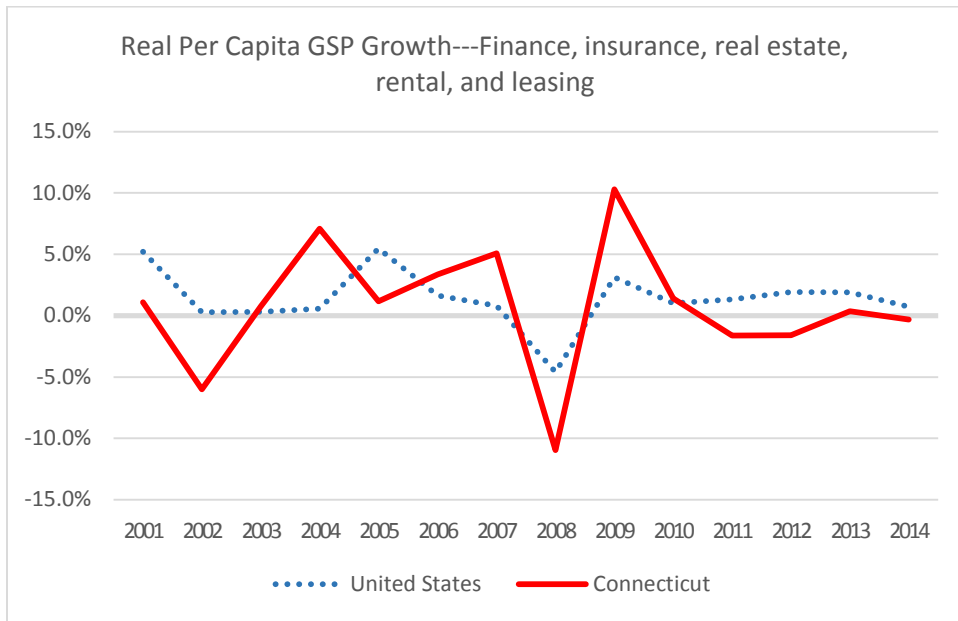
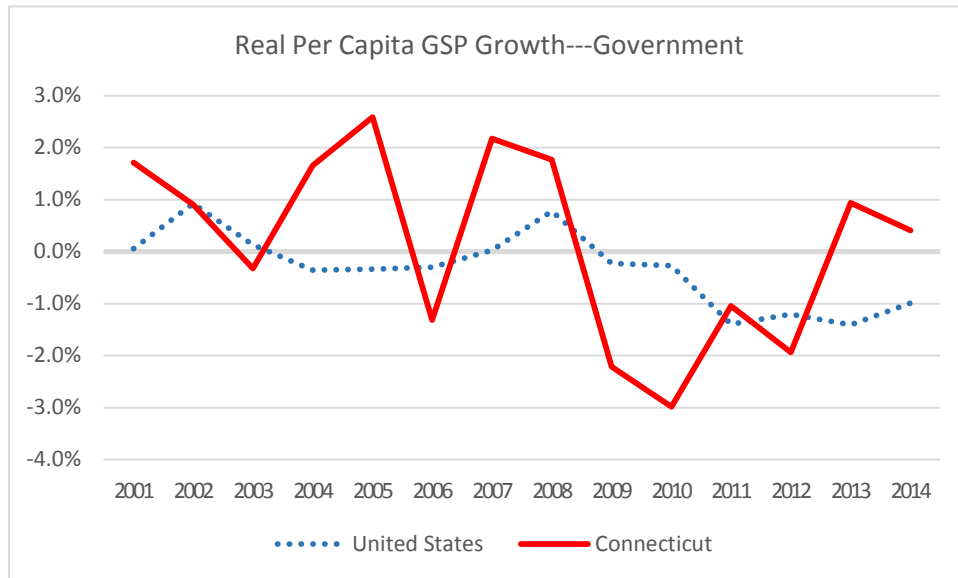
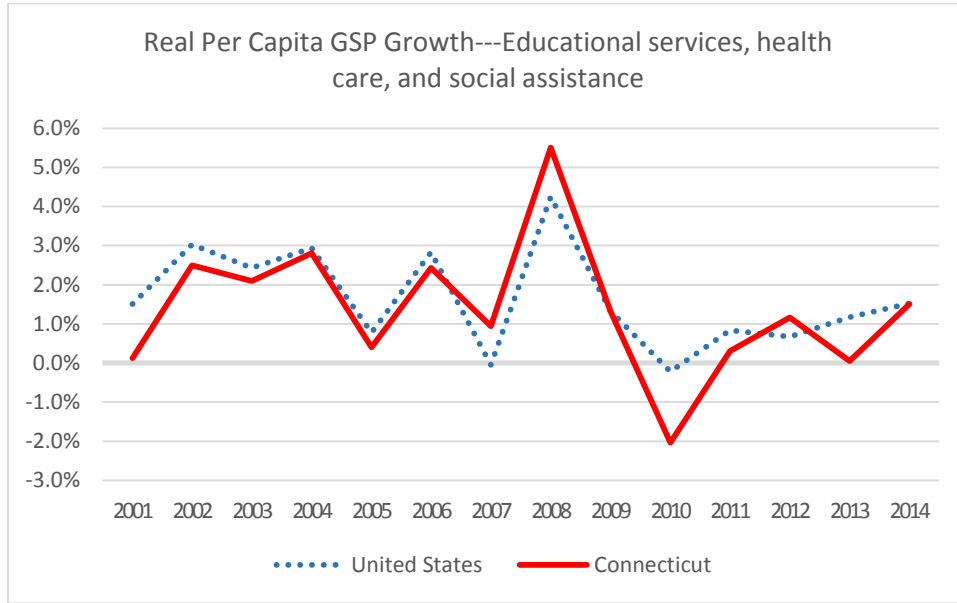


Figure 1 (continued)

Growth in Real Per Capita GSP for Connecticut and the United States: Total and for Selected Industries 2001-2014



3.2 Growth in Connecticut's Metropolitan Statistical Areas

Another question is whether sluggish growth occurs in any particular metropolitan statistical area (MSA) within the state or do all three MSAs in the state grow at roughly the same rates? With about 84 percent of the Connecticut's population living in one of three metropolitan areas, - Bridgeport-Stamford-Norwalk (BSN); Hartford-West Hartford-East Hartford (H-WH-EH); and New Haven-Milford (NH-M) - these MSAs will likely drive growth in Connecticut. Uneven patterns of growth or decline among the regions could be a responsible for the slow growth. Such a pattern would suggest policy intervention at the regional level, whereas similar growth or decline in all three MSAs may suggest a more general set of policy interventions.

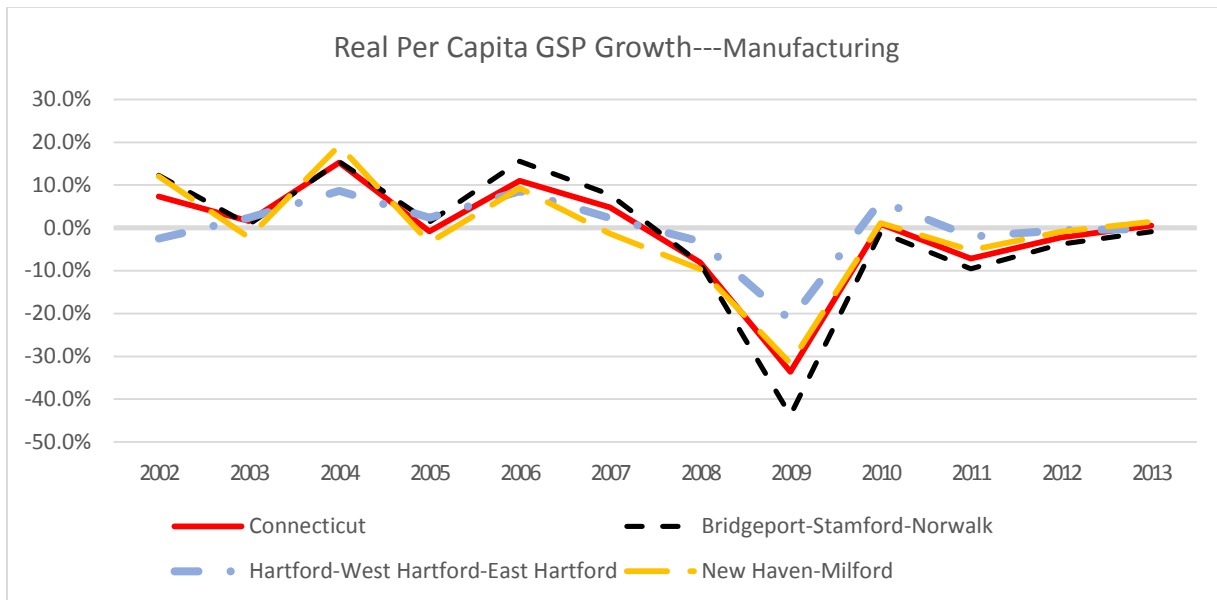
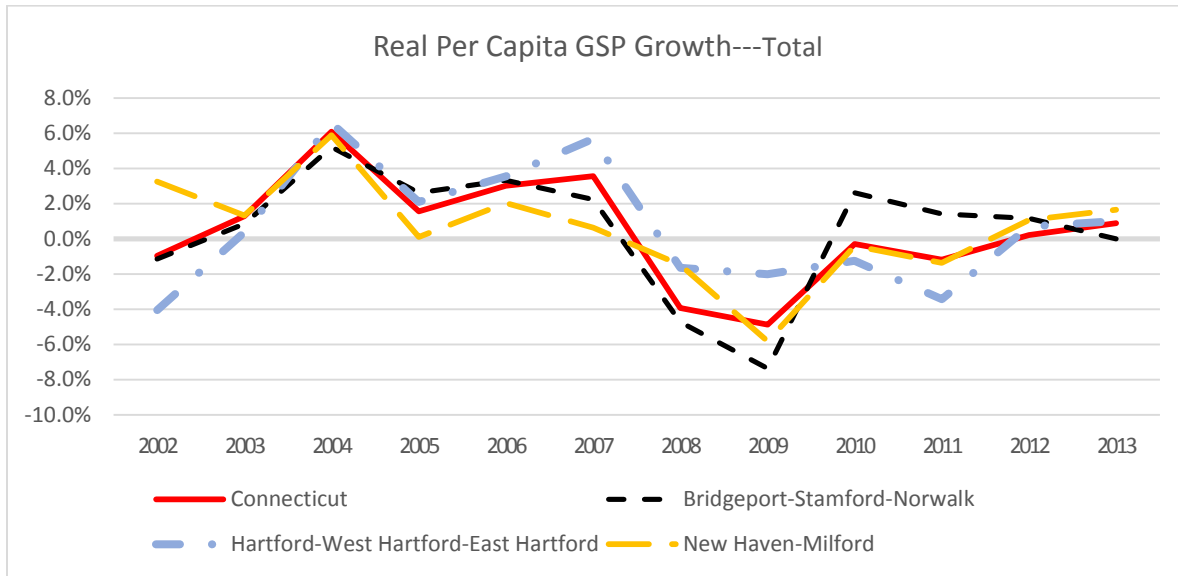
A second set of graphs in Figure 2 examines real per capita GSP growth in each of the three MSAs for the 2001 to 2014 period for the same industries as above.

Using the 2001 to 2013 period, for which we have data on the metropolitan areas, the graphs show the annual rates of growth in each of the three MSAs using the State's rate of growth (red line) as a benchmark. For real per capita GSP growth, BSN emerges from the recession with stronger growth rates than the other two MSAs. By 2012, its growth rate returns to the mean in the State, and after 2011, NH-M has stronger annual growth than the State overall. The differences in growth rates among the MSA can be attributed to two industry sectors: finance, insurance, real estate, rental and leasing; and education services, health care and social assistance. NH-M shows strong growth in the former sector in recent years, and H-WH-EH and NH-M show stronger than average growth in educational service, health care and social assistance. While the growth differences among the MSAs are not large and the differences may be ephemeral, as the growth rates change over time, the numbers suggest some areas of strength in two MSAs, but not enough strength to drive high growth in the State overall.

At the same time, the figures do not support the ideas that a particular area of the State or an industry sector in the state have grown or shrunk more than any other. Put another way, whatever has caused the low economic growth in Connecticut during the post-recession period appears to affect the entire State and does not appear to be confined to a particular area or industry.

Figure 2⁷

Growth in Real Per Capita GSP for Connecticut and Three MSAs: 2001-2013



⁷ Source: Real per capita GSP is in chained 2009 dollars from the U.S. Bureau of Economic Analysis.

<http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=1#reqid=70&step=1&isuri=1>

Figure 2 (continued)

Growth in Real Per Capita GSP for Connecticut and Three MSAs: 2001-2013

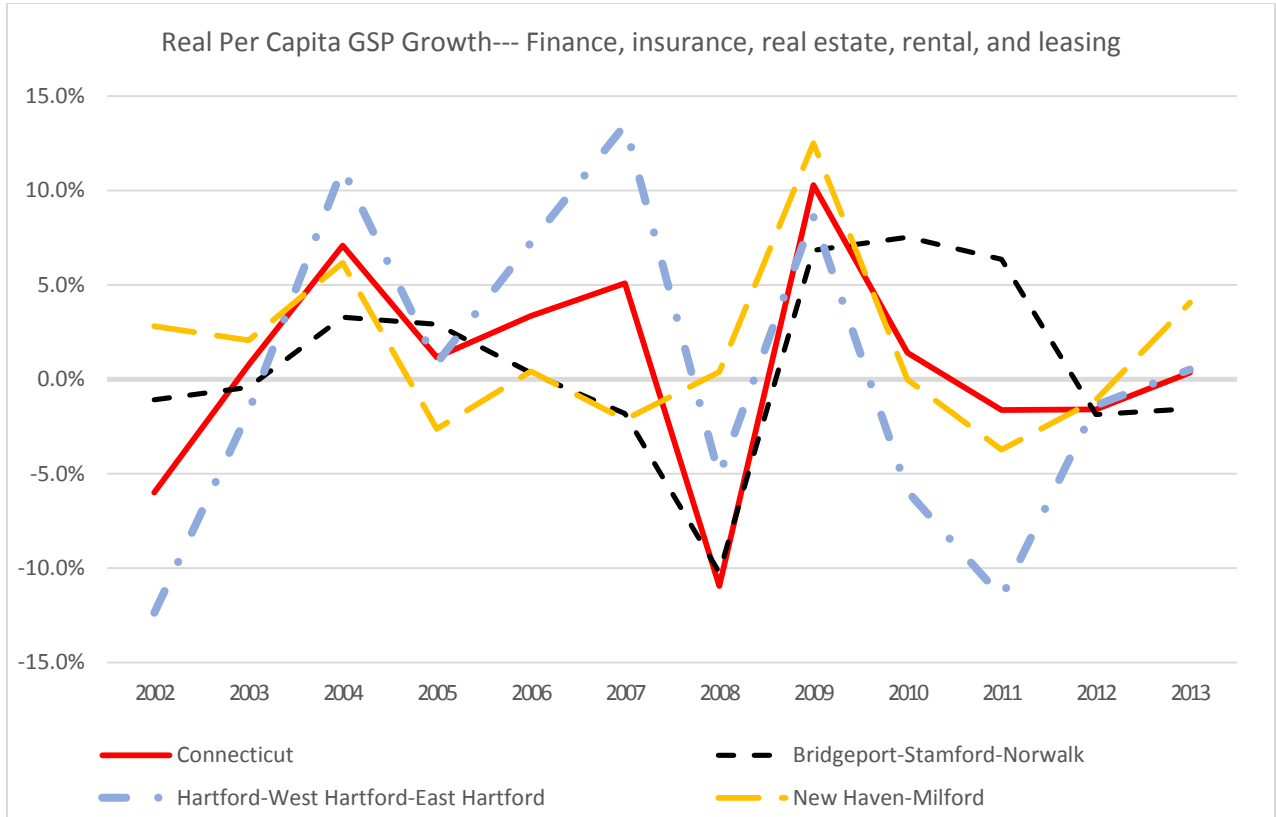


Figure 2 (continued)

Growth in Real Per Capita GSP for Connecticut and Three MSAs: 2001-2013

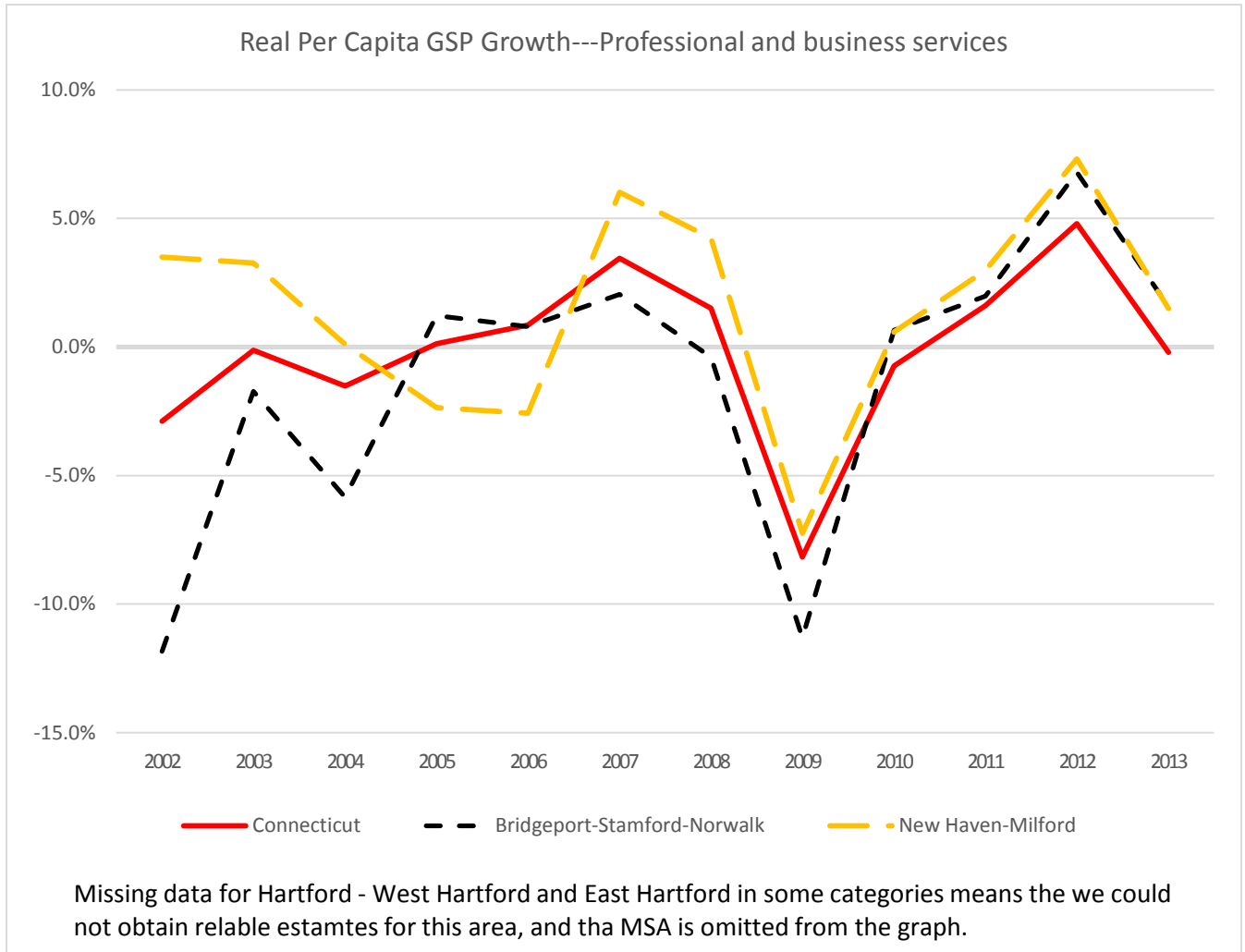
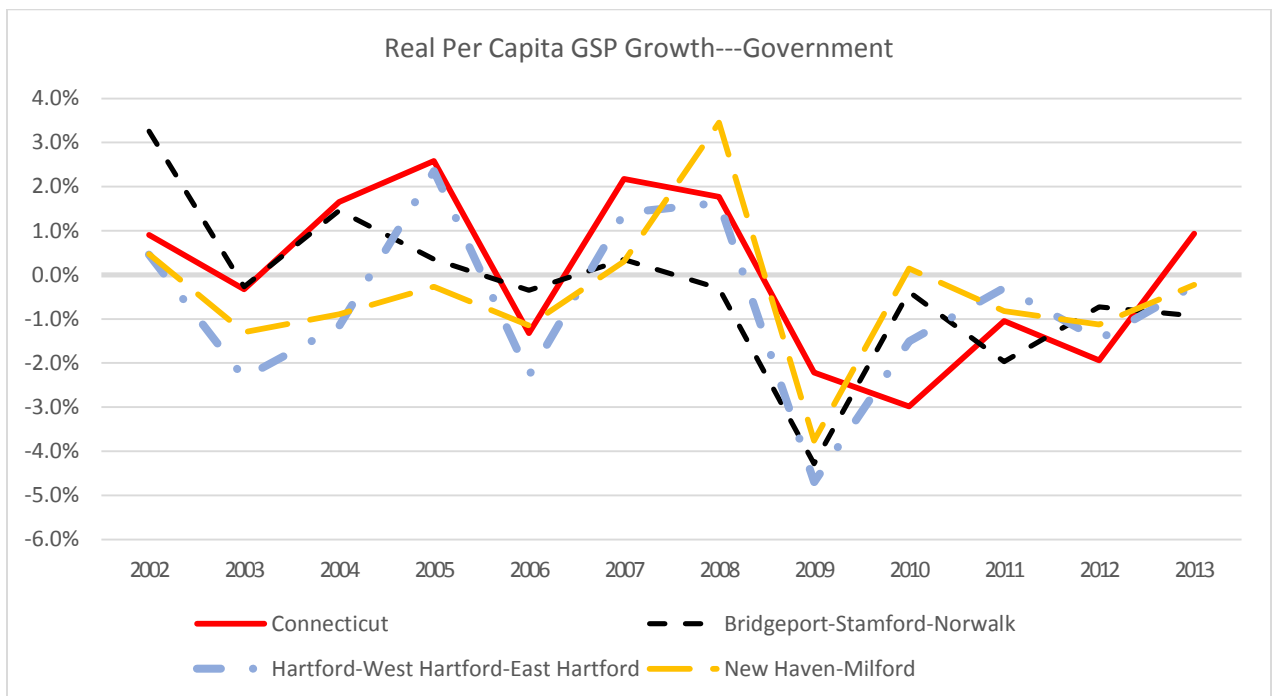
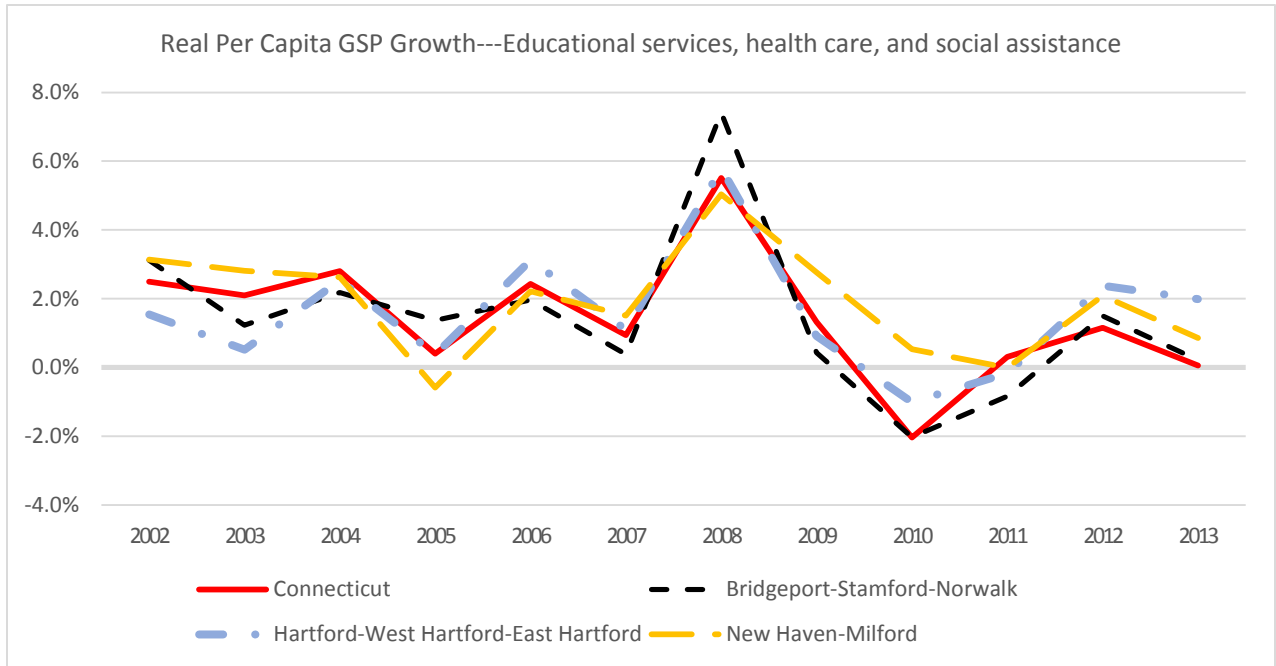


Figure 2 (continued)

Growth in Real Per Capita GSP for Connecticut and Three MSAs: 2001-2013



3.3 High-Wage, Knowledge-Based Industries

Global competition as well as automation have presented challenges for job growth in the United States. A number of studies [Dever et al. (2014), Hecker (2005), Fischer (2015), Kantor and Whalley (2012), Moretti (2012), and Muro et al. (2015)] point to advanced manufacturing in pharmaceuticals and related industries as well as knowledge-based industries as sources for new high-wage job growth in the United States. These industries in particular cluster around one another so that knowledge workers continue to learn and innovate through contact with workers in the same and related industry sectors (Jacobs 1969).

Measuring the amount of biotech and knowledge-based industries in a state or region poses two types of challenges. The first is that any definition of what constitutes a knowledge-based sector requires aggregating industries from their three- and four-digit level NAICS codes. But state-level and MSA-level Gross State Products are not available by three-digit and four-digit NAICS codes. Consequently, to examine state-level and MSA-level concentrations and growth in these industry clusters, we use employment data from the U.S. Bureau of Labor Statistics. These employment figures rely on ES-202 data reported by states and aggregated by employers in each county - or quasi-counties in the cases of Connecticut and Massachusetts.

Another challenge is that there is not a unique definition of biotech and knowledge-based industries. Three different studies have defined advanced manufacturing and knowledge-based industries. There is significant overlap in the definitions of knowledge-based and biotech used in the three studies, however. In choosing a definition for the purpose of this study, we take advantage of the observation by Muro et al. (2015) that knowledge-based industries have a presence in all but six states, and that the type of knowledge-based industries located in a state varies by region of the U.S. and by state. We have chosen an industry definition used in a study of Massachusetts (2007), because that definition is representative of the industries likely to locate in East Coast MSAs and states.

The industry definitions used in this report are noted in a text box below. For purposes here, biotech itself consists of employees in four advanced manufacturing industries. And the biotech industries are a subset of the more broadly defined knowledge-based industries, which consist of advanced manufacturing as well as information services, education, research and development, hospitals, insurance, and professional services industries.

Biotech manufacturing, as defined here employs about 0.6 percent of the workforce nationwide and roughly 0.8 percent of the workforces in Connecticut and Massachusetts. The more broadly defined knowledge-based industries employ 19 percent of the workforce nationwide; 21 percent of the workforce in Connecticut and 25 percent of the workforce in Massachusetts. See Figure 3.

Figure 4 displays average real earnings for employees in biotech and knowledge-based industries. Earnings of employees are measured in real 2013 dollars and real earnings in these industries for the U.S. overall exceed \$90,000 in 2014 and have grown from under \$80,000 in 2000. Real earnings for biotech employees in Connecticut and Massachusetts are \$110,000 in 2014, and since 2000 average real earnings in biotech industries have grown from \$90,000 in Massachusetts and from \$100,000 in Connecticut.

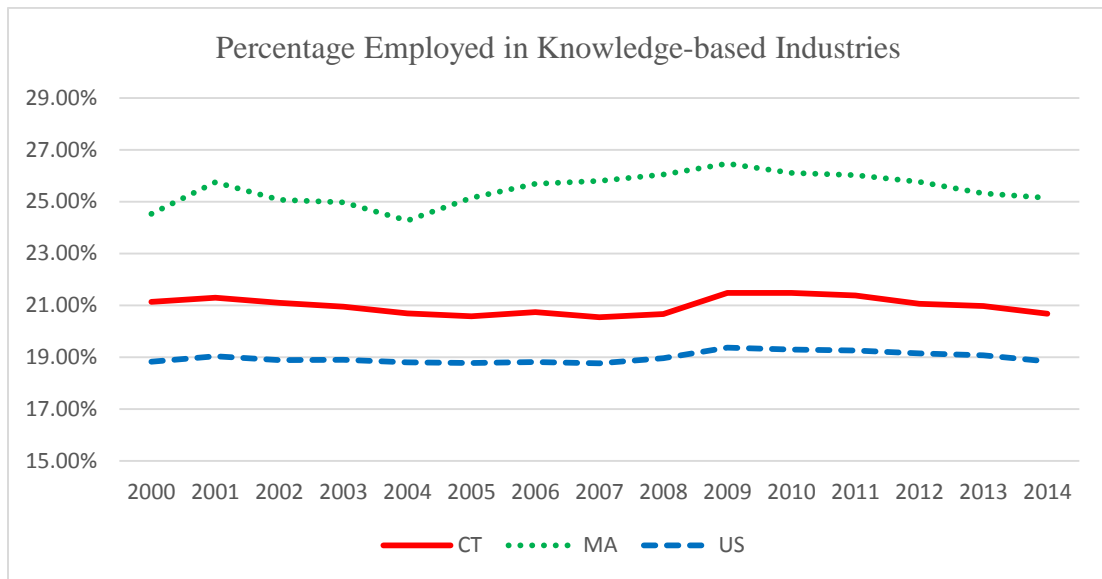
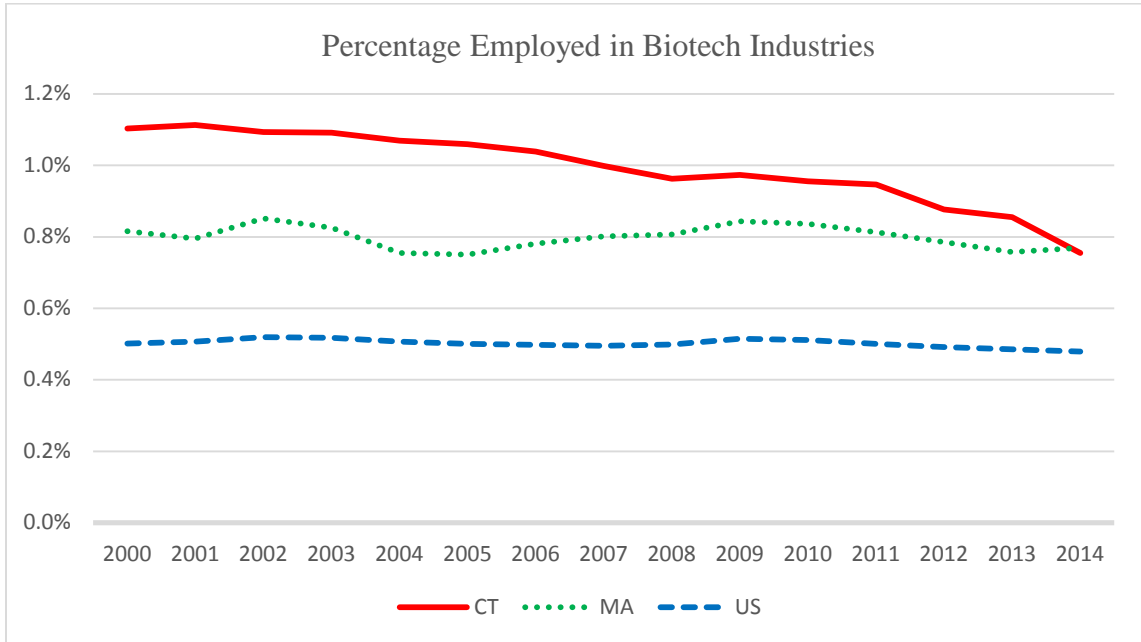
Knowledge and Information Industries

Definitions of knowledge industries and information technology industries vary across studies - see, for example, Hecker (2005) and Muro et al. (2015) - but there is similarity in the definitions of knowledge-based or advanced technological industries across the studies. National studies look at advanced industries more broadly and find that among the advanced industries certain groups concentrate in different areas of the country Muro et al. (2015). For the purpose of this report, we use a definition adopted by for a study of the Massachusetts work force. (“Identifying and Defining; Life Science, Bio-Tech, High Tech Knowledge Industries and Information Technology Industries.” Prepared by: Massachusetts Department of Workforce Development, Division of Career services, Economic Analysis Office, July 2007.) Bio tech industries include the following industry NAICS (2002) industries: 3254 Pharmaceutical and Medicine manufacturing; 334510 Electro Medical Apparatus manufacturing; 334517 Irradiation Apparatus manufacturing; and 3391 Medical Equipment and Supplies Manufacturing.

Knowledge-based industries include the following NAICS industries: 3231 Printing and Related Support Activities; 5411 Legal Services; 5412 Accounting, Tax Preparation, Payroll, and Bookkeeping Services; 5413 Architectural, Engineering and Related Services; 5417 Scientific Research and Development Services; 6112 Junior Colleges; 6113 Colleges and Universities; 6114 Business, Computer and Management Training; 6115 Technical and Trade Schools; 3254 Pharmaceutical and Medicine Manufacturing; 3391 Medical Equipment and Supplies Manufacturing; 662 Hospitals; 334 Computer and Electronic Product Manufacturing; 335 Electrical Equipment and Appliances; 5512 Software Publishers; 516 Internet Publishing and Broadcasting (519 NACIS in 2012); 517 Telecommunications; 518 Data Processing, Hosting, and Related Services; 5415 Computer Systems Design and Related Services; 522 Credit Intermediation and Related Activity; 523 Securities, Commodity Contracts, and Other Financial Investments and Related Activity; and 524 Insurance Carriers and Related Activities.

Figure 3

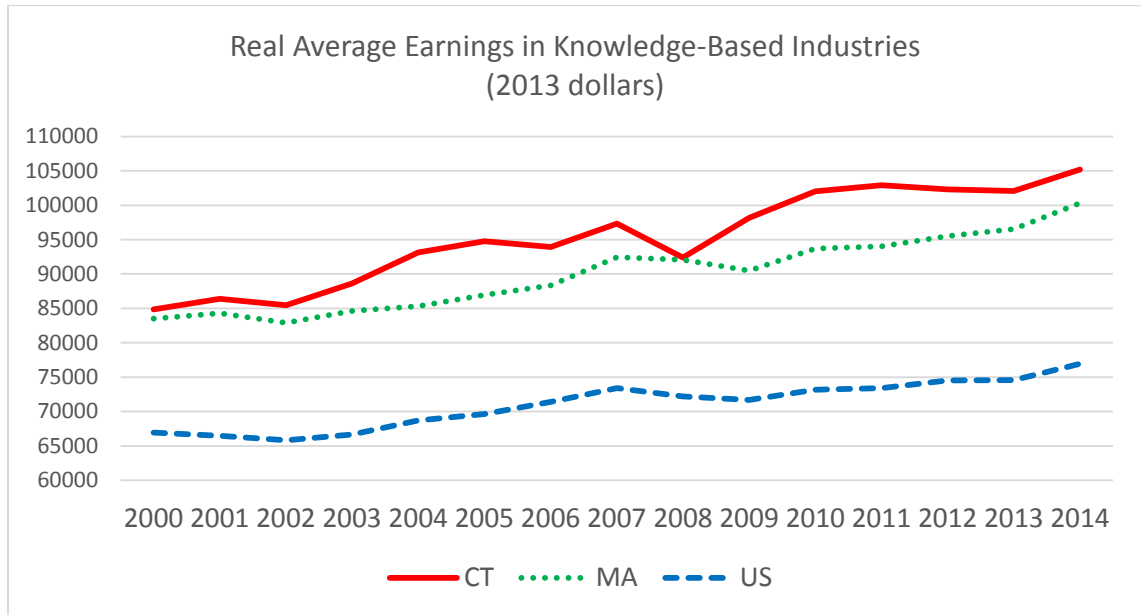
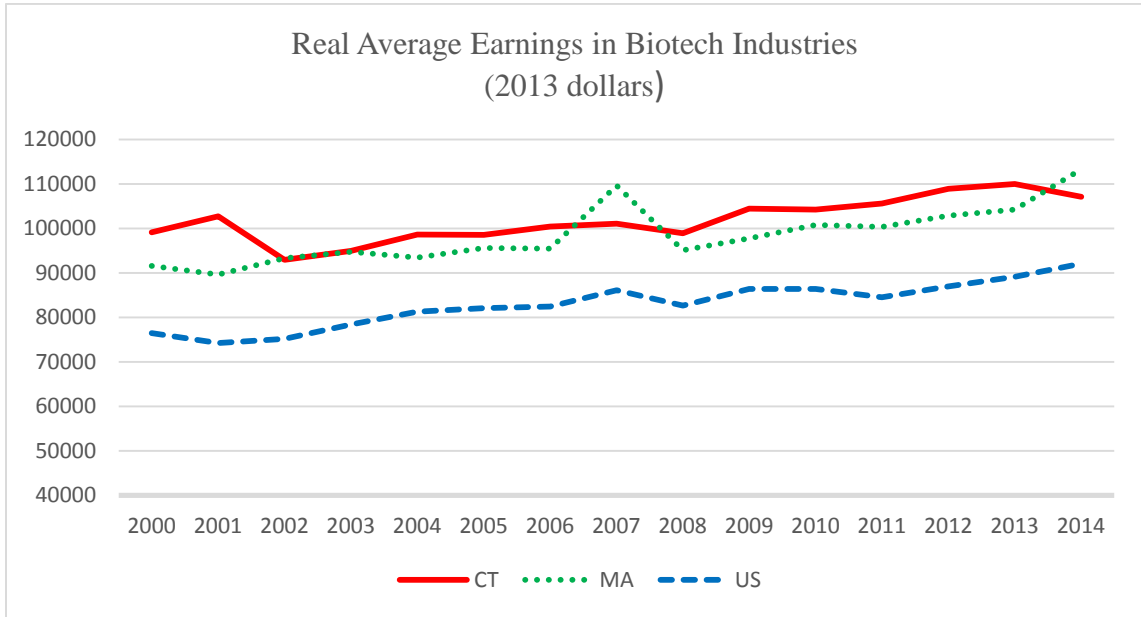
Employment in Biotech and Knowledge-based Industries as a Percentage of Total Employment: U.S., Connecticut and Massachusetts



Source: U.S. Bureau of Labor Statistics. Quarterly Census of Employment and Wages.
<http://www.bls.gov/cew/datatoc.htm>

Figure 4

Real Average Earnings in Biotech and Knowledge-based Industries:
U.S., Connecticut and Massachusetts



Source: U.S. Bureau of Labor Statistics. Quarterly Census of Employment and Wages.
<http://www.bls.gov/cew/datatoc.htm>

Connecticut biotech workers start with higher average annual earnings than Massachusetts in 2000 but real earnings grow faster in Massachusetts and catch-up with average earnings for workers in these industries in Connecticut. The fact that earnings are higher in biotech, which is a consistent and a well-defined set of industries, in Connecticut and Massachusetts than in the United States as a whole suggests that productivity of workers is higher in Connecticut and Massachusetts and the earnings reflect higher productivity.⁸

Average 2014 real earnings in the knowledge-based industries average \$77,000 for the nation overall and average \$100,000 in Massachusetts and \$105,000 in Connecticut. Some of the differences in average earnings are due to the industry mix and the skills required for different industries. Nonetheless, this sector is an important source of employment and an important source of high-earnings employment. As Moretti (2010) has noted, high-earnings workers spend dollars locally and tend to create many more local jobs – up to 5 local jobs per knowledge-work jobs.

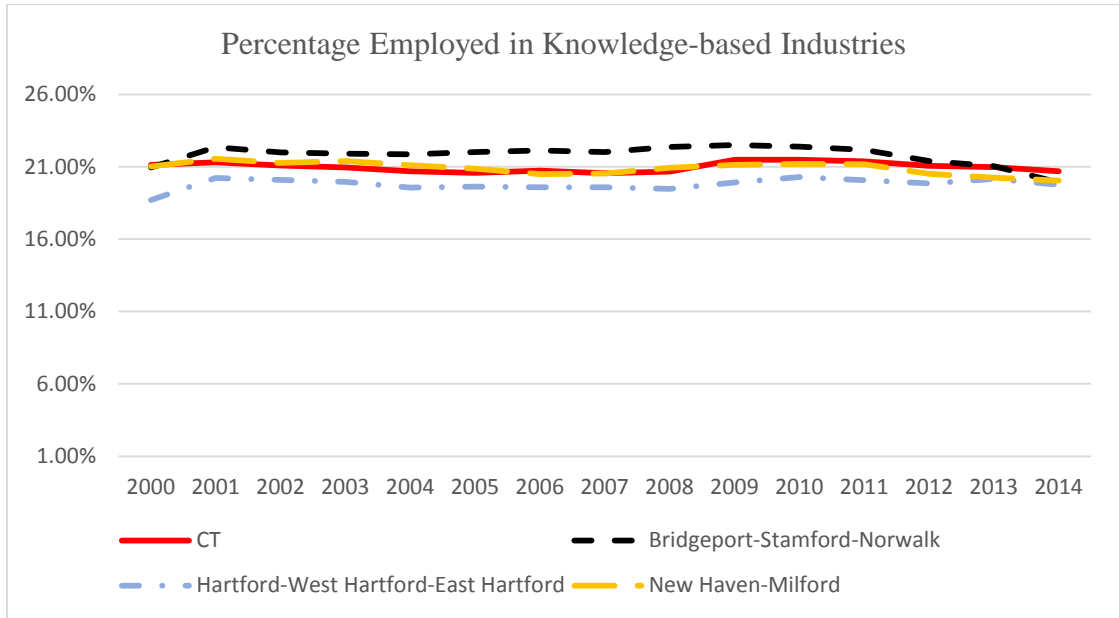
A related question is whether a particular Connecticut MSA has a higher employment level or has higher employment growth in biotech and knowledge-based industries than other MSAs in the state. All three of Connecticut's MSAs have about 21 percent of their employment in knowledge-based industries. See Figure 5. Since 2012 the Hartford-West Hartford-East Hartford MSA has had a higher employment growth rate for knowledge-based industries than the other two MSAs in Connecticut. See Figure 6.

As an advanced economy, Connecticut will want to demonstrate that it continues to have an attractive business climate, especially for knowledge-based industries and their employees.

⁸ It should be noted that the price of housing – cost of living – may also be higher in these two states than in the United States overall. Housing price increases and more congestion can offset the high earnings in a state or region. This point is made by Glaeser and Gottlieb (2009).

Figure 5

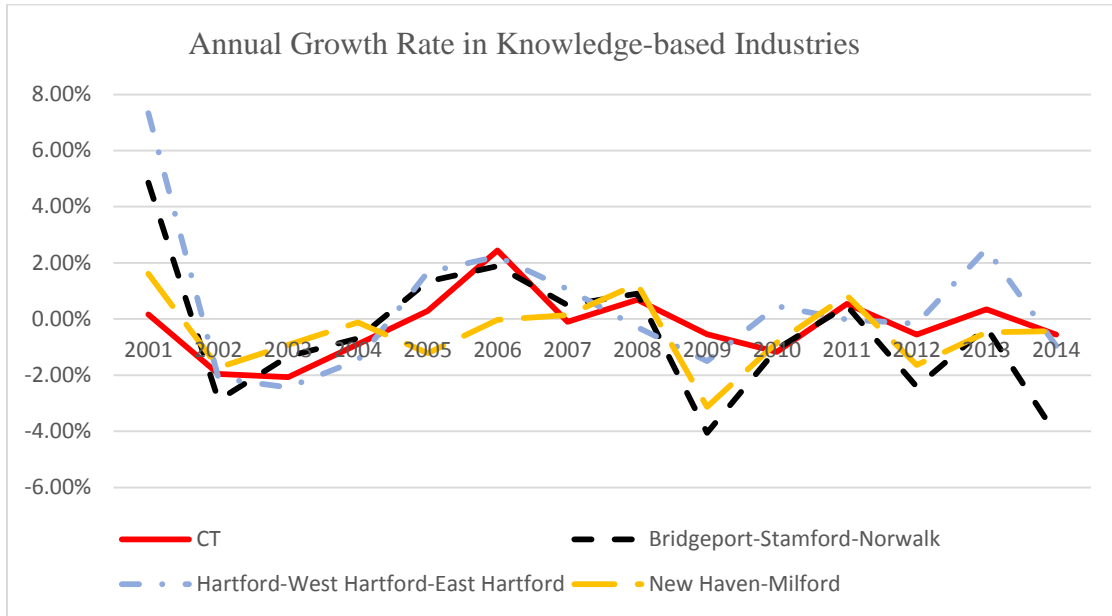
Employment in Knowledge-based Industries as a Percentage of Total Employment: Connecticut's Metropolitan Statistical Areas



Source: U.S. Bureau of Labor Statistics. Quarterly Census of Employment and Wages.
<http://www.bls.gov/cew/datatoc.htm>

Figure 6

Annual Growth Rates Knowledge-based Industries in Connecticut's MSAs



Source: U.S. Bureau of Labor Statistics. Quarterly Census of Employment and Wages. <http://www.bls.gov/cew/datatoc.htm>

4 Growth in States: Major Forces for Growth and Business Climate

For many of the reasons stated in the literature review, it is difficult to uncover sources of growth in a national economy and even more difficult at the subnational level. (Rotman, 2015) Forces of automation, global competition, as well as state-level or local-level shifts in labor force compositions, capital investment agglomeration economies, and fiscal policies change simultaneously. Identifying the exact forces that cause employment or GSP growth in a state or region presents an empirically daunting challenge. And these same forces that cause growth in one period may be different in another period.

As drivers of subnational economic growth, most studies have focused on two types of variables: agglomeration economies and state and local fiscal policy. Other economic variables – energy prices, urban population percentage – can influence growth, but agglomeration and state and local fiscal variables are generally of interest. The precise reasons that agglomeration economies drive economic growth are not settled in the

literature and their effects can vary among industries. Jane Jacobs (1969) argued that clustering of people generated ideas, innovation and growth. Silicon Valley; the Boston area; pharmaceutical firms along the Washington- Boston corridor; and groups of universities, research hospitals and other medical facilities are often cited as areas that grow due to agglomeration or proximity of researchers and technically skilled workers. Recent authors, Kantor and Whalley (2012) also note that, under the right set of circumstances and universities' priorities, research universities can "anchor" economic development strategies.

Other industries may benefit from agglomeration clusters in other ways – proximity to a large and skilled labor force, for example. A large labor force facilitates labor mobility among industries and promotes better matching between firms' demands for labor skills and labor supply. Krugman (1991) makes a strong case that firms realize increasing returns from geographic concentrations.

State and local fiscal policy has traditionally focused on tax policy, but a growing number of states have undertaken public investment in industry, such as nanotechnology in Albany, N.Y. or investment in scientific facilities in Texas. Economists have cautioned against these so-called place-based or industry-specific subsidies. Investing in a specific place presents risks, and Moretti (2012) summarizes economic thinking on place-based subsidies. He notes that when they work, it has taken sustained and deep investment and uses the TVA as an example of a successful place-based subsidy. Others, such as investment in Appalachia, have worked less well. Moretti notes that empowerment zones have generally been successful place-based subsidies, because they apply to all industries locating in the zone and the subsidies are long lasting enough to get businesses established and profitable in these areas.

A few states, such as Texas, have invested in the scientific facilities at its land grant institutions, hoping that the research will attract entrepreneurial faculty who start businesses with venture capitalists, and these startups then form the basis of an ecosystem of larger firms that buyout the startups and continue the research and as well as enhance the biotech and knowledge-based profile of the state. (Basken, August 7, 2015) Again, where undertaken successfully, there was a significant university presence already in place and states made a large investment in providing funds for science labs to both build them and sustain their operations.

On the tax side, taxes themselves may deter growth, but high taxes may also be capitalized into lower land prices, so that they have a neutral effect overall. The level of current taxation is often used to measure the business climate of a state. Future tax obligations may also be a concern to the extent that states accumulate debt obligations and have underfunded public employee retirement systems. Both may signal mounting interest payments and future tax obligations to fund interest payments and pensions.

4.1 Business Climate

Most measures of business climate focus on the tax environment and within that some measures take into account tax rates and other aspects of the tax code, as well as regulations, unionization of the workforce and other variables. Criticisms of business climate measures are well-known, and the scope of various business climate studies is examined in detail in the Panel's Report on Connecticut Fiscal Comparisons by Bourdeaux and de Zeeuw (2015). The data on fiscal variables for our empirical work below will also show Connecticut's competitive fiscal position.

Two additional points can be made here. Taxes on business, as typically measured, do not account for the actual tax incidence or whether the tax is borne by capital, land, labor or consumers. The ultimate burden of the corporate tax, for example, may ultimately fall on labor, capital, land or consumers. In fact, there is reason to believe that the corporate tax at the state level does not fall on corporations but is shifted from capital to less mobile factors of production (McLure, 1980).

For the second point, recall that the empirical literature on taxation and its effect on growth almost uniformly shows taxes and fiscal variables have a more significant role when business location or expansion decisions are made among a small set of contiguous geographic states or regions. Given the findings about adjacent locations, Connecticut competes on fiscal dimensions most with its bordering states and it is important for Connecticut's tax system to be competitive with its neighbors as well as implement tax policy in line with economic efficiency and best administrative practices.

4.2 Future Fiscal Concerns: Debt Obligations and Pension Funds

States with high outstanding debt obligations risk higher taxes and an unstable future fiscal system. As well, many state and local employees have defined-benefit retirement plans and often have state-financed health insurance into retirement. The underfunding of the trust funds that undergird these future obligations poses risks for future fiscal stability.

Norcross (2015) in her report ranks states by overall fiscal solvency. Connecticut, Massachusetts, New Jersey and Illinois rank at the bottom, primarily due to underfunded employee pension and retiree health insurance.

Standard and Poor's (2014) analysis of state pension systems reinforces Norcross' findings. Connecticut has a funded to pension obligation ratio of 49.1 percent, whereas New Jersey and Massachusetts have funded to pension obligation ratios of 65 percent. At the same time, these three states have relatively high real per capita GSP and thus may have a higher fiscal capacity than most states to secure future tax funding to meet the obligations.

In the empirical analysis below, we'll examine the extent to which outstanding debt, expenditures on insurance trust funds and other expenditures, and tax variables influence growth in state economies.

5. Empirical Analysis

This section of the report provides a new empirical analysis that examines the effect of fiscal and other variables that have (i) been identified as key variables of interest in Connecticut and (ii) explain economic growth in states over the pre-Great Recession (1980-2007) period and the post-Great Recession (2009-2013).

Average annual growth in real per capita GSP is used here to measure state economic growth. The deep recession between 2008 and 2009 complicates the empirical analysis. The recession years impose in this case a large discontinuity in the data, as the recession affected states differentially for reasons not accounted for by the standard economic development variables that are used in empirical work here and elsewhere. The analysis here handles the discontinuity by excluding that time period.

Two models are used. To start the analytics, we use the long trend model previously developed by Glaeser et al. (1992). The advantage to examining a long time period using a fixed set of explanatory variables is to uncover the variables that have enduring effects over long time periods.

On the other hand, the long trend model relies on a cross section of 48 state observations. The statistical tests and the results with few observations are not always robust, and the results are subject to error caused by omitted variable bias that occurs when variables that influence growth are not included in the empirical model.

To address both of these concerns, a second analysis takes advantage of newer empirical techniques that are designed to increase the sample size and examine trends over multiple time periods. The pooling of states across multiple time periods increases the sample size. Both the pooling and the sample size allow the analysis to incorporate fixed effects for each state to address omitted variable bias. The second analysis is based on papers by Reed (2008) and Gale, Krupkin and Rueben (2015). In the second set of models, we examine annual growth in real per capita GSP growth in each state over the 1991 to 2000, 2001 to 2007, and 2009 to 2013 periods. Because the time periods vary in their lengths – one is ten years, one is seven years and a third is four years - pooling time periods with different lengths complicates the interpretation of the estimated coefficients of the explanatory variables. To accommodate the different length periods, average annual growth rates are used for each state in each period rather than using total growth for ten years, seven years and four years. Using annual average growth rates standardizes the

coefficients and makes interpretation of the coefficients consistent over different length time periods.⁹

The explanatory variables are based on a set of variables used in the empirical literature on economic growth in states. These variables include agglomeration economies, energy prices/costs and sets of fiscal variables for both expenditures and taxes. All variables are measured for each state and time period.

Analyses of business and economic development consistently find that agglomeration economies have a significant influence on growth. As described in a previous section of the report, agglomeration can take at least two forms. The first is the synergy and productivity enhancement that occurs when clever people work and live near one another. Gains in productivity growth occur across industries and within industries. Inventors, mathematicians, programmers, engineers, machinists, architects and others feed off each others ideas and production. The second type of agglomeration occurs within an industry. A workforce specialized in an industry adds productivity as above within an industry, and adds to the efficiency of labor markets. Workers can move almost seamlessly among establishments, which in turn have the flexibility to expand or contract, knowing that workers more readily find other employment when downsizing occurs or employers can find qualified workers when they want to hire.

Energy prices are relatively high in New England and vary among states and regions. These may deter growth, especially in industries that use energy intensively in their production.

Fiscal variables are of special interest here and in the literature on growth. Rather than put a few fiscal variables in the estimating equation, Helms (1985) has set a precedent for using fiscal variables in an estimation framework. Helms starts with a budget constraint for state and local governments where the surplus or deficit equals the sum over each of the state and local revenues $REV(j)$ in a state less the sum over each of the state and local expenditures $EXP(i)$ in a state.

$$Deficit (surplus) = \sum_i REV(j) - \sum_j EXP(i)$$

For empirical purposes, different expenditure categories and various taxes may each affect growth more, less or not at all. To accommodate the potential different effects of taxes and expenditures on growth, coefficients a_i and b_j are added to each of the

⁹ Reed (2008) and Gale et al. (2015) use time periods of the same length in their analyses and so use total growth in each period. This affects the size of the coefficients relative to the coefficients estimated here.

expenditures and revenues.¹⁰ Finally, outstanding debt, which is not included in the budget constraint per se, may portend tax obligations in the future and it is included in the estimation equation.

The empirical equation has the following general form:

$$PCRGP_{st} = f (AGJ_{st}, AGC_{st}, P_{ENERGY}, \sum a_i EXP_{s,t,i} , \sum b_j TAX_{s,t,j}, OUTDEBT)$$

where

- AGJ_{st} represents agglomeration economies of the Jacobs's-type or clusters of productive and bright workers;
- AGC_{st} represents agglomeration economies when industries cluster;
- P_{ENERGY} represents the price of electricity or natural gas;
- $\sum a_i EXP_{s,t,i}$ represents a vector of state and local expenditures in each state (s) and time (t) period;
- $\sum b_j TAX_{s,t,j}$ represents a vector of state and local taxes and charges in each state (s) and time (t) period;
- OUTDEBT represents outstanding debt for state and local governments.

The estimation equation is specified in linear form and the fiscal variables are measured as a proportion of income in the state. The sources for the variables are listed in Table 6.

5.1 Measures of the Fiscal and other Variables

Agglomeration economies at the state level are difficult to measure. To capture Jacobs-type agglomeration, we use the percentage of state residents between the ages of 25 and 60 who hold a bachelor's degree or higher. Industry specific agglomeration economies are typically measured by clusters of similar workers within a particular industry. This type of agglomeration does not apply to an analysis of aggregate growth, and this measure is dropped from the model. Energy costs are collected for electricity and natural gas in both the industrial and commercial sectors. Commercial and industrial prices of

¹⁰ In an ideal public finance setting, where citizen and industry preferences for public goods and expenditures and tax financing match the expenditures made and taxes and charges imposed, fiscal variables would have little or no effect on economic growth. When some of the expenditures or revenue items match citizen and business preferences, the well-matched items of expenditure and revenue may have no effect on growth while other expenditures and revenues affect growth.

electrical energy are correlated with each other, and the same correlation is observed in the commercial and industrial prices of natural gas. We first included all four energy costs in the empirical model, and after examining the simple correlations across the four energy costs, the cost of electricity for the industrial sector and the cost of natural gas in the industrial sector are used in the empirical model reported here.

The fiscal variables require some explanation. All of the fiscal variables are measured as a proportion of personal income. More importantly, in a balanced budget situation – the sum of expenditures on goods and services equal the sum of revenues collected – the budget equation above becomes an identity, and empirical tests cannot be performed when all the fiscal variables in the budget equation are included in the empirical equation. Helms (1985) omits one expenditure or tax item from the estimating equation. That resolves the identity, but requires taking the omitted expenditure or tax item into account when interpreting the empirical results.

There are six principal expenditure categories: basic services (BASICSERVICES), elementary and secondary education (ELSECED), higher education (HIGHED), public welfare (PUBWELFARE), payments into insurance trust benefits for public employees' retirements (INSTRUST), and other expenditures (OTHEREXP).¹¹ The tax variables include property tax (PROPTAX), personal income tax (INCTAX), corporate income tax (CORPTAX), intergovernmental revenue (INTERGOV), and other revenue (OTHREV), which includes license taxes, charges, gift taxes, selective sales taxes and other taxes. In the empirical work, we omit, basic services in part to get explicit coefficients on various taxes and important expenditure items, such as education, public welfare, and insurance trust expenditures. The rationale behind including these expenditures is that previous studies have shown that one or more of these expenditure variables impact growth, and in some other instances, policy makers or business leaders in Connecticut have expressed interest in knowing the impact of some of these specific variables.

On the tax side, the data reported in Table 6 reveal that Connecticut relies on the property tax and the individual income tax to a much greater extent than the average in states. These two taxes are highly visible, as both require filing and the amount of the tax is clearly indicated. Sales taxes by contrast are generally not very visible and become more visible when consumers purchase high-priced commodities, such as automobiles and expensive appliances. Given the above, property taxes, individual income taxes, intergovernmental revenue, and the category “all other revenues” are used as explanatory variables.¹²

¹¹ Basic services include police, corrections, air transportation, natural resources, parking, parks and recreation, sanitation, sewer management, water, health and hospitals, libraries, highways and housing. The category “other expenditures” include: subsidies, interest and administrative expenditures.

¹² All other revenues for this empirical model include select sales taxes, license taxes, death and gift taxes, state corporate income taxes, taxes not elsewhere classified, and total charges and miscellaneous revenue. The fiscal data are from the Tax Policy Center 2013 <http://slfdqs.taxpolicycenter.org/>

To interpret the results, a negative coefficient on a tax variable means that increasing the tax to pay for more basic services would have a negative impact on growth. For example, suppose the coefficient on the individual income tax variable is -0.15. Then increasing the individual income tax by \$1 per \$100 of personal income to pay for an increase in basic services would reduce growth on average by 0.15 percentage points per year.

However, one could hold basic services constant, increase the personal income tax, and increase insurance trust spending. Suppose the coefficient on the individual income tax is -0.15 and the coefficient on insurance trust spending is 0.10 or putting money into the trust fund is generally seen as good for growth. The net effect is a -0.05 (-0.15 + 0.10) decrease in the annual growth rate, as taxes more than offset the positive effects of the spending. These cases are, of course, hypothetical and the empirical results for the fiscal variables are discussed below.

We include outstanding debt as a proportion of personal income (DEBTOUT) in the empirical model to measure the states' long-term tax obligations associated with higher debt. Norcross (2015) suggests that higher longer-term debt may represent a drag on economic growth in states.

5.2 Comparison of Connecticut with Other States

Table 6 lists the 2012 values of the fiscal and other key variables for Connecticut, the 2012 mean for all states, and the range of the data (minimum and maximum) for each variable. The data sources are listed at the bottom of the table. A few variables stand out. Connecticut has a highly educated work force or population relative to other states, with almost 40 percent of the population between the ages of 25 and 60 holding a bachelor's degree or higher. For electrical energy costs in the industrial sector, Connecticut has the highest rate among the states in 2012 and very near the top for the commercial sector. Connecticut's natural gas costs in the industrial sector are above the mean for states and in the commercial sector fall just below the mean for the states.

Table 6

Means and Minimum and Maximum Values of Explanatory Variables

VARIABLES	Connecticut	Mean for 48 States	Min	Max
Percent of state population 25-60 with Bachelor's degree or higher	39.61	29.92	19.77	42.84
Percent of state population in MSAs	94.78	78.48	0	100
Total State Population (Census)	3,591,765	6,481,664	576,626	37,999,878
P _{ENERGY} Natural gas price for industrial (\$ per million Btu)	8.56	6.08	2.92 (LA)	11.29 (DE)
P _{ENERGY} Electricity price for industrial (\$ per million Btu)	37.14	20.67	12.10 (WA)	37.14 (CT)
P _{ENERGY} Natural gas price for commercial (\$ per million Btu)	8.14	8.44	5.67 (ND)	12.94 (DE)
P _{ENERGY} Electricity price for commercial (\$ per million Btu)	42.94	28.51	20.12 (ID)	44.13 (NY)
BASICSERVICES	0.042	0.063	0.037 (NH)	0.114 (WY)
ELSECED	0.041	0.041	0.031 (NC)	0.054 (WY)
HIGHED	0.012	0.020	0.011 (NV)	0.035 (UT)
PUBWELFARE	0.029	0.036	0.022 (NV)	0.055 (ME)
INSTRUST	0.025	0.022	0.011 (NH)	0.037 (OH)
OTHEREXP	0.024	0.026	0.019 (MO)	0.035 (DE)
PROPTAX	0.043	0.030	0.014 (OK)	0.053 (NJ)
GENSALES	0.017	0.022	0	0.040 (WA)
INCTAX	0.034	0.020	0	0.044 (NY)
CORPTAX	0.002	0.003	0	0.009 (NY)
INTERGOV	0.029	0.047	0.027 (VA)	0.082 (MS)
OTHERREV	0.039	0.069	0.039 (CT)	0.144 (ND)
DEBTOUT	0.198	0.189	0.079 (WY)	0.321 (NY)

Sources: <https://usa.ipums.org/usa/> for the population variables; the energy price data are from U.S. Energy Information Administration <http://www.eia.gov/state/seds/>, and the fiscal data are from the Tax Policy Center 2013 <http://slfdqs.taxpolicycenter.org/>

Energy costs in general are well above average in each of the New England states. Massachusetts, for example, has higher natural gas costs than Connecticut and electricity costs are only one dollar lower than the costs displayed in Table 6 for Connecticut. Energy costs in the Middle Atlantic States are generally less expensive than in Connecticut. Natural gas costs per BTU in these states are at or slightly below the average for all states, and except in New York and New Jersey, electricity costs in other Middle Atlantic States are average to below average. New England states, along with immediate neighboring states of New York and New Jersey, in general, have higher costs for energy.

Measured as a proportion of personal income in the state, Connecticut's state and local expenditures register at or below the mean for states. The exception is expenditures on insurance trust benefits that build balances for public employee retirement and health insurance benefits. As already noted, Norcross (2015) ranks Connecticut as a state with substantial out-year unfunded obligations for employee pensions. Higher spending in this area can be viewed as taking a responsible approach to address the shortfall in the pension obligation accounts. Alternatively, having a shortfall may signal higher spending in the future that crowds out spending on other services, or reduces aid to local governments that may provide property tax relief, or signals future increases in tax burdens, or a combination of the above.

On the revenue side, Connecticut's property taxes and individual income taxes as a proportion of personal income are among the highest for the states. Other revenues as a proportion of Connecticut's personal income are below the mean for states. Federal intergovernmental revenue is also below the mean for states. Much of the aid from the federal government finances the federal share of Medicaid expenses or public welfare. Connecticut and other states with higher personal incomes receive a lower Medicaid reimbursement from the federal government, and consequently lower intergovernmental aid.

5.3 Empirical Results

As already noted, two models are used here to estimate the importance of fiscal and other variables on real per capita state GSP growth. Running a variety of models for different time periods and samples of states checks the robustness of the findings and increases the confidence of the recommendations that stem from the empirical work.

Table 7 reports results based on the Glaeser et al. (1992) long-run model. The dependent variable is annual average growth rate of real per capita state GSP from 1980 to 2007. It is run against the explanatory variables for the 48 states. All the statistical models are first run for the 48 states, excluding Alaska and Hawaii, and then for states with fewer than one million residents - Delaware, Montana, North Dakota, South Dakota, Vermont and Wyoming. Removing those states from the sample also excludes the states that have grown primarily due to resource discovery. Finally, we also exclude two states

Table 7

Growth in States from 1980 to 2007

(Dependent Variable: Annual Real Per Capita Gross State Product Growth Rate)

VARIABLES	(1)	(2)	(3)
	48 States	States with Pop > 1 Million	Sates with 20M > Pop > 1M
AGJ (pop % Age 25-60 with bachelors or higher)	0.000159	0.000228	0.000270*
P _{ENERGY} natural gas in industrial sector	0.00198*	0.00255***	0.00257***
P _{ENERGY} electricity in industrial sector	0.000581***	0.000431**	0.000472**
Primary/Secondary Ed	0.193	0.385***	0.368**
Higher Ed	-0.0346	-0.217*	-0.162
Public Welfare	0.00270	0.0296	0.0626
Insurance Trust Ben	-0.298***	-0.317***	-0.311***
Property Tax	-0.128	-0.213**	-0.235**
Individual Income Tax	-0.00161	-0.0293	-0.0387
Intergovernmental Revenue	-0.00706	-0.0206	-0.0553
Other Revenue	-0.114*	-0.167***	-0.165***
OUTDEBT	0.0238**	0.0199**	0.0201**
Observations	48	42	40
R-squared	0.682	0.757	0.783

*** Significant at the 1 percent level

** Significant at the 5 percent level

* Significant at the 10 percent level

that have more than 20 million people (California and Texas). Both types of states (large states and resource-based or small states) may differ enough from the rest of the states to skew the results when they are included in the analysis.

We use 1980 values to represent the right-hand side variables to remove as much endogeneity as feasible from the estimation. Agglomeration economies do not yield statistically significant effects except when the small and two large states are removed from the model. And then the effects on growth rates are quantitatively small. Energy prices are statistically significant but have the wrong sign or the results indicate that states with higher energy costs have higher growth rates.

For the state and local fiscal variables, the results suggest that states with more than one million people and more expenditure on elementary and secondary education as a proportion of personal income education have higher growth rates. States with more spending on insurance trust benefits, higher property taxes and greater revenue from sources other than individual income tax have slower growth rates. On the other hand, states with more outstanding debt as a proportion of personal income appear to grow at faster rates.

As noted above, the long growth model has some limitations by modern statistical standards for empirical modeling. It is presented here to fix ideas and as a check on variables that consistently exhibit a drag on growth rates across the tests of different empirical models and over time. The property tax is one such variable as is elementary and secondary education.

Table 8 displays results for a statistical model based on the recent papers by Reed (2008) and Gale, Krupkin and Rueben (2015). The sample consists of growth in three time periods – 1991 to 2000, 2001 to 2007, and 2009 to 2013 – for the 48 states or a total of 144 state observations on growth rates. The explanatory variables are lagged ten years – 1980 measures are used for first time period, 1990 for the second time period, and 2000 for the third time period - to address endogeneity or attempt to determine to the extent possible whether the explanatory variables truly cause growth rather than being coincident with it. The pooled sample also accommodates correction for omitted variables by using fixed effects or a set of binomial variables to represent other aspects of each state that the explanatory variables do not explicitly take into account. Finally, time effect binomial variables are used to account for macro aspects that are common across states in each of the time periods but that differ across time periods. (Globalization, automation, and economic downturns, for example.)

As in the case for the long growth model, the models are run for three samples: the 48 states, states with populations of 1 million people or more, and states with fewer than 20 million and more than one million people. The results differ for the individual income tax and outstanding debt variables between the 48 state sample and the two restricted samples. The two restricted samples have similar results. Overall though, the results are not sensitive to the sample restrictions.

Table 8
Growth in States 1990-99, 2000-2007, 2009-2013

	(1)	(2)	(3)
VARIABLES	48 States	States with Pop >1 Million	Sates with 20M > Pop > 1M
AGJ (pop % Age 25-60 with bachelors or higher)	-0.000441	-0.000532	-0.000455
P _{ENERGY} natural gas in industrial sector	-0.00332**	-0.00225*	-0.00262**
P _{ENERGY} electricity in industrial sector	0.000780	-0.000704	-0.000873
Primary/Secondary Ed	1.288***	1.273***	1.222***
Higher Ed	1.179	0.485	0.546
Public Welfare	-0.522*	-0.571***	-0.576***

(Dependent Variable: Annual Real Per Capita Growth Rate in Three Time Periods)

Insurance Trust Ben	0.791	0.461	0.407
Property Tax	-0.881**	-0.903***	-0.887***
Individual Income Tax	-1.051***	-0.731***	-0.685***
Intergovernmental Revenue	1.110***	0.655***	0.633**
Other Revenue	-0.107	0.0199	0.0331
OUTDEBT	0.0760*	0.0208	0.0210
Observations	144	126	120
R-squared	0.572	0.668	0.675
Number of States	48	42	40
Year Fixed Effects	YES	YES	YES
State Fixed Effects	YES	YES	YES

*** Significant at the 1 percent level

** Significant at the 5 percent level

* Significant at the 10 percent level

Agglomeration does not influence growth among states. Agglomeration tends to be more important in analyses of MSA growth and is harder to find in more aggregate data at the state level. From the results at the state level, it would be wrong to conclude that agglomeration effects are not important for growth. A better conclusion is that agglomeration effects occur over much smaller areas and their effects are not captured using statewide data. Higher costs of natural gas tend to depress growth rates, while the coefficient on the price of electricity is not statistically significant. As noted above, the energy prices are correlated, and, based on the empirical results here, higher energy costs can be said to reduce GSP growth in states.

For state and local expenditures, elementary and secondary education expenditure tends to increase growth compared to basic services and more expenditure on public welfare tends to depress state GSP growth. Coefficients on expenditure on higher education and insurance trust benefits are not statistically significant.

On the tax side, property taxes and individual incomes taxes have coefficients that are negative and statistically significant for all three of the state samples. These are two areas where Connecticut ranks high when compared with other states. The results here on the negative influence of property taxes on growth are consistent with the findings of Gale, Krupkin and Rueben and with the results for the long growth model in Table 7 of this report. .

Tax reform might take a hard look at these two taxes and evaluate whether Connecticut can maintain its spending in key areas while it creates a more balanced tax system. On the other hand, property taxes typically fund a large share of expenditures on elementary and secondary education. And what education spending property taxes do not fund derives from state intergovernmental aid that is often funded by revenues from individual income taxes. While higher taxes on property and income depress growth rates, they fund elementary and secondary education that has a positive effect on growth. In fact, the empirical results here suggest that the positive effects of spending on education more than offset the negative effects of property taxes. The negative effects of the individual income tax are not so clearly offset by higher spending on elementary and secondary education. Reform of the two revenue sources needs to be done with an eye on the effect reform will have on elementary and secondary education. And knowledge sector employees are likely to value high-quality education at all levels.

The coefficients on “other revenues” - from selective sales, corporate and other taxes and charges – indicate that “other revenues”, as defined here, do not have statistically significant effects on state GSP growth. And more federal revenue in the form of intergovernmental aid increases GSP growth. Outstanding debt as a ratio of personal income does not appear to have a statistically significant effect on GSP growth.

To test the robustness of the results, we dropped the agglomeration and energy prices from the list of explanatory variables, allowing their influence to be captured in the fixed effects variables. See Table 9. The coefficients of the fiscal variables change very little

Table 9

Growth in States 1990-99, 2000-2007, 2009-2013: Fiscal Variables Only

(Dependent Variable: Annual Real Per Capita Growth Rate in Three Time Periods)

	(1)	(2)	(3)
VARIABLES	48 States	States with Pop >1 Million	Sates with 20M > Pop > 1M
Primary/Secondary Ed	1.175**	0.892***	0.859**
Higher Ed	0.889	0.494	0.495
Public Welfare	-0.794**	-0.951***	-0.974***
Insurance Trust Ben	0.853	0.339	0.305
Property Tax	-0.481	-0.531**	-0.503*
Individual Income Tax	-1.252***	-1.142***	-1.111***
Intergovernmental Revenue	1.069***	0.978***	0.988***
Other Revenue	-0.142	0.00730	0.0209
OUTDEBT	0.0721	0.0193	0.0209
Observations	144	126	120
R-squared	0.517	0.618	0.619
Number of States	48	42	40
Year Fixed Effects	YES	YES	YES
State Fixed Effects	YES	YES	YES

* Significant at the 10 percent level

** Significant at the 5 percent level

*** Significant at the 1 percent level

when agglomeration and energy prices are omitted from the empirical models. The same conclusions as above apply to the effects of property and income taxes, and the same conclusions as above apply to the influence of state and local expenditures on growth.

5.4 “What if” Fiscal Scenarios for Connecticut

The empirical results taken a face value support the idea that high property taxes and high individual income taxes rates imply lower growth rates for those states that score higher in these personal tax burdens. Nonetheless, the competitiveness literature suggests that these effects, while statistically significant, generally do not play a major role in a state’s growth rate. It bears repeating that the fiscal effect play a more significant role in growth in economic competitions with nearby states than in growth in economic competitions with states across the country.

To determine the size of the influence that fiscal variables may have on Connecticut’s growth rate, a few simulations are run based on changes in the property tax and the individual income tax. The changes have to be paid for with either expenditure reductions or increased taxes elsewhere in the system.

The results for the simulation are displayed in Table 10. The first row of the table reports results when the property tax is reduced from 0.043 of personal income to 0.033, and revenues are increased by rising revenues from all other own sources except the individual income tax. In this case, annual growth might increase by as much as 0.1 percentage points. This figure compares to Connecticut’s annual growth during the recent period of 1.0 percent annually. Fiscal changes alone will not lead to a large increase in growth but the results do suggest that less reliance on the property tax would enhance growth prospects in Connecticut.

Two other scenarios are run to pay for the property tax cut; making up the revenues through an increase in the individual income tax in the second case, and cutting elementary and secondary education expenses in the third scenario. Both actions lead to reductions in the state’s growth rate or it is better to leave the tax system as it is than to cut property taxes and pay for the cuts with higher income taxes or reduced school spending.

The second row of the table reports results when property taxes are reduced from 0.043 of personal income to 0.033 of personal income and the individual income tax is reduced from 0.034 of personal income to 0.024 of personal income, a figure that is closer to the average for all states. Again paying for the cuts by increasing revenues from all other sources may increase annual growth by as much as 0.2 percentage points. But according to the estimate in this report, paying for the cuts with reduced school spending will reduce growth on average in Connecticut.

While the results suggest that the fiscal environment has only a modest effect on growth, it nonetheless indicates that an unbalanced tax system or overreliance on a few taxes can deter growth. It also suggests that Connecticut residents value public services overall and especially elementary and secondary education.

Table 10

Expected Changes in Connecticut’s Annual Growth When Taxes and Spending Change: Simulations based from Results in Table 8

Tax Reduction	Annual growth rate change when a fiscally neutral tax reduction is paid for by increasing another tax or reducing spending as follows:		
	Increase “other revenues”	Increase individual income tax	Cut spending on Elementary and secondary education
Reduce the property tax by 1 percentage point of personal income	+0.10%	-0.02%	-0.05%
Reduce property tax and the individual income tax each by 1 percentage point of income	+0.21%		-0.08%

Source: Author calculations

6.0 Conclusions

In a recent report, Mirrlees (2011) and his fellow commission members reiterate long understood principles of tax design. They emphasize “looking at the fiscal system as a whole rather than at its individual components.” (Page 26) The system should be progressive, neutral and a system (page 471.). In the context of this report, neutrality means that a tax system should interfere with economic growth as little as possible. High tax rates and overreliance on a few taxes can reduce economic growth.

The empirical analysis done for this report finds that overreliance on two taxes by some states – property and individual income taxes – reduces their per capita Gross State Product (GSP) growth rates. And it finds that elementary and secondary education produce value for residents and more spending favorably influences economic growth.

Connecticut is one state that has overreliance on property and individual income taxes and the fiscal analysis done here suggests that reducing those taxes and increasing revenue from other own sources to pay for the cuts in property or individual income taxes will modestly enhance Connecticut’s per capita GSP growth rate. On the other hand, reducing those taxes and cutting elementary and secondary education to pay for the cuts will have deleterious effects on per capita GSP growth.

Connecticut has an underfunded public employee pension system. That situation is unlikely to help future growth, because to some private sector decision makers, it represents an unfunded liability and the potential for higher taxes in the future.

The Northeast Corridor of the United States has a high concentration of knowledge industries and workers. Connecticut has a substantial share of its economy in knowledge-based industries. These industries through the high earnings and consumption spending by knowledge workers support a large number of jobs outside of the knowledge-based industries; by one estimate, each knowledge sector worker supports as many as five service sector jobs. Given that most economic growth in a state comes from its existing businesses and industries, it is important to retain and expand its current industries and especially the knowledge-based industries that drive growth in other areas.

A pervasive finding in the growth literature is that knowledge-based industry workers learn from one another and through their close interactions produce new ideas and economic growth. Knowledge industries rely extensively on a continuing flow of highly educated and innovative workers in a state or region. In addition to modifying its tax system, Connecticut should continue to invest in the services and environments that knowledge workers enjoy. Connecticut has attractive coasts and good recreation. It might ensure that its fiscal environment remains stable and competitive with neighboring states as well as that its zoning laws do not, by being highly restrictive, drive up land and housing prices. By keeping housing prices more affordable than its neighboring states, Connecticut could gain a competitive advantage. Connecticut may also consider strategic investment in its university laboratories and STEM disciplines to increase knowledge creation at its universities as well as to increase the supply of knowledge workers.

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