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SES - ECONOMICS

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TITLE OF PROPOSED PROJECT   **The Effects of State Job Creation Hiring Credits: Evidence from the Great Recession**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ 265,550	36 months	07/01/12	

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PI/PD DEPARTMENT **Economics**	PI/PD POSTAL ADDRESS **3151 Social Science Plaza** **University of California, Irvine** **Irvine, CA 92657** **United States**
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CERTIFICATION PAGE

Certification for Authorized Organizational Representative or Individual Applicant:

By signing and submitting this proposal, the Authorized Organizational Representative or Individual Applicant is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding debarment and suspension, drug-free workplace, lobbying activities (see below), responsible conduct of research, nondiscrimination, and flood hazard insurance (when applicable) as set forth in the NSF Proposal & Award Policies & Procedures Guide, Part I: the Grant Proposal Guide (GPG) (NSF 11-1). Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U. S. Code, Title 18, Section 1001).

Conflict of Interest Certification

In addition, if the applicant institution employs more than fifty persons, by electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative of the applicant institution is certifying that the institution has implemented a written and enforced conflict of interest policy that is consistent with the provisions of the NSF Proposal & Award Policies & Procedures Guide, Part II, Award & Administration Guide (AAG) Chapter IV.A; that to the best of his/her knowledge, all financial disclosures required by that conflict of interest policy have been made; and that all identified conflicts of interest will have been satisfactorily managed, reduced or eliminated prior to the institution's expenditure of any funds under the award, in accordance with the institution's conflict of interest policy. Conflicts which cannot be satisfactorily managed, reduced or eliminated must be disclosed to NSF.

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Is the organization or its principals presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded
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The following certification is required for an award of a Federal contract, grant, or cooperative agreement exceeding $100,000 and for an award of a Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding $150,000.

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The undersigned certifies, to the best of his or her knowledge and belief, that:
(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, ''Disclosure of Lobbying Activities,'' in accordance with its instructions.
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Two sections of the National Flood Insurance Act of 1968 (42 USC §4012a and §4106) bar Federal agencies from giving financial assistance for acquisition or construction purposes in any area identified by the Federal Emergency Management Agency (FEMA) as having special flood hazards unless the:
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* EAGER - EArly-concept Grants for Exploratory Research
** RAPID - Grants for Rapid Response Research

Project Summary

In recent decades numerous states enacted job creation hiring credits (JCHCs) – tax credits for new hiring that are non-categorical or focused on the unemployed. These JCHCs differ from most federal hiring credits, which have focused on the disadvantaged, have not explicitly incentivized job creation, and have generally proven ineffective at creating jobs. There is far less evidence on JCHCs. Research based on a federal program in the late 1970's suggests that they can be more effective. States have used JCHCs far more extensively, both before and during the Great Recession. However, there is virtually no research on the effects of these state policies.

The proposed research will principally study how state JCHCs influenced the impacts of the Great Recession on workers and families. If JCHCs boost labor demand by lowering labor costs, then state JCHCs should have moderated the adverse effects of the Great Recession.

The key input into the empirical analysis is a comprehensive database on state hiring tax credits, constructed as part of this research. Using this database, the empirical strategy is to compare the actual labor market changes in states as the Great Recession unfolded with a counterfactual capturing what the impact of the recession in each state would have been absent the state JCHCs, and to estimate how state hiring credit policies affected the observed deviations between actual and predicted labor market outcomes. The analysis couples the hiring credit database with data from the Current Population Survey, Quarterly Census of Employment and Wages, Job Openings and Labor Turnover Survey, and Current Employment Statistics. These different data sources will be used both to construct alternative counterfactual business cycle variables, and to measure numerous labor market outcomes.

The effects of JCHCs in moderating the impact of the Great Recession (and other recessions) will be estimated from a statistical model that controls for an extensive set of other influences on state outcomes, using a combination of rich data and panel data techniques. Moreover, the approach will be extended to estimate the differential effects of a variety of features of state JCHCs that are captured in the hiring credit database, to determine how JCHCs might best be configured to maximize their impact.

Intellectual Merit

The intellectual merit of this project rests on three legs. First, in coming years there will be strong interest in the Great Recession – both what caused it, and what did and did not help with recovery. Second, there is virtually no evidence on the plethora of state hiring credits that the preliminary research for this project has uncovered, while the evidence on federal credits is outdated and problematic. Third, the research design is strong, allowing for a highly-saturated model that strengthens the conclusions that can be drawn about the effects of state JCHCs.

Broader Impact

The broader impact of the research stems from its potentially important forward-looking policy implication. In particular, if JCHCs moderated the labor market effects of the Great Recession (and earlier recessions), states – and perhaps the federal government – might want such hiring credits on the books as "automatic stabilizers" that complement other such policies triggered by future economic downturns. JCHCs as might be particularly useful as automatic stabilizers by directly inducing employment growth.

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Appendix Items:

*Proposers may select any numbering mechanism for the proposal. The entire proposal however, must be paginated. Complete both columns only if the proposal is numbered consecutively.

Project Description

<u>Introduction</u>

The Great Recession led to levels of job loss and unemployment that are the worst on record since the Great Depression (Elsby et al., 2010; Martínez-García and Koech, 2010). For most states unemployment rates have climbed to higher levels than in any post-War recession, and in general the high levels of unemployment reached during the Great Recession have been more persistent than in past recessions (Pittelko, 2011). Naturally, state and federal policymakers grappling with the aftermath of the Great Recession have sought ways to spur job creation, in many cases adopting hiring credits for employers that create new jobs (termed job creation hiring credits, or JCHCs). The Hiring Incentives to Restore Employment (HIRE) Act established a modest credit for 2010 at the federal level. More significantly, states have used JCHCs extensively, both before and during the Great Recession. The fundamental goal of the proposed research is to provide rigorous, up-to-date evidence on the effects of state JCHCs, in particular on how these credits influenced – most likely moderating – the effects of the Great Recession.

There are two major questions about using JCHCs to counter recessions, and these questions, coupled with the experiences of states during the Great Recession (as well as earlier recessions), provide the background and motivation for the proposed research. First, there is considerable debate in the existing research literature about the effectiveness of hiring credits for creating jobs. The experience of the Great Recession, coupled with an extensive set of state JCHCs from earlier periods as well as during the Great Recession, provides an ideal setting in which to test the effectiveness of hiring credits that explicitly target job creation. Second, there are practical policy concerns about how best to structure JCHCs to make them more effective, and whether JCHCs should be adopted as automatic stabilizers to counter future recessions.

As summarized in Neumark (2011), there is a research literature arguing that hiring credits are ineffective (Bartik, 2001; Dickert-Conlin and Holtz-Eakin, 2000; Katz, 1998). However, most of the evidence pointing to ineffective hiring credits comes from hiring credit programs that target the disadvantaged, in contrast to hiring credits that are non-categorical or at least do not target the disadvantaged, and which explicitly try to incentivize job creation, especially during recessions. (Based on these differences, in this proposal the latter types of hiring credits are referred to as "job creation hiring credits," or JCHCs.)

There is much less evidence on JCHCs – with essentially the only evidence coming from the New Jobs Tax Credit (NJTC) of the late 1970s. This evidence is more positive, and suggests that a hiring credit that is non-categorical and creates explicit incentives for job creation can help create jobs. However, the evidence on the NJTC is very limited – both because it is dated, and because of the usual difficulties of identifying the effect of policy at the national level stemming from the problem of constructing a counterfactual for what would have happened absent the NJTC.

At the same time, the preliminary research for this project has uncovered an extensive set of state JCHCs – many of which were in existence prior to the Great Recession, and some of which were enacted during the Great Recession. Yet there is virtually no empirical work on these state JCHCs from the Great Recession or from earlier recessions.[1] It is the combination of the conjectures

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[1] There are only a few exceptions. Bartik and Erickcek (2010) evaluate the MEGA Tax Credit Program in Michigan, which is quite different from other hiring credits. In addition, there are some evaluations of small-scale hiring credit (or "voucher") experiments (see Burtless, 1985, and the discussion in Hollenbeck and Willke, 1991). Finally, a recent, preliminary paper (Chirinko and Wilson, 2010) estimates the effects of state hiring credits, finding some modest evidence of positive

about the beneficial effects of JCHCs coupled with the availability of information on multiple state-level JCHCs that provide the motivation for the *central* question the proposed research will address, which is whether state JCHCs – and in particular those that were on the books before the Great Recession hit – acted to moderate the adverse labor market impacts of the Great Recession.

Based on the existing evidence limited evidence on JCHCs, as well as theoretical reasoning, Neumark (2011) offers some suggestions for structuring JCHCs to make them more effective tools for countering the adverse labor market impacts of recessions. Among these suggestions are targeting the unemployed, specifying the credit as temporary, and incentivizing increases in employment rather than hours. However, these suggestions are speculative, based on at best a patchwork of evidence, most of it quite dated. A second motivation for the proposed research, then, is to estimate the differential effects of state JCHCs that vary along these (and other) dimensions, to try to reach specific conclusions about how JCHCs should be constructed to be more effective.

Finally, if JCHCs are effective at moderating the effects of recessions, then there may be merit to enacting legislation establishing federal or state JCHCs that turn on automatically and aggressively when economic downturns occur. Such credits would complement other "automatic stabilizers" that seek to provide a boost to workers' and families' incomes when a recession occurs, such as Unemployment Insurance, welfare, and progressive taxation. JCHCs might be particularly useful as automatic stabilizers if they encourage employment (by lowering the cost of labor to firms), thereby generating multiplier effects. The evidence the proposed research will garner on how state JCHCs influenced – most likely moderating – the effects of the Great Recession, and similar evidence from earlier recessions, will speak to the merits of putting such legislation in place proactively. Adopting an "automatic JCHC" triggered by future economic downturns could represent a substantial improvement over what happened during the Great Recession, when some states (and the federal government) debated the adoption of JCHCs in the middle or near the end of the recession, and, facing the budgetary difficulties attributable to the recession that had already set in, at best enacted poorly funded or narrowly-targeted hiring credits.[2]

Specific Hypotheses

The central hypothesis that the proposed research will test is this: State job creation hiring credits moderated the effects of the Great Recession on labor market outcomes, helping some states weather the Great Recession with more modest run-ups in unemployment rates, and less adverse effects on workers and families generally.

The theory of hiring credits is straightforward. Hiring credits subsidize wages when employers hire from particular groups of workers, and therefore should boost labor demand and hence employment by reducing the effective wage paid by employers. Practical complications, however, can substantially reduce the effects of hiring credits. First, it is hard to design a hiring credit that rewards net new job creation, rather than rewarding hiring that would have occurred anyway, generating "windfalls" for firms. Thus, hiring credits can potentially be costly without creating a lot of jobs. Second, to sharpen incentives for net job creation, policymakers impose administrative requirements on firms, and the costs of compliance can deter use of the credit. And

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effects. They focus on some subtler issues of the timing of effects based on the effective versus the signing date of the credit, stemming from theoretical considerations. The proposed research differs in numerous ways, including its focus on the moderating effects of JCHCs on the impact of the Great Recession, and using a much more comprehensive database on state hiring credit programs.
[2] For example, California's New Jobs Credit, enacted in 2009, targets small businesses generally, rather than the disadvantaged or the unemployed, and very few hiring credits have been claimed.

third, when hiring credits are targeted at disadvantaged workers, these workers can be "stigmatized," with their eligibility for the credit signaling low productivity to employers. Most of the research on hiring credits studies those targeting the disadvantaged, and attributes their ineffectiveness to stigmatization (Katz, 1998).

However, evidence on JCHCs – which differ in that they do not target the disadvantaged, but instead aim more broadly at job creation and re-employing the unemployed – is more relevant in thinking about policy responses to the Great Recession and future recessions. Katz (1998) concludes that evidence from studies of the NJTC – the prime historical example of a JCHC – shows that a "temporary, noncategorical, incremental subsidy has some potential for stimulating employment growth" (p. 31). And more recently, researchers have taken a stronger position on its effectiveness (Bartik and Bishop, 2009; Bishop, 2008).

One of the principal reasons an anti-recessionary JCHC may be more effective is that, coming on the heels of a steep recession, stigma effects are likely to be severely weakened or eliminated for a credit that is either non-categorical or that targets the unemployed. Employers likely understand that many people become unemployed in a recession because of external adverse shocks to their employers, rather than because of individual low productivity, malfeasance, etc. And when employment has largely been falling, it should be easier to reward hiring that would not have occurred absent the credit, reducing windfalls (although the Job Openings and Labor Turnover Survey shows that there were growing firms even during the Great Recession). For example, in the current environment, basing eligibility simply on whether a firm's employment is growing might pose acceptable windfall costs. A simple rule for establishing eligibility also imposes smaller costs on firms, making the credit more effective, and a credit targeting the unemployed is administratively simple, as it is easy to verify unemployed status.

Although there is a central unifying hypothesis that the proposed research will test, there are a number of analyses that are planned to explore this hypothesis along a number of dimensions, with four goals. The first goal is to ensure that conclusions about the role of state JCHCs in moderating the effects of the Great Recession are robust and apply to a broad range of labor market outcomes for a broad range of groups – and if not to understand the differences and to clarify the reasons for them. To that end, the central hypothesis will be tested with respect not only to unemployment rates, but to unemployment duration, labor force participation, and wages. In addition, it will be tested with respect to these labor market outcomes for specific demographic groups (men and women; and whites, blacks, and Hispanics).

The second goal is to extend this analysis from the effects on labor market outcomes for workers to the impacts of the Great Recession on families – again asking whether state JCHCs moderated the Great Recession's adverse effects on family incomes. Such information is particularly relevant to an assessment of JCHCs. Past research typically faults hiring credits – relative to subsidies to workers in the form of the EITC – because they target poor and low-income families badly (Dickert-Conlin and Holtz-Eakin, 2000). However, the unemployment burden of the Great Recession fell much more heavily on men, because of the industries that were most strongly affected (Neumark, 2011). That is, in the context of an anti-recessionary response – or at least a response to the Great Recession, which fell heavily on men – JCHCs may have had more beneficial effects on the distribution of family incomes than previous hiring credits focused on the disadvantaged have had.

The third goal is to bolster the interpretation of the findings by analyzing auxiliary evidence on the effects of state JCHCs. For example, there are potentially confounding factors in the empirical analysis that could result in mistakenly attributing to JCHCs the effects of other policies or factors, and some traction can be gained on whether the results reflect the incentive effects of

JCHCs by testing sharper hypotheses regarding not just the level of employment by its dynamics. In particular, JCHCs should raise employment by increasing hiring – inflows into employment – rather than by slowing outflows from employment. Thus, one component of the analysis will study the effects of JCHCs on entry into and exit from employment.

The fourth goal is to try to strengthen policy prescriptions that might be drawn from the analysis. Three different types of analyses will contribute to this goal. One analysis will explore whether conclusions drawn from the experience of the Great Recession generalize to other recessions. This is of obvious importance in assessing the validity of any recommendations about establishing state (or federal) JCHCs as automatic stabilizers that would kick in when future recessions set in, since future recessions are less likely to be as severe. As documented below, there is enough variation in earlier state JCHCs and sufficient coverage by the available data to do the analysis back through the late 1970s, and especially for the 1990s.

A second analysis will study the design of effective state JCHCs. For example, poorly-designed credits can be ineffective or have perverse effects, such as incentivizing churning of workers rather than longer-term employment (Katz, 1998); and credits that target full-time employment rather than full-time-equivalent employment can lead employers to substitute full-time for part-time workers, a negative influence on employment. The variation among state JCHCs regarding different ways to incentivize net new hiring, targeting, and other dimensions (documented below) can provide important information on how to increase the job-creating potential of these credits.

The third analysis will explore how the effects of JCHCs vary over the business cycle. Do they, for example, largely mitigate the initial downturn, or do they speed the recovery (which might be expected since they induce hiring)? This information is potentially helpful in designing anti-recessionary JCHCs, in particular with regard to specifying at what point in the business cycle they should kick in – immediately after the unemployment rate starts to climb, after a given length of time, above some level, etc. One issue that arises in this regard is whether the effect of an anticipated versus an unanticipated JCHC might differ, with an anticipated JCHC delaying hiring in the period prior to its enactment. Some empirical traction on this question may come from contrasting the effects of state JCHCs that were on the books before the Great Recession hit with the effects of JCHCs enacted subsequent to its onset.

Empirical Approach

Basic Approach

The empirical strategy is to compare the actual labor market changes in states as the Great Recession unfolded with a counterfactual capturing what the impact of the recession in each state would have been absent a state's JCHCs, and to estimate how deviations between actual labor market outcomes and predicted counterfactual changes are influenced by state hiring credit policies.

The first step is to construct this "counterfactual cycle," by applying national time-series changes in disaggregated industry employment (or other measures) to the state, based on the state's industry composition in a baseline period of stable aggregate economic growth. To provide a simple example, if a state, at baseline, had 50% of employment in the auto industry and 50% in the restaurant industry, then the counterfactual for employment change over a given period would be an equally-weighted average of the employment change nationally in these two industries. Letting subscripts j index states, k industries, and b the baseline period (which differs depending on the analysis and the data used), SE_{jkb} is then total employment in state j, industry k, and period b. Denote by AE_{kt} aggregate (national) employment in each period t in industry k, and by AE_{jb}

aggregate employment in industry k in the baseline period b. Then state employment based solely on aggregate developments can be predicted in each period subsequent to b by applying the national changes to the baseline composition, as in

$$PSE_{jt} = \sum_k SE_{jkb} \times \left(\frac{AE_{kt} - AE_{kb}}{AE_{kb}} \right).$$

This equation predicts state employment in each period by applying the national growth rate of employment in each industry between the baseline period and that period to the baseline employment level in the corresponding industry in the state, and then aggregating, weighting by the baseline industry distribution of employment in the state.

The next step is to estimate regression models relating changes in labor market transitions and outcomes to the counterfactual cycle as well as state JCHCs. For example, in a regression for the state employment rate (or individual-level employment), a positive effect of the counterfactual business cycle measure is expected: when the cycle turns down (counterfactual employment declines), state employment also falls. By appending the hiring credit database, it becomes possible to test whether this effect is diminished when there are JCHCs in place – of most interest, whether the adverse effect of a downturn in the counterfactual cycle on state employment is weaker when there is a JCHC (or a particular type of JCHC) in place.

To be more specific, but in a simplified setting, suppose the labor market outcome of interest is the state employment rate, E_{jt}, and denote by JC_{jt} a dummy variable for a JCHC in state j and period t. Let P_{jt} represent a set of state policies aside from JCHCs, S_j a vector of state dummy variables, and T_t a vector of period dummy variables. Then the regression to be estimated is:

$$E_{jt} = \alpha + \beta PSE_{jt} + \gamma JC_{jt} + \delta(PSE_{jt} \times JC_{jt}) + P_{jt}\pi + (PSE_{jt} \times P_{jt})\varphi + S_j\theta + T_t\tau + \varepsilon_{jt} \, .$$

The key parameter in this regression is δ, which captures differences in the effect of the counterfactual business cycle indicator for the state (*PSE*) on the state employment rate (*E*) for states with JCHCs versus states without them. The central hypothesis, in the context of this regression model for the state employment rate, is that $\delta < 0$. That is, for example, when the aggregate economy turns down, the state employment rate declines by less when there is a JCHC.

The other control variables account for important sources of variation that could confound estimates of the effects of JHCCs. Most importantly, *P* captures other relevant state-level policies (state Unemployment Insurance); and its interaction with *PSE* allows for these policies, as well, to influence the impact of the aggregate business cycle on the state's labor market. The year dummy variables (*T*) net out changes in labor markets common to all states, to account for correlations between aggregate changes and the adoption of JCHCs, as, for example, states adopt JCHCs at particular points in the aggregate business cycle. The state dummy variables (*S*) control for fixed state differences in characteristics – for example, of the workforce, or unmeasured policies – that influence the employment rate. Controls will also be added for workforce characteristics that change over time, estimated from the CPS.

To help understand this model, contrast it with a standard panel data analysis of the effects of JCHCs on the employment rate. In that case, the usual difference-in-differences analysis would include an intercept, state effects, year effects, and a dummy variable (in the simplest case) capturing changes in JCHCs. (And a difference-in-difference-in-differences model might estimate the effects of JCHCs for an affected group relative to an unaffected group – for example, in the context of studying a hiring credit focused on the disadvantaged.) The regression model above embeds this, but also includes interactions between the JCHC variable and the influence of the aggregate business cycle in the state – precisely to ask how JCHCs influenced the impact of the

Great Recession.

In other respects, this is a conventional panel data analysis. Robust inference requires clustering the data at the level of the state to allow for arbitrary patterns of serial correlation within states, and heteroscedasticity across states. With 50 states, the asymptotic approximations should provide reliable inference, but given that the relationship between the number of groups and the validity of these approximations is dependent on the model specification and properties of the data, bootstrap confidence intervals will also be computed, as in Cameron et al. (2008). In addition, in separate analyses methods of using panel data to construct control groups in a semi-parametric fashion that, in essence, lets the data "pick" the control states (Abadie, 2005), will be used.[3] These can all be thought of as variants of the analysis that will establish the robustness of the conclusions, in addition to other robustness analyses discussed below.

Many JCHCs were in effect before the Great Recession began, and in a sense these provide the cleanest identification because they were not adopted during the Great Recession, which could have occurred in response to labor market developments in the state, making adoption endogenous. On the other hand, JCHCs that are enacted during the Great Recession can provide additional identifying information, because the effects of these latter JCHCs can be identified even if the regression model above is augmented to include interactions between the state dummy variables and the business cycle indicator ($PSE_{jt} \times S_j$), identifying how JCHCs influence responses to the business cycle *only* for the states for which JC changes during the sample period. (For states with JCHCs that do not change over the sample period, the interaction variable ($PSE_{jt} \times JC_{jt}$) would be subsumed in ($PSE_{jt} \times S_j$), because JC_{jt} is perfectly collinear with S_j.)

The advantage of augmenting the specification in this manner is that the regressors ($PSE_{jt} \times S_j$) allow for variation across states in the responsiveness of state economies to the aggregate business cycle.[4] Finally, it is hard to ever establish that controls have been included for all other state-level policies that could influence the effects of the Great Recession, and this specification simply sweeps out the effects of such policies as long as they are time-invariant. And although there is not a natural instrumental variable to try to explain the adoption of JCHCs during the Great Recession, it is at least possible to assess the endogeneity of these adoptions by seeing whether they are predicted by prior labor market developments. If they are not, then this augmentation of the specification is appropriate; if they are, then identification from the effects of JCHCs enacted before the Great Recession, despite not being able to address this last issue, may be more reliable.

Along a similar vein, interactions between PSE_{jt} and T_t can be added. The inclusion of these interactions ensures that the estimated effects of the ($PSE_{jt} \times JC_{jt}$) interactions are not simply picking up time-series changes in the sensitivity of state unemployment rates to the business cycle.

Finally, the discussion to this point has been in terms of state JCHCs. As noted earlier, the federal HIRE Act, establishing a modest credit, was enacted in 2010. In contrast to research on the NJTC, which faced the usual problems of inferring the effects of a policy that is set nationally, in

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[3] Moreover, because the aggregate business cycle can be influenced by state JCHCs, the estimates may understate the effects of JCHCs. This will be explored in part by analyses constructing the counterfactual business cycle measure from states that do not have credits in place, for a comparable set of states with JCHCs.

[4] That could happen because of state differences in the types of employment in an industry. For example, two states might have equal employment in the auto industry, but one manufactures luxury cars for which demand may be more cyclically sensitive, whereas another manufactures compact cars for which demand is less cyclically sensitive. Or states may differ in their exposure to domestic versus international markets.

the present framework the effects of the HIRE Act can be identified more reliably. In particular, those states with JCHCs that most closely paralleled the HIRE Act prior to the latter's enactment can be delineated. The effect of the HIRE Act can then be identified from its differential impact on states that did and did not have similar JCHCs of their own before the HIRE Act became effective.[5]

<u>Additional Analyses and Extensions</u>

A number of variants of the specification and data, using the basic approach just explained, will be used to address the additional questions outlined earlier. First, the model will be estimated for a number of labor market and related outcomes, including unemployment durations, labor force participation, entry into employment and exit from employment (using matched CPS files), and family incomes. Second, the model will be estimated for different demographic groups. Third, a taxonomy of JCHCs will be developed to test whether particular types of credits had different effects in terms of moderating the Great Recession. To the extent possible, the specifics of each state's hiring credit program(s) will be categorized, in order to estimate the effects of different types of programs, and – where appropriate – to identify workers who are and are not eligible for the credit, and to estimate effects for those who are eligible. Of the additional analyses, this is probably the most significant extension, because it can directly inform policy decisions about how to structure these credits. Some preliminary work classifying JCHCs and estimating the effects of different types of JCHCs is described below.

In addition, three analyses will delve deeper into the effects of JCHCs over the business cycle. First, although the key analysis will focus on the period running up to and encompassing the Great Recession, the analysis will also be done for other recessions to see whether and how the results generalize to other recessions. Second, the specification will be augmented to test for differential effects at different parts of the business cycle, by including variables (interacted with JC) capturing not only the level of the business cycle measure, but also its rate of change and other measures of the length of the time since the Great Recession began. And third, the influence of JCHCs on how the aggregate cycle affects state economies may be asymmetric. For example, a state JCHC may substantially moderate the effect of an aggregate downturn, but have less immediate influence on the effect of an aggregate upturn. This will be explored by allowing asymmetries in the regression model above, with differential effects of the ($PSE_{jt} \times JC_{jt}$) interactions depending on the direction of change of PSE_{jt}.

Finally, numerous robustness analyses will be carried out, whenever possible using alternative data sources. For example, as discussed in the data section below, there are different data sources that will be used to construct the counterfactual business cycle variable and the labor market outcomes. In addition, sensitivity analyses will be used to identify results that are robust to the choice of the baseline period in constructing the counterfactual business cycle measure.

Data

<u>Information on State Hiring Credits</u>

The key input into the empirical analysis, which is a major product of the proposed research, is a detailed database on state hiring tax credits – including not only explicit job creation hiring credits but also hiring credits focused on specific groups such as the disadvantaged. A good deal of the work assembling this database has already been done, in large part to assess the feasibility of the

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[5] However, unlike the other state credits (JCHCs) that are the focus of the proposed research, the HIRE Act does not explicitly incentivize job creation.

proposed research. However, much additional effort is needed to pin down fully the historical timing of state enactments and terminations or repeals of all hiring credits, and to categorize and classify the hiring credits and code them up for the empirical analysis.

The construction of the database on state hiring credits – including specific job creation hiring credits – relies on several sources. Rogers (1998) provides a brief description of state hiring credits as of 1997. For the hiring credits currently in place, the best source is State Capital Group (2010), which provides an updated overview (as of August 2010) of state economic incentive programs, including hiring credits. BLS & Co. (n.d.) also provides a compendium of a more narrow range of state incentive programs. Information on older hiring credit programs comes from National Association of State Development Agencies (1983, 1986, 1991, and 2003). The information on hiring credit programs obtained from these sources is being confirmed and completed through a search on the web pages of the Department of Economic Development, Department of Commerce, Department of Revenue, or the relevant state institution. Finally, the legal history of each JCHC program is obtained from Loislaw,[6] Westlaw,[7] and LexisNexis.[8]

Table 1 presents a brief summary of the characteristics of the state hiring credit programs enacted at the state level during the last three decades or so. The table covers only hiring credits for which employers statewide are eligible. Hence, the table does not include narrow, geographically-based credits, such as enterprise zone programs.[9] At this point the database includes 159 hiring credit programs (including some that have been repealed or have expired). However, work is ongoing, and will be completed early in the research project, to finalize the JCHC database.

Table 1: Summary of State Hiring Credits, 1976-2011

A. States	
States analyzed	50
No hiring credit	7
1 or more hiring credits	43
B. Basic information	
Total number of hiring credit programs	159
Creation date	
1976-1989	18
1990-1999	50
2000-before Great Recession	62
During Great Recession	7
After Great Recession	22
Current for tax year 2011	136[*]

[*]This is a preliminary number. When the database is completed it is likely that some current JCHCs will be determined to have expired.

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[6] See http://www.loislaw.com/.

[7] See http://www.westlaw.com/signon/default.wl?sp=uci-2000&rs=imp1.0&vr=1.0&cbhf=none.

[8] See http://www.lexisnexis.com/lawschool/login.aspx.

[9] In 2008, 40 states had enterprise zones (Ham et al., 2009). There are a couple of state enterprise zone programs that apply to most or all of a state, which will be incorporated into the analysis and treated as state JCHCs.

Based on the information assembled so far, most states have implemented at least one JCHC. Only seven states (Alaska, Minnesota, New Hampshire, South Dakota, Texas, Washington, and Wyoming) do not have any hiring credit programs according to our criteria. Hawaii, Nevada, Oregon, and Vermont have a single hiring credit, while all other states have at least two.

Hiring credits vary significantly among the other 43 states in terms of the specific provisions used to promote job creation, as well as who is targeted. Some of this information is summarized in Table 2. As Table 2 shows, state JCHCs differ on whether they target specific sets of workers (unemployed, disadvantaged, etc.) or employers (size, type, industry). Credits vary in a number of ways, such as their value per job created, and the base on which they are calculated (e.g., New York pays the credit based on capital investment if jobs are created). Some JCHCs specifically incentivize net job creation, and some specify a minimum wage requirement to promote the creation of higher-wage or higher-skill jobs. Finally, some vary across regions within states.

Table 2 does not present an exhaustive classification of state JCHCs, but a preliminary look at some key features. A complete classification of state JCHCs will be an important part of the research, and the papers produced as part of this research will provide a complete cataloguing for use by other researchers, as well as an explanation of the coding of the credits for the empirical analysis. Among other features of these hiring credit policies not included in Table 2 are: whether the program offers a credit (many states) or per-job payments (e.g., Colorado); whether there are carry-forwards of credits to future tax years (e.g., Louisiana); whether the JCHC has other requirements, such as training or capital investment (e.g., Delaware); whether there are provisions to induce the creation of long-lasting jobs, such as requirements that new employees remain in the company for at least one year (e.g., Colorado), or incrementing the value of the credit for longer periods of employment (e.g., Arizona); whether the credit is higher (as a percentage of pay) for higher-wage jobs (e.g., Alabama); and whether there are efforts to ensure that credits are paid for new job creation by allowing "recapturing" of "clawing back" some of the tax credits if net job creation is lower than required for payment of the credit (e.g., Connecticut and Pennsylvania).

Although only seven states are listed in Table 1 as having no JCHCs, the control group available for most of the analyses will be considerably larger. First, some state hiring credits have expired or have been repealed. This information has been difficult to pin down precisely, but the extensive research to date shows that starting and stopping dates of JCHCs can be accurately determined, and a good deal of this work is completed. Second, in some states the only hiring credit programs available target the disadvantaged, and are not explicit JCHCs (e.g., Hawaii). Third, in some cases states did not have a JCHC until late in the Great Recession (e.g., California and Massachusetts),[10] so there is still information on the state absent a JCHC even in the central time period on which the research will focus. And fourth, as discussed next, much of the empirical analysis will focus on different features of JCHCs, so that states with JCHCs that do not have those features will serve as control groups.

The explanation of the empirical approach above was done in the simple case of a single JCHC that either was or was not in existence in a state or year. The incorporation of varying features of state JCHCs is straightforward. While it is impractical to study all dimensions of state JCHCs simultaneously, different analyses can be done for different dimensions. Examples include:

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[10] For example, California implemented a jobs tax credit in 1979, which seems to have been repealed in 1985, but then is mentioned in some documents in 1988. There is additional work to be done to pin these ending dates down, and this is likely to lead to identification of additional states that did not originally have a JCHC when the Great Recession began, but then adopted one.

credits targeting the unemployed, the disadvantaged, or neither; credits with value per worker hired above some cutoff, versus below; credits that explicitly target net job creation versus those that do

Table 2: Characteristics of State Hiring Credits

A. General classification	
Non-targeted	88
Jobs only	39
Jobs & investment or other requirements	49
Targeted	71
By employee's characteristics	30
Unemployed	6
Disadvantaged	12
Other groups	12
By firm's characteristics	41
Small business	6
Large business	5
Industry dependent	23
Type dependent (e.g., headquarters)	7
B. Value of credit	
Form of credit[*]	
Based on employment level	86
Based on payroll level	65
Based on capital investment	19
Other[†]	14
Value of credit per job created ($, estimated)	
134-3,000	91
3,001-5,000	16
5,001-10,000	15
> 10,000	6
Discretionary	11
Cannot be determined	20
C. Net job creation	
Based on new full-time jobs	94
Based on new full-time equivalent jobs	41
Unspecified	24
D. Job requirements	
Wage requirement	58
E. Within-state geographic variation	
Special provisions for disadvantaged regions	34

[*]These categories are not mutually exclusive, i.e., in some instances the value of the credit depends on some combination of the number of jobs created, payroll increment, investment or some other criterion.
[†]The value of the credit is determined as a percentage of a corporate tax (e.g., property tax credits, sales and use tax credits) or some other criterion like e.g. square footage of the property used.

not; and credits that allow for recapture or clawbacks versus those that do not. Thus, for example, for a two-way classification of JCHCs, two dummy variables JC^1_{jt} and JC^2_{jt} can be defined, and substituted for the single JC_{jt} in the regression equation above – adding both main and interactive effects.[11] This allows the estimation of the effects of each type of credit in influencing the effect of the business cycle, and testing for differences between these.

The question of how many different types of characteristics of JCHCs can be studied simultaneously is one that can only be answered in the course of the empirical analysis. There is an advantage to considering many characteristics simultaneously to reduce the likelihood of spurious conclusions regarding one feature of JCHCs that is in fact attributable to another feature. At some point, though, the ability of the data to discern fine differences between the effects of different types of JCHCs will be limited. This issue will be explored fully, with the goals of both estimating as rich a model as possible, and also delineating the "boundaries" of how far one can push the data in this direction without the data becoming uninformative.

<u>Data on Labor Market Outcomes, Cyclical Indicators, and Other State Policies</u>

The hiring credit database will be appended to data from the Current Population Survey (CPS), using monthly Outgoing Rotation Group (ORG) files to study unemployment and labor market transitions and outcomes, and March files to study family incomes and poverty.[12] (The CPS is preferable to the American Community Survey because the CPS data refer to specific reference periods.) State unemployment rates from the Local Area Unemployment Statistics Program – which use CPS data as well as other sources – will also be used as an alternative to CPS data.[13]

Data on industry employment from the Quarterly Census of Employment and Wages (QCEW), the monthly Current Employment Statistics (CES), and the CPS, will be used to construct alternative versions of the counterfactual business cycle measure. In particular, for the analysis of the effects of hiring credits on different demographic groups, the CPS data will also be used to construct the counterfactual business cycle indicator based on national industry employment changes specific to the demographic group under study. (And as part of this, the robustness of the aggregated results to using the CPS data to construct the counterfactual will be explored.) In addition, other measures can be constructed besides employment. In particular, the Job Openings and Labor Turnover Survey (JOLTS) provides measures of employment dynamics such as hires and involuntary separations at the industry level. These can provide additional business cycle indicators, perhaps of most relevance for the analyses that will study hires and exits (in the CPS) as dependent variables.[14] All of these are readily available and downloadable from the Department of Labor, the U.S. Census Bureau, Unicon, or IPUMS. The Principal Investigator already has extensive experience with nearly all of these data sets.

The two main data sources to be used for constructing the counterfactual business cycle measure – the QCEW and the CES – have different strengths and weaknesses. The CES has the advantage of being available monthly, but it is based on a sample of employers. The QCEW, on the

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[11] A given state at a point in time can have one, neither, or both types of credits.

[12] The limited information on family income in the monthly ORG files will also be used.

[13] See http://www.bls.gov/lau/lauov.htm.

[14] The JOLTS data are not published by state, so they cannot be used to construct the state-by-year measures to use as dependent variables. The CES data are published by state, so one version of the analysis will use the national data to construct the business cycle variable, and use the state data as the dependent variable.

other hand, has quarterly data, but it covers 99.7% of all civilian employment. Furthermore, CES data is released just one week after the end of each month, while QCEW data is released several months after the end of the quarter. However, because of the large coverage of the QCEW, CES data are benchmarked each year with data from the QCEW. Hence, while CES data will permit more up-to-date estimates because they are released with a shorter lag than the QCEW, CES data are subject to revisions that can be significant. For the analysis of entry and exit at the state level, the JOLTS can provide a counterfactual business cycle measure (again, pegged to states based on industry composition) that is more closely tied to the dependent variable of interest.[15] JOLTS data is released approximately five weeks after the end of the month.

Another advantage of the QCEW that will be exploited is that is has data at the county level. This permits some sub-state analyses that can be useful in two ways. First, some state JCHCs target particular counties or have credit values that vary by county. By looking at variation within counties (using a regression model similar to the one above), cleaner identification may be possible because other state-specific factors that may vary over time can be held constant. Second, Dube et al. (2010), in research on minimum wages, have used county-level QCEW data – and in particular, data on counties matched (contiguously) across state lines – to try to better identify the effects of state policies because other economic shocks or trends affecting the counties should be similar for these matched pairs. In this latter analysis, this method would be applied to studying the effects of state-level JCHCs. The empirical feasibility of using these approaches will be explored early, and if promising (in terms of within-state variation in hiring credits, or bordering states with useful variation in hiring credits), the intention is to implement these analyses as well.

These data sources also differ in terms of the industry classification used. And in the CPS data there is a change over time with the introduction of the North American Industry Classification System (NAICS). But there is cross-walk available when the classification system has to be bridged, and this crosswalk is built into some of the data series (e.g., the CES).

Finally, some of these data sources are readily available for fewer years; for example, QCEW data that uses a common industry classification (NAICS) go back only to 1990;[16] and data for JOLTS is available only from December, 2000. Regardless, all are available for the analysis of the period of the Great Recession. And even the most restrictive data sets also include the last two recessions, whose official dates according to the National Bureau of Economic Research were March, 2001 – November, 2001, and December, 2007 – June, 2009.[17]

Other State Policies

Identification in the statistical models outlined above comes from interactions between the counterfactual state business cycle variable and state JCHCs. To the extent that other state policies affecting labor markets also influenced the impacts of the Great Recession, it is important to introduce parallel interactions between these state policies and the business cycle variable, to ensure that the effects identified are actually the effects of JCHCs. Even in the specification with interactions between the counterfactual business cycle measure and state dummy variables (*PSE* × *S*), there is a need to account for state-level policies that change over time, so this augmented specification is not a panacea for unmeasured state-level policies.

There is a potentially large set of policies that can affect the level of economic activity in states. But the key policies for this study are those that are likely to influence how macroeconomic

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[15] The sample size of JOLTS, however, is considerably smaller than CES.

[16] See http://www.bls.gov/cew/cewnote.htm.

[17] See http://www.nber.org/cycles/cyclesmain.html.

shocks affect labor markets. The most important of these is probably Unemployment Insurance benefits. A large body of literature on search and unemployment shows that the level of Unemployment Insurance benefits can matter, as a high level of benefits can lead to lengthier search (although the prediction holds only for those eligible for benefits), and thus more persistent unemployment (e.g., Daly et al., 2011). A stronger prediction is that a longer period for which benefits are available leads to more unemployment (e.g., Cahuc and Zylberberg, Chapter 3). Data on the level of Unemployment Insurance benefits are readily available.[18] Moreover, during the Great Recession there was variation in the duration of benefits as federal legislation extended them beyond the usual six months in high unemployment states. Given the potentially important role of the duration of benefits, it will be critical to incorporate information on these extensions by state over the sample period, data on which are also available.[19] Finally, data on other state policies that could affect both labor demand and labor supply, such as minimum wages, welfare benefits, and state EITCs, are readily available.[20] Early in the course of the research, information will be collected on other state-level policies that may have to be incorporated.

Preliminary Results

Mainly to illustrate the feasibility of the approach, Table 3 presents some very preliminary results; both the empirical analysis and the coding of the JCHCs will undergo a great deal more development and refinement. In this analysis, the data come solely from the QCEW, as none of the work with the other data sets has been done yet. So, referring to the earlier regression equation, the dependent variable is state employment in state j and month t, and the coefficient δ captures how the effect of the counterfactual business cycle measure on state employment varies with hiring credits. Because the dependent variable and the business cycle measure are from the same source, there is no scope for aggregate effects not captured in the counterfactual business cycle measure, so time effects are not included in the results reported here. Finally, in this analysis no information on the federal HIRE Act is used.

Five specifications are reported. Column (1) simply includes a dummy variable for whether the state had any JCHC; main and interactive effects are included. Columns (2) and (3) include interactions between the JCHC indicator and an indicator for whether the credit requires growth in full-time or in full-time-equivalent (FTE) employment. Column (4) distinguishes credits paying a higher value per hire ($3,000 or above) from those paying a lower credit (or cases where the value of the credit could not (yet) be determined). And column (5) introduces asymmetries, asking whether the effects of JCHCs in moderating business cycle effects are particularly strong during downturns.[21]

The key results are highlighted in boldface in the table.[22] In column (1), where all JCHCs

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[18] Detailed information is available from the Department of Labor, at http://workforcesecurity.doleta.gov/unemploy/statelaws.asp and http://workforcesecurity.doleta.gov/unemploy/sig_measure.asp.

[19] Detailed information is available from the Department of Labor, at http://workforcesecurity.doleta.gov/unemploy/euc.asp.

[20] These were used in Neumark and Wascher (2011), and will require only modest updating.

[21] A full exploration of this issue requires the addition of additional dynamics, because it would be expected that over the business cycle the differences in behavior owing to JCHCs would net out.

[22] The other coefficient estimates are not emphasized in this discussion. For example, overall effect of having a JCHC has to be computed as the sum of the main and interactive effects, evaluated, for example, at the sample means.

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are treated alike, the estimated coefficient of the ($JC \times PSE$) interaction (δ) is negative. This is consistent with expectations, as it implies that JCHCs moderate the effect of the aggregate business cycle. In particular, if the countercyclical business cycle measure declines by, say, 5 percent, the estimated coefficient on *PSE*, which here is in logs, implies that state employment will decline by 5.55 percent when there is no JHCC, but by only 5.49 percent ($\{1.11 - .013\} \times .05$) if there is a

Table 3: Preliminary Regression Results, 2001-2010

Independent variables:	(1)	(2)	(3)	(4)	(5)
Job creation hiring credit (*JC*)	.20 (.11)	.31 (.52)	.10 (.11)	.20 (.11)	.19 (.11)
Log predicted state empl. (*PSE*)	1.11 (.07)	1.11 (.07)	1.12 (.07)	1.11 (.06)	1.12 (.07)
JC × PSE	**-.013 (.008)**	**-.020 (.035)**	**-.005 (.008)**	**-.012 (.008)**	**-.012 (.008)**
$JC \times$ requires growth in full-time employment *(FT)*	…	-.108 (.504)	…	…	…
JC × PSE × FT	…	**.007 (.034)**	…	…	…
JC × PSE + JC × PSE × FT	…	**-.013 (.007)**	…	…	…
$JC \times$ requires growth in full-time-equivalent employment *(FTE)*	…	…	0.338 (.124)	…	…
JC × PSE × FTE	…	…	**-.024 (.009)**	…	…
JC × PSE + JC × PSE × FTE	…	…	**-.030 (.010)**	…	…
$JC \times$ high-value credit(*HV*)	…	…	…	.321 (.118)	…
JC × PSE × HV	…	…	…	**-.022 (.009)**	…
JC × PSE + JC × PSE × HV	…	…	…	**-.034 (.012)**	…
$JC \times I_{\{\Delta PSE<0\}}$	…	…	…	…	.036 (.019)
JC × PSE × $I_{\{\Delta PSE<0\}}$	…	…	…	…	**-.003 (.001)**
JC × PSE + JC × PSE × $I_{\{\Delta PSE<0\}}$	…	…	…	…	**-.014 (.008)**
Share of state-month obs.'s with at least one JCHC of specified type	1	.81	.54	.44	.25

Dependent variable is log monthly state employment from the QCEW. All specifications include fixed state effects. There are 6,000 observations on state-month pairs; 4,572 have at least one JCHC. In column (5), $I_{\{\Delta PSE<0\}}$ is an indicator for whether the monthly change in the counterfactual business cycle measure is negative for the state; an interaction $PSE \times I_{\{\Delta PSE<0\}}$ is also included.

JCHC – or about a 1.1 percent smaller downturn in state employment. This estimated effect is small, and only marginally statistically significant.

Columns (2) and (3) allow for different effects of JCHCs that require either growth in full-time employment or in FTE employment; as Table 1 showed, most require one or the other. When growth in full-time employment is required, the effect of the JCHC is actually diminished, although the estimated differential is not statistically significant. A requirement of full-time employment growth may cause employers to substitute from part-time to full-time employment, which can lower employment. In contrast, JCHCs that require growth in FTE employment have stronger effects, and the differential is statistically significant. The summed effect is −.030, which, based on the same example as above, implies that in response to a 5 percent aggregate decline in employment, state employment fall by 5.4 rather than 5.55 percent – or a 2.7 percent smaller decline in employment.

In column (4), similar evidence emerges for higher-value JCHCs; these credits have stronger effects in mitigating the business cycle. Finally, column (5) distinguishes between negative and positive changes in the counterfactual business cycle variable for the state, otherwise reverting to the simple indicator for any JCHC, as in column (1). The difference between the effects of JCHCs when there are negative or positive shocks is small, but statistically significant, and implies that JCHCs do more to mitigate the effects of negative shocks.

Overall, these very preliminary results establish a few things that bolster the viability of this research project. First, the empirical approach is feasible, in the sense of providing an informative empirical analysis of the effects of state JCHCs in which fairly small effects of JCHCs on the influence of the aggregate business cycle are detectable as statistically significant. Second, the data appear able to discern the effects of different types of JCHCs. And third, some of the preliminary findings are consistent with what might be expected, with, for example, higher-value JCHCs doing more to mitigate the effects of aggregate adverse economic shocks.

Products

It is anticipated that this research will lead to at least three research papers that will be targeted for publication in top general interest and labor economics journals. One will focus on the basic results for key varieties of JCHCs, and how they impacted the effects of the Great Recession on labor market outcomes. It will also describe in detail the construction of the database on JCHCs and their coding. The second will focus on effects on family incomes and demographic differences. (This paper may also include the county-level analysis, or that may be done in a separate paper.) And the third will focus on dynamics – both the effects of JCHCs on the dynamics of employment, and the effects of JCHCs at different points in the cycle. Publication in top journals seems attainable for three reasons. First, there is and will continue to be strong interest in the Great Recession. Second, research on the effects of state job creation hiring credits is new, and there has been very little research on the effects of state hiring credits generally. And third, the research design to identify the effects of JCHC's is strong, allowing for a highly-saturated model that strengthens the conclusions that can be drawn about the effects of state JCHCs.

References

Abadie, Alberto. 2005. "Semiparametric Difference-in-Differences Estimators." *Review of Economic Studies*, Vol. 72, No. 1, January, pp. 1-19.

Bartik, Timothy J. 2001. Jobs for the Poor: Can Labor Demand Policies Help? New York: Russell Sage Foundation.

Bartik, Timothy J., and John H. Bishop. 2009. "The Job Creation Tax Credit: Dismal Projections for Employment Call for a Quick, Efficient, and Effective Response." Economic Policy Institute Briefing Paper No. 248, Washington, D.C., October 20.

Bartik, Timothy J., and George Erickcek. 2010. "The Employment and Fiscal Effects of Michigan's MEGA Tax Credit Program." Upjohn Institute Working Paper No. 10-164.

Bishop, John. 2008. "The 1977-78 New Jobs Tax Credit Was a Big Success. Can a Tax Credit for Employment Growth in 2009 and 2010 Restore Animal Spirits and Help Jump Start the Economy." Cornell University, http://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1185&context=articles (viewed December 21, 2010).

BLS & Co. n.d. *State Economic Development Incentives and Demographic Profiles*. Available at http://www.blsstrategies.com/state-incentives (viewed April 25, 2011).

Burtless, Gary. 1985. "Are Targeted Wage Subsidies Harmful? Evidence from a Wage Voucher Experiment." *Industrial and Labor Relations Review*, Vol. 39, No. 1, October, pp. 105-114.

Cahuc, Pierre, and André Zylberberg. 2001. Labor Economics. Cambridge, MA: MIT Press.

Cameron, A. Colin, Jonah B. Gelbach, and Douglas L. Miller. 2008. "Bootstrap-Based Improvements for Inference with Clustered Errors." *Review of Economics and Statistics*, Vol. 90, No. 3, August, 414–427.

Chirinko, Robert S., and Daniel J. Wilson. 2010. "Job Creation Tax Credits and Job Growth: Whether, When, and Where?" Federal Reserve Bank of San Francisco Working Paper 2010-25.

Daly, Mary, Bart Hobjin, and Rob Valletta. 2011. "The Recent Evolution of the Natural Rate of Unemployment." Federal Reserve Bank of San Francisco Working Paper 2011-05.

Dickert-Conlin, Stacy, and Douglas Holtz-Eakin. 2000. "Employee-Based Versus Employer-Based Subsidies to Low-Wage Workers: A Public Finance Perspective." In David E. Card and Rebecca M. Blank, eds., Finding Jobs: Work and Welfare Reform. New York: Russell Sage Foundation, pp. 262-294.

Dube, Arindrajit, T. William Lester, and Michael Reich. 2010. "Minimum Wage Effects Across State Borders: Estimates Using Contiguous Counties." *Review of Economics and Statistics*, Vol. 92, No. 4, November, pp. 945-964.

Elsby, Michael, Bart Hobijn, and Aysegul Sahin. 2010. "The Labor Market in the Great Recession." http://www.nber.org/papers/w15979.

Ham, John C., Ayse Imrohoroglu, and Charles Swenson. 2009. "Government Programs Can Improve Local Labor Markets: Evidence from State Enterprise Zones, Federal Empowerment Zones and Federal Enterprise Communities." Unpublished paper. Available at https://msbfile03.usc.edu/digitalmeasures/cswenson/intellcont/Government%20Programs%20Can%20Improve%20Local%20Labor%20Markets-1.pdf (viewed August 16, 2011).

Hollenbeck, Kevin M., and Richard J. Willke. 1991. "The Employment and Earnings Impact of the Targeted Jobs Tax Credit." Upjohn Institute Staff Working Paper 91-07, Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Katz, Lawrence F. 1998. "Wage Subsidies for the Disadvantaged." In Richard B. Freeman and Peter Gottschalk, eds., Generating Jobs: How to Increase Demand for Less-Skilled Workers. New York, NY: Russell Sage Foundation, pp. 21-53.

Martínez-García, Enrique, and Janet Koech. 2010. "A Historical Look at the Labor Market During Recessions." *Economic Letter*, Federal Reserve Bank of Dallas. Vol. 5, No. 1, January.

National Association of State Development Agencies. 1983. *Directory of Incentives for Business Investment and Development in the United States: A State-By-State Guide*, 1st ed. Washington D.C.: The Urban Institute Press.

National Association of State Development Agencies. 1986. *Directory of Incentives for Business Investment and Development in the United States: A State-By-State Guide*, 2nd ed. Washington D.C.: The Urban Institute Press.

National Association of State Development Agencies. 1991. *Directory of Incentives for Business Investment and Development in the United States: A State-By-State Guide*, 3rd ed. Washington D.C.: The Urban Institute Press.

National Association of State Development Agencies. 2003. *State by State Guide to Incentives for Business Investment and Development.* Austin, TX: Summers Press.

Neumark, David. 2011. "Policies to Encourage Job Creation: Hiring Credits vs. Worker Subsidies." National Bureau of Economic Research Working Paper No. 16866.

Neumark, David, and William Wascher. 2011, "Does a Higher Minimum Wage Enhance the Effectiveness of the Earned Income Tax Credit?" Industrial and Labor Relations Review, Vol. 64, No. 4, pp. 712-746.

Pittelko, Brian. 2011. "Trends in States' Unemployment Rates." The Upjohn Institute Blog, April 22. Available at http://www.upjohninst.org/blog (viewed April 26, 2011).

Rogers, Cami. 1998. "State Guidelines: The Jobs Creation Tax Credit." *Journal of State Taxation*, Vol. 16, Winter, pp. 44-63.

State Capital Group. 2010. *Incentives for Businesses 50 State Handbook.* Available at http://www.statecapitalgroup.org/newspublications/businessincentives/BusinessIncentives2010_Final.pdf (viewed April 25, 2011).

David Neumark
Biographical Sketch

A. Professional Preparation

University of Pennsylvania	Economics Major	BA, 1982
Harvard University	Economics	MA, 1985
Harvard University	Economics	Ph.D., 1987

B. Appointments

University of California, Irvine, Department of Economics—Professor of Economics, 2006-present

National Bureau of Economic Research, Research Associate, 1990-present

Public Policy Institute of California—Bren Fellow/Senior Fellow, Economics, 2002-2011

Michigan State University, Department of Economics—Professor of Economics, 1994-2004

University of Pennsylvania, Department of Economics—Assistant Professor of Economics, 1989-1994

Board of Governors of the Federal Reserve System—Economist, Division of Research and Statistics, 1987-1989

Abt Associates, Inc.—Economic consultant, 1987-1989

C. Publications

(i) Most closely related to proposed project

1. Neumark, David, and William Wascher, 2011, "Does a Higher Minimum Wage Enhance the Effectiveness of the Earned Income Tax Credit?" Industrial and Labor Relations Review, Vol. 64, pp. 712-746.
2. Neumark, David, Brandon Wall, and Junfu Zhang, 2011, "Do Small Businesses Create More Jobs? New Evidence from the National Establishment Time Series," Review of Economics and Statistics, Vol. 92, pp. 16-29.
3. Neumark, David, and Jed Kolko, 2010, "Do Enterprise Zones Create Jobs? Evidence from California's Enterprise Zone Program," Journal of Urban Economics, Vol. 68, pp. 1-19.
4. Neumark, David, Junfu Zhang, and Steven Ciccarella, 2008, "The Effects of Wal-Mart Openings on Local Labor Markets," Journal of Urban Economics, Vol. 63, pp. 405-430.
5. Neumark, David, Mark Schweitzer, and William Wascher, 2004, "Minimum Wage Effects Throughout the Wage Distribution," Journal of Human Resources, Vol. 39, pp. 425-450.

(ii) Other significant publications

1. Hellerstein, Judith, Melissa McInerney, and David Neumark, 2008, "Neighbors and Co-Workers: The Importance of Residential Labor Market Networks," forthcoming in Journal of Labor Economics. NBER Working Paper 14201.
2. Neumark, David, Mark Schweitzer, and William Wascher, 2005, "The Effects of Minimum Wages on the Distribution of Family Incomes: A Non-Parametric Analysis," Journal of Human Resources, Vol. 40, pp. 867-894.
3. Neumark, David, and William Wascher, 2001, "Using the EITC to Increase Family Earnings: New Evidence and a Comparison with the Minimum Wage," National Tax Journal, Vol. 54, pp. 281-317.

4. Neumark, David, and William Wascher, 2000, "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania: Comment," <u>American Economic Review,</u> Vol. 90, pp. 1362-1396.
5. Neumark, David, and Wendy Stock, 1999, "Age Discrimination Laws and Labor Market Efficiency," <u>Journal of Political Economy</u>, Vol. 107, pp. 1081-1125.

D. Synergistic Activities
1. Creation of 1990 and 2000 Decennial Employer-Employee Databases (DEED), in joint research with Judith K. Hellerstein. These are matched data sets between the near-universe of business establishments in the United States and individual-level data on long-form respondents to the Decennial Census of Population. The work was done at the Center for Economic Studies and the U.S. Census Bureau, and has led to many publications as well as the creation of data products available to other researchers.
2. Extensive involvement in the communication of public-policy related research findings on enterprise zones, minimum wages, job creation policies, and other topics, to the policy community, through testimony in the U.S. Congress and California Senate, publishing less technical versions of studies through the Public Policy Institute of California, writing op-eds published in the *Wall Street Journal*, *San Francisco Chronicle*, *Detroit News*, *Sacramento Bee*, and *San Diego Union-Tribune*, and numerous radio and TV appearances.
3. Extensive participation in journal editing, including serving as Associate Editor of *Review of Economics of the Household*, and on editorial boards of *Journal of Urban Economics*, *Economics of Education Review*, *Contemporary Economic Policy*, *Industrial Relations*, and *Journal of Labor Research*. (All current except for *Economics of Education Review*.)

E. Collaborators & Other Affiliations

(i) Collaborators
Cathy Bradley, Virginia Commonwealth University; Steven Ciccarella, Cornell University; Nicholas Farrell, Virginia Commonwealth University; Judith K. Hellerstein, University of Maryland; Jed Kolko, Public Policy Institute of California; Francesca Mazzolari, Fondazione Rodolfo Debenedetti; Melissa McInerney, College of William and Mary; Lisa Shickle, Virginia Commonwealth University; Brandon Wall, KIPP Foundation; William Wascher, Board of Governors of the Federal Reserve System; Junfu Zhang, Clark University

(ii) Graduate and Post-Doctoral Advisors
David Bloom, Harvard University; Zvi Griliches, Harvard University (deceased)

(iii) Thesis Advisor and Postgraduate-Scholar Sponsor
Ph.D. students advised in last five years – 9: Daria Burnes, Charles Rivers Associates; Keith Finlay, Tulane University; Sabina Gandhi, Virginia Commonwealth University; Jennifer Graves, University of Oklahoma; Kent Hymel, Volpe Center, Department of Transportation; Mark Kutzbach, Center for Economic Studies; Raaj Tiagi, The Fraser Institute; Smith Williams, FDIC; Kathleen Wong, University of Toronto