University of Connecticut

Driving Recovery:

2020 Vision for Connecticut

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Driving Recovery:

2020 Vision for Connecticut

Introduction

Connecticut has the worst jobs record in the nation over the last twenty years. No only has Connecticut failed to create net new jobs, the overall quality of jobs in the economy has steadily deteriorated, with high-skill, high-wage jobs shrinking, replaced broadly with low-skill, low-wage jobs. Connecticut must reverse this trend.

Economic recovery is not automatic; recoveries do not necessarily follow historic patterns[1]. The quality and speed of recovery depends in significant measure from how carefully policy is crafted and whether it is applied with enough flexibility to operate quickly and effectively, avoiding entanglements, delays, and the frustrations of red-tape. Large employers often play a critical role; such firms, based or operating in Connecticut, can chose to consolidate or expand operations locations in Connecticut or elsewhere. Thus Connecticut development policy should seek to retain and expand operations of companies already in the state, while attracting others to locate here as quickly as possible. The immediate objective must be to preserve the base of economic activity and employment, and then to build a new vibrancy to assure future competitiveness

There is little doubt of the urgent need for adoption of aggressive economic development policies. Seasonally adjusted CT employment over the last two years has fallen by more than 100,000. The latest CCEA *Outlook* projects a further decline of 12,000 jobs[2] over the next two years; the Department of Economic and Community Development's (DECD) own forecast is slightly more optimistic, simply seeing no employment improvement in 2010.[3] The Global-Insight forecast for the Hartford metro area does not anticipate recovering lost jobs until after 2015.[4]

A major component in state economic development policy has been awarding tax credits for investment (ITC) in research and development. This was sound public policy for a host of reasons, but then the state restricted the use of earned ITCs so severely that larger firms essentially could not use them to any meaningful degree. (See Appendix A.) The state's largest employers have accumulated hundreds of

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[1] Paul Krugman, **The Return of Depression Economics and the Crisis of 2008**, Norton 2009.

[2] CCEA, *No Jobs recovery! When will Connecticut's Misery End?* **The Connecticut Outlook**, Feb 2010.

[3] http://www.ctdol.state.ct.us/lmi/misc/cedjan10.pdf. The reasons for its relative cautious optimism are based on expected time for turnarounds based on widely varying historical cycles and a more optimistic view of a national recovery despite obvious needs to redress budget imbalances that can apply the brakes to recovery efforts.

[4] IHS Global Insight, "U.S. Metro Job Recovery Will Take a While."

: http://www.ihsglobalinsight.com/Perspective/PerspectiveDetail17524.htm

millions of dollars of unused CT R&D ITCs. Unusable ITCs are worthless, undercutting, if not negating, related development policies. Moreover, denying companies avenues to use credits they have earned in good faith directly undermines the state's long-term economic health and diminishes the credibility of any economic development strategy. Funds from discouraged investors dry-up, employment shrinks, growth flattens or reverses, all resulting in further declines in tax revenues, driving deficits deeper. Now is the time to correct this corrosive policy; now is the time to encourage full use of the R&D ITCs through a dynamic policy that drives investment, creates jobs, builds a stronger economic base, and reverses the long-term pattern of decline in Connecticut's economy.

This report evaluates proposed legislation (attached as Exhibit A: "Tax Credit Legislation") that addresses the dilemma described above. This dynamic economic impact (REMI) analysis shows this legislation, permitting utilization of the R&D ITCs to drive major capital investments—building about 4 million square feet of new class A offices, laboratories, and advanced manufacturing facilities directly employing more than 16,000 workers—immediately generates substantial new employment—more than 36,000 by 2013, approaching 40,000 by 2020—and broad business activity that then generates new tax revenues, revenues that fully off-sets the cost of utilizing the ITCs. That is, the proposed legislation converts accumulated tax credits into investments in a way that is fully self-funding, and even generates a revenue surplus for Connecticut. Critically, this approach clearly helps change that pernicious long-term pattern of competitive decline in the state's economy.

This report provides detailed analysis of the array of the economic and fiscal impacts that flow from adoption of this legislation. Critically, the analysis compares those results against both the status quo and further deterioration of the state's economy as action-oriented competitors "out hustle" Connecticut, leading to an even deeper erosion of employment in Connecticut than the recent CCEA *Outlook* envisaged.

Driving Recovery: A Proposal

Driving Recovery evaluates a policy proposal that, over the period 2013- 2017, CT pay out one billion dollars in outstanding R&D ITCs in exchange for one billion dollars investment in plant and qualified equipment and machinery in the next 30 months, before December 31, 2012.[5] This new construction translates into about 4 million square feet of new, fully equipped new offices, laboratories, and advanced manufacturing facilities. These new facilities will directly employ more than 16,000 workers; by 2013 the total employment impact exceeds 36,000, and by 2020 approaches 40,000 new, quality jobs for Connecticut.

Current holders of CT R&D ITCs, investing individually or collectively, must make qualifying investments before December 31, 2012. State payment on the R&D ITCs would begin in 2013 when, under iron-clad agreements between each Investor and the State, five annual payments of $200 million will be exchanged for the R&D ITCs on qualified investments fully committed between 2010 and the 2012 deadline. As a result of the new economic activity these investments generate, the state will receive significant additional new tax revenues; these are revenues the government would not receive without these investments. Thus adopting this policy ***creates no burden*** on Connecticut taxpayers, while the companies are able to access their R&D ITCs, tax credits they earned in good faith.

Overview of Results

Utilizing the Connecticut REMI model, the CCEA has evaluated the Tax Credit Legislation to project that the recovery it drives generates sufficient net new tax revenues to cover fully the payments on the R&D ITCs. Compared to policies such as educational incentives that may be complementary, this policy triggers a timely, robust recovery of not only government budgets, but also CT employment and incomes. Moreover, the benefits that flow to the state are inherently long-term, because the nature of these investments will anchor the activities of large employers and investors in the state.

The alternative outcome, where other jurisdictions successfully induce CT firms to move activities out of state, has the reverse impact. Employment differences between the two cases approach 80,000 jobs—over and above the 100,000 already lost in the current recession; such an outcome has dire consequences for the already deficit-ridden state budget.

Methodology

This section briefly describes the methodological approach, describing the inputs to the Connecticut REMI model; Appendix B provides a full description of REMI itself. This analysis allocates the billion dollars of investments across four industries, with shares shown in parentheses:

1. Pharmaceutical (33%)

[5] Under current rules for qualification the vast majority of M&E including trucks is qualified, albeit, automobiles are not in order to prevent abuses tied to luxury purchases rather than true investments.

2. High-Tech (33%)
3. Biotechnologies (16.67%)
4. Insurance (16.7%)

The analysis spreads investments geographically, based on industry shares in the three leading CT counties; Table 1 shows the investments by county in millions of dollars. Three of the industries are primarily located in Fairfield, New Haven, and Hartford counties, with New London replacing Hartford for pharmaceuticals.

Table 1: Non-Leveraged Direct CT Stimulus by Funding Industry and County (2010 Millions $)

Industry\County	Fairfield	New Haven	Hartford	New London
Pharmaceuticals	144.1	85.6		103.6
High-Tech Manu.	126.6	78.8	127.9	
Biotechnologies	69.5	41.5	55.7	
Insurance	32.7	13.1	120.9	
Total	$372.9	$219.1	$304.5	$103.6

In addition, the analysis divides the investments in each industry between construction and the cost of equipping the building, i.e., machinery and equipment (M&E). Construction includes HVAC, wiring and plumbing; M&E is industry-specific, including shares of qualified components, based on national shares of M&E annual investments consistent with industrial categories in REMI. This process allocates the investments in construction at $495.4 million, the remainder in M&E. The four industries vary considerably in their shares of investment in plant and M&E, as Tables 2 and 3 show. These results reflect the current geospatial distribution among counties, but the analysis easily accommodates locating these investments in other counties; such relocation would have minor implications for state-level economic and fiscal impacts.

Table 2: Direct CT Construction Stimulus by Funding Industry and County (Millions $)

Industry\County	Fairfield	New Haven	Hartford	New London
Pharmaceuticals	82.3	48.9		59.2
High-Tech Manu.	65.2	40.6	65.8	
Biotechnologies	22.1	13.2	17.7	
Insurance	15.6	6.3	57.7	
Total	185.2	108.9	141.2	59.2

The analysis further allocates investments over time, with construction, including planning and site preparation, occurring in 2010 (25%) and 2011 (75%), with M&E being put in place during 2011 (40%) and 2012 (60%); the analysis assumes on average completion by mid-2012. Because investors will pursue multiple projects flowing from this policy, construction and installation of M&E will finish sooner

on some projects than on others, resulting in considerable overlap between construction and installation of M&E. In addition, startup dates among projects are likely to be different, so that the transition from construction employment to operating employment is smoother for the analysis as a whole than for a single project scenario. We recognize that this investment schedule is aggressive. However, based on the assumption that these industries typically have shovel-ready projects seeking capital and that the State will facilitate rapid permitting, schedule is defensible.

Table 3: Direct CT M&E Stimulus by Recipient Industry and County (Millions $)

Industry\County	Fairfield	New Haven	Hartford	New London
Computers	11.6	4.5	14.8	2.4
Software	79.9	32.6	83.6	16.3
Communications equip	4.4	2.2	5.3	0.4
Other electronic	23.6	6.7	15.1	8.6
Fabricated metal	4.4	0.9	1.4	2.1
Machinery	69.9	25.9	43.2	19.6
Trucks	1.7	0.7	5.1	0.1
Furniture	6.2	2.8	8.6	0.8
Total	201.7	76.2	177.1	50.4

While dollars invested determine construction and M&E employment, there is no such connection with operating employment. The analysis projects operating employment based on national 2008 employment to capital stock ratios for each industry, reduced by the annual rate of change in Connecticut's overall employment to capital stock ratio of -3.5%, estimated over the last 4 years. Because the last two of these were recessionary years, this process may cause a slight downward bias in employment estimates. The analysis uses the industry estimates of operating employment[6] as the initial direct impact that drives the REMI model; the analysis apportions that impact among the counties consistent with their current industry shares and the investments made in each.[7] The REMI model gives the results measured in incremental or net new jobs. Taking part-time jobs into account, each direct job generates 1.308 incremental jobs, based on the Bureau of Labor Statistics (BLS) usage.

REMI Results

[6] Technically, BLS based employment estimates were translated in to REMI job estimates by using the 2008 average for such conversions, a multiple of 1.308286. Anyone wishing to convert the jobs results to employment should use the same proxy in reverse. "Employment" references BLS data and "Jobs" for REMI data.

[7] When both investment and employment data are used simultaneously in REMI, the model requires that Investment induced by the additional employment be backed out of the estimates; this analysis made those adjustments.

The next two sections, "Deploying Unused R&D ITCs" and "Deterioration," culminate in a third section "Crossroads". This reveals the differences resulting from a decision to act and a failure to act in the face of rising pressures from competitors.

Deploying Unused R&D ITCs

The investment of a billion dollars of R&D ITCs as contemplated by the Tax Credit Legislation creates a direct construction stimulus, followed by enduring operating impacts from each of the investing industries. This section defines construction and operating stimuli together with indirect and induced impacts, first for the CT economy, then for State government. It demonstrates that this policy clearly stimulates significant recovery in the state economy and generates sufficient net new state tax revenues[8] to fully repay investors over the years 2013 to 2017. Indeed, the analysis reveals that this approach generates annual surpluses in tax revenue, permitting payment of modest amounts of interest back to the investors to compensate for the deferred recovery of the R&D ITCs!

The Direct Shock

For REMI modeling purposes, the analysis defines the construction shock in millions of fixed 2000 dollars. Because of continuing productivity improvements in the affected construction and M&E, investment costs in 2000 dollars are higher than in current dollars, as Table 4 shows by county and for CT as whole.

Table 4: Direct Annual Construction Phase Shock by County and Connecticut (Millions 2000 $)

Direct Shock	2010	2011	2012	Total
Fairfield				
Construction	48.7	146.3	0.0	195.1
Machinery & Equipment	0.0	90.4	135.5	225.9
Total	48.7	236.7	135.5	421.0
New Haven				
Construction	28.7	86.1	0.0	114.8
Machinery & Equipment	0.0	34.1	51.1	85.2
Total	28.7	120.2	51.1	200.0
Hartford				
Construction	37.2	111.6	0.0	148.8
Machinery & Equipment	0.0	78.3	117.5	195.8
Total	37.2	190.0	117.5	344.6
New London				
Construction	15.6	46.8	0.0	62.3
Machinery & Equipment	0.0	22.7	34.1	56.8
Total	15.6	69.5	34.1	119.2
Connecticut				
Construction	130.1	390.8	0.0	521.0
Machinery & Equipment	0.0	225.5	338.2	563.7
Total	$130.1	$616.3	$338.2	$1,084.7

[8] That is increased revenues net of incremental state expenditures arising from the expansion.

Based on ratios of national employment to capital stock for each industry, Table 5 show how direct employment increases in each industry, by county and for the state. The analysis assumes that, after 2013, the industries retain this increased employment.

Table 5: Direct Annual Operating Shock by County and Connecticut (Jobs)

Industry	Fairfield		New Haven		Hartford		New London		Connecticut	
	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
Chemical Manu. Ex. Petroleum, Coal, Plastics and Rubber	404	809	238	475	330	660	112	225	1,084	2,168
Computer and Electronic	391	782	230	460	319	639	109	217	1,049	2,098
Transportation Equip, Manuf. ex. Vehicles	428	856	251	503	349	699	119	238	1,148	2,295
Food Manuf.	209	417	123	245	170	341	58	116	559	1,118
Paper	203	405	119	238	166	331	56	113	544	1,087
Professional and Technical Services	492	983	289	578	401	803	137	273	1,319	2,637
Insurance Carriers and Related Activities	904	1,808	531	1,062	738	1,476	251	502	2,424	4,848
Total	3,030	6,060	1,780	3,560	2,474	4,948	842	1,684	8,126	16,253

CT Economic Impacts

Indirect impacts swell the total impact, generally captured within state supply chains of the target industries, and by induced impacts arising from individuals and companies spending their incomes resulting from total construction and operating activity as well as population movements resulting from new opportunities in CT. Among the key economic indicators are income measures, i.e., CT real gross domestic product (CT RGDP) and real personal disposable income (RPDI), as well as total jobs, related demographic shifts in the labor force, and population. The next section discusses fiscal impacts in more detail. Increased CT RGDP captures the impacts on total economic output prior to depreciation. Increases in RPDI capture the expansion of individual choice flowing from economic growth.

Income indicators

Preliminary estimates of CT RGDP in 2009 amounted to $178.3 billion. Implementation of the Tax Credit Legislation will augment it by $6 billion by 2013 with ongoing sustained development thereafter as Chart 1 shows. After taking tax and personal income shares of the increased output into consideration, the impacts on CT RPDI in 2013 reach $1.8 billion with further growth to come.

Employment impacts follow a similar pattern, as Chart 2 shows. Given seasonally adjusted employment in 2009Q4 at annual levels of 1,619,000, the addition of 36,900 jobs by 2013 offers a major recovery from current serious unemployment, social malaise, and underutilization of human resources.

Chart 1: Connecticut RGDP and RPDI Impacts (Fixed 2000 Billions $)

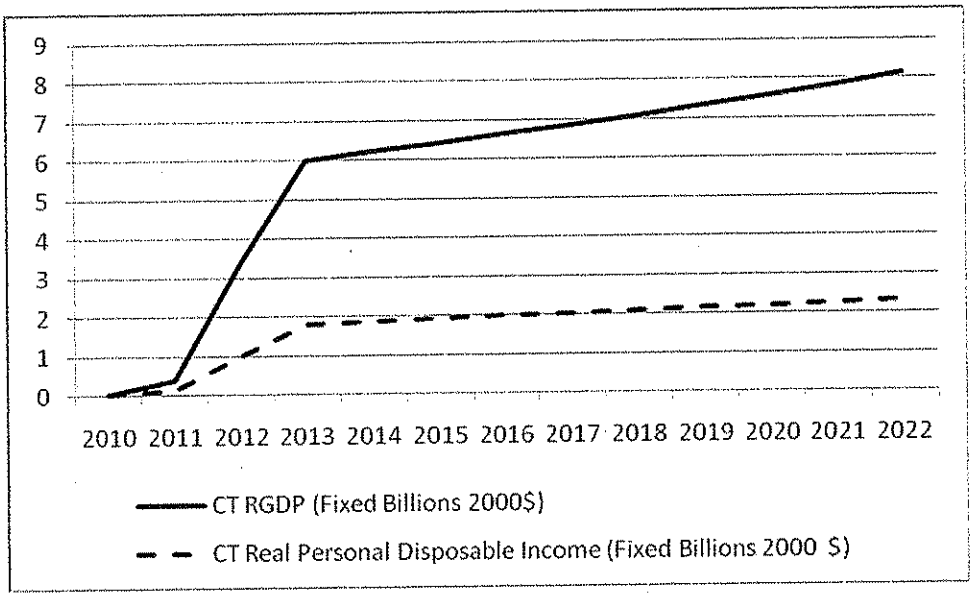
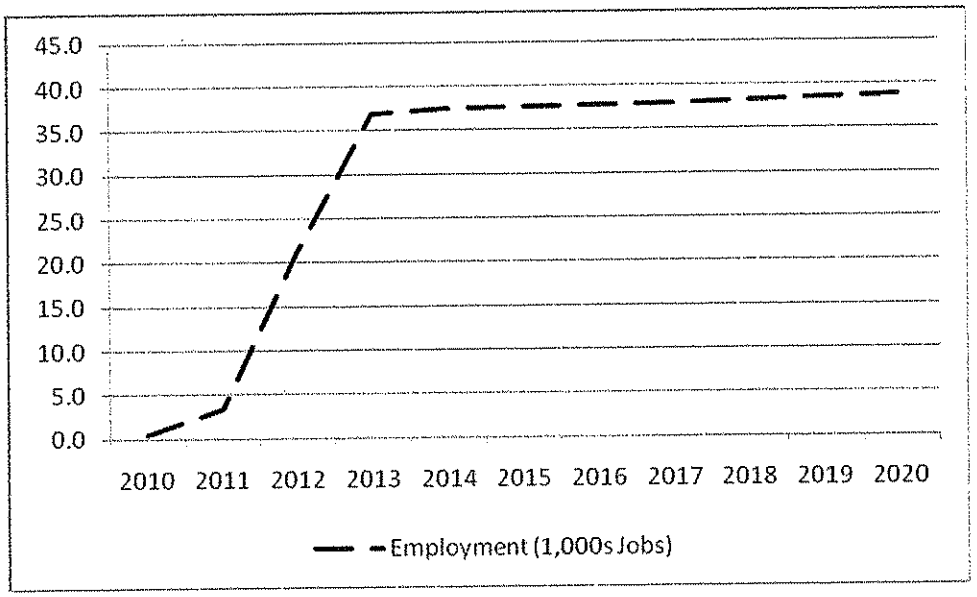


Chart 2: Job Impacts (1,000s)

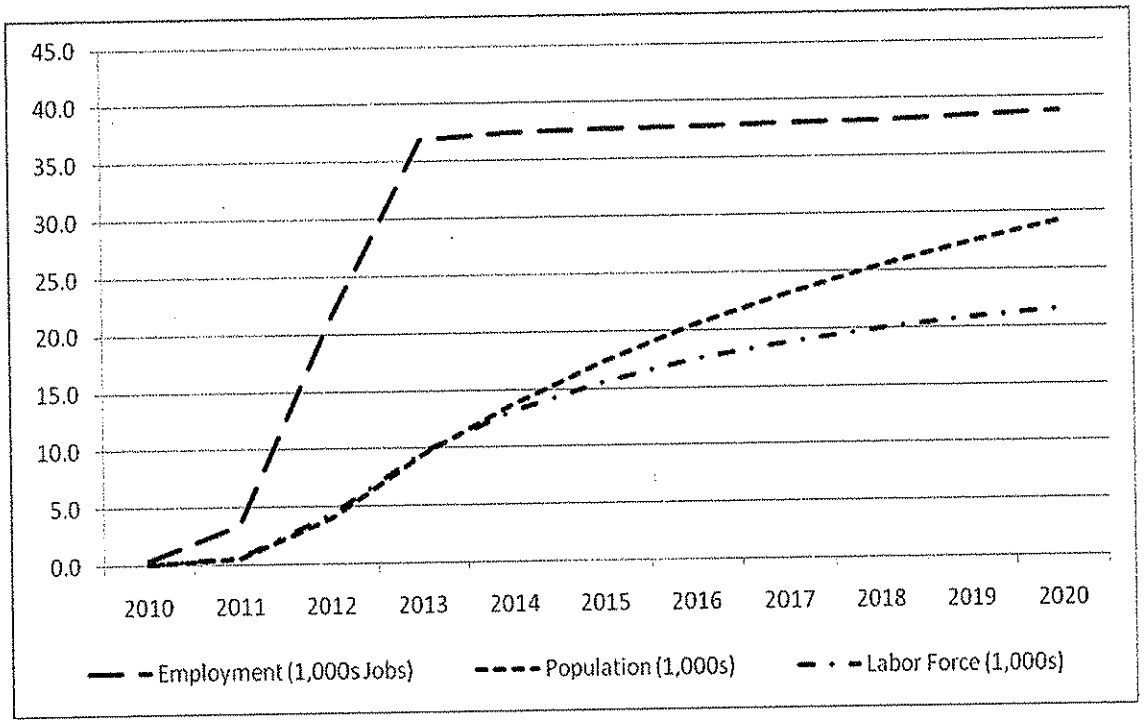


Both indicators point to quick, strong results from the implementation of the Tax Credit Legislation. In essence, the proposed policy quickly mobilizes private sector resources that powerfully redress the agony that the prolonged underperformance of Connecticut's economy is inflicting.

Labor Force Shifts

Job expansion encourages population to remain in Connecticut and/or move into the state to take advantage of the job opportunities, so adoption of this approach impacts positively both population and labor force participation. Chart 3 captures the resulting implications for employment, labor force, and population growth. Growth in employment initially outpaces that in the labor force, assisting a decline in CT unemployment. As operations in these relatively high-paying industries become more established, the rate of labor force growth drops off. The opposite is true for population growth, as relatively young workers retained and initially attracted start families. All these factors impact both state revenues and expenditures.

Chart 3: Labor Force and Population Changes (1,000s)



Fiscal Impacts

State and local governments benefit from the expansion in tax bases these investments generate. This includes direct impacts on the Grand List in host municipalities and from induced demands for housing, and increased incomes resulting from improved personal and corporate incomes, swelling collections on personal, corporate, and sales taxes. Governments also face increased expenditures as additional employment opportunities retain and attract population, which also leads to additional family formation. This analysis feeds the REMI results into the CCEA's state fiscal model[9] to project annual

[9] CCEA, jointly with DECD, developed and maintains a fiscal impact for the state and each of its municipalities. This model provides the average per capita cost for all elements of state and municipal services; because it necessarily relies on average costs of government services, it overstates the actual increase in the cost of services. There is no

fiscal impacts. This yields annual impacts on State revenues and expenditures in nominal dollars, taking both real growth and price impacts into account.

Lines 1-3 of Table 6 show fiscal impacts on annual State revenues, expenditures, and the net of the two before redeeming any R&D ITC. The fourth line gives the cumulated net revenues before redeeming R&D ITCs. Line five shows the repayments of $200 million per year, starting in 2013, with no interest charges; line six gives the net surplus revenues remaining with government after those payments.

Table 6: Incremental Annual and Cumulated State Fiscal Impacts (Millions of Nominal $) 2010-2020

		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Gross New Tax Revenues (Millions $)	3.5	29.4	235.3	441.6	476.3	504.7	530.7	555.9	581.3	607.5
2	Incremental Government Expenditures (Millions $)	0.5	4.1	30.2	72.7	108.7	140.5	169.2	195.3	219.5	242.0
3	Net New Annual Tax Revenue	3.0	25.4	205.0	368.9	367.7	364.2	361.6	360.7	361.8	365.5
4	Cumulative Net New Tax Revenue	3.0	28.3	233.4	602.3	969.9	1,334.2	1,695.7	2,056.4	2,418.2	2,783.7
5	Payment on R&D ITCs				200.0	200.0	200.0	200.0	200.0		
6	***Cumulative Net New Tax Revenue after Payment of ITCs***	***3.0***	***28.3***	***233.4***	***402.3***	***569.9***	***734.2***	***895.7***	***1,056.4***	***1,418.2***	***1,783.7***
7	Payment of Interest				75.9	103.8	111.7	98.2	61.6		
8	Payment of R&D ITCs + Interest				275.9	303.8	311.7	298.2	261.6		
9	Annual Net with Interest	3.0	25.4	205.0	93.0	63.9	52.5	63.3	99.1	361.8	365.5
10	***Cumulative Net New Tax Revenue after Payment of R & D ITCs + Interest***	***3.0***	***25.4***	***233.4***	***326.4***	***390.2***	***442.7***	***506.1***	***605.2***	***967.0***	***1,332.5***

"*" Assumes interest rate of 5% starting at the average completion date of July 1, 2012 with annual payments made on Dec. 31.

This table illustrates that the investments, assuming they are fully utilized by hiring at the average level of employment relative to the new capital stock, generate for Connecticut state government net new tax revenues (after paying for additional public services for in-migrating population) sufficient to cover fully the five annual $200 million refunds on R&D ITCs. Moreover, by the end of 2017, the State of Connecticut will accumulate net new revenues of *$1.056 billion* as a result of implementing this policy. In two additional years, after refunds end, the state will have gained nearly $1.8 billion in cumulative tax collections, with net revenue continuing annually at more than $365 million.

Alternatively, the state, to accelerate investment activity and drive economic recovery, may wish to offer to pay modest interest (5%) on the billion dollar investment commitment, net of payments made by the state to redeem the R&D ITCs. Such a process encourages the State to make the redemptions sooner, and significantly strengthens the attractiveness for investors. In this example, the State's net

basis on which to calculate the marginal cost of these services, which is systematically lower than average costs, and it ignores the potential scale effects in providing increase municipal and state services.

accumulated additional revenues reach $605 million. Alternative simulations show that the State secures annual net benefits through 2017 for any interest rate below 7%.

As Table 6 reveals, the State may be able to accumulate surpluses during 2010 and 2011, permitting offset of the first ITC refund at the end of 2012. This strategy would save the State interest and payback investors sooner. It would advance the state's last payment by a year, so the 2017 accumulated benefit would be $771 million, well above the $605 million generated with refunds beginning in 2013.

Investor Impacts

The impacts on investors are not as generous as they appear because the above calculations do not include investors' costs of capital. To estimate these costs, CCEA has discounted the value of redeemed R&D ITCs to mid-2012, when, on average, construction is complete. Using blended costs of capital to businesses of 15%, Table 7 shows net present values (NPVs) of redeemed R&D ITCs to investors, differentiated by the level of interest the State pays on those R&D ITCs remaining to be redeemed and the starting time for the redemptions. The differences between these numbers and one billion dollars constitute the NPV of the companies' investments in the State's recovery under the alternative interest rate strategies on unredeemed R&D ITCs.

Table 7: NPV of Redeemed R&D ITCs (Mid 2012, Millions $)

Interest Paid by the State on Unredeemed R&D ITCs (percent)	NPV Payments Commencing End of 2013	NPV Payments Commencing End of 2012
Zero	625.2	719.0
Five	909.3	918.0
Seven	1,031.8	1,001.8

With no interest payments by the state on unredeemed R&D ITCs and with redemptions starting at the end of 2013, R&D ITC redemptions represent less than the 65% refunded to small business for their R&D ITCs. Commencing payments at the end of 2012 or paying interest on them enhances NPV returns to business. If net redemptions start at the end of 2012 and the unredeemed portions pay 7% interest, net new revenues would match the cost to the state. This then is the breakeven point, assuming investors' internal cost of capital is 15%.

Deterioration

Introduction

Other jurisdictions are competing aggressively to attract companies which have a significant presence in Connecticut. In an era of consolidation, they may enjoy increased success. Competitors often offer lower costs, more reliable and higher-quality electricity, superior transportation infrastructure, educational programs highly responsive to business needs, and an ability to use or monetize R&D ITCs. The current CCEA *Outlook* turns a blind eye on the possibility of major relocation by businesses out of CT. This section confronts that threat. **What happens if firms and related jobs migrate out of Connecticut in significant numbers?**

Methodology

To establish Connecticut's vulnerability, this analysis characterizes such an exodus with parallel job cuts in industries and counties as a mirror image of gains in the previous section, with REMI determining the parallel losses in investment.

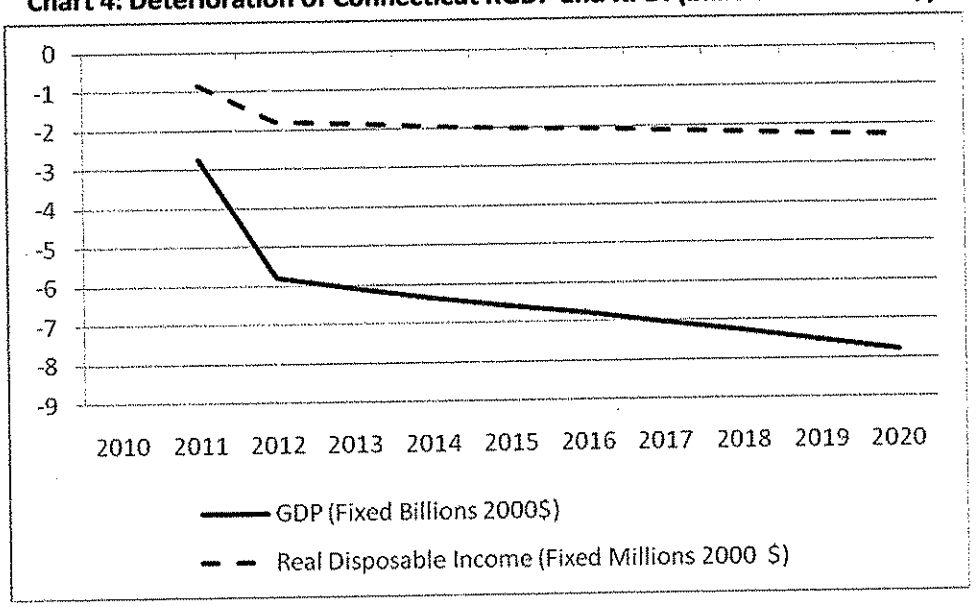
CT Economic Impacts

This section reveals the impacts of an exodus hypothesized above on incomes and employment.

Incomes

Not unexpectedly, CT incomes deteriorate relative to what they would have been, as Chart 4 illustrates. The deterioration in CT RGDP is sufficiently steep in 2011 and 2012 to undermine any likely recovery from the current recession. The economic contraction over the two years exceeds 3% of Connecticut's RGDP. Thereafter the deterioration slows, but continues.

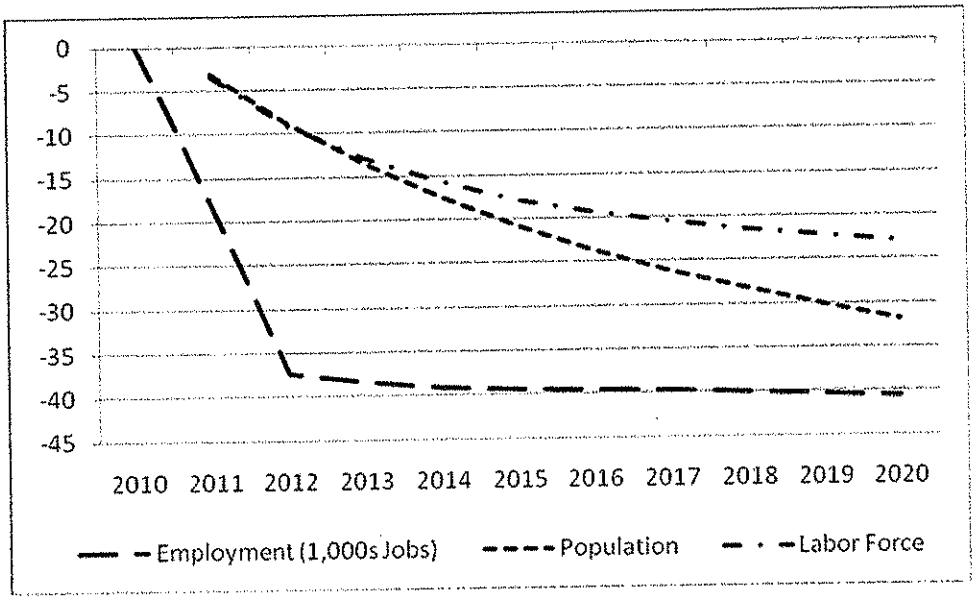
Chart 4: Deterioration of Connecticut RGDP and RPDI (billions Fixed 2000$)



Labor Force

This contraction in Connecticut's output, on top of the impacts of the current recession, will surely adversely impact labor markets. Chart 5, taking direct, indirect, and induced impacts into consideration, points to total job losses by 2012 exceeding 36,000. This would result in a significant exodus from the labor force and contraction in population. These migration patterns undermine housing markets and any recovery that might otherwise have occurred.

Chart 5: Job Declines and Labor Force Exodus (1,000s)



Fiscal Impacts

The fiscal impacts from the loss of these firms and their employment are severe. Table 8 reveals the loss in projected loss in tax revenue, net of reduction in public services (resulting from a contracting population). These results take into account the contraction in investment, so expected growth in the Grand List would be reduced by an amount roughly equal to the earlier expansion.

Table 8: Annual and Cumulated State Fiscal Shortfalls (Millions of Nominal $) 2010-2020

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Reduction in Tax Revenues	197.0	427.8	468.0	501.4	528.9	554.7	580.4	606.5	633.7
Reductions in Public Services	23.4	67.4	104.8	138.3	168.2	195.4	220.5	243.9	265.9
Increased Net Deficit	173.6	360.4	363.1	363.1	360.7	359.3	359.9	362.6	367.9
Cumulative Net Deficit	***173.6***	***534.0***	***897.1***	***1,260.2***	***1,620.9***	***1,980.2***	***2,340.2***	***2,702.8***	***3,070.6***

The results show a clear deterioration in State net revenues increases the deficit $360 million in 2012; this level of deficit continues thereafter. If not offset with increased taxes or additional reductions in public services, the cumulative additional state deficit resulting from this potential exodus of businesses would exceed $3 billion by 2019. This accumulating deficit results from the deterioration in all sources of government revenues, including the Grand List, sales taxes, and both personal and corporate income taxes.

Crossroads

Combining results from the two scenarios drives home the immense importance of encouraging resident firms in the very near term to expand through authorized capital investments, funded through scheduled redemptions of R&D ITCs. Adoption of this policy is emphatically superior to letting businesses slip away in response to attractive offers from competing jurisdictions, permitting, even facilitating, continued deterioration of the state's economic base.

Looking at the projected outcomes for the year 2020, the choice is between increased CT RGDP of $7.6 billion or contraction of $7.8 billion; between RPDI growing $2.2 billion or contracting $2.3 billion; between Connecticut households enjoying $4.7 billion in additional disposable income, or seeing a contraction approaching $8 billion; between adding 38,800 new jobs or losing 40,500 jobs; between net increases in the State's revenue base of $371 million or a deterioration of $368 million.

Conclusions

This proposal to redeem a billion dollars in earned R&D ITCs to fund new capital investments by the end of 2012 presents a singular opportunity to drive Connecticut's recovery from this recession, demonstrate a credible commitment to economic development, restore good faith between CT and its business community, and assist the State in balancing future budgets.

Appendix A: Encumbrances on Using R&D ITCs

Introduction

Based on State of Connecticut Department of Revenue Services, **Guide to Connecticut Business Tax Credits** 04/24/07, this appendix delineates the major encumbrances placed the use of R&D ITCs by Connecticut. While minimizing its short-term budgetary risks, the encumbrances erode the developments that the R&D ITCs are intended to generate.

Encumbrances limit the tax claims for which the R&D ITCs may be utilized under any of three avenues.

1. A *credit may be applied against the Connecticut corporation business tax for the incremental increase in amounts spent by a corporation for any grant or combination of grants to any* ***institution of higher education*** *in Connecticut made for the purposes of* ***research and development related to advancements in technology****. ... The credit is equal to 25% of the amount by which qualifying grants made in the current income year exceed the average qualifying grants made during the three immediately preceding income years.*

2. *A credit may be applied against the Connecticut corporation business tax for* ***research and development expenses*** *incurred in Connecticut.* **(Where)** ***Research and development expenses*** are those expenses that may be deducted under Section 174 of the Internal Revenue Code of 1986, as in effect on May 28, 1993, and basic research payments as defined under Section 41 of the Internal Revenue Code of 1986, as in effect on May 28, 1993, provided the expenditures and payments are:

    a. Paid or incurred for the research and experimentation and basic research conducted in Connecticut; **and**
    b. Not funded, as provided in Section 41(d)(4)(H) of the Internal Revenue Code of 1986, as in effect on May 28, 1993, by any grant, contract, or otherwise by a person or governmental entity other than the taxpayer unless the other person is included in a combined return with the person paying or incurring such expenses.
    c. Research and development expenses may include but are not limited to:
        i. Expenditures incurred in connection with the taxpayer's trade or business that represent research and development costs in the experimental or laboratory sense;
        ii. All costs incident to the development or improvement of a product including any pilot model, process, formula, invention, technique, patent, or similar property. The product can be used by the corporation in its trade or business or can be held for sale, lease, or license; **or**

b. more than 2% but not more than 3% 10%
c. more than 3% but not more than 4% 20%
d. more than 4% but not more than 5% 40%
e. more than 5% but not more than 6% 70%
f. more than 6% 100%

Further encumbrances include:
_ One-third of the amount of the credit allowable for any income year; or
_ The greater of:
_ 50% of the taxpayer's tax liability, determined without regard to any credits allowed by Conn. Gen. Stat. §12-217n; **or**
_ The lesser of 200% of the credit otherwise allowed for the income year or 90% of the taxpayer's tax liability, determined without regard to any credits allowed by Conn. Gen. Stat. §12-217n.

Any taxpayer also claiming a corporation business tax credit on **Form CT-1120RC**, *Research and Experimental Expenditures Credit*, will reduce the amount of research and development expenses that might otherwise be taken into account in computing the allowable credit by the amount of the incremental increase in research and experimental expenditures, as computed on Form CT-1120RC.

Any taxpayer also claiming a corporation business tax credit on **Form CT-1120GC**, *Tax Credit for Research and Development Grants to Institutions of Higher Education* will reduce the amount of research and development expenses that might otherwise be taken into account in computing the allowable credit by the amount of the incremental increase in grants, as computed on Form CT-1120GC.

Calculate the credit by multiplying the amount spent on research and development conducted in Connecticut by the appropriate percentage. The calculation reported on **Form CT-1120 RDC**, *Research and Development Credit*, must be entered on **Form CT-1120K**, *Business Tax Credit Summary.*

In the case of combined returns, all allowances and limitations will be made on an aggregate basis for all taxpayers included in the combined return, provided, the credit attributable to a **qualified small business** may be taken only against the combined tax liability attributable to the qualified small business. The amount of the combined tax for all corporations properly included in a combined corporation business tax return that is attributable to a qualified small business will be in the same ratio to the combined tax that the net income apportioned to Connecticut of the **qualified small business** bears to the net income in the aggregate of all corporations included in the combined return. For the purposes of computing this ratio, any net loss apportioned to Connecticut by a corporation included in the combined return will be disregarded.

Carryforward/Carryback Limitations

Credits that are allowed but that exceed the limitation amounts may be carried forward to each successive income year until such credits are fully taken. All allowable credits from prior years

iii. Costs of obtaining a patent, such as attorneys' fees expended in making and perfecting a patent application.

d. The following are examples of Internal Revenue Code of 1986, Section 174 expenses that **do not** qualify:

i. Overhead and other expenses, such as general and administrative expenses that relate to a corporation's activities as a whole and do not contribute directly to the research and development effort; **or**

ii. The ordinary testing or inspection of materials or products for quality control, for efficiency surveys, management studies, consumer surveys, advertising or promotions, for research in connection with literary, historical, or similar projects, and the costs of acquiring another's patent, model, production, or process.

A tentative credit of 6% is available to a **qualified small business**. A ***qualified small business*** is defined as a company that has gross income for the previous income year that does not exceed $100 million and has not met the gross income test through transactions with a related person, as defined in Conn. Gen. Stat. §12-217w. All other companies calculate their credit as provided in the chart below.

Expense Amounts Credit Percentage

$50 million or less

more than $50 million but not more than $100 million

more than $100 million but not more than $200 million

more than $200 million

Companies headquartered in an Enterprise Zone, with revenues in excess of $3 billion, employing more than 2,500 employees, may elect to multiply their research and development expenses by 3.5% instead of using the credit percentage listed above

$5,500,000 + 6% over $200 million

$500,000 + 2% over $50 million

$1,500,000 + 4% over $100 million

1%

Wage Base Reduction Adjustment

Taxpayers that pay or incur more than $200 million in research and development expenses in an income year must reduce their Research and Development Credit if workforce reductions exceed certain percentages. To determine the extent of workforce reductions, the current Connecticut wage base is compared to a historic Connecticut wage base determined from the third full income year immediately preceding the current income year. The Connecticut wage base is calculated from the total wages assigned to Connecticut with exclusions for the ten most highly paid executives of the taxpayer. The Research and Development Credit must be reduced by the following percentages based on the extent of the workforce reduction from the historic wage base:

a. not more than 2% 0%

must be carried forward and applied before the current year credit may be taken. No carryback is allowed.

3. A credit may be applied against the Connecticut corporation business tax for the incremental increase in **research and experimental expenditures** conducted in Connecticut. ***Research and experimental expenditures*** as defined in Section 174 of the Internal Revenue Code of 1986, as amended, include but are not limited to:
    a. Expenditures incurred in connection with the taxpayer's trade or business that represent research and development costs in the experimental or laboratory sense;
    b. All costs incident to the development or improvement of a product, including any pilot model, process, formula, invention, technique, patent, or similar property. The product can be used by the corporation in its trade or business or can be held for sale, lease, or license; **or**
    c. Costs of obtaining a patent, such as attorneys' fees expended in making and perfecting a patent application.

    The following are examples of expenses that **do not** qualify:
    a. Overhead and other expenses, such as general and administrative expenses, that relate to a corporation's activities as a whole and do not contribute directly to the research and development effort; **or**
    d. The ordinary testing or inspection of materials or products for quality control, for efficiency surveys, management studies, consumer surveys, advertising or promotions, for research in connection with literary, historical, or similar projects and the costs of acquiring another's patent, model, production, or process.

    The credit percentage is 20% of the excess of research and experimental expenditures in Connecticut in the current income year over research and experimental expenditures in Connecticut in the preceding income year.

With the exception of small businesses, with revenues under $100 million in the previous year, no refunds are available for a business without tax liabilities and the refunds are for 65% of the value of the R&D ITCs. Especially difficult in a recession, R&D ITCs that would otherwise be awarded for internal R&D are subject to claw backs if labor forces are trimmed.

Appendix B: Technical Discussion

Background

In 2009, Connecticut's Office of Fiscal Analysis expected Connecticut business credits to reach $305.6 million. It also expected the film industry at $115 million and historic sites at $50 million to exercise over half the credits. Among the remaining 21 credits, capital items, of interest to this analysis, amounted to $102.5 million including Fixed Capital Investments, Electronic Data Processing, Machinery and Equipment, Research and Development, and Research and Experimentation. See Table B1 for amounts.

Aside from film credits, Connecticut R&D investment tax credits (ITCs) are not transferable. Further, except for Research and Experimentation undertaken by small business[10] discounted to 65%, the State does not refund unused credits when each company's accumulation of them exceeds taxes due on the company's income. Excess credits can be accumulated for periods noted in the Table. Several major companies have collectively accumulated over $1 billion in CT R&D credits. Because companies have accumulated far more credits than they are likely to use to defray state corporate taxes and R&D ITCs are not marketable, current CT R&D tax credits provide little incentive to accumulate more so that the intended incentive to undertake R&D in Connecticut becomes valueless to these companies.

Table B1: Summary of CT Investment Tax Credits and Expectations for 2009

Type	$ Mil.	Description	Eligibility	Exclusions	Features
Investment					
a. Fixed Capital	60	5% of $ paid or incurred for new fixed capital investments.	Recipients must use capital in CT for 5 years	Land, buildings, and motor vehicles.	5-year carry-forward recapture provision.
b. Electronic Data Processing	25				
c. Machinery and Equipment	2.5	5-10% of machinery and equipment expenditures.	Only firms including related firms with less than 800 employees	Cannot be taken with fixed capital credit No large firms above 800 employees.	Must exceed expenditures in the previous year.
Research and					
a. Development	5	Generally credit amount is 1% of R&D expenditures less than $50 million; plus 2% of R&D expenses from $50 to $100 million; plus 4% for R&D expenses from $100 to $200 million; plus 6% for expenses above $200 million.	Firms with in state R&D that qualifies under federal law.	Reduced for taxpayers with workforce reductions in excess of defined thresholds and ceilings on amounts that can be claimed.	Indefinite carry-forward with special provisions for small businesses.
b. Experimentation	10	20% of incremental R&D expenditures from previous year.	Qualify under federal law.	Non-incremental R&D.	15-year carry-forward. Refundable at 65% for small businesses.

Sources: Jennifer Weiner, State Business Tax Incentives Examining Evidence of their Effectiveness, Federal Reserve Bank of Boston, Office of Fiscal Analysis, the Connecticut General Assembly The Connecticut Tax Expenditure Report 2009.

[10] Small Businesses are those with expected income of less than $70 million.

In essence, except for research and experimentation by small businesses, start-up companies may accumulate R&D ITCs but cannot use them until they become profitable against corporate profit taxes that would otherwise be payable and then only to the extent that they qualify under the maze of constraints noted above that limit values in their annual use . Companies starting-up large R&D facilities may have larger incremental R&D costs in the state than taxes due and therefore be awarded tax credits in excess of what can be used in that year and then with gradual further expansion for several years lose their capacity to utilize the R&D ITCs they are accumulating. Due to constraints on their use and the barriers against monetizing CT R&D ITCs, additional accumulations become virtually worthless to firms with large accumulations and yield little or no incentive to expand in Connecticut, let alone remain in here. In short, the ITC's intended incentive is dissipated.

The question is then "How can CT policies be adjusted to encourage companies to utilize dormant R&D tax credits to invest in and grow Connecticut while simultaneously reinstituting effective Connecticut R&D ITCs as incentives to encourage R&D in Connecticut within a balanced budget?"

Methodology

This process defines economic stimuli and then analyses them by combining data from national and CT databases with REMI's regional analytical model and a sub program on fiscal impacts housed at the CCEA.

Stimuli and Data Sources

This analysis generates two scenarios with variations on each of them. In the first scenario a billion dollars of investment in Connecticut is allocated among four "Industries" or "activities. Two of the four are actual industries, while others are more accurately defined as activities approximated by the combined output of several industries.

The two actual industries are pharmaceuticals and insurance. Due to data limitations relating to the stock of capital and industry categories within REMI, they are covered in this work by somewhat broader industries. The pharmaceutical industry is approximated by chemicals other than petroleum, coal, plastics and rubber. Insurance is approximated by insurance carriers and related activities.

The two activities include high-tech and biotechnologies. High-tech is covered by the computer and communications equipment industry and the vehicle manufacturing other than automobiles with the weighting of each industry being dependent on the industry output in each CT County[11] included in the study. The biotechnology activity is evolving rapidly and includes a lot of pharmaceutical R&D rather than manufacturing. Other R&D is addressing possible applications of biotechnologies to other industries. Biotechnology activities also cover evolving new technologies for production of pulp and

[11] Rather using output as the criterion, CCEA also tested weighting by the value added by each industry, and found the geographic shares to be within one percent of each other so variations on that alternative were no pursued.

paper including new processes to extract valuable chemicals prior to paper production as well as the processing of wastes from paper mills into fuels[12]. Similarly the food processing is adopting biotechnologies to efficiently enhance their products. For these reasons the biotechnology activity in each CT County has been approximated by its output of paper and processed food plus 30% of professional and R&D services occurring in the county.

The modeled shares of investments arising from the use of a billion dollars in currently unused R&D ITCs involved the four industries/ economic activities namely:

1. Pharmaceutical (33%)
2. High-Tech (33%)
3. Biotechnologies (16.67%)
4. Insurance (16.7%)

The investments where geographically spread among the three leading CT counties in each industry culminating in the values shown for the four counties listed in Table B2. Three of the industries are primarily located in Fairfield, New Haven, and Hartford with New London replacing Hartford as a key home-county for pharmaceuticals.

Table B2: Non-Leveraged Direct CT Stimulus by Funding Industry and County (2010 Millions $)

Industry\County	Fairfield	New Haven	Hartford	New London
Pharmaceuticals	144.1	85.6		103.6
High-Tech Manu.	126.6	78.8	127.9	
Biotechnologies	69.5	41.5	55.7	
Insurance	32.7	13.1	120.9	
Total	372.9	219.1	304.5	103.6

In addition, new investments in each directly impacted industry were further divided in to construction and M&E. Construction included HVAC, wiring and plumbing whereas M&E is industry specific and included the shares of various qualified components based on national shares of M&E annual investments consistent with industries covered in REMI. The division of the investment data in each industry was determined in line with the capital stock in each of the industries listed above. The capital stock was determined for each industry by a straight-line depreciation of annual investments in plant over the last 25 years and a straight-line depreciation of annual investments M&E over the last five years. These data were only available by industry on a national basis to 2009[13].

[12] Peter E. Gunther, **Capturing Canada's Green Advantage: based on biotechnologies** pb Canadian Forestry Innovation Council, The Alberta Research Council, Paprican, the Alberta Forest Research Institute, and Industry Canada, 2006.

[13] http://www.bea.gov/national/FA2004/Details/Index.html (Feb 2010)

This process facilitated an allocation of the above investments into construction amounting to $495.4 million with the remainder in M&E. There was considerable variation among the four industries in their shares of investment in plant and M&E as implied Tables B3 and B4. While these results are based on the current geospatial distribution among counties, alternative sites could be developed, with minor implications for state level results.

Table B3: Non-Leveraged Direct CT Construction Stimulus by Funding Industry and County (Millions $)

Industry\County	Fairfield	New Haven	Hartford	New London
Pharmaceuticals	82.3	48.9		59.2
High-Tech Manu.	65.2	40.6	65.8	
Biotechnologies	22.1	13.2	17.7	
Insurance	15.6	6.3	57.7	
Total	185.2	108.9	141.2	59.2

Table B4: Non-Leveraged Direct CT M&E Stimulus by Recipient Industry and County (Millions $)

Industry\County	Fairfield	New Haven	Hartford	New London
Computers	11.6	4.5	14.8	2.4
Software	79.9	32.6	83.6	16.3
Communications equip	4.4	2.2	5.3	0.4
Other electronic	23.6	6.7	15.1	8.6
Fabricated metal	4.4	0.9	1.4	2.1
Machinery	69.9	25.9	43.2	19.6
Trucks	1.7	0.7	5.1	0.1
Furniture	6.2	2.8	8.6	0.8
Total	201.7	76.2	177.1	50.4

Investments were further divided through time with construction including planning and site presentation occurring in 2010 (25%) and 2011 (75%) and the M&E being put in place during 2011 (40%) and 2012 (60%), but averaging completion mid 2012. Since there will be multiple projects under the rubric of this policy, construction and installation of M&E will finish sooner on some projects than on others so that there is considerable overlap between all construction and the initiating installation of M&E. In addition startup dates among projects are likely to be different so that the transition from construction employment to operating employment is smoother than for a single project scenario.

While construction and M&E employment is determined by the dollars invested, there is no such connection to operating employment. Operating employment was determined for each industry by national 2008 employment to capital stock ratios for each industry, reduced by the annual rate of change in CT overall employment to capital stock ratio of -3.5%, estimated over the last 4 years.

National employment data for 2008 by industry was generated from 2008 BLS data and matched by NAICS codes to the investment data.

Since the last two of these were recessionary years, this process may cause a slight downward bias in employment estimates. Those industry estimates of operating employment[14] were used as the direct operating shock to the REMI model. That shock was apportioned among the counties in line with current shares among the four counties in which the investments are being made[15]. Since the shock is being used in the REMI context it is in terms of incremental jobs. As noted earlier taking part time jobs into account, there are about 1.308 incremental jobs per employee as commonly used by the BLS 2008 data and aggregate 2008 capital data for CT from REMI.

Alternative Approaches

These results are divided into two sections "Deploying Unused R&D ITCs" and "Deterioration" culminating in a third section "Crossroads". The focus is on the differences arising from policy decisions to act and the failure to act mid rising competitive pressures from other jurisdictions.

All these approaches are based on findings from the REMI model and the CCEA's fiscal impact model. While key outputs are covered in the main text, this appendix summarizes each model.

REMI

The Connecticut REMI model is a dynamic, multi-sector, regional model developed and maintained for the Connecticut Center for Economic Analysis by Regional Economic Models, Inc. of Amherst, Massachusetts. This model provides detail on all eight counties in the State of Connecticut and any combination of these counties. The REMI model includes all of the major inter-industry linkages among 466 private industries, aggregated into 70 major industrial sectors. With the addition of farming and three public sectors (state and local government, civilian federal government, and military), there are 70 sectors represented in the model for the eight counties.

The REMI model is based on a national *input-output* (I/O) model that the U.S. Department of Commerce (DoC) developed and continues to maintain. Modern input/output models are largely the result of groundbreaking research by Nobel laureate Wassily Leontief. Such models focus on the inter-relationships between industries and provide information about how changes in specific variables—whether economic variable such as employment or prices in a certain industry or other variables like population affect factor markets, intermediate goods production, and final goods production and consumption.

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[14] Technically, BLS based employment estimates were translated in to REMI job estimates by using the 2008 average for such conversions, a multiple of 1.308286. Anyone wishing to convert the jobs results to employment should use the same proxy in reverse. "Employment" references BLS data and "Jobs" for REMI data.

[15] When both investment and employment data are used simultaneously in REMI, the model requires that Investment induced by the additional employment be backed out of the estimates. Those adjustments were made.

The REMI Connecticut model takes the U.S. I/O "table" results and scales them according to traditional regional relationships and current conditions, allowing the relationships to adapt at reasonable rates to changing conditions. Listed below are some salient structural characteristics of the REMI model:

- REMI determines consumption on an industry-by-industry basis, and models real disposable income in Keynesian fashion, that is, with prices fixed in the short run and GDP (Gross Domestic Product) determined solely by aggregate demand.
- The demand for labor, capital, fuel, and intermediate inputs per unit of output depends on relative prices of inputs. Changes in relative prices cause producers to substitute cheaper inputs for relatively more expensive inputs.
- Supply of and demand for labor in a sector determine the wage level, and these characteristics are factored by regional differences. The supply of labor depends on the size of the population and the size of the workforce.
- Migration—that affects population size—depends on real after-tax wages as well as employment opportunities and amenity value in a region relative to other areas.
- Wages and other measures of prices and productivity determine the cost of doing business. Changes in the cost of doing business will affect profits and/or prices in a given industry. When the change in the cost of doing business is specific to a region, the share of the local and U.S. market supplied by local firms is also affected. Market shares and demand determine local output.
- "Imports" and "exports between states are related to relative prices and relative production costs.
- Property income depends only on population and its distribution adjusted for traditional regional differences, *not* on market conditions or building rates relative to business activity.
- Estimates of transfer payments depend on unemployment details of the previous period, and total government expenditures are proportional to population size.
- Federal military and civilian employment is exogenous and maintained at a *fixed* share of the corresponding total U.S. values, unless specifically altered in the analysis.

Because the each variable in the REMI model is related, a change in one variable affects many others. For example, if wages in a certain sector rise, the relative prices of inputs change and may cause the producer to substitute capital for labor. This changes demand for inputs, which affects employment, wages, and other variables in those industries. Changes in employment and wages affect migration and the population level that in turn affect other employment variables. Such chain-reactions continue in time across all sectors in the model. Depending on the analysis performed, the nature of the chain of events cascading through the model economy can be as informative for the policymaker as the final aggregate results. Because REMI generates extensive sector detail, it is possible for experienced economists in this field to discern the dominant causal linkages involved in the results.

The REMI model is a structural model, meaning that it clearly includes cause-and-effect relationships. The model shares two key underlying assumptions with mainstream economic theory: *households maximize utility* and *producers maximize profits*. In the model, businesses produce goods to sell to other firms, consumers, investors, governments and purchasers outside the region. The output is produced

using labor, capital, fuel and intermediate inputs. The demand for labor, capital and fuel per unit output depends on their relative costs, because an increase in the price of one of these inputs leads to substitution away from that input to other inputs. The supply of labor in the model depends on the number of people in the population and the proportion of those people who participate in the labor force. Economic migration affects population size and its growth rate. People move into an area if the real after-tax wage rates or the likelihood of being employed increases in a region.

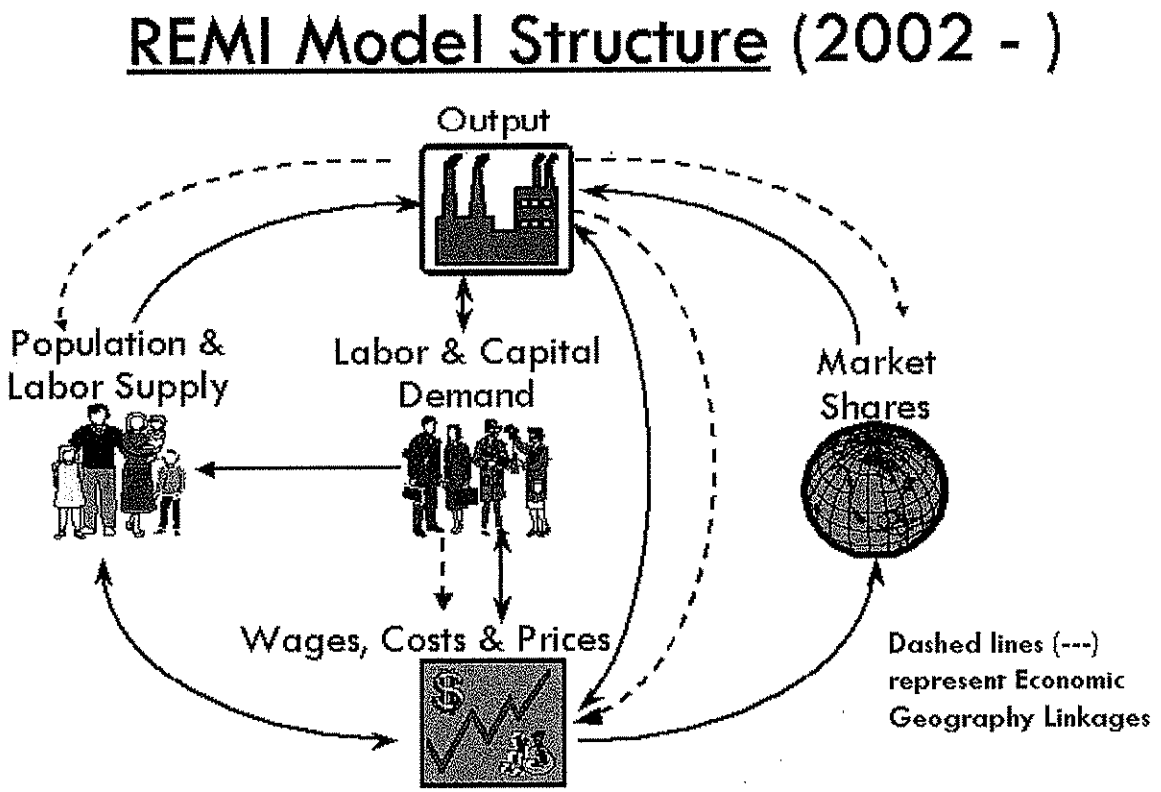
Real wage rates are determined by supply of and demand for labor. These wage rates, along with other prices and productivity, determine the cost of doing business for each industry in the model. An increase in the cost of doing business causes either an increase in price or a cut in profits, depending on the market supplied by local firms. This market share combined with the demand described above determines the amount of local output. The model has many other feedbacks. For example, changes in wages and employment impact income and consumption, while economic expansion changes investment and population growth impacts government spending.

Model Overview

Figure B.1 is a pictorial representation of the model. The Output block shows a factory that sells to all the sectors of final demand as well as to other industries. The Labor and Capital Demand block shows how labor and capital requirements depend on both output and their relative costs. Population and Labor Supply are shown as contributing to demand and to wage determination in the product and labor market. The feedback from this market shows that economic migrants respond to labor market conditions. Demand and supply interact in the Wage, Price and Profit block. Once prices and profits are established, they determine market shares, which along with components of demand, determine output.

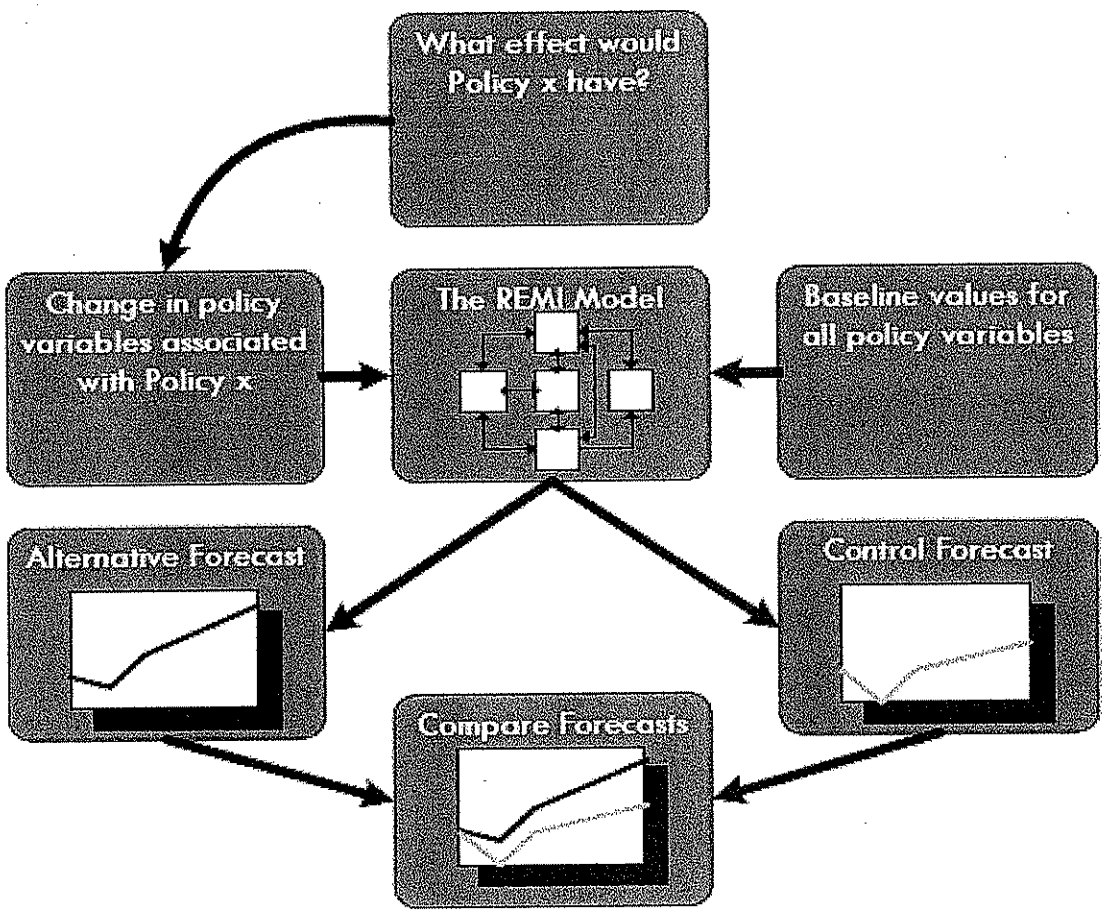
The REMI model brings together the above elements to determine the value of each of the variables in the model for each year in the baseline forecasts. The model includes each inter-industry relationship that is in an input/output model in the Output block, but goes well beyond the input/output model by including the relationships in all of the other blocks shown in Figure B.2. In order to broaden the model in this way, it is necessary to estimate key relationships econometrically.

Figure B.1



Estimation is accomplished by using extensive data sets covering all areas of the country. These large data sets and two decades of research effort have enabled REMI to simultaneously maintain a theoretically sound model structure and build a model based on all the relevant data available. The model has strong dynamic properties, which means that it forecasts not only what will happen, but also when it will happen. This results in long-term predictions that have general equilibrium properties. This means that the long-term properties of general equilibrium models are preserved without sacrificing the accuracy of event timing predictions and without simply taking elasticity estimates from secondary sources.

Figure B.2



CCEA's Fiscal Model

This model uses data inputs and REMI results to adjust the CT and county tax bases in order to estimate the changes expected in State and local revenues arising from the total impacts of various economic shocks, in this case the investment shock during construction followed by expended employment during operations. It estimates increased revenues accruing to both State and local governments, including inter-jurisdictional transfers.

In this instance, there were four counties being impacted albeit the model is set-up for single county impacts. In order to determine if it was necessary to rewrite the model to accommodate this exception to normal impact runs, the total county impacts were assigned to each of the counties and the

differences among the four found to be less than one percent on the total discounted impacts on the State. In this instance the lowest of the estimates benefits accruing to the state was used in order to keep state impact estimates conservative.

Most state expenditures are tied to per capita expenditures. While not ideal, due to the lumpiness of State expenditures and revenues, this shortfall in the model is expected to balance off over time.