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**Short-time Compensation: Factors Leading
to its Adoption and its Success in Connecticut**

William Kimball
Honors Thesis in Economics
May 11, 2012

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Abstract

The recent financial crisis has reawakened the U.S to the possible effects of a rapid economic downturn. Poor economic conditions have forced both households and government to tighten their budgets. Still, unemployment persists and the growth rate of the U.S has not been as robust as past recoveries. Worksharing, or short-time compensation (STC), is an unemployment insurance program where a pool of workers shares a reduction in their hours to avoid layoffs. The program offers both benefits and possible issues for firms, employees and state governments alike. This paper attempts to determine why certain states have elected to adopt STC where others have passed on it. Besides the obvious cause of higher unemployment, geography and political institutions prove to have substantial impacts on the chances of a state enacting legislation for STC. This model is followed by an analysis of STC's small but positive impact on unemployment rates in the state of Connecticut.

I. Introduction

The 2008-2009 Financial Crisis has resulted in the largest economic downturn since the Great Depression. This "Great Recession" came at a time when citizens and many economists had settled into a sense of security from severe economic hardship (The Economist 2009). Since 1933, America's recessions had become more sporadic and shorter in duration (CNBC 2007). However, the crash of the housing market and the sequential collapse of the financial industry brought about widespread economic instability. Among other deteriorating economic conditions, unemployment rose from 5.0% at the beginning of 2008 to 9.9% at the end of 2009, the highest since 1983 (U.S Bureau of Labor Statistics). The recovery from this downfall has also been relatively slow and lackluster. GDP growth has averaged a tepid 2.4% since the end of the recession. Similarly, unemployment only declined to 8.2% in the first quarter of 2012 (Bureau of

Economic Analysis). Although our economy has shown to be relatively more stable in the recent decades, the experience from the past few years indicates that we still have room to improve our recovery policies. With respect to unemployment levels, some policymakers and think-tanks are considering some form of workshare to help avoid mass layoffs in downturns. As an indication of this focus on workshare, the federal government's Job Creation Act of 2012 included funding for states' STC programs. In the scope of American policymaking, the workshare program is often referred to as short-time compensation.

Short-time compensation (STC) is a form of unemployment insurance whereby firms spread the reduction of hours across a larger pool of workers in lieu of laying off a select number of employees. For example, instead of laying off one employee, a firm reduces the hours of five employees by 20% each, thus equaling one lost employee. The goal of the program is to provide companies with the ability to temporarily reduce their production levels during an economic downturn (for the firm/industry or economy as a whole). By retaining more employees, firms can then return to pre-downturn production levels quicker and more efficiently. Businesses enrolled in the program can avoid recruiting and training costs. Additionally, workers in danger of losing their jobs avoid the typical economic and social hardships associated with losing a job (Shelton 2011, p. 10). It is also thought that STC will reduce the social costs and burdens of unemployed workers on the government. STC is a common component in 25 of 33 OECD countries' unemployment insurance systems. Despite STC's popularity in Europe and its possible benefits, only 20 states in the U.S have enacted legislation to institute workshare.

The lingering effects of the 2008-2009 Financial Crisis remind us how unemployment can cause persistent economic and social woes for individuals and society as a whole. Consumer confidence in the United States has suffered significantly since the onset of the Great Recession

(The Conference Board 2012). While the unemployment rate has steadily decreased since 2008, the real unemployment rate is speculated to be much higher. Additionally, as of January 2012, 42.9% of those unemployed had been unemployed for 27 weeks or over (U.S Bureau of Labor Statistics 2012). Our federalist system provides the ability for individual states to create and test unique public policies. This enables other states to see the relative levels of success (or failure) of these policies so that they can adopt similar strategies. Short-time compensation as a form of unemployment insurance certainly promises advantages to reduce unemployment and allow for firms to adjust to downturns easily. In many of those states that do not have a form of short-time compensation, legislators have proposed introducing STC in the first session of 2012 (Timesizing).

This paper aims to determine the factors that cause states to adopt or not adopt STC. Various studies attempted to determine STC's effects on unemployment, economic growth and state unemployment funds in the U.S as well as in other OECD countries. However, there has been very little research in understanding why states turn to STC. Many presume that states' high unemployment rates are the primary cause for states adopting STC (Best 1981, p. 1). Unemployment will certainly play a large part of this decision but what factors induce some states to pursue it while others have held off? Mathematic Policy Research Institute and Berkeley Planning Associates' (1997) survey study suggested that lobbying efforts of particular groups prevented or encouraged STC. Specifically, they found that legislators and organizations familiar with STC pushed for its adoption whereas others voiced concerns about its impact on businesses and the state funds. This was an interesting finding but it lacks any general systematic characteristics that might have played a role in these processes.

This paper will examine some of the institutional causes (or obstacles) for STC in states. By studying this question, we can understand the impediments to workshare legislation in the United States. This will explain at least partially, why the U.S lags behind countries like Germany which sport prominent workshare programs. Also, the results of this paper can help us predict STC's future in the U.S. The empirical work in this paper tests how various indicators of economic conditions, legislature demographics and major characteristics of the state economy affect the chances of a state adopting STC. I used a binary logit model to determine the odds that the outcome of an STC program is due to one of the predictors. This paper will also include a rudimentary analysis of STC's effect on the unemployment rate in the state of Connecticut. For this work, I used a multiple linear regression model to determine whether or not initial claims of STC have significantly affected the unemployment rate in Connecticut. I was not able to apply this analysis to every state because I was not able to acquire the number of enrolled firms and workers in each state's program. Finally, I will remark on what the future holds for researching STC and its nuances. Collectively, this article will provide insight into the adoption of STC, its effects on unemployment in Connecticut and the promotion of STC within states that do offer it.

The second section of this paper will provide some background information of worksharing in the United States. This is useful to see how the program has developed in the U.S and perhaps why it has been a slow transition. The third section offers a general overview of workshare and short-time compensation programs. This provides insight into some of the benefits and problems of workshare as well as highlights some of the possible differences between state programs. It will also entail a brief introduction to some of the literature and research on the subject of workshare and short-time compensation. In the fourth section, I will describe the methodology I used for my empirical research on short-time compensation. This

will entail both a brief analysis of the factors affecting adoption of STC and an analysis of STC's relative effectiveness at alleviating unemployment rates in Connecticut. The fifth section will present the results of these regression sets. The sixth section will provide an analysis of this data and an interpretation of the results. I will then go over my conclusions of the data and make predictions on workshare's future in the United States in the seventh and final section of the paper.

II. History and Trends of Work share in the U.S

Beginning in the U.S

Worksharing as a method to reduce production dates back to the Great Depression when U.S firms sought to avoid widespread unemployment and poverty. At the time, unemployment insurance was not supplied by the government (Walsh et al 1997, p. 3-2). California enacted the first legislation incorporating STC in 1978. After the passage of Proposition 13, which limited property tax assessments, California state employees faced massive layoffs. In response to this concern, legislators instituted STC to reduce the work while avoiding a significant increase in unemployment (Torrence and Rejda 1987, p. 9). A few other states (3: Arizona, Washington and Oregon) enacted STC programs of their own in the years soon after 1978. The federal government recognized the trend and instituted federal laws and guidelines for these programs as other states (8) continued to adopt STC in the early 1980's. However, the latter half of the 1980's marked a period in which the federal government rescinded its oversight of STC. Seven states initiated work share programs during this time period. In the early 1990's, Congress reinstated laws for STC as just two more states began their own programs (Connecticut, Rhode Island). In 2010, 18 states (see Table 1-1) had legislation for STC programs (U.S Department of Labor 2012). Yet, in the wake of the 2008-2009 Financial Crisis, three more states have introduced new

legislation for STC in 2011. Many more states are expected to pass similar bills in 2012 (*Timesizing* 2012).

III. Overview of Short-Time Compensation

Generic program details

For the majority of states' short-time compensation programs, unemployment insurance agencies require details of the four main facets of the plan for workshare from those firms that are interested in participating. First, firms must estimate the percent of work reduction necessary for them to continue operations. Often, states will only accept those firms with a minimum (typically 5, 10 or 20%) and/or a maximum reduction of their workforce (40-60%). Second, firms are required to report the workers involved and a plan for how their hours will be effected. Third, the firm must come up with a preliminary estimate of the duration of the program. Finally, firms are to indicate whether or not they will reduce (or eliminate altogether) fringe benefits to the work share employees (Vroman and Brusentsev 2009, p. 2-3). Some states require firms to continue extending full fringe benefits to the employees.

Studies and research on STC

Scholars have analyzed STC for its merits and its weaknesses but there is no consensus on its effectiveness. Torrence and Rejda (1987) discussed the "New Employee Benefit" of STC and how the program might affect businesses, employees and the government respectively. Besides providing an overview of the program, they also offered a thorough literature review to describe real experiences of STC businesses, employees and state agencies. Businesses incurred higher relative costs in fringe benefits (provide same health care benefits while reducing production) and unemployment insurance payments but they also enjoyed lower training costs, improved labor productivity and improved labor relations (p. 13). As far as STC's ability to

alleviate unemployment, Torrence and Rejda concluded that STC's effect will be limited unless participation rates are significantly higher (p. 15).

The Mathematic Policy Research Institute and Berkeley Planning Associates (1997) conducted one of the more cited empirical projects to examine how STC affected unemployment and state unemployment insurance trust funds. The paper found that state trust funds remained solvent (p. iii). Yet, the enactment of STC did not prove to substantially affect unemployment rates because participation rates were still relatively small. Surveying the businesses enrolled however, MPR and BPA concluded that firms expressed "general satisfaction" with the program and "often used the program repeatedly" (p. iii). The study also looked into the causes for states adopting STC but this scope largely focused on surveys and therefore produced individual reasons. Also, Cahuc and Carcillo (2010) examined STC in OECD countries. Their paper concluded that STC is useful in maintaining employment levels during recessionary periods. Burdett and Wright (2001) studied the labor market implications of short-time compensation, comparing the European model (prominent use of work share) to the U.S unemployment insurance program (primarily encouraged layoffs). From their model, Burdett and Wright suggested that workshare programs only expanded inefficient retention of employees, leading to substantial underemployment.

Other papers have focused more on the construction and implementation of worksharing programs. Wayne Vroman of the Urban Institute and Vera Brustentsev (2009) of the University of Delaware studied short-time compensation and proposed those program extensions that offered the greatest likelihood of success for states. Cahuc and Carcillo (2010) also made suggestions for states to reduce inefficient use of work share programs. Van Audenrode's

research on the cases of OECD countries' experience with work share focused on the generosity of the program and the states' ability to respond to economic conditions quickly.

IV. Methodology

Data

This paper compiled the majority of its data from a variety of original sources including the Bureau of Economic Analysis (BEA – U.S Department of Commerce 2012), U.S Department of Labor (U.S DOL), Connecticut Department of Labor (CT DOL) and U.S' Bureau of Labor Statistics (BLS). I acquired certain data from third party sources such as Hirsch and Macpherson's (2012) UnionStats database as well as Balducchi and Wandner's (2011) study on STC. The BEA supplied information on gross state product (GSP), employment and industry-specific production levels. The U.S DOL provided information on the adoption of STC by states. Additionally, the DOL's information on other state unemployment insurance programs served as a basis for this paper's principle component analysis for state innovation. Connecticut's DOL provided data on its workshare claims from its adoption in 1992. The BLS offered data on state unemployment rates and industry employment levels.

Dependent Variables

For the main portion of this paper, I analyzed the factors affecting the chances of states adopting STC. This data came from the U.S DOL which provided the years for enactment of STC for any state. This dependent variable was a dummy variable (*stc*). I assigned a "0" to any state that never instituted any form of STC. Once a state adopted STC in any particular year, I inputted a "1" for that year but assigned no value for STC after that year. That is, once a state adopted STC, the variable becomes "dead". The purpose of this method is to ensure that the study tests for the factors leading *up to* adoption. For instance, an explanatory variable such as

high unemployment might cause a state to adopt STC. If unemployment were to then go down but a “1” for STC would skew the data to suggest that unemployment did not have an impact on STC. This dummy variable for STC does overlook a few nuances. A dummy variable for STC ignores any possible qualifier for a state’s commitment to the program. While a state may enact legislation to include STC in its functioning *by law*, the state may decline to commit resources to really initiate the program. Also, the nature of the legislative process often delays a public policy from being enacted immediately after an event or situation. Although one of the model’s variables might cause a state to consider enacting STC, it may take a year or two for the respective state legislature to turn out legislation for the program.

The second extension of this paper seeks to perform an analysis of the effects on the unemployment rate (*ctun*) of Connecticut for the same time period of 1978-2011. STC programs can affect a number of economic indicators. As mentioned earlier, STC potentially protects levels of consumption, GDP growth and labor production levels. However, I chose to test STC’s significance to Connecticut’s unemployment rate because it is the central focus of the program. Furthermore, a state’s unemployment rate is intimately involved with these other economic indicators. Once again however, a newly instituted STC program will not necessarily have an immediate impact on unemployment rates. State agencies, firms and employees will take time to learn about the program and use it effectively.

Independent variables

For the binary logit model that tested the factors affecting STC adoption I controlled for the region of the states. These regions were broken down into the Midwest (*mw*), Northeast (*ne*), Southwest (*sw*) and West (*west*). This meant that the intercept accounted for states in the Southeast. I included these regional variables to account for geographical patterns that defined

these areas. States within a region share economic, political and social characteristics that may not be accounted for in other variables of the model. These regions, of course, are not perfect separations and are partially arbitrary. Similar to this variable for the region, I tested the significance of a dummy variable for a neighboring state having adopted STC (*dumnei*). State legislatures may mimic neighboring states' policies for a number of reasons. The geographical proximity makes it more likely that legislators from neighboring states maintain some sort of correspondence, presenting the possibility of information spillover. Also, neighboring states are in competition for acquiring (or retaining) residents so a legislature might adopt STC if it has a positive reputation. This model also controlled for the year variable (*yr*) to determine if there was a general growth pattern of STC in the U.S.

Economic conditions and aspects surely play a role in the chances that a state will adopt STC. Equation 1 tested for how states' unemployment rates (*un*) might affect the chances of adopting STC. I acquired the data from the U.S' Bureau of Labor Statistics (BLS) which measured the rates as the percentage of persons in the workforce without a job. This variable tests the common explanation for the unemployment causing STC adoption. I also introduced a variable for labor productiveness, average production of labor (*avpro*). Using BEA data on gross state production (GSP) and the total number of private employees, I calculated for the average production of labor by dividing GSP by the number of employees. Advocates of STC suggest that the program allows firms to retain skilled employees in a time of economic uncertainty. The average production of labor can therefore test if a higher-skilled workforce might induce states to enact STC. This measure of labor's average production lacked data on the actual number of hours worked. Rather, it depended on just the number of employees. Also, this variable for human capital might be distorted by states' varying bounty of technology and capital. These

inputs might artificially increase the average production of labor without actual higher human capital. Another important economic factor to consider is the breakdown of a state's economy. For this particular model, I tested for the number of construction employees (*const*, in thousands of jobs) in a state. The construction industry's nature makes it an ideal candidate for using STC. Shelton (2011) researched the firms enrolling in STC and found that "specialty trades contractors" in construction often used STC because apprentices learned numerous skills on the job (p. 6). Also, the construction industry is highly sensitive to economic fluctuations so STC could help keep it afloat during downturns. As a result, one would expect legislators might be more likely to enact STC if a substantial construction industry is undergoing mass layoffs.

Besides economic interpretations, this paper attempts to determine if certain political aspects could encourage legislatures to adopt STC. This model controlled for the unionization (*perunion*) of a state. Hirsch and Macpherson (2012) compiled data from the U.S Census' CPA to determine the percentage of employees in a state that belong to unions. Krueger and Burton (1989) found that higher union rates partially caused higher levels of workers' compensation claims. Consequently, they suggested that union members may be "better informed of their rights" and ready to use them. The variable for unionization could then possibly explain a larger lobbying effort by unions to pursue STC legislation. To control for the political ideology of a state legislature, I tested the relationship that a Democrat-dominated legislature (*demdom*) might have on the chances of a state adopting STC. This dummy variable assigned a value of "1" to those respective states and years where Democrats held a majority in both the House and Senate chambers of the state legislature. Ultimately, state legislators determine which laws are passed and controlling both chambers makes it far easier for one party to pass its own bills. Democrats

typically favor more government intervention in economic and income inequality matters. I expect this variable to have a positive correlation with the chances of states adopting STC.

Beyond this ideological factor, this paper attempts to account for a state legislature's level of public policy innovation with respect to unemployment insurance programs. To create an index of state innovation, I incorporated a number of special programs and extensions relating to unemployment insurance in a principal component analysis (PCA). These programs ranged from offering self employment assistance to funding extended training for people on unemployment insurance. The U.S Department of Labor listed these options in their breakdown of state unemployment insurance laws. However, the DOL has constantly altered what they included in this list so the PCA only accounted for one year to simplify the analysis. This clearly overlooks how a state's level of innovation may evolve from year to year. Still, it is not that difficult to imagine that some states have always pursued creative government policies (California, Washington, etc.) while others consistently avoid government solutions (Montana, North Dakota, etc.) I chose to collect the special programs of the most recent year, 2011. This index for state innovation can incorporate a number of aspects of a state such as its general political ideology or the extent to which its legislators are informed of alternatives in unemployment insurance policies. Finally, I included a dummy variable for those years that the federal government instituted its own policy guidelines for STC (*fedpol*). Federal policies can both discourage and encourage states to adopt a particular program such as STC. This variable differed from the alternative of the federal government just having STC in law. I suggest that instituting guidelines presents a more direct connection to state legislation because it entails some sort of oversight.

Equation 2 offers a multiple linear regression model to determine how STC has affected the unemployment rate in the state of Connecticut from 1978 to 2011. Connecticut only enacted

STC in 1992 where filing for it began in October. The first control variable is that of the year (*yr*). As before, this variable simply presents any general pattern of Connecticut's unemployment rate. This model also controls for the national unemployment rate (*natun*) as a general indicator of the national economic environment. This speaks to firms and consumers' confidence levels as they perceive economic crisis on the national scale even if it may initially be focused in different region(s) of the country. This variable entails some level of endogeneity as Connecticut's unemployment rate factors into the national unemployment rate.

This model also attempts to account for some of the possible economic causes of unemployment. First, taxes on production simply add to the costs of production and can therefore lead to firms reducing their workforces (*tax*). This variable came from DOC's BEA (2012) which defined the indicator as the total number of taxes levied on production and imports less subsidies. To account for the overall economic conditions of Connecticut's economy, I included a variable for gross state production (*gsp*). The BEA measured this as the value of all the goods and services produced in the state. Employment levels also depend on the wealth of human capital in the state. Once again, I used the average production of labor (*ctavpro*) to reflect this quality aspect of labor. The model also incorporated the ratio of goods-production employees to services-production employees (*gsrat*) to generate a conception of industry mix. Polzin (2001) implied that industry mix is one of the factors affecting growth and unemployment levels. This produces an issue of multicollinearity as this variable might affect the variable for GSP.

The primary explanatory variables I focused on are the number of seasonally-adjusted initial claims for both normal unemployment insurance and STC. I acquired the data for seasonally-adjusted initial claims of generic unemployment insurance (*ini_sa*) on the DOL's website (2012). Data on the number of initial claims made was only available for the years of

1986-2011. An inquiry into the Connecticut Department of Labor resulted in the compilation of data for the number of seasonally-adjusted workshare initial claims (*wic_sa*). This variable will produce an overestimated effect of STC's effect because it did not offer equivalent numbers for normal unemployment insurance. That is, a firm enrolled in STC may file four claims to reduce the hours of each employee by 25% to equal one complete layoff. In the normal unemployment insurance program however, this firm would have just made one claim for the individual laid off. To reduce the effect of this inherent data error, I tested the logs of each claims variable. This way, the model tests for the impact of the change in each of these variables rather than their actual values.

Equation 1: Factors Affecting Chances of Adopting STC (n=1700, included observations=1268)			
Variable	Explanation of variable	Summary Statistics	Data Source
MW	Dummy variable indicating state is in the Midwest region	Sum=408 (12 states * 34 years)	
NE	Dummy variable indicating state is in the Northeast region	Sum=374 (11 states * 34 years)	
SW	Dummy variable indicating state is in the Southwest region	Sum=136 (4 states * 34 years)	
West	Dummy variable indicating state is in the West region	Sum=374 (11 states * 34 years)	
YR	Variable for the year	Min=1978, Max=2011, Median=1994.5	
Un	The average state unemployment rate for each respective year (% of people in the workforce without work)	Min=2.2, Max=17.4, Mean=5.99, Median=5.6	U.S' Bureau of Labor Statistics (BLS)
Avpro	Average production of labor, calculated as gross state product (GSP, in millions of \$) divided by the total number of private employees (thousands of employees)	Min=19.58, Max=151.21, Mean=59.15, Median=55.73	Calculated using GSP and employment figures from U.S' Bureau of Economic Analysis (BEA)
Perunion	The percentage of employees in the state that are unionized (%)	Min=2.3, Max=32.5, Mean=13.99, Median=13.2	Hirsch and Macpherson (2012), UnionStates.com (compiled from U.S' Census' Current Population Survey)
Demdom	Dummy variable indicating a state legislature where both chambers are controlled by a majority of Democrats	Sum=820	U.S Census' Statistical Abstract
PCAinn	Index rating states' public policy with respect to special unemployment insurance programs constructed by a principal component analysis (Normalized scale where 0 is average, above 0 is more creative state, and below zero is less creative)	Min= -2.78, Max=2.76, Mean= -2.00E-11, Median=0.19	Principal Component Analysis (Policy information from U.S Department of Labor (DOL))
Fedpol	Dummy variable indicating that the federal government instituted federal policy guidelines for the respective years	Sum=200 (4 years * 50 states)	Balducchi and Wandner (Compiled from U.S DOL)
Dumnei	Dummy variable indicating that a neighbor state has enacted STC	Sum=1054	
Const	Variable for the number of construction employees in a state (# employees)	Min=12,786; Max=1,289,555 Mean=161820.2 Median=	U.S DOC's BEA

Equation 2: STC's Effect on Connecticut's Unemployment Rate (1978-2011, n=34)			
Variable	Explanation of variable	Summary Statistics	Data Source
YR	Variable for the year	Min=1978, Max=2011, Mean=1994.5, Median=1994.5	
Tax	Taxes levied on production and imports less subsidies (millions of current \$)	Min=2,820; Max=15,609; Mean=9,074.15; Median=8,689	U.S DOC's BEA
NatUN	The national unemployment rate, calculated as the number of unemployed persons in the workforce (%)	Min=3.97, Max=9.71, Mean=6.36, Median=5.92	U.S BLS
GSP	Gross state production	Min=33,231; Max=246,500; Mean=129,013.6; Median=118,163.5	U.S DOC's BEA
CTavpro	Average production of labor, calculated as gross state product (GSP, in millions of \$) divided by the total number of private employees (thousands of employees)	Min=23.84, Max=127.86, Mean=71.85, Median=70.42	Calculated using GSP and employment figures from U.S' Bureau of Economic Analysis (BEA)
GSrat	The ratio of goods-producing employees to services-producing employees	Min=0.15, Max=0.37, Mean=0.25, Median=0.24	U.S BLS
WIC_SA	The number of seasonally adjusted workshare initial claims filed	n=20, Min=54.36, Max=1795.38, Mean=297.72, Median=174.88	Connecticut Department of Labor
INI_SA	The number of seasonally-adjusted normal unemployment insurance initial claims	n=26, Min=3217.65, Max=6737.86, Mean=4719.52, Median=4816.48	U.S DOL

V. Results

Equation 1

Dependent Variable: STC				
Method: ML - Binary Logit (Quadratic hill climbing)				
Date: 05/11/12 Time: 11:53				
Sample: 1978 2011				
Included observations: 1267				
Convergence achieved after 10 iterations				
Covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-106.8825	201.2179	-0.531178	0.5953
MW	2.617186	1.081515	2.419926	0.0155
NE	3.130840	1.135088	2.758234	0.0058
SW	1.690222	0.922995	1.831236	0.0671
WEST	1.969852	1.004479	1.961067	0.0499
DUMNEI	3.015260	0.761676	3.958718	0.0001
YR	0.050014	0.101763	0.491474	0.6231
UN	0.230735	0.133260	1.731466	0.0834
AVPRO	-0.054385	0.044561	-1.220447	0.2223
CONST	0.005775	0.002151	2.684775	0.0073
PERUNION	-0.125042	0.074524	-1.677862	0.0934
DEMDOM	1.592612	0.613610	2.595479	0.0094
PCAINN	0.374699	0.295332	1.268740	0.2045
FEDPOL	1.628492	0.664410	2.451034	0.0142
McFadden R-squared	0.223245	Mean dependent var	0.016575	
S.D. dependent var	0.127721	S.E. of regression	0.123037	
Akaike info criterion	0.153201	Sum squared resid	18.96813	
Schwarz criterion	0.210045	Log likelihood	-83.05263	
Hannan-Quinn criter.	0.174556	Restr. log likelihood	-106.9226	
LR statistic	47.73990	Avg. log likelihood	-0.065551	
Prob(LR statistic)	0.000007			
Obs with Dep=0	1246	Total obs	1267	
Obs with Dep=1	21			

Equation 2

Dependent Variable: CTUN				
Method: Least Squares				
Date: 05/11/12 Time: 11:45				
Sample (adjusted): 1992 2011				
Included observations: 20 after adjustments				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	645.2078	1082.768	0.595887	0.5633
YR	-0.323146	0.564897	-0.572043	0.5788
NATUN	0.862891	0.274366	3.145033	0.0093
TAX	-0.417832	0.620894	-0.672952	0.5149
LOG(GSP)	-3.941596	10.39037	-0.379351	0.7116
LOG(GSRAT)	-20.08491	9.191493	-2.185163	0.0514
CTAVPRO	0.060411	0.118581	0.509447	0.6205
LOG(WIC_SA)	-0.983272	0.182213	-5.396281	0.0002
LOG(INI_SA)	2.559240	1.818644	1.407224	0.1870
R-squared	0.973410	Mean dependent var	5.315000	
Adjusted R-squared	0.954071	S.D. dependent var	1.917036	
S.E. of regression	0.410841	Akaike info criterion	1.360941	
Sum squared resid	1.856692	Schwarz criterion	1.809021	
Log likelihood	-4.609412	Hannan-Quinn criter.	1.448411	
F-statistic	50.33528	Durbin-Watson stat	2.060141	
Prob(F-statistic)	0.000000			

VI. Analysis

Equation 1

The results for equation 1 only got a McFadden R-squared of 0.2232 so the explanatory variables of the model only accounted for approximately 22% of the variance of the dependent variable. The coefficients of this equation represented the effect of the variable on the logged odds of a state adopting STC. To calculate the percentage effect on these changes, I inputted the coefficient into the exponential function [e.g. $e^{(\beta)}$]. Predictably, regions like the Northeast and Midwest had higher coefficients (3.13 and 2.62 respectively) while the Southeast was lower than any region. Of the Southeastern states, only Arkansas, Louisiana and Florida have enacted legislation for STC. The dummy variable for a neighboring state having adopted STC (*dumnei*)

had a substantial and significant effect on the odds of another state enacting STC. The coefficient, 3.02 ($p=0.0001$), results in an approximate 1939% increase in the chance of a state adopting STC. Surely, this effect is exaggerated but it does speak to how neighboring states interact. If a neighbor state adopts STC, it is likely that neighboring state legislatures will strongly consider enacting STC in the years soon afterward. The variable for the year had a positive but statistically insignificant effect on the logged odds of adopting STC (0.05, $p=0.6231$). A number of states enacted STC legislation throughout the 1980's and a few adopted the program in the early 1990's. There was a gap until the onset of the recent financial crisis when three states adopted STC in 2011.

State unemployment rates did have fairly strong effect (coef=0.2307, s.e. 0.1333) on the dependent variable but the p-value was a little high at 0.0834. The coefficient on unemployment implies that a one-point increase in the state's unemployment rate would increase the chances of the state adopting STC by 26%. This was the predicted effect of unemployment but the variable is not strongly significant. The significance of unemployment might be hurt by the lag time between unemployment rising and states actually adopting STC. The component for human capital, average production of labor, had the opposite of the predicted effect on the dependent variable. An additional \$1,000 in production per employee decreased the chances of a state enacting STC by approximately 5.29%. The p-value was high ($p=0.2223$) for this variable however so it is not significant. The number of construction employees in a state had a small but statistically effect of coef=0.0058. This meant that an additional 1,000 employees in a state's construction industry result in 0.58% increase in the chances of adopting STC. Although this impact is small, an aggregation of similar industries like manufacturing could cause a more substantial difference. Unionization seems to have a statistically insignificant impact but it did

have a negative coefficient which is interesting by itself. This relationship might be explained by union leaders' desire to retain their own income levels. Shelton (2011) explained that higher-income workers had to give more hours to make up for their higher wages (p. 3).

A Democrat-dominated legislature substantially increases the logged odds of the state pursuing STC (coef=1.5926). This translated into an approximate 392% increase in these odds. Once again, this result seems to be overemphasized but it does seem that Democrats are more willing to explore new government policies to intervene in the state economy. This paper's PCA for state innovation did not produce a statistically significant result ($p=0.2045$) but it did have a positive sign associated with the odds of STC. This result is pretty straight forward in assuming that a more innovative state legislature will be more willing to enact legislation for the relatively young program of STC. Finally, the years in which the federal government instituted guidelines for state STC programs had a high, positive correlation with adoption of STC. *Fedpol* increased chances of adoption by approximately 410%. Although the p-value was low for this variable ($p=0.0142$), the minimal number of years where federal policy was instituted (1982-1986) casts significant doubt on this finding. Also, the relationship could simply be inverted. That is, a number of states adopting STC in those years caused the federal government to respond with guidelines of its own.

Equation 2

Equation 2 is the result of a multiple linear regressions model testing for the factors affecting Connecticut's unemployment rate from 1978-2011. The adjusted R-squared for equation 2 was very high at 0.9541 implying that the independent variables accounted for about 95% of the changes in Connecticut's unemployment rate. The year variable (*yr*) again had a statistically insignificant result ($p=0.5788$) but it had a negative sign on the coefficient. This

meant that Connecticut's unemployment rate has generally declined since 1978. This does make sense considering our economy has become relatively more stable (minus the recent financial crisis). The national unemployment rate (*natun*) had the predicted positive effect on Connecticut's unemployment rate. An increase in the national unemployment rate by 1 point increased Connecticut's unemployment rate by 0.86. This indicates that Connecticut is less affected by a national economic downturn than other states. There is a conflict of endogeneity here as Connecticut's unemployment is factored into the national rate.

It was interesting to find that taxes levied on production and imports (*tax*) actually seemed to reduce the unemployment rate although the p-value was high (0.5149). This conclusion could be attributed to the fact that the state will reap more taxes from private production in times of good economic conditions when unemployment is down. The change in GSP [*log(gsp)*] had a similar result where it reduced unemployment but the finding was not significant ($p=0.7116$). The change in the ratio of goods-producing employees to services-producing employees provided another interesting conclusion. Again, the change in this variable reduced unemployment and the p-value was relatively low ($p=0.0514$). A 1% increase in this ratio resulted in a decrease of the unemployment rate by 0.2. The max of this explanatory variable was 0.37 so in the selected time period, there have been more services-producing employees in the state. This variable was meant to express industry diversity so it would make sense that as *gsrat* approached a value of "1", the increase in industry diversity would lead to a lower unemployment rate. The variable is not a perfect representation of industry mix. The average production of labor in Connecticut (*ctavpro*) was also included to get some sense of human capital. It did not have a significant result and its sign was positive so this indicator was not very relevant. As mentioned earlier, average production of labor is not the ideal

representation of human capital because of mitigating inputs of technology and capital.

Education attainment levels were not readily accessible for each year but that could better serve the use as human capital.

The changes in the initial claims of normal unemployment insurance programs and STC presented the predicted results. A 1% increase in the seasonally-adjusted workshare initial claim reduced Connecticut's unemployment rate by approximately 0.01. Although this value is small, the coefficient has the predicted sign and the p-value indicates that the variable is significant. Future studies ought to calculate the effect of normal unemployment insurance-equivalent STC claims on unemployment rates. In contrast, a 1% in the number of initial claims filed for normal unemployment insurance increased unemployment by 0.03 but this result was less significant ($p=0.1870$). This showed that STC seemed to reduce unemployment compared to its alternative of unemployment insurance.

VII. Conclusion

Findings

The "Great Recession" has policymakers scrambling for answers to alleviate high unemployment rates, stir stagnant GDP growth and restore confidence in our economy. Workshare or STC makes for an attractive remedy. Rather than encouraging employers to lay off workers to reduce costs, STC subsidizes firms to reduce hours of multiple individuals (Shelton 2011, p. 2). This program allows businesses to easily adjust to downswing and upswings of the economy. Employees retain their jobs and can make appropriate plans for their future careers if necessary. The government avoids the burden of a larger unemployed workforce. Yet, only 20 states have adopted some form of STC as of 2011. This paper aimed to generate systematic explanations for why more states haven't enacted STC. Furthermore, I performed a limited

analysis on the performance of STC in the state of Connecticut to pose the benefit of the program.

The primary model of this paper did justify some of the typical economic explanations for the adoption of STC but it also showed how geography and political institutions affect public policies. Higher unemployment, as predicted, induced states to create legislation for STC. Also, a larger pool of construction employees had a small but positive effect on the chances of adopting STC. A more egalitarian Democrat legislature proved to substantially increase the chances enacting the program. Yet, many prominent advocates of worksharing today come from conservative think tanks such as Kevin Hassett of the American Enterprise Institute (Woo 2011). Even more important, states appeared to mimic neighboring states that adopted STC. Information spillover, or the exchange of knowledge and information, may cause legislators and policy actors to follow the example of neighboring states. Also, states are competitive in nature for business and residents so STC seems to be an attractive program for states.

MPR and BPA (1997) studied the factors leading to the adoption of STC from surveying policymakers, firms and state citizens. This paper's findings complement MPR and BPA's more individualized microanalysis. They found that it was often the work of a legislator or organization favoring STC that pushed for its adoption (p. ii). My findings suggest that prominent stakeholders in implementing a form of STC will find success in states with Democrat-dominated legislatures. Given the similarities of ideology between many neighboring states, reports of success for STC will quickly transfer to neighbor states. Stakeholders may be legislators or organizations but my model also showed how a particular industry (construction) could also encourage states to adopt STC.

This paper's second model tested for STC's effectiveness at reducing unemployment in Connecticut between 1978 and 2011 (though STC was instituted in 1992). With other economic factors hold fixed, an increase in the number of workshare initial claims filed caused unemployment to fall. This effect was small but the data inherently suggests a couple of caveats to consider. As I showed in the first equation, higher state unemployment rates will encourage the adoption of STC. Therefore, a greater usage of STC will also be the result of higher unemployment. An important relationship to recognize is how workshare's effect differs from typical unemployment insurance. In this model, unemployment insurance showed to have a positive effect on Connecticut's unemployment rate.

Equation 2 is a very small sample of data and thus does not carry with it a lot of weight but it does fall in line with the other empirical work. Cahuc and Carcillo's (2011) study of STC in OECD countries found that STW's take-up rate helped permanent and temporary job-holders to retain their employment. However, the only consensus about STC's effects is that it is difficult to determine. Low take-up rates by firms in a state prevent economists from truly determining if workshare affects the state's unemployment rate (MPR & BPA 1997, p. ii). Furthermore, studies analyzing differences between firms opting for STC and those that just lay off workers are hampered by the varying economic circumstances that each firm faces (Schiff, p. 435).

Areas for further research

A substantial amount of research is out there to be completed to determine the factors in adopting workshare and its relative effectiveness in the United States. The models presented in this paper lack some important variables and facets of the variables used. For example, the first model missed an indicator of some kind for a state legislature's level of professionalism. A legislature that is more experienced and spends more time in the state chambers may allow them

to discuss and explore more options like STC. Adoption of STC can also be tested by a more detailed breakdown of a state's economy. This paper's first equation did include a variable for the prevalence of construction employees in the state but there are a number of other industries that could either increase or decrease the chances of adopting STC.

In those states that have adopted STC, research can test a more comprehensive study of STC's effects. This paper's second equation was limited to only the state of Connecticut due to a lack of data for other states. Even within the data for the state of Connecticut, workshare claims were not equalized with the comparable unemployment insurance claims. Another interesting route for this research could be to see how STC affects other economic indicators in a state such as GDP growth recovery, labor production levels and the state's unemployment insurance trust funds. MPR and BPA's (1997) work also suggested that the marketing of STC can differ greatly between states. STC's effectiveness might be skewed if businesses are not properly informed of the program's benefits (and cons). Furthermore, STC programs are made up from a number of different aspects (continuing fringe benefits) which differ between states. Future research ought to investigate how these various extensions of the program might affect the take-up rates by firms in a state.

Short-time compensation is not a cure-all for the effects of economic downturns but preliminary studies offer optimism for its potential. Innovative state agencies have shown the ability already to ameliorate issues of STC's funding and administrative procedures by streamlining the process (MPR and BPA 1997, p. ii). To get to this point however, states need to adopt the program and install their own preferences for the program. The primary model of this paper indicates that this may be a lengthy process because STC adoption has largely depended on Democrat-dominated politics and a geographical proximity to other states with STC. With

respect to the region of the Southeast, STC will have to overcome ideological preferences and little participation in the program as of right now. STC has shown that it can help states adjust to economic downturns but economists, state agencies and policymakers will have to continue to work out its kinks so that it is more appealing to critics.

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