Who’s In, Who’s Out?
Policy to Address Job Rationing During Recessions

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I. Introduction

In response to the Great Recession, the federal government spent hundreds of billions of dollars in tax and other interventions in the labor market as part of the stimulus and follow-up policies. Policy-makers traditionally have based their policies on "Keynesian" theories that recessions are driven by inadequate demand, so that increasing government spending will increase demand for economic activity and workers. However, these theories guide how much to spend, not how to design the spending. As a result, despite this massive outlay of funds, the theory for the form that labor income taxes and related policies should change during recessions is surprisingly poorly developed. Instead of drawing on Keynesian macroeconomic theories, we draw on the microeconomics literature on how labor markets function during recessions—in particular, the literature on matching unemployed workers with firms. Insights from microeconomics help answer why there are "too few" jobs and which workers gain employment.

The Article draws two counterintuitive conclusions for maximizing social welfare during slack labor markets during and after recessions. First, subsidize nonemployment. This draws marginal workers out of the labor force, creating space for those who really need jobs. Second, subsidize employers for hiring, not the employees themselves. The problem during recessions is having too few jobs. Econometric evidence shows that statutory incidence matters for economic incidence during recessions; subsidizing employers creates more jobs, while subsidizing employees confers benefits on those who already won the job lottery.

Policy during and after the Great Recession often did not follow these recommendations.

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We base these recommendations on a novel model of the recession economy that has two key features. First, jobs are rationed during recessions. That is, the number of people willing to work substantially exceeds the number of jobs available. Many economists believe that the job rationing comes from the fact that wages fall little in recessions even though demand for workers fall, generating more people who wish to work than jobs to employ.\(^5\) Whatever the cause, high unemployment itself means that jobs must be rationed. Second, evidence suggests that there is a substantial amount of randomness in how jobs are rationed.\(^6\) That is, some people really value having a job, and others do not, and there are likely insufficient mechanisms in place to ensure that the high-surplus type of worker receives the job over the low-surplus type of worker.\(^7\) For example, an individual with a mortgage to pay, a nonworking spouse, and three children may re-

\(^5\) For economics papers arguing why rationing is an important feature of recessionary economies because wages do not change quickly enough to stop the rationing, see Truman F. Bewley, *Why Wages Don't Fall During a Recession* 1-19 (1999) (suggesting, based on interviews with workers and management, that workers strongly dislike decreases in their "nominal"—that is, noninflation-adjusted wage and that these decreases would decrease morale and therefore productivity), and John B. Taylor, *Staggered Wage Setting in a Macro Model*, 69 Am. Econ. Rev. (Papers & Proc.) 108, 109-10, 112 (1979) (explaining that wage stickiness, both upward and downward, results from the fact that firms cannot fully adjust wages if competitors are not adjusting theirs at the same time because of staggered wage-setting). Bewley's work builds in part on that of George Akerlof. George A. Akerlof, *Labor Contracts as Partial Gift Exchange*, 97 Q.J. Econ. 543, 543-45 (1982) (suggesting that norms may matter in wage-setting). Recent prominent macroeconomic models have included these wage rigidities. See Robert E. Hall, *Employment Fluctuations with Equilibrium Wage Stickiness*, 95 Am. Econ. Rev. 50, 50-51 (2005) (incorporating sticky wages into a search model, but assuming that the sticky wages merely adjust the division of surplus and do not generate layoffs, contrary to our model); Robert Shimer, *The Consequences of Rigid Wages in Search Models*, 2 J. Eur. Econ. Ass'n 469, 476-79 (2004) (adding wage rigidities to a search model with stochastic shocks and finding that, if all wages are inflexible, the model does a better job of predicting the dynamics of employment throughout business cycles, but finding that the welfare costs of the business cycle are still low); Robert Shimer, *Convergence in Macroeconomics: The Labor Wedge*, 1 Am. Econ. J.: Macroeconomics 280, 295-96 (2009) (arguing that wage rigidities, combined with search frictions, are a promising possible explanation for unemployment during recessions). But see Christopher A. Pissarides, *The Unemployment Volatility Puzzle: Is Wage Stickiness the Answer?*, 77 Econometrica 1339, 1366 (2009) (arguing that wage rigidities cannot explain unemployment during recessions). This literature does not include heterogeneous reservation wages, which we explore.

\(^6\) See Part VI (presenting the evidence); see also Bewley, note 5, at 238-41 (showing that firms do not appear to account for how much employees value jobs in layoff decisions); id. at 341-47 (showing that more effort put into looking for a job often does result in getting a job).

\(^7\) The implications of heterogeneous worker surplus have been explored in other contexts. See, e.g., Christian Bontemps, Jean-Marc Robin & Gerard J. Van den Berg, *An Empirical Equilibrium Job Search Model with Search on the Job and Heterogeneous Workers and Firms*, 40 Int'l Econ. Rev. 1039 (1999) (studying the implications of heterogeneous worker surplus on equilibrium wage dispersion, that is, how wages for similar jobs vary).
ally need a job; this is a high-surplus worker.\textsuperscript{8} If rationing is inefficient, then this inefficient rationing, not the shortage of jobs per se, is the much bigger cause of social welfare loss in the economy.

These two features of the recessionary economy generate the two policy recommendations. With randomness in rationing, one key concern is ensuring that the right type of person receives the jobs, generating the first recommendation of subsidizing nonemployment to encourage marginal workers to leave the labor force and create space for high-valuation workers. Likewise, with rationing, another key concern is creating more jobs, not subsidizing existing workers, generating the second recommendation of subsidizing employers for employing workers, not the employees themselves. The reason is that, with rationing, statutory incidence matters,\textsuperscript{9} and subsidizing hiring encourages employers to hire, whereas subsidizing the employee-side does not increase the number of jobs available and does not increase employment. Asking how these features of recessions should affect policy is new. We describe how taxes should be affected, along with other policies, like unemployment insurance, public hiring, and employer mandates.\textsuperscript{10}

Though the model does not capture all relevant factors, its limitations generally do not qualitatively affect the policy recommendations. Perhaps most importantly, this microeconomic model does not consider the Keynesian macroeconomic goal of increasing aggregate demand. The best estimates of the macroeconomic stimulus of the relevant policies, however, suggest that the policies recommended in this Article are actually some of the best for macroeconomic stimulus, so there is no tension between the recommendations of microeconomics and macroeconomics.\textsuperscript{11} Additionally, while of course there are mechanisms by which those who really want jobs are disproportionately able to get them and in which wages are not perfectly sticky, as long as substantial unemployment remains and as long as a

\textsuperscript{8} There are many reasons that individuals may vary in their surplus from work. For example, some may particularly fear long-term earnings losses due to long-term unemployment resulting from being unemployed (related to "hysteresis," or increased unemployment resulting from prolonged periods of unemployment during economic shocks). See Steven J. Davis & Till von Wachter, Recessions and the Costs of Job Loss, Brookings Papers on Econ. Activity 1, 1 (2011) (providing evidence on long-term earning losses resulting from being laid off during recessions).

\textsuperscript{9} See note 4.

\textsuperscript{10} See Section V.D.

\textsuperscript{11} Policies for Increasing Economic Growth and Employment in 2012 and 2013 Before the Comm. on the Budget 28 tbl.1 (Nov. 15, 2011) (statement of Douglas W. Elmendorf, Director, Cong. Budget Office), http://www.cbo.gov/sites/default/files/cbofiles/attachments/11-15-Outlook_Stimulus_Testimony.pdf (showing that the policies recommended by the Article also have high macroeconomic multipliers). For further explanation, see Section VI.
substantial number of people who really want jobs are unable to get them, the results hold qualitatively. Of course, this Article presents a stylized model, and the magnitude of the appropriate policy response depends on empirical estimates that are beyond the scope of this Article. The Article’s goal is to shift policy in the direction of its recommendations.

Policy during the Great Recession was mixed in its adherence to the Article’s two recommendations. The first recommendation—of subsidizing nonemployment—was followed by Congress. However, despite interest in policies consistent with this Article, the second recommendation—of subsidizing employers, not employees—was largely not followed. To the contrary, a policy commonly used during this and other recessions, employee-side payroll tax rebates, draws marginal workers into the labor force, decreasing social welfare by encouraging people who value work relatively little to join the competition for a fixed number of jobs that otherwise would have been sought only by people who more highly value working.

II. CONTRIBUTION TO LITERATURE

This Article contributes to several literatures. First, this Article contributes to the renewed interest in how taxes and spending should change during recessions, in light of the aftermath of the Great Recession. Prominent economists have noted that research in this area is sorely needed. Lawyers have started the project of understanding how tax laws should change during recessions. In particular, Yair Listokin makes a forceful argument that the lack of macroeconomic considerations in tax law is quite problematic. Others have begun understanding how features of the Code, like the alternative minimum tax, soften the blow of recessions and how they could do an even better job of serving that goal. Others have considered how unem-

12 See Section VIII.A.
13 See Section VIII.B.
15 Alan J. Auerbach, Implementing the New Fiscal Policy Activism, 99 Am. Econ. Rev. (Papers & Proc.) 543, 548 (2009) (“[I]f we are going to practice fiscal discretionary policy on a large scale, then more attention to policy design is sorely needed.”).
17 IRC § 55(a).
ployment insurance should vary over the business cycle.\textsuperscript{19} This is the first Article that considers the implications of efficient and inefficient job rationing on the choice between subsidizing employers, employees, and nonemployment.

Second, this Article is part of a broader reassessment of the implications for tax law when traditional assumptions on the invariance of statutory incidence for economic incidence do not hold.\textsuperscript{20} That is, in a Coase-like way, economists traditionally have believed that it does not matter who actually remits a tax in determining who actually ends up paying for the tax after all price changes have been taken into account.\textsuperscript{21} For example, Wojciech Kopczuk, Justin Marion, Erich Muehlegger, and Joel Slemrod show that the point of collection matters for the incidence of state diesel taxes due to evasion.\textsuperscript{22} Most relevant for this Article, James Poterba, Julio Rotemberg, and Lawrence Summers show that the statutory incidence of taxes does matter for economic incidence during recessions.\textsuperscript{23} This Article applies these econometric results about the importance of statutory incidence to draw conclusions about tax law and shows a context in which standard assumptions about incidence are misguided—and therefore may be leading to bad policies, like subsidizing workers instead of their employers.

Third, we apply to a new context the theory on inefficient rationing. Since at least the 1940’s, scholars have recognized that regulations such as rent control prevent the efficient allocation of demanders to suppliers.\textsuperscript{24} More recently, scholars have studied the inefficiencies of misallocation of workers and jobs in the context of the minimum

\textsuperscript{19} Camille Landais, Pascal Michaillat & Emmanuel Saez, A Macroeconomic Theory of Optimal Unemployment Insurance 5-8, 47-48 (Nat’l Bureau Econ. Research, Working Paper No. 16526, 2010), www.nber.org/papers/w16526 (finding that unemployment insurance should be more generous during recessions, but based on a model that assumes that all workers value work the same amount and also not studying the choice between taxing employees or subsidizing employers or other forms of subsidizing nonemployment); see Kory Kroft & Matthew J. Notowidigdo, Should Unemployment Insurance Vary with the Unemployment Rate? Theory and Evidence, 83 Rev. Econ. Stud. 1092, 1121-22 (2016) (finding similar results).

\textsuperscript{20} See note 4.

\textsuperscript{21} Kyle D. Logue & Joel Slemrod, Of Coase, Calabresi, and Optimal Tax Liability, 63 Tax L. Rev. 797, 798-99 (2010).

\textsuperscript{22} Wojciech Kopczuk, Justin Marion, Erich Muehlegger & Joel Slemrod, Does Tax-Collection Invariance Hold? Evasion and the Pass-Through of State Diesel Taxes, 8 Am. Econ. J.: Econ. Pol’y 251 (2016); see Donohue, note 4, at 554, 569 (discussing the distribution prediction when bonuses are paid to either workers or employers).

\textsuperscript{23} Poterba et al., note 4, at 662-75.

\textsuperscript{24} Milton Friedman & George J. Stigler, Roofs or Ceilings? The Current Housing Problem, 1 Popular Essays on Current Probs. 7, 16-20 (1946).
wage.\textsuperscript{25} Studies from the gasoline, rental housing, and natural gas markets provide good evidence that regulation causes misallocation.\textsuperscript{26} We build in particular on earlier theoretical work by Edward Glaeser and Erzo Luttmer, who develop welfare analysis for the efficiency of rationing in rent-controlled housing market.\textsuperscript{27} We apply this theory for the first time to the context of labor markets during recessions\textsuperscript{28} and make the point that the market can exhibit the same problems on its own that result from price regulations—and that similar policy solutions can apply.

Finally, this Article contributes to the nascent discourse on behavioral tax law.\textsuperscript{29} In particular, it explores the implications for tax policy of the most-touted explanation for wage stickiness, norms within firms that prevent wages from decreasing during recessions.\textsuperscript{30} This Article combines these nonstandard preferences with their effects on the macroeconomy to develop new implications for tax law.

III. MODEL OF THE RECESSIONARY ECONOMY

In this Part, we develop a basic model of a recessionary economy; policy implications follow in later Parts. To make the insights most transparent, we keep the math to a minimum and relegate the details to the Appendix. Following Glaeser and Luttmer in their discussion

\begin{footnotesize}
\begin{enumerate}
\item See Erzo F.P. Luttmer, Does the Minimum Wage Cause Inefficient Rationing?, 7 B.E. J. Econ. Analysis & Pol'y: Contributions to Econ. Analysis & Pol'y, no. 1, 2007, at 2 (reviewing empirical evidence of misallocation due to regulation).
\item Edward L. Glaeser & Erzo F.P. Luttmer, The Misallocation of Housing Under Rent Control, 93 Am. Econ. Rev. 1027, 1027-30 (2003). A later paper by Luttmer develops a test for the efficiency of rationing in the minimum wage labor market using a test that is conceptually similar; he studies how the demographics of the workforce change as the minimum wage changes, under the principle that a higher minimum wage leads to more rationing and that some demographics are correlated with reservation wage. Luttmer, note 26, at 2-4, 7-18, 31-32.
\item David Lee and Emmanuel Saez explore optimal minimum wage policy if the social planner values redistribution, where rationing is efficient and inefficient. David Lee & Emmanuel Saez, Optimal Minimum Wage Policy in Competitive Labor Markets, 96 J. Pub. Econ. 739, 739-40 (2012).
\item See Bewley, note 5, at 1-19 (providing interview-based evidence on the dislike of nominal wage decreases); Akerlof, note 5, at 543-45 (developing foundational theory on norms in labor markets).
\end{enumerate}
\end{footnotesize}
of rent control, we consider a model with linear labor demand and supply, with labor demand given by \( P^D = b_D - m_D Q \) and labor supply given by \( P^s = b_s + m_s Q \).\(^{31}\) We also assume that employment is binary: Workers are either employed or not employed; there are no part-time jobs or adjustment to the number of hours worked. Workers have identical productivity but heterogeneous surplus from work (the difference between the actual wage level and the lowest wage level at which an individual is willing to work, which is known as the "reservation wage").\(^{32}\)

Suppose that, because a recession has just begun and wages are sticky, the wage level is some amount \( \theta \) greater than the efficient market-clearing price \((P^*)\).\(^{33}\) We do not explore the possible causes of the stickiness, instead accepting at face value the commonly held view that wages must be somewhat sticky to generate such large fluctuations in employment during business cycles.\(^{34}\) For example, interviews of managers by economist Truman Bewley show that "[m]ost managers were astonished by the idea of offering as an alternative to layoff continued work on the same job at reduced pay."\(^{35}\) This could be because morale would be harmed too much if wages were lowered,\(^{36}\) because employers cannot coordinate in lowering wages,\(^{37}\) or other reasons.\(^{38}\) Effectively, the labor demand curve has shifted down, but wages do not adjust fully. As shown in Figure 1, \( Q^5 \) workers are will-

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31 Glaeser \& Luttmer, note 27.
33 As noted above, this assumption is common in the economics literature. See note 6 and accompanying text. It is also supported by the interviews conducted by Bewley. Bewley, note 5, at 241-43 (noting that no companies offered "choice between layoff and continued work on the same job at lower pay"). Of course, none of this is to say that firms never cut wages. See Barbara Kiviat, When Companies Opt for Pay Cuts Instead of Layoffs, Time, Apr. 27, 2009 (providing examples of companies that cut wages).
35 Bewley, note 5, at 243.
36 Id.
37 Taylor, note 5, at 109, 111-12.
38 Note that the problem of sticky wages persists even as many people come and go from jobs. See 3 Steven J. Davis \& John Haltiwanger, Gross Job Flows, in Handbook of Labor Economics 2711 (Orley C. Ashenfelter \& David Card eds., 1999) (discussing the large flows of people into and out of jobs, even when the total number of jobs is stable). New hires are also affected by sticky wages, both to maintain intra-firm equity in wages between old and new hires, and because firms offering new jobs are competing with employers.
ing to work at this wage, but only $Q^p$ are employed, resulting in an excess supply of workers. Suppose that welfare can be measured by taking the area between the labor demand and supply curves, thereby adding up the employer and employee surplus.\textsuperscript{39} Of course, it is fine for this story if wages adjust some, such as through cuts in fringe benefits or through a gradual erosion in real wages through inflation, as long as they do not adjust fully. Similarly, the results continue to apply so long as wages stay sticky, even after a recession ends, though of course wages will tend to become gradually unstuck with time.

**Figure 1**

**Employees Willing to Work at the Sticky Wage**

We assume that workers are rationed into jobs either efficiently or uniformly. Consider two kinds of workers, *Eager Eric* and *Vacation Victor*. *Eager Eric* gets lots of surplus from work; perhaps he has children to feed, a mortgage to pay, a spouse who does not work, little savings, and an identity making work important to him. *Vacation

\textsuperscript{39} This is the case with "quasi-linear utility functions" conventionally used in economic models. This means that utility is linear in income. In other words, there are no income effects. See Peter A. Diamond, Optimal Income Taxation: An Example with a U-Shaped Pattern of Optimal Marginal Tax Rates, 88 Am. Econ. Rev. 83, 85 (1998) (finding no income effects with a quasi-linear utility function).
Victor, in contrast, gets little surplus from work; perhaps he has no children to feed, no mortgage to pay, savings to use, and a desire to take time off from work to travel. Under “efficient rationing,” the workers who value the job the most receive it. Only the Eager Erics are employed. Under “uniform rationing,” all workers who are willing to work at the prevailing wage have an equal probability of receiving the job. Eager Eric and Vacation Victor have equal likelihoods of being employed. In the absence of any price-based incentive (or ability) for firms to distinguish between workers with higher and lower surplus from work, there may be little reason that firms would draw such distinctions, since firms care about productivity. Uniform rationing is a convenient analytical starting point and is the focus of our policy analysis. Part VI discusses the plausibility of uniform rationing, suggesting that—while uniform rationing is not literally accurate—there are many reasons and much evidence that job rationing during recessions is inefficient.

IV. Welfare Consequences from Rationing

This setup yields the following result:

RI: The deadweight loss (“DWL” or loss to welfare) from uniform rationing, \( \frac{b_D - b_S}{2m_D} \theta \), is strictly higher than the DWL from efficient rationing, \( \frac{m_D + m_S}{2m_D} \theta^2 \).

To gain insight into this result, we turn to graphical representations of the DWL in the two rationing regimes. Figure 2 shows the DWL in the case of efficient rationing, where only Eager Erics are employed. The DWL is represented by ABC, the area between the supply and demand curves for workers who would work at quantity \( Q^* \) at the market-clearing wage but not at the sticky wage. Area ABC is a standard Harberger triangle, the familiar way of measuring DWL in economics. We call this triangle the “quantity DWL.”

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40 See note 67 and accompanying text.
41 The result requires the additional natural assumption that the sticky wage is not so high that the market evaporates or so low that there is in fact no sticky wage (that \( \theta = 0 \)).
Uniform rationing results in the same quantity DWL plus an additional DWL resulting from the misallocation of workers to jobs—that is, from the fact that some jobs are taken by *Vacation Victors* instead of *Eager Erics*. We call this additional DWL the “allocative DWL,” and it is represented by area \( CDEF \) in Figure 3. In the efficient rationing case, the worker surplus is the area from the wage to the supply curve. In the uniform case, the worker surplus only constitutes the area from the wage down to the average reservation wage of workers willing to work at this wage—the average reservation wage of the *Eager Erics* and *Vacation Victors*. Willing workers have a higher average reservation wage than just the subset of willing workers with the lowest reservation wage (that is, with the highest surplus from work). (Note that a lower reservation wage means higher worker surplus.) The allocative DWL is large because the first individual rationed out of a job is the average individual willing to work at the sticky wage, who is not indifferent between working and not working.\(^{43}\)

\(^{43}\) Technically, the DWL is first-order in \( \theta \) for uniform rationing and second-order in \( \theta \) for efficient rationing. See note 45 (explaining first-order and second-order).
The concern here about rationing efficiency is not a trivial one. Quite to the contrary, for small amounts of wage stickiness, the main problem is not that there are too few jobs, resulting in quantity DWL, but rather that the wrong workers are in the jobs that exist. The intuition is simple: Suppose that there is just a small amount of rationing, such that there is only one excess worker. The quantity DWL is tiny (indeed, infinitesimally small); that worker was close to the margin of working anyway, so there is very little loss to him or his employer from his not being able to work. But if rationing is uniform, then the one worker who cannot find a job may be one who really needed the job—indeed, on average, it will be the willing worker with the average surplus from working as shown in Figure 3. The loss to this worker is very large.

44 More technically, \( \lim_{\theta \to 0} \left( \frac{\text{DWL under uniform rationing} - \text{DWL under efficient rationing}}{\text{DWL under efficient rationing}} \right) = \infty \). That is, the limit as \( \theta \) approaches 0 of the ratio of (1) the extra DWL from uniform rationing relative to efficient rationing and (2) the DWL from efficient rationing alone is infinite. For small amounts of rationing, all that matters is the inefficient rationing, not the jobs shortage.
V. OPTIMAL GOVERNMENT POLICY

Here we consider two labor market policies that could help alleviate the DWL during recessions. For simplicity we assume that all government policy is financed by nondistortionary lump sum taxes.

A. Recommendation 1: Subsidize Nonemployment

The first result from this setup is:

\[ R2: \text{In the case of uniform rationing, a subsidy for nonemployment causes a large welfare gain.}^{45} \]

Consider a subsidy for nonemployment, like an increase in unemployment insurance\(^46\) or a welfare program like Temporary Assistance for Needy Families.\(^47\) As shown in Figure 4, labor supply shifts up since having a job is relatively less valuable.

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\(^{45}\) In particular, for subsidy \( W \), the welfare gain is

\[
\frac{1}{2} \left( P^* + \theta - \left( b_0 + \frac{(\theta - W)(m_T + m_D) + m_S(b_0 - b_2)}{m_S(m_T + m_D)} \right) Q^* \right). \]

The welfare gain is "large" in the sense of being a first-order welfare gain; that is, \( W \) appears in the equation without being multiplied by itself. Since economic welfare analysis is done "on the margin" (that is, for the first infinitesimally small unit of \( W \)) and when \( W \) is less than one, multiplying \( W \) by itself (that is, a second-order welfare gain) yields a product less than \( W \) itself, the welfare gain is considered large for first-order welfare gains. An additional technical (and sensible) assumption for the marginal welfare gain to be positive is that the subsidy is not so gigantic that it reduces the number of workers willing to work to less than \( Q^D \), the level of employment with no intervention.

\(^{46}\) Recipients of unemployment insurance must be actively seeking work and must accept suitable employment if offered. See notes 48–50. So the way that more generous unemployment benefits keep people out of the labor force is by reducing search intensity and reducing the rate of acceptance of potentially nonsuitable job offers. Evidence shows that expanding unemployment insurance does, indeed, reduce the rate of exit from unemployment. See Jesse Rothstein, Stephanie Aaronson & Lisa B. Kahn, Unemployment Insurance and Job Search in the Great Recession [With Comments and Discussion], 2011 Brookings Papers on Econ. Activity 143, 144.

Under efficient rationing this policy has no impact on DWL. Regardless of the subsidy, the individuals gaining the most from the job are employed. However, with uniform rationing and no subsidy, many employed workers receive little surplus from their employment. A subsidy for nonemployment induces those with the least surplus to exit the labor force, creating space for workers with a higher surplus from work. Figure 4 shows the reduced allocative DWL ($CD'E'F'$) if labor supply changes to $Supply_2$, decreasing the average reservation wage of those employed by removing marginal workers from the labor force. Indeed, the allocative DWL can be eliminated if the subsidy is raised enough that workers are only willing to supply $Q^D$ of labor. Intuitively, what happens is that a worker who values working at almost nothing is replaced by the average unemployed worker, who actually values working quite a lot, substantially increasing social welfare.

With uniform rationing there is an obvious welfare-enhancing trade to be made: People who value working highly but who were not hired should pay those who value working only a small amount but who were hired to give up their jobs. A subsidy for nonemployment mimics this payment system.

A corollary of the result that subsidizing nonemployment increases social welfare is that policies that discourage marginal individuals
from seeking work and competing with those who really need jobs are also beneficial. So policymakers should consider making it easier for individuals to stay eligible for social insurance programs rather than returning to jobs that they do not wish to take. For example, federal regulations provide that a jobless worker collecting unemployment insurance must search for work, but may limit his search to jobs that constitute "suitable work."\textsuperscript{48} If an unemployed worker refuses to accept suitable work without suitable cause, he loses unemployment insurance benefits.\textsuperscript{49} The surplus of jobs and presence of some workers who want them more than others suggest that, during recessions, suitable work standards should be weakened—that is, the definition of work that is considered suitable should be narrowed. As a result, unemployed individuals would not need to pursue and accept jobs that they do not want very much just to maintain their unemployment insurance, making both the individual not forced to take the job and the individual who actually gets the job better off. Another condition of eligibility for unemployment insurance is the "prevailing conditions" test, allowing unemployment insurance recipients to refuse jobs that fall below prevailing market conditions as determined by the overall labor market, rather than worker's own skills as for the suitable work requirements.\textsuperscript{50} Weakening this test during recessions would also help ensure that those who most need jobs receive them.

Similar reasoning applies to social insurance programs from supplemental income for food to health care: During recessions, eligibility should be expanded so that unemployed individuals need not seek out and accept jobs that they value little when there are many others who highly value those jobs. Likewise, expanding aid for education, especially at community colleges, could keep marginal workers out of the labor force.


\textsuperscript{49} 20 C.F.R. § 604.5(a)(2).

B. Recommendation 2: Subsidize Employers for Hiring, Not the Employees

1. Subsidizing Employers Is Welfare-Increasing

Second, consider a subsidy that pays employers for each of the employees that they employ, like a cut in the payroll taxes that employers pay on their employees’ wages, and the following result:

R3: In rationed labor markets, a hiring subsidy for employers increases welfare.\(^{51}\)

As shown in Figure 5, suppose that the subsidy increases labor demand to \(D_{\text{emand}}\). Because of the subsidy, employers hire more workers, and the quantity DWL shrinks from the large area \(ABC\) in Figure 3, with no employer subsidy, to the smaller area \(AB''C''\) in Figure 5, with the subsidy. Essentially, a key problem in rationed labor markets is that employers provide too few jobs. Subsidizing employers to hire more workers alleviates this problem. Because sticky wages cause employers to pay “too much” for workers,\(^{52}\) the fact that the subsidy goes to employers, not employees, is key, since the subsidies reduce the wage that employers pay. If the subsidy had gone to workers, there would have been no decline in the amount that employers had to pay their workers.

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\(^{51}\) In particular, the welfare gain for subsidizing an employer is \(\frac{1}{2} (P^* + \theta - b_s - W) \frac{w}{w_0}\). While still positive, the welfare gain starts decreasing when the subsidy is greater than half the surplus of the highest-surplus worker (that is, the total welfare benefits start declining when \(W > \frac{P^* + \theta - b_s}{2}\)). Put another way, for large employer-side subsidies, in which the marginal dollar in employer subsidy causes little decrease in quantity DWL, a marginal increase in the subsidy can increase total DWL, so employer subsidies should be set below this point.

\(^{52}\) See note 5 and accompanying text.
Although the analysis in this Article generally assumes that rationing is uniform, note that this result does not depend on the efficiency of the rationing, since the gain in efficiency comes from quantity DWL, not allocative DWL. Quantity DWL is the same under either type of rationing. Rather, subsidizing employers can actually be less valuable under uniform rationing than under efficient rationing. The reason is that, with uniform rationing, the allocative inefficiency (area $C''D''EF$) grows with the subsidy in some cases, as shown in Figure 5, with the extension of allocative DWL to the right even as quantity DWL shrinks to the right. The rationale is simple: Although more workers are employed, some of those gaining employment do not value their jobs very much, increasing allocative inefficiency. In other words, some of the loss in quantity DWL is “taken back” by an increase in allocative DWL. Nevertheless, under either form of rationing, an employer subsidy is a welfare-improving policy.

53 Compare Figure 2 (efficient rationing), with Figure 3 (uniform rationing).
54 In particular, when the average reservation wage of workers willing to work is greater than that of the worker who would be rationed into employment under efficient rationing (the employee at $Q_2^D$ along the supply curve), a marginal increase in the subsidy increases allocative deadweight loss.
2. **Subsidizing Employees Is Welfare-Decreasing**

Now consider a subsidy for employees, instead of employers—for example, a cut in employee-side payroll taxes. This is exactly the opposite of Recommendation 1, subsidizing nonemployment, since subsidies for employees make nonemployment less attractive, not more attractive. This yields the following result:

**R4:** In the case of uniform rationing, a subsidy for employees decreases welfare.\(^{55}\)

An employee-side subsidy reverses the analysis for subsidizing nonemployment discussed in Section V.A and shown in Figure 4. When workers decide whether to enter the labor market, they compare their utility from entering the labor market with their utility from exiting the labor market. Thus, this policy draws more marginal workers into the labor force, by making working more attractive. However, it does not increase the number of jobs, like subsidizing employers does. These marginal workers then compete with workers who really need jobs, the opposite of what happens with the subsidy for nonemployment. The presence in the labor market of workers who care only a little about working makes it less likely that those who really want to work will get hired at one of a fixed number of jobs. Therefore, these tax cuts are counterproductive with uniform rationing as they aggravate the allocative deadweight loss without reducing the quantity deadweight loss.\(^{56}\) This result of subsidizing employers instead of employees resonates with the political debate during the recession on the importance of “creating” more jobs; the focus was not on helping out workers who already were lucky enough to have jobs.

Of course, if increasing the returns to work does not in fact draw workers to participate, then this point is moot. However, credible evidence consistently shows substantial increases in participation when the returns to working go up.\(^{57}\)

\(^{55}\) Thus, the welfare loss from subsidizing an employee is simply the negative of the welfare gain from subsidizing nonemployment. See the results in note 45.

\(^{56}\) Instead of subsidizing employees, the model actually implies that it is desirable to increase taxes on employees. Of course, raising taxes during recessions is a bad idea for macroeconomic reasons. If it were wise, though, taxing employees and subsidizing employers would effectively reduce the post-tax wage, removing the underlying source of inefficiency and therefore reducing both allocative and quantity deadweight losses. Although the market will not get the wage down, the government can effectively decrease it. Such a policy is an alternative to inflation when the Federal Reserve already has interest rates as low as they can go, which happened in the most recent recession.

\(^{57}\) See, e.g., Raj Chetty, Bounds on Elasticities with Optimization Frictions: A Synthesis of Micro and Macro Evidence on Labor Supply, 80 Econometrica 969, 1008 (2012) (reviewing the recent literature and finding that quasi-experimental estimates have an average
3. Implementation

The two policies recommended here—subsidizing nonemployment and subsidizing employers during recessions—could be enacted in at least two ways. First, Congress could add “triggers” to the Code and welfare programs in which these policies go into effect if unemployment passes a certain threshold, say 7%. Neither the Code nor welfare programs currently contain such triggers. Such triggers would have the advantage of coming into effect without delay from Congress. They would have the disadvantage of potentially generating perverse strategic behavior. For example, suppose that this trigger policy has been adopted and the unemployment rate is creeping toward 7% as an employer debates whether to hire a temporary employee now or in a few months. The employer may delay hiring new employees until he can get a wage subsidy from the government, potentially exacerbating the very problem the employer-side subsidies are designed to solve.58 Alternatively, Congress could adopt new laws as times of economic stress arise, as was done in the most recent recession. This policy has the advantage of allowing Congress to tailor the policies to the specific contemporaneous circumstances, but the disadvantage of delay—or potentially no action at all.

4. Other Policy Levers

The stylized model has focused on tax and transfer policy—income or payroll tax cuts, or changes in benefits like Temporary Assistance for Needy Families and unemployment insurance. But this analysis also has implications for the attractiveness of other policy levers. For example, federal or state government hiring and layoff policy could be altered during recessions to explicitly consider surplus from work. Another implication might be to adjust the salience of the various subsidies. The government could try to make potentially problematic employee-side subsidies less salient,59 while trying to make more beneficial (by the argument in this Article) employer-side and nonemployment subsidies more salient, to increase the behavioral response.


58 Congress could partially respond to the concern about employers’ strategic behavior by promising during its deliberations to make the subsidy retroactive.

59 Indeed, in a poll from February 2010, many reported that they believed that the Obama administration had not cut taxes. Robert Henden, Poll Reveals Most Americans Don’t Know They Got a Tax Cut, CBS News (Feb. 12, 2010), http://www.cbsnews.com/news/poll-reveals-most-americans-dont-know-they-got-a-tax-cut/.
Similarly, recessions may be a particularly bad time to increase employers' costs of hiring workers—for example, through regulatory mandates that are statutorily incident on employers. Rather, this analysis suggests reasons (on the margin) to make new mandates statutorily incident on employees during recessions to the extent possible, or to delay new mandates.

The federal government could also encourage states to maintain generous unemployment insurance through policy tweaks. Current law requires states to repay the federal government for loans it provides for unemployment insurance within roughly two years of incurring the loan, resulting in some states making unemployment insurance less generous and/or raising taxes on firms while the labor market was still slack. The federal government could reduce the speed with which states are required to repay the federal government or reduce the penalty for not repaying on the normal schedule, as the Obama Administration proposed. Doing so would encourage states to maintain generous unemployment insurance and avoid increases in the taxes that firms pay for workers, promoting both of the Article's policy recommendations.

Finally, this analysis could be viewed as favorable toward work-sharing arrangements, in which employees work for fewer hours, so that more employees are employed. If there is a somewhat fixed number of hours worked, then work-sharing would at least allow some high-surplus workers who are rationed of jobs to have some employment. Regulations such as those promulgated at the end of the Obama administration to increase overtime pay, thereby discouraging longer hours, could have de facto promoted such work-sharing.

VI. How Efficient Is Rationing?

In this Part, we argue that it is reasonable to think that job rationing during recessions is inefficient. Though we describe uniform rationing for analytical clarity, we think it unlikely that rationing is literally uni-

60 IRC § 3302(c)(2)(B), (d)(3) (reducing unemployment insurance tax credit for employers in states that do not repay loans by November tenth of the second year).
62 Id. (explaining that the Obama Administration suggested suspending interest for two years and delaying penalties for states that were struggling to repay their loans in the aftermath of the Great Recession).
Nevertheless, there are many reasons to expect inefficient rationing—that is, that it is not always the case that—within a class of workers with similar productivity—those who most want jobs get them. To understand how efficient rationing is during recessions, one must consider the two main sources of unemployment—layoffs and lack of hiring. Each can potentially have a different mechanism that bears on the efficiency of rationing. We review each type in turn.

First, evidence suggests that how much workers value the job is not a criterion considered by firms in making layoff decisions. In particular, when Bewley interviewed firms about their layoff decisions, there was no evidence at all that this was a concern. This apparent indifference makes sense because firms care about productivity, not worker surplus from work. Indeed, evidence from Bewley and others confirms that productivity is an important criterion when considering whom to lay off. As well, even if firms did care, it would be difficult for them to distinguish between workers with high and low surplus from work; presumably, many workers would profess having a high surplus in order to help them keep their jobs. Furthermore, in some cases, firms do not even choose individual workers to lay off and instead lay off whole divisions or close entire plants. In those cases, of course, there can be no attention paid to worker surplus. Indeed, Bewley concludes, "[d]espite the widespread use of the performance criterion, the population of unemployed was probably not of low quality, for many firms laid off whole departments or large portions of...

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64 Measuring rationing efficiency is particularly challenging given the unobservability of surplus from work. One approach to measuring surplus from work is using the amount that individuals say that they value working (as in Martin Feldstein & James Poterba, Unemployment Insurance and Reservation Wages, 23 J. Pub. Econ. 141 (1984)); however, economists tend to be skeptical of such stated values, versus those that are revealed by individuals’ behavior. Moshe Ben-Akiva, Daniel McFadden & Kenneth Train, Foundations of Stated Preference Elicitation: Consumer Behavior and Choice-Based Conjoint Analysis (Mar. 2016), https://eml.berkeley.edu/~train/foundations.pdf (describing economists’ typical skepticism of stated preferences).

65 In principle, people who quit but do not find employment could also be a part of unemployment. However, evidence shows that the number of people quitting jobs actually went down substantially during the recession, so quits are unlikely to play an important role in cyclical unemployment. In contrast, layoffs increased substantially and the number of job openings and the amount of hiring plummeted, making it harder to find jobs. See Job Opening and Labor Turnover Point to (Slow) Recovery, EconomicData (Nov. 10, 2011, 8:08 AM), http://economipicdata.blogspot.com/2011/11/job-opening-and-labor-turn-over-point-to.html.


67 See, e.g., id.; Robert Gibbons & Lawrence Katz, Layoffs and Lemons, 9 J. Lab. Econ. 351 (1991) (confirming empirical predictions of a model in which low-productivity workers are laid off when firms do not close whole plants and therefore have discretion over layoffs).

68 Of course, family circumstances and other things may be observed, but these are likely to be crude proxies.
them." Thus, the best evidence suggests that, on the layoff side, employer behavior does not undermine the assumption of uniform rationing; firms lay off whole plants or divisions or they pay attention to productivity, not worker surplus.70

Evidence from the hiring side also suggests that inefficient rationing may be rampant. As with layoffs, there is little evidence that firms considered workers’ surplus in hiring. Bewley’s research reveals no attempt to hire those with higher surplus from work.71 Of course, employers may be doing so without knowing it, but it remains unlikely that employee surplus is fully taken into account. There is also a second side to hiring—worker effort into getting hired. Likely, the ability of workers who have a higher surplus from employment to work hard at getting a job partly undoes part of what otherwise might be inefficient rationing. However, the evidence from Bewley and others suggests that even significant search effort or flexibility by the unemployed often did not yield a job during a recession.72

Indeed, though not framed as inefficient job rationing, the kind of luck that generates inefficient rationing is implicit in a great deal of economic modeling on how workers search for jobs. Although these models range from quite simple73 to very complex,74 all recognize that in finding (and often losing) a job, there is an element of chance.75 Plants close, interviews go poorly, unlucky social networks of friends, and stochastic rapport between interviewer and firm all cause otherwise identical individuals to face different outcomes in the labor market. In fact, there is a large empirical literature suggesting that

69 Bewley, note 5, at 238.
70 Some firms also lay off in reverse seniority, which also is unlikely to closely correspond to workers’ surplus from work. Id. at 236, 238.
71 Id. at 277-302.
72 Id. at 341 (“I asked whether people could find work quickly if they were sufficiently flexible and energetic in their job search. The answer was usually an emphatic ‘no.’ Respondents claimed that the general shortage of jobs and the overqualification problem made finding a job of any type a long, difficult process, though some job hunters were lucky. The shortage of jobs relative to the number of job seekers preoccupied advisers of the unemployed. . . . All but one of [eighteen interviewed advisers] said it normally took a long time to find work, even if job searchers were energetic and completely flexible.”); see also Alan B. Krueger & Andreas Mueller, Job Search and Unemployment Insurance: New Evidence from Time Use Data 24 (Inst. for the Study of Labor (IZA), Discussion Paper No. 3667, 2008), http://anon-ftp.iza.org/dp3667.pdf (finding in the most basic model that “increasing [job] search by one hour increases the probability of finding a job by 0.31 percentage points,” which the authors consider “small”).
73 See, e.g., John McCall, Economics of Information and Job Search, 84 Q.J. Econ. 113 (1970).
75 See McCall, note 73, at 115-17; Postel-Vinay & Robin, note 74, at 2300-01.
workers who lose their jobs for plausibly exogenous reasons, such as firm closures, experience substantially worse labor market outcomes.\textsuperscript{76} This literature emphasizes that there is a random component to labor market outcomes. The model rests on the assumption that finding and keeping a job is partly a random process.

Additional support for inefficient job rationing during recessions comes from the problematic results when one assumes that there is no inefficient job rationing. Famously, Nobel laureate Robert Lucas built an economic model that found that recessions should have only small consequences for social welfare.\textsuperscript{77} That is, aggregate happiness should not be affected much by recessions. This conclusion may not fit with intuitions that recessions are very important and cause great hardship and definitely does not fit with the political attention afforded recessions. A key part of the reason for his conclusion is that all members of the economy are identical in Lucas' model, removing the possibility that some individuals who particularly would like to work are not able to.\textsuperscript{78} Thus, implicitly assuming efficient rationing helps lead to results that seem wrong.

Finally, one potential critique of the existence of inefficient rationing is that workers and employers should take advantage of the Coase theorem to arrive a mutually-beneficial bargain. For example, among similar workers, those with high surplus could pay workers with low surplus to resign, "leaving a space" for the high-surplus worker in the face of layoffs. Or an unemployed high-surplus individual could pay an unemployed low-surplus individual not to apply for a rationed job. Bewley observed no such bargains,\textsuperscript{79} and we can find no evidence that others do either. Social norms or coordination failures might prevent side deals that otherwise might take place. Alternatively, it could be that one worker could pay another to quit, but that the quitter may save another person's job, not that of he who paid. That is, coordinating side payments may be difficult.

Altogether then, while not suggesting that rationing is literally uniform, the evidence suggests a lot of reason to expect inefficient rationing.


\textsuperscript{78} Lucas also implicitly assumes that every individual has perfect insurance against fluctuations in income. See id. at 67-68; see also Alan S. Blinder, Keynes, Lucas, and Scientific Progress, 77 Am. Econ. Rev. (Papers & Proc.) 130, 131-32 (1987). Combining heterogeneous surplus from work and inefficient rationing together provides a reason that imperfect insurance would yield particularly large welfare losses: Some of those losing jobs (and therefore consumption) during recessions are those most in need.

\textsuperscript{79} See Bewley, note 5, at 218-62.
VII. OTHER CONSIDERATIONS

The model developed in this Article is, of course, limited by its assumptions. Even looking outside the model, however, other considerations are generally supportive of the Article’s conclusions. One important consideration outside of this model is the policy’s effect on aggregate demand. In particular, one might be concerned that subsidizing employers instead of employees would put money in the hands of those who are less likely to spend it (that is, they have a lower “marginal propensity to consume”), resulting in less spending and therefore less aggregate demand, harming economic recovery. Fortunately, the best evidence suggests that the growth effects of the policies recommended here are also policies with large effects on aggregate demand. In particular, among the thirteen options considered by the Congressional Budget Office for increasing economic growth in the aftermath of the Great Recession, the two with the largest impact on GDP per dollar of spending were increasing aid to the unemployed (expected to increase GDP by $1.15 per dollar of spending), a form of subsidizing nonemployment, and reducing employers’ payroll taxes (expected to increase GDP by $0.75 per dollar of spending), a hiring subsidy for employers. Reducing employees’ payroll taxes, thereby subsidizing employment on the employee side, was expected to have a smaller impact, at $0.50 per dollar of spending. Thus, the concern that increasing employment and making sure that the right employees are employed would harm economic growth appears to be unfounded based on the best available evidence.

The so-called “social costs of queueing” is a second factor not considered in the preceding analysis; it bolsters the first policy recommendation of subsidizing nonemployment. Suppose that when jobs are over-subscribed, anyone who wishes to gain employment must participate in a lottery and pay some fixed cost like waiting in line, inter-

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80 For a useful summary of recent theory on Keynesian economic policies, see Jordi Gali, Modern Perspectives on Fiscal Stabilization Policies, 51 CESifo Econ. Stud. 587 (2005) (summarizing the New Keynesian perspective on increasing aggregate demand in recessions).


82 Elmendorf, note 11, at 28 tbl.1.

83 Id. Perhaps part of the reason that the CBO makes these findings is the significant amount of stress businesses were under, perhaps increasing the likelihood that they would spend the money rather than save it.

84 For a discussion of the economic effects of queueing, see Yoram Barzel, A Theory of Rationing by Waiting, 17 J.L. & Econ. 73 (1974).
viewing, or mailing applications. On the one hand, these costs can decrease deadweight loss by ensuring that extremely marginal individuals do not bother applying. On the other hand, the more people spending time applying for a fixed number of jobs, the more social waste results from the queueing process. A program to subsidize nonemployment through unemployment or welfare payments could reduce these costs by reducing the extent to which jobs are over-subscribed; as such, the above analysis may actually understate the value of nonemployment subsidies.

A third relevant factor not considered in the model is the distortion to behavior that results from the government's need to raise funds to pay for government programs. Of course, this factor does not alter the recommendation of subsidizing firms instead of workers, since both take revenue. However, it does affect the value of subsidizing nonemployment. In particular, if we added considerations of the costs of taxation, the cost of subsidizing employers and nonemployment would be understated.

A fourth factor is distribution between richer and poorer people—for example, if one believes that a dollar in the hands of a poor person is better than a dollar in the hands of a rich person, ceteris paribus. This goal may partially undermine the recommendation of cutting employer-side, rather than employee-side taxes, since employers may be richer than employees, and the gains may disproportionately stick with the employers. On the other hand, this goal reinforces the recommendation of subsidizing nonemployment, since the nonemployed tend to be poor. One interpretation of the Article is, holding distributional concerns fixed, the recommendations suggest shifting toward subsidies for nonemployment and hiring subsidies instead of employee tax cuts.

Of course, the model ignores other potentially important considerations, including hiring and firing costs, heterogeneity across sectors of the economy, the possibility of targeting based on observables, and potential long-term impacts on labor force participation and economic efficiency. The model assumes a fixed wage; to the extent that work-

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85 Note that this cost would be the same under efficient and inefficient sorting.
86 For a discussion of targeted hiring credits, see David Neumark, Spurring Job Creation in Response to Severe Recessions: Reconsidering Hiring Credits, 32 J. Pol'y Analysis & Mgmt. 142, 150-58 (2013).
87 As to dynamics, one might be concerned that a subsidy for nonemployment that discourages marginal workers from taking jobs could exacerbate the problem of hysteresis, in which a period of high unemployment during a recession leads to higher unemployment after the recession. For a brief introduction to hysteresis, see Lawrence Ball & N. Gregory Mankiw, The NAIRU in Theory and Practice, J. Econ. Persp., Autumn 2002, at 115, 119-20. There is mixed evidence as to whether hysteresis really exists, but in any case subsidizing nonemployment is unlikely to substantially exacerbate hysteresis because it would
ers' wages respond to the reservation wage, fall in a recession, or change with subsidies, the results will be less relevant. Indeed, we think it unlikely that wages are literally sticky in a way that makes a tax cut on employers entirely incident on them or that employment is literally rationed uniformly. However, so long as wages are somewhat sticky, the side of the labor market that receives tax cuts matters, and, as long as a substantial number of workers who really want jobs are unable to get them and workers remain attentive to incentives, drawing marginal workers out of the labor force will create space for those who really need jobs.

VIII. ASSESSMENT OF POLICIES DURING THE GREAT RECESSION

A. Congress Subsidized Nonemployment

The first policy recommendation implied by the analysis is that subsidies on the nonemployed should go up during recessions. Congress followed this recommendation. Most importantly, Congress repeatedly extended increases in the generosity of unemployment insurance. At an estimated cost of $39 billion, the approximately $800 billion American Recovery and Reinvestment Act (also known as the Obama stimulus or the “Recovery Act”) increased weekly unemployment payouts by $25, suspended income taxation on the first $2,400 of benefits in 2009, and extended the duration of unemployment insur-

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not substantially decrease the number of people employed, since the premise of the program is that there is a (relatively) fixed number of jobs available. Another concern is that subsidizing firms to hire might reduce the positive "cleansing" function of recessions, in which low-productivity employees are laid off, ultimately benefitting the economy. Again the evidence on whether this phenomenon exists is unclear, but this is also unlikely to be a substantial issue because—even if there is some beneficial cleansing—the only workers saved from being laid off by virtue of a hiring subsidy are the marginal workers. And unless one believes that the full costs of job loss are worth bearing, then reducing job loss from marginal workers should be unproblematic. More importantly, by far the larger change during the Great Recession was in reductions in hiring, not increases in layoffs, and only the latter could lead to beneficial cleansing. See Job Opening, note 65. And, in any case, the best evidence suggests that the Great Recession caused less cleansing than earlier recessions, suggesting that the issue may be moot. See Lucia Foster, Cheryl Grim & John Haltiwanger, Reallocation in the Great Recession: Cleansing or Not?, 34 J. Lab. Econ. S293, S297 (2016).

ance by 13 weeks. Benefits similar to these were extended through shortly before the end of 2013. Evidence suggests that these unemployment extensions did, indeed, keep people out of the labor force.

The Recovery Act included many other provisions effectively subsidizing nonemployment as well. First, the Recovery Act increased the subsidies for health insurance through former employers for the unemployed (known as “COBRA”), at an estimated cost of $25 billion. The Supplemental Nutrition Assistance Program and other expenditures to pay for food for very low-income or unemployed individuals were also expanded, at a cost of over $20 billion, thereby further easing nonemployment. Likewise, the Recovery Act included funding for states to maintain their cash “welfare” Temporary Assistance for Needy Families payments, estimated at a cost of $18.5 billion. Finally, the Recovery Act provided an estimated $88 billion in funding for state governments, conditioned on their maintaining the standards in Medicaid, the program that provides health care to low-income individuals, many of whom were not employed.


91 See Rothstein et al., note 46, at 190.


93 Recovery Act, note 89, § 3001, 123 Stat. at 455-56. For a description, see Brass et al., note 89, at 29, 32-33.

94 Recovery Act, note 89, § 101, 123 Stat. at 120-21. For a description, see Brass et al., note 89, at 14.


Policy during the recession was inconsistent with the second policy recommendation, to subsidize employers instead of employees. Evidence suggests that employer-side subsidies in difficult economies do substantially increase employment. Nevertheless, although President Obama at least twice proposed substantial credits to employers for hiring new workers, Congress only enacted two tiny and one small credits. The tiny credits were in the Recovery Act and provided an estimated $231 million in tax credits for hiring unemployed veterans and unskilled younger workers, as well as a program providing funds for state welfare agencies to subsidize jobs for welfare recipients that cost $1.32 billion. The small credit came in the Hiring Incentives to Restore Employment (HIRE) Act, enacted in March 2008.

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99 The first was a campaign promise that “[d]uring 2009 and 2010, existing businesses will receive a $3,000 refundable tax credit for each additional full-time employee hired.” Press Release, Obama for America, Barack Obama and Joe Biden: A Rescue Plan for the Middle Class (Oct. 13, 2008), 2008 TNT 200-36, Oct. 15, 2008, LEXIS, Tax Analysts File. Second, in January 2010, President Obama proposed the Small Business Jobs and Wages Tax Cut, which would provide business with “a $5,000 tax credit for every net new employee that they employ in 2010,” capped at $500,000 per firm and with half the tax credit allowed for start-ups. Press Release, White House Office of the Press Sec’y, President Obama to Propose New Small Business Jobs and Wages Tax Cut (Jan. 28, 2010), https://obamawhitehouse.archives.gov/the-press-office/president-obama-propose-new-small-business-jobs-and-wages-tax-cut. It also would have reimbursed “[s]mall businesses that increased wages or hours for their existing employees . . . for the Social Security payroll taxes they paid on real increases in their payrolls.” Id. Firms would have been “able to claim the credit on a quarterly basis, . . . [to get] money out to businesses quickly and provide[ ] and [sic] early incentive to hire and increase payrolls.” Id.


101 Recovery Act, note 89, § 1221, 123 Stat. at 337-38. For a description of the provision, see Internal Revenue Serv., IRS Offers Tax Credit Guidance to Businesses Hiring Unemployed Veterans and Certain Youth (May 28, 2009), http://www.irs.gov/uac/IRS-Offers-Tax-Credit-Guidance-to-Businesses-Hiring-Unemployed-Veterans-and-Certain-Youth. The funding came through the Temporary Assistance for Needy Families Emergency Fund. Recovery Act, note 89, § 2101, 123 Stat. at 446-49; Elizabeth Lower-Basch, Rethinking Work Opportunity: From Tax Credits to Subsidized Job Placements, Big Ideas for Job Creation 1, 3 (2011), http://aecf.org/m/resourcedoc/aecf-BigIdeasforJobCreationRethinkingWorkOpportunity-2011.pdf. There have also been various extensions of the Work Opportunity Tax Credit, which provides subsidized employment for targeted groups, but there was not an expansion during or after the Great Recession. See id. at 1, 5.
2010, which provided an estimated $13 billion in subsidies to employers who hired certain previously unemployed workers.\textsuperscript{103} Overall then hiring subsidies constituted a very small share of the approximately $1 trillion spent during and after the Recovery Act.\textsuperscript{104}

Instead, Congress passed policies contrary to the recommendations in this Article. In particular, Congress passed employee-side payroll tax reductions. The Recovery Act included the Making Work Pay Tax Credit, a refundable tax credit of up to $400 for individuals and $800 for married couples in 2009 and 2010.\textsuperscript{105} The credit was available up to 6.2\% of earned income and phased out for high-income tax payers.\textsuperscript{106} The credit was estimated to cost $116.2 billion, about ten times the estimated cost of the HIRE Act.\textsuperscript{107} Furthermore, similar tax reductions were extended into 2011,\textsuperscript{108} at an estimated cost of $112 billion\textsuperscript{109} and into 2012 at a similar cost.\textsuperscript{110} Thus, the $13 billion in

\textsuperscript{103} Hiring Incentives to Restore Employment Act, Pub. L. No. 111-147, 124 Stat. 71 (2010). The Act provided two benefits to employers: "The first, referred to as the payroll tax exemption, provides employers with an exemption from the employer's 6.2\% share of social security tax on wages paid to qualifying employees, effective for wages paid from March 19, 2010 through December 31, 2010. In addition, for each qualified employee retained for at least 52 consecutive weeks, businesses will also be eligible for a general business tax credit, referred to as the new hire retention credit, of 6.2\% of wages paid to the qualified employee over the 52 week period, up to a maximum credit of $1,000.") Internal Revenue Serv., HIRE Act: Questions and Answers for Employers, http://www.in.gov/sboa/files/Hoff_HIRE_Act.pdf; see also Press Release, U.S. Senate Comm. on Fin., Baucus Hails Final Passage of Job-Creation Legislation (Mar. 17, 2010), https://www.finance.senate.gov/imo/media/doc/prb031710.pdf.

\textsuperscript{104} See Cong. Budget office, note 81, at 1 (estimating that the Recovery Act will increase budget deficits by $840 billion between 2009 and 2019).

\textsuperscript{105} Recovery Act, note 89, § 1001, 123 Stat. at 309-12; Brass et al., note 89, at 36.

\textsuperscript{106} In particular, it "phase[d] out for taxpayers with modified adjusted gross income in excess of $75,000, or in the case of married couples filing jointly, $150,000." Brass et al., note 89, at 36.

\textsuperscript{107} Id.


employer-side subsidies for employment enacted by Congress are dwarfed by the over $330 billion in employee-side subsidies. This Article's reasoning suggests that this spending drew marginal workers into a fixed number of jobs and made it harder for those who really needed to work to find employment, and that the funds may have been better targeted elsewhere.

IX. CONCLUSION

Recessions cause a tremendous amount of suffering. Many people are out of work, and some of them really need jobs. The government typically steps in to help alleviate this suffering, sometimes with massive expenditures. Yet, at least in the recent downturn, the response was widely-believed to have fallen short, despite this great expense. This Article identifies part of why the response might have fallen short in the arena of labor income tax policy and how to improve tax policy next time around.

The Article makes two, perhaps counterintuitive, recommendations for how to do so, though of course the ideal size of such programs would depend on various empirical parameters the measurement of which is beyond the scope of this Article. The goal of this Article is to shift policy in the direction of these recommendations. First, subsidize nonemployment. This draws marginal workers out of the labor force, creating "space" for those who really need jobs. Second, subsidize employers, not employees. The recommendations accord with empirical evidence on the effectiveness of jobs programs and with common intuitions about the problems with the economy; the main problem during the recession downturn was not that pay is too low for those who have jobs, but rather that employers created too few jobs. The policies are also among those that cause the most macroeconomic stimulus.

The Article has two broader implications for policy design during recessions. First, with high unemployment, standard economic assumptions are likely wrong, and statutory incidence can be very important for policy effectiveness. Second, though the recommendations here are to do more or less of policies that are already under consideration as macro stimulus and already have reasons for adoption on those grounds, the political optics of hiring subsidies and subsidizing nonemployment may be poor. To try to address those optics, proponents could point to perhaps the key implication of the Article: Policymakers should care about more than employment and GDP; who gets a job can be as or more important than total employment. Much work remains to be done in determining how to do that—both
basic economics on the efficiency of rationing, as well as policy analysis on the best response to it.
I. Model Setup

This Section describes the key features of the labor market, solves for the competitive equilibrium without distortions, and calculates the social surplus from employment. There is a unit mass of potential workers and a unit mass of firms. Potential workers choose to work or not work. Workers have costs from employment that are distributed uniformly from \(b_s\) to some large cost, \(m_s + b_s\)\(^{111}\). Symmetrically, firms have benefit from employment that are distributed uniformly from \(b_D - m_D\) to some large benefit \(b_D\). Throughout, we assume that the market-clearing wage will be such that some workers and some firms are unmatched; that is, there is always a reserve of potential workers and potential employers.

The assumptions that employee costs and employer benefits are uniformly distributed give rise to linear aggregate supply and demand curves. Labor demand is therefore given by

\[
P^D = b_D - m_D Q.
\]

Similarly, labor supply is also linear and is given by

\[
P^S = b_s + m_s Q.
\]

We make several innocuous parametric assumptions:

- \(b_D, b_s > 0\) (The most eager individuals (firms) would be willing to accept (pay) a positive amount for employment.)
- \(b_D > b_s\) (The intercept of the demand curve is greater than the intercept of the supply curve.)
- \(m_D, m_s > 0\) (The demand (supply) curve slopes downward (upward).)

In a free market equilibrium, demand equals supply. This implies that

\[
\begin{align*}
    b_D - m_D Q &= b_s + m_s Q \\
    b_D - b_s &= Q \cdot (m_D + m_s)
\end{align*}
\]

or that

\[
Q^* = \frac{b_D - b_s}{m_D + m_s}.
\]

\(^{111}\) For variables related to workers (labor suppliers), we use the abbreviation \(S\). For variables related to employers (labor demanders), we use the abbreviation \(D\). As becomes clear below, the variables \(b_s\) and \(b_D\) refer to the intercepts of the labor supply and demand curves, while the variables \(m_s\) and \(m_D\) refer to the slope of the labor supply and demand curves.
Plugging in the equilibrium price to the supply curve yields:
\[ P^* = b_S + m_S Q^* = \frac{b_D m_S + m_D b_S}{m_D + m_S}. \]

The social surplus is the area between the supply and demand curves. In general, this would be
\[ \text{Social Surplus} = \int_0^{Q^*} [P^D(Q) - P^S(Q)] dQ. \]

Here, the form is especially easy because it is a triangle. The social surplus in the free market economy is
\[ \text{Social Surplus} = \frac{1}{2} Q^* (b_D - b_S) = \frac{1}{2} \frac{b_D - b_S}{m_D + m_S} (b_D - b_S) = \frac{(b_D - b_S)^2}{2(m_D + m_S)}. \]

The above results applied to a free market flexible price equilibrium. For the remainder of the Appendix, we assume that wages are sticky, so that actual wages \( P^A = P^* + \theta \), for \( 0 \leq \theta \).

II. Results

A. Result 1: Welfare Consequences of Rationing

We first calculate the welfare consequences of efficient rationing and then uniform rationing, before comparing the DWL in the two scenarios.

Efficient Rationing

The DWL from efficient rationing is second-order in \( \theta \) and is given by \( \frac{m_D + m_S}{2m_D^2} \theta^2 \).

To determine how much labor is demanded at \( P^A \), we use the labor demand equation. We denote this quantity \( Q^D \).
We then solve for the price that would cause the labor supplied to be equal to $Q^D$:

$$P^L = b_s + m_s Q^D$$
$$= \frac{b_D m_D m_s - m_D m_s \theta + m_D^2 b_s - m_s^2 \theta}{m_D m_s + m_D^2}.$$ 

The DWL associated with the sticky wages is given by the standard Harberger triangle bounded by the demand curve, the supply curve, and the quantity demanded at $P^* + \theta$. The DWL is therefore equal to

$$\frac{1}{2} \left[ (P^* + \theta - P^L) \right] \cdot \frac{[Q^* - Q^D]}{\text{Base of triangle: difference in price}} \cdot \frac{[Q^* - Q^D]}{\text{Height of triangle: difference in quantity}}$$

$$= \frac{1}{2} \left[ \frac{b_D m_s + m_D b_s}{m_D + m_s} + \theta - \frac{b_D m_D m_s - m_D m_s \theta + m_D^2 b_s - m_s^2 \theta}{m_D m_s + m_D^2} \right] \cdot \frac{[b_D - b_s - b_D m_D - m_D b_s - m_D \theta - m_s \theta]}{[m_D + m_s - m_D m_s + m_D^2]}$$
$$= \frac{m_D + m_s}{2m_D^2} \cdot \theta^2.$$  

**Uniform Rationing**

The DWL from uniform rationing is first-order in $\theta$ and is given by

$$\frac{b_D - b_s}{2m_D} \cdot \theta.$$ 

To determine the DWL, we calculate the surplus of the employers and the workers under this system and subtract from the free market case. Employer surplus is given by the triangle under the demand curve and above the sticky wage, $P^* + \theta$. The triangle has a height of $b_D - (P^* + \theta)$ and a base of $Q_D$.

Employer Surplus

$$= \frac{1}{2} \left( b_D - (P^* + \theta) \right) Q^D$$
$$= \frac{(m_D b_s - b_D m_D + m_D \theta + m_s \theta)^2}{2(m_D + m_s)^2 m_D}.$$
Second, we find welfare for the employees. The employee surplus is more complicated to compute. If every worker who wanted a job were hired, the surplus would be given by the triangle given by the points \((Q, P)\) space \((0, b_s), (0, P^* + \theta), \) and \((Q^s, P^* + \theta)\). To solve for \(Q^s\), the measure of workers that would want to work at the binding minimum wage, we use the supply curve.

\[
p^A = b_s + m_s Q
\]

\[
Q^s = \frac{P^* + \theta - b_s}{m_s}
\]

\[
= \frac{b_D m_s - b_s m_s + m_D \theta + m_s \theta}{m_D m_s + m_s^2}
\]

The area of this triangle defined by \((0, b_s), (0, P^* + \theta), \) and \((Q^s, P^* + \theta)\) is

\[
\frac{1}{2} \left( \frac{P^* + \theta - b_s}{m_s} \right) Q^s
\]

\[
= \frac{(b_D m_s - b_s m_s + m_D \theta + m_s \theta)^2}{2(m_D + m_s)^2 m_s}
\]

However, since the measure of firms that would like to hire a worker at the price \(P^* + \theta\) is \(Q^D\) and the measure of workers willing to work is \(Q^s\), with the uniform rationing, each worker would like to work is employed with probability \(Q^D/Q^s\). Hence the employee surplus is given by

\[
\frac{Q^D (b_D m_s - b_s m_s + m_D \theta + m_s \theta)^2}{Q^s 2(m_D + m_s)^2 m_s}
\]

\[
= \frac{(b_s m_s - b_D m_s - m_D \theta - m_s \theta)(b_D m_s - b_D m_s - m_D \theta + m_s \theta)}{2(m_D + m_s)^2 m_D}
\]

To calculate the DWL, we first find the total social surplus, which is the sum of the employee and employer surplus. It is therefore

\[
\frac{(m_D b_s - b_D m_D + m_D \theta + m_s \theta)^2}{2(m_D + m_s)^2 m_D}
\]

Employer surplus

\[
\frac{(b_s m_s - b_D m_s - m_D \theta + m_s \theta)(b_s m_s - b_D m_s - m_D \theta + m_s \theta)}{2(m_D + m_s)^2 m_D}
\]

Employee surplus

\[
= \frac{(m_D b_s - b_D m_D + m_D \theta + m_s \theta)(b_s - b_D)}{2(m_D + m_s) m_D}
\]
DWL is therefore the difference between the total surplus in the free market case and here.

\[
DWL(\theta) = \frac{(b_D - b_S)^2}{2(m_D + m_S)} - \frac{(m_D b_S - b_D m_D + m_D \theta + m_S \theta)(b_S - b_D)}{2(m_D + m_S)m_D}.
\]

Comparison of Uniform and Efficient Rationing

The DWL from uniform rationing is strictly higher than the DWL from efficient rationing, all \( \theta \in (0, \theta_{\text{max}}) \), where \( \theta_{\text{max}} \) is defined below.

First, we restrict to cases in which the sticky wage is not so high that the market evaporates or so low that there is in fact no sticky wage. This is equivalent to stipulating that \( \theta \in \left(0, \frac{(b_D - b_S)m_D}{(m_D + m_S)}\right) \). Let \( \theta_{\text{max}} = \frac{(b_D - b_S)m_D}{(m_D + m_S)} \).

We wish to calculate:

\[
\Delta DWL(\theta) = [\text{DWL, uniform sorting}] - [\text{DWL, efficient sorting}]
\]

\[
= \frac{(b_D - b_S)\theta}{2m_D} - \frac{(m_D + m_S)\theta^2}{2m_D^2}
\]

\[
= -\frac{(m_D b_S - b_D m_D + m_D \theta + m_S \theta)\theta}{2m_D^2}.
\]

First note that \( \Delta DWL(0) = \Delta DWL(\theta_{\text{max}}) = 0 \). We next find:

\[
\Delta DWL'(\theta) = \frac{\partial}{\partial \theta} \left(-\frac{(m_D b_S - b_D m_D + m_D \theta + m_S \theta)\theta}{2m_D^2}\right)
\]

\[
= -\frac{m_D b_S - b_D m_D + 2m_D \theta + 2m_S \theta}{2m_D^2}.
\]

Note as well that

\[
\Delta DWL''(\theta) = \frac{\partial}{\partial \theta} \left(-\frac{m_D b_S - b_D m_D + 2m_D \theta + 2m_S \theta}{m_D^2}\right)
\]

\[
= -\frac{m_D + m_S}{m_D^2} < 0.
\]
Recall that \( m_D, m_s > 0 \) by assumption (the demand and supply curves must slope the correct way). Hence we know that \( \Delta DWL''(\theta) < 0; \Delta DWL(\theta) \) is strictly concave. Since \( \Delta DWL(0) = \Delta DWL(\theta_{\text{max}}) = 0 \), and since the function is strictly concave, we know that \( \Delta DWL(\theta) > 0 \) for all \( \theta \in (0, \theta_{\text{max}}) \). 

**B. Result 2: Subsidy for Nonemployment**

Consider a subsidy for nonemployment. Suppose that the government gives a subsidy of \( W \) to an individual if and only if he does not work. Suppose that \( W \) is not so large so as to make the quantity of workers willing to supply labor less than \( Q^D \). That is, the subsidy does not influence the measure of employed workers.

To find the total surplus, we need to add together the employer surplus and employee surplus, as above. Note that the utility of workers is unaffected by the fact that nonemployment is subsidized, so the lump-sum transfer to the nonemployed does not factor directly into the welfare calculations. Since employer surplus is unchanged, we only need to calculate employee surplus.

To do this, note that the surplus is the measure of workers who are employed times their average surplus. The measure of employees is \( Q^D \), and the average surplus is the average surplus of workers willing to work up to \( Q^S_{2} \), the measure of workers willing to work given supply curve \( Supply_2 \) which results after the nonemployment subsidy (see Figure 4 for a graphical representation). Given the uniform sorting, this surplus is the average of \( P^* + \theta - b_s \) (the largest surplus) and \( P^* + \theta - P^S_2 \), where \( P^S_2 \) is the price at which \( Q^S_2 \) workers would be willing to work under \( Supply_1 \) (the supply curve without the nonemployment subsidy). To find \( Q^S_2 \), we solve for \( Q \) under \( Supply_2 \):

\[
P = b_s + W + m_s Q
\]

\[
Q^S_2 = \frac{P^* + \theta - b_s - W}{m_s} = \frac{(\theta - W)(m_s + m_D) + m_s(b_D - b_s)}{m_s \cdot (m_s + m_D)}.
\]

To find \( P^S_2 \), we plug \( Q^S_2 \) into \( Supply_1 \):

\[
P^S_2 = b_s + m_s Q^S_2
\]

\[
= b_s + m_s \frac{(\theta - W)(m_s + m_D) + m_s(b_D - b_s)}{m_s \cdot (m_s + m_D)}.
\]

Thus the employee surplus with \( W \) is
For comparison, we find the employee surplus without $W$ using the same method. Note that this is just the quantity supplied times the average reservation wage, which is in turn, the average between 1) the surplus of the highest-reservation-wage individual and 2) the surpluses of the lowest surplus individual who is employed (0):

$$\frac{1}{2} (P^* + \theta - b_s) Q^D.$$  

Thus, the difference is

$$\frac{1}{2} \left( P^* + \theta - b_s + P^* + \theta - \left( b_s + m_s \frac{(-W)(m_s + m_D) + m_s(b_D - b_s)}{m_s(m_s + m_D)} \right) \right) Q^D - \frac{1}{2} (P^* + \theta - b_s) Q^D$$

Employee surplus, with $W$

$$= \frac{1}{2} \left( P^* + \theta - \left( b_s + m_s \frac{(-W)(m_s + m_D) + m_s(b_D - b_s)}{m_s(m_s + m_D)} \right) \right) Q^D$$

$$= \frac{1}{2} \left( P^* + \theta - p_2^S \right) Q^D > 0$$

since $p_2^S < P^* + \theta$. Note that this welfare gain is first-order in $W$. ■

**C. Result 3: Subsidizing Employers for Hiring**

Now, consider the case of subsidizing employers for hiring workers by $W$ per worker. In this case, welfare for both employers and employees changes. The amount of the transfer $W$ across the workers must also be subtracted off the change in welfare.

First, employer surplus is the area formed by the triangle with corners $(0, P^* + \theta), (0, b_D + W)$, and $(Q_2^D, P^* + \theta)$ where $Q_2^D$ is the quantity of workers demanded with the demand curve $Demand_2$ that results with the subsidy $W$ (as shown in Figure 5). This employer surplus equals

$$\frac{1}{2} (b_D + W - P^* - \theta) Q_2^D.$$  

To find $Q_2^D$, substitute $P^* + \theta$ into $Demand_2$:  

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Next, we find the employee surplus, which equals the measure of employees times the average surplus (which is the same as the case without $W$):

$$\frac{1}{2}(P^* + \theta - b\bar{s})Q_2^D.$$ 

The transfer then equals the measure employed times the size of the transfer, $W$. Thus, total welfare with $W$ is

$$\frac{1}{2}(b_D + W - P^* - \theta)Q_2^D + \frac{1}{2}(P^* + \theta - b\bar{s})Q_1^D - WQ_2^D.$$ 

To find the change in welfare with the employer subsidy, subtract welfare in the no-subsidy case, yielding

$$\frac{1}{2}(b_D + W - P^* - \theta)Q_2^D - \frac{1}{2}(b_D - P^* - \theta)Q_1^D$$

$$+ \frac{1}{2}(P^* + \theta - b\bar{s})(Q_2^D - Q_1^D) - WQ_2^D$$

$$= \frac{1}{2}(P^* + \theta - b\bar{s} - W)\frac{W}{m_D} > 0. \blacksquare$$

Note that a marginal increase in the subsidy can lead to a marginal increase in DWL when $W$ is large:

$$\partial \left( \frac{1}{2}(P^* + \theta - b\bar{s} - W)\left(\frac{W}{m_D}\right) \right)$$

$$\partial W$$

$$= \frac{1}{2m_D}(P^* + \theta - b\bar{s} - 2W)$$

$$> 0 \text{ if and only if } W < \frac{P^* + \theta - b\bar{s}}{2}.$$ 

which means that the subsidy is not greater than half the surplus of the highest-surplus worker $(P^* + \theta - b\bar{s})$. 

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D. Result 4: Subsidy for Employees

Consider the case in which there is a subsidy for employees. In this case, the total surplus is the sum of employer surplus, employee surplus, and the transfer from workers to the government. However, given the money metric utility, total welfare is the same if the government and if the workers have it. Thus, since a subsidy for employees is the exact opposite of a subsidy for nonemployment, the change in total surplus is just the opposite of that for a nonemployment subsidy.