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February 2010

Employment Policies
INSTITUTE

WHAT'S BEST AT REDUCING POVERTY?

An Examination of the Effectiveness of the 2007 Minimum Wage Increase

The Employment Policies Institute (EPI) is a nonprofit research organization dedicated to studying public policy issues surrounding employment growth. In particular, EPI research focuses on issues that affect entry-level employment. Among other issues, EPI research has quantified the impact of new labor costs on job creation, explored the connection between entry-level employment and welfare reform, and analyzed the demographic distribution of mandated benefits. EPI sponsors nonpartisan research that is conducted by independent economists at major universities around the country.

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Table of Contents

Executive Summary 3

Introduction 5

Section II: The Matched and Merged CPS and Earner Study Data 13

Section III: Ripple Effects, Wage Spillovers, and Simulation Procedures 17

Section IV: The Effects of the FMWA Compared to Alternative Labor Market Policies 22

Section V: Indirect Costs of the FMWA 38

Section VI: Simulations of a $9.50 Minimum Wage and an Overview of Research Findings . . 40

Conclusions and Policy Implications 45

References 51

Appendix A: Procedures Used in Extracting March CPS and ORG Data 53

Appendix B: Results for Simulations with Zero Disemployment Effects Using the Best Estimate of Wage Spillovers 57

Appendix C: Comprehensive Income and the Sen Index of Poverty 63

Appendix D: Results Simulations Based Upon Best Estimates of Disemployment Effects and No Trickle-up Wage Spillover 65

WHAT'S BEST AT REDUCING POVERTY?

An Examination of the Effectiveness of the 2007 Minimum Wage Increase

Executive Summary

On July 24th, 2009, the federal minimum was raised to $7.25 an hour. This was the last of three 70-cent increases which began in July 2007, and were mandated by the Fair Minimum Wage Act (FMWA) of 2007. In an op-ed published that same day, Secretary of Labor Hilda Solis praised the increase for helping "put between 3 million and 5 million Americans a step closer to making ends meet every month."

Proponents of the FMWA argue that an increase in the minimum wage is particularly important during an economic recession. They claim it raises the wages of poor and low-income workers and thus leads to increased consumer spending. Some have made the case that the FMWA does not go far enough; most notably, as a candidate for president in 2008, Barack Obama promised to raise the minimum wage to $9.50 by 2011 as part of his plan to combat poverty.

The confidence behind these claims begs the question: has the FMWA been proven an effective and efficient policy prescription to lift low-income families out of poverty?

In this study, the authors examine this question by focusing on the FMWA side-by-side with other anti-poverty solutions. Using two sets of recent earnings data, Drs. John P. Formby, John A. Bishop, and Hoseong Kim evaluate the poverty-reducing effects of the three 70-cent increases in the minimum wage. They find that these increases are not well-targeted at poor and low-income populations. Further, they determine that two policy alternatives to the FMWA—an expansion of the Earned Income Tax Credit (EITC) and an increased rebate of the Federal Insurance Contributions Act (FICA) tax—

would each be a more effective and less costly means to assist needy families.

Advocates of a higher minimum wage frequently portray the policy as a direct benefit to America's poor and low-income families. This study casts doubt on that piece of conventional wisdom, as the authors find that "many low-income families do not contain a low-wage worker." As a result, more than 85 percent of low-income families saw no direct monetary benefit from each of the three 70-cent wage increases.

Better-targeted alternatives to the FMWA include an expansion of the EITC and an increase in the FICA tax rebate. Both of these policies can be directed at specific income brackets; the authors find that—compared to the FMWA—both the EITC and FICA rebate put more dollars in the pockets of those poor families who need it most.

The authors show that 1.95 million people living below 150 percent of the federal poverty level would be lifted out of poverty due to an EITC expansion while 1.65 million people would escape poverty as a result of a FICA rebate. In other words, 2.5 times more Americans would escape poverty with an EITC expansion than with the FMWA.

A minimum wage increase is a costly policy—for both employers and employees. For employers, the wages of entry-level employees of course increase. Those hikes in turn produce "spillover" wage increases for those earning slightly more than the minimum wage. The authors point to indirect "disemployment" costs repeatedly mentioned in the vast body of wage literature, as higher wages make it more difficult for inexperienced earners and young applicants to find employment.

The authors conclude the study by considering President Obama's 2008 campaign promise to raise the minimum wage to $9.50 by the year 2011. They find this $2.25 increase in the minimum wage to be deficient in the same way as the FMWA; it is not well-targeted to poor and low-income families, and not as cost-effective as policy alternatives like an EITC expansion.

In the public debate on the minimum wage, the burden of proof often rests with those in opposition. After all, speaking out *against* increases in the wages of American workers is not likely to win a legislator popular support. However, the work of Drs. Formby, Bishop, and Kim suggests that those who advocate for such increases bear a burden of their own—a lack of proof that their favored policy is a well-targeted or cost-effective method to help poor and low-income families. Instead of offering lip service to impoverished constituents, legislators should support those policies which have a proven record of lifting people out of poverty.

—Employment Policies Institute

Introduction

It is now generally recognized that most of the benefits of rising minimum wages go to the non-poor. As a consequence, labor market policies that increase the minimum wage are not likely to be cost-effective in reducing poverty and improving the well-being of low-income families. This research investigates and reports exact measures of the cost-effectiveness and poverty-reducing effects of raising the federal minimum wage by applying simulation methods to the Fair Minimum Wage Act of 2007 (hereafter FMWA). The analysis of the FMWA is extended to consider a hypothetical $9.50 federal minimum wage as proposed by President Barack Obama during the 2008 presidential campaign.[1] To judge the cost-effectiveness, we also consider two alternative labor market policies that could be adopted in lieu of increasing the federal minimum wage. Specifically, the research compares the poverty-reducing effects and cost-effectiveness of the (FMWA's) three-stage increase in the federal minimum wage and the possible extension to $9.50 per hour with two alternative policies: (1) an increase in the earned income tax credit (EITC) or (2) a rebate of a portion of the Federal Insurance Contributions Act (P.L. 74-271) payroll taxes paid by workers in low-income families (also known as FICA taxes).

Compared to previous studies of the minimum wage, the current research has three distinguishing characteristics. First, it makes use of a unique data set created by matching and merging household, family, and person records in the Annual Demographic File of the Current Population Survey (March CPS) with individual records in the annual CPS Outgoing Rotation Group (ORG) files, also referred to as the Earner Study files. The matched and merged data provide comprehensive measures of family income as well as the best available data on the individual worker's wages, hours, and earnings. Second, the data are adjusted to reflect changes in state minimum wage laws across time, and the FMWA-mandated wage increases are applied to individual workers in the subset of states where the federal minimum wage is binding. The resulting increases in earnings are tracked to family incomes to determine marginal gains and then aggregated. Thus, workers in states in which the federal minimum wage is nonbinding are unaffected in the simulations, but poverty and income redistribution effects are evaluated using the entire national sample. Third, in addition to alternative disemployment simulations we consider two scenarios of wage spillovers, or ripple effects, of rising minimum wages.

The principal focus of the research is on the cost-effectiveness of the FMWA in reducing aggregate poverty, but we also consider the policy-effectiveness of the FMWA by comparing it to alternative labor market policies that have the same total costs but result in different reductions in aggregate poverty. Furthermore, we report estimates of the effects of the FMWA on the entire distribution of income with emphasis upon the economic well-being of low-income families. In addition, we assume that after the FMWA is fully phased in, the Fair Labor Standards Act is amended to require a $9.50 minimum wage, which we analyze as if it were an extension of the FMWA.

The FMWA mandates three successive 70-cent annual increases in the federal minimum wage effective July 24, 2007. Stage 1 of the FMWA raised the federal minimum from $5.15 to $5.85, a 13.6 percent rise. Stage 2 boosted the federal minimum another 12 percent to $6.55. Effective July 24, 2009, Stage 3 of the FMWA lifts the federal minimum by 10.7 percent to $7.25. Thus, over the three-year phase-in period, the federal minimum increases by 40.8 percent. The FMWA increases are relatively large

[1] http://www.barackobama.com/issues/poverty/index_campaign.php, last accessed on November 3, 2009.

in percentage terms when compared to the numerous increases occurring in the last quarter of the 20th century. For example, the most recent increases prior to the FMWA were a decade earlier and phased in 11.7 percent and 8.4 percent increases over two years for a total rise of 21.1 percent. The $5.15 minimum wage remained unchanged for ten consecutive years, which led many states to adopt or substantially modify their existing minimum wage laws. As a consequence, the federal minimum wage became progressively less important until July 2007.

The matched and merged March CPS and ORG data provide observations of family incomes and individual wage rates for calendar year 2006. In analyzing the poverty reducing effects and cost-effectiveness of the FMWA, we assume that state minimum wage laws prevailing on July 24, 2007 remain unchanged as the 40.8 percent rise in the federal minimum wage is phased in. However, in 2006 and early 2007 there were a host of new and modified state minimum wages that must be taken into account to reliably assess the effects of the FMWA. Therefore, we first adjust the observed wage rates in the matched and merged March CPS and ORG data for 2006 to reflect changes occurring in the various states immediately prior to Stage 1 of the FMWA. We then simulate a three-stage phase-in by raising the federal minimum in sequential 70-cent increments and measure the resulting poverty-reducing and redistributive effects in each stage. We also measure the associated costs of increasing the minimum wage in each Stage of the FMWA and make comparisons to the costs of an alternative scenario that increases the federal EITC *and achieves the same poverty reducing objective*. The *cost-effectiveness of the FMWA* is assessed by comparing the ratios of the costs of attaining equivalent reductions in poverty using alternative labor market policies. Next, we evaluate the policy-effectiveness of the FMWA by comparing its poverty-reducing effects to alternative labor market policies that have the *same total policy costs*. The policy-effectiveness of the FMWA is assessed by comparing the ratios of the poverty-reducing effects of alternative labor market policies with *equivalent aggregate policy costs*. In this latter analysis aggregate costs are held constant at the level given by the costs of the FMWA. Finally, we also simulate the effects of President Obama's campaign proposal that calls for an additional increase in the federal minimum wage to $9.50. As with the FMWA, the hypothetical rise in federal minimum wage to $9.50 is evaluated using cost- and policy-effectiveness measures derived from comparisons to alternative labor market policies.

The research report is organized as follows. The remainder of this section provides an overview of the research, briefly reviews state minimum wage changes in 2006 and 2007 and discusses when and where the FMWA-mandated increases are binding and nonbinding. Section II summarizes the procedures used in constructing the matched and merged March CPS and ORG data set, outlines the advantages of using the data, and briefly describes some of its characteristics. Section III provides information on spillover effects of minimum wage changes on the distribution of wages surrounding the old and new minimum wages. This section also provides details concerning how we incorporate the minimum wage ripple effects into our simulations of the impact of the FMWA on the wage distribution of low-paid workers. Section IV presents empirical results for what we regard as the mostly likely scenario of effects of Stage 1, Stage 2, and Stage 3 of the FMWA. Section V discusses indirect costs of the FMWA's mandatory increases in the minimum wage and provides estimates of the losses caused by allocative inefficiency. Section VI provides results for an alternative simulation with smaller ripple effects and extends the analysis to consider a hypothetical increase in the federal minimum wage to $9.50. The final section summarizes major conclusions, discusses why minimum wage increases have such small effects on poverty, and outlines the policy implications of the research.

A Brief Overview of the Research

To examine the poverty-reducing effects and cost-effectiveness of the FMWA and alternative labor market policies, we build upon the earlier work of Formby, Bishop, and Kim (2005), hereafter FBK, and simulate the effects of rising federal minimum wages. However, unlike the earlier work, the research reported here makes use of a vastly superior data set and simulates the three-stage rise in the minimum wage and a hypothetical extension of the federal minimum to $9.50 per hour. Further, the earlier work (FBK, 2005) does not analyze or evaluate the cost-effectiveness of minimum wage increases compared to alternative labor market policies, which is a major focus of the research reported below. [2]

The current research uses two distinct wage spillover simulation scenarios and applies both to each of the three stages of the FMWA-mandated rise in the federal minimum wage. We extend one of the ripple effects wage simulation scenarios to consider a further rise in the federal minimum wage to $9.50. In addition, we consider two alternative simulations of the disemployment effects accompanying the rise in minimum wages and the adoption of alternative labor market policies. To facilitate a better understanding of the scope of the research, the following tabulations identify the different simulated estimates we make of the effects of the FMWA, a hypothetical $9.50 minimum wage and alternative EITC and FICA labor market policies. The first set of simulations relies upon what we regard as the best estimates of the wage spillovers accompanying the FMWA.

The second set of simulations assumes smaller wage spillovers that affect only workers earning less than the old (before the FMWA) minimum wage. The $9.50 hypothetical minimum wage extends beyond the 20th per-

Simulations with Wage Spillovers Occurring Both Above and Below the New Federal Minimum Wage		
	Best Estimates of Disemployment Effects	**Zero Disemployment Effects**
Stage 1 of FMWA	Simulation No. 1	Simulation No. 4
Stage 2 of FMWA	Simulation No. 2	Simulation No. 5
Stage 3 of FMWA	Simulation No. 3	Simulation No. 6

Simulations with Wage Spillovers Occurring Below, but not Above, the New Federal Minimum Wage		
	Best Estimates of Disemployment Effects	**Zero Disemployment Effects**
Stage 1 of FMWA	Simulation No. 7	Simulation No. 11
Stage 2 of FMWA	Simulation No. 8	Simulation No. 12
Stage 3 of FMWA	Simulation No. 9	Simulation No. 13
$9.50 Minimum Wage	Simulation No. 10	Simulation No. 14

[2] Our earlier research (FBK, 2005) simulates a one-shot hypothetical $1.00 (19.4%) increase in the federal minimum wage in 2001. The work focuses on the comparative redistributive and poverty-reducing effects of alternative *equal cost* labor market policies. It uses the entire March CPS sample, but not the ORG data. Used alone, the March CPS provides excellent data for analyzing poverty and income distributions, but is widely acknowledged to contain a lot of noise in calculated hourly wage rates.

centile of the wage distribution. In our judgment, the estimation of upward wage spillovers in this range of the wage distribution is problematic. Therefore, we analyze the $9.50 hypothetical minimum wage by appending it to the set of FMWA simulations with smaller wage spillovers that affect only subminimum wage workers. We focus primary attention on Simulations 1, 2, 3, and 10 and report detailed results for Simulations 4-9.[3]

The methodologies employed in estimating the effects of the FMWA and alternative labor market policies are briefly outlined in the remainder of this section. Additional details relating to exact procedures are provided in ensuing sections of this report. First, we adjust the observed wage rates in the matched and merged March CPS and ORG data for 2006 to reflect changes in wage rates mandated by state minimum wage laws enacted or amended in the period immediately preceding Stage 1 of the FMWA. Second, we consider two wage spillover scenarios for simulating the minimum wage changes, which leads to the two tabulations above. Third, we also simulate two different disemployment effects of minimum wage changes and alternative labor market policies. This aspect of the research closely follows FBK (2005), who simulate a wide range of empirically estimated disemployment effects and provide a set of *best elasticity estimates*. FBK (2005) conclude that there are only small differences in the extreme effects considered. Therefore, the current research reports simulation results for only two cases: zero employment elasticities and the best estimate of the relevant disemployment elasticities.[4]

Next, for each FMWA-mandated increase in the minimum wage and the hypothetical rise to $9.50 we calculate the costs of the policy and estimate its poverty-reducing benefits. Given the reductions in poverty resulting from higher minimum wages, we next simulate equiproportionate increases in the EITC and equiproportionate rebates of FICA taxes to workers in low-income families that *achieve the same poverty-reducing benefits*. Finally, we estimate the associated cost of the change in the EITC and FICA policies required to bring about the same poverty-reducing policy objective. By design, both alternative policies have the same beneficial effects on poverty as the rise in the minimum wage. The difference in the costs of each policy reveals the relative cost-effectiveness of one policy vis-à-vis the other. All simulations are based upon the direct costs including spillovers associated with raising the minimum wage. There are no indirect costs when the disemployment effects are zero. However, when disemployment effects accompany the rise in the minimum wage, even small ones, then there are necessarily some indirect costs due to allocative inefficiency. We briefly discuss these costs and our estimates of them, but we do not incorporate the small indirect costs into our simulations.

State Minimum Wages and the Binding and Nonbinding Effects of the FMWA

U.S. states had minimum wage laws long before the first federal minimum wage was mandated by the Fair Labor Standards Act of 1938. Historically, some state minimum wages have exceeded the federal minimum resulting in a *binding state minimum* and a *nonbinding federal minimum*. As a consequence, the federal minimum wage

[3]Results for Simulations 11-14 are very similar to Simulations 7-10 and are not reported.

[4]FBK's (2005, p. 110) best estimates for the disemployment effects of a rising minimum wage involve eight groups of low-wage workers, six with negative employment elasticities and two with small positive elasticities. The negative elasticities are -0.2 for white male teenagers, -0.3 for white female teens and -0.65 for nonwhite/nonHispanic teens. For young adults aged 20-24, the elasticities for white males, white females, and nonwhite/nonHispanics are -0.1, -0.1, and -0.3, respectively. The two subgroups having small positive elasticities ($\varepsilon = 0.05$) are nonHispanic high school dropouts and all Hispanic workers. The EITC and FICA alternative policies have an adverse effect on hours worked of wives whose spouse's EITC benefits rise or whose spouse's payroll taxes are rebated. The best estimate of the elasticity of hours worked with respect to spouse's increase in EITC benefits is -0.4.

is typically binding only in a subset of states. In the period immediately preceding Stage 1 of the FMWA there was a crescendo of new state minimum wage laws and amendments to existing laws that resulted in the federal minimum being non-binding in most states.[5] However, in Stage 2 and 3 of the FMWA the federal minimum becomes binding in additional states. Thus, the FMWA has a differential impact across time due to state minimum wage laws and changes in the binding and nonbinding effects of the federal minimum wage. Table 1.1 shows the effective state minimum wages immediately prior to the beginning of Stage 1 of the FMWA and scheduled changes in them in each stage of the federal phase-in. In Stage 1 the FMWA's $5.85 minimum was binding (federal minimum > state minimum) in only 20 states, which together contained slightly more than 30 percent of the U.S. population.[6]

To correctly estimate the effects of the FMWA necessitates a separation of its binding and nonbinding effects in each stage of the phase-in. To make this separation we use the state codes in the CPS to create subsamples of workers in the states in which the federal minimum wage is binding. As noted above, the FMWA was initially binding in only 20 states. It is binding in all three stages of the FMWA in 19 of these states. It is in these states that the rise in the FMWA has its greatest impact. Figure 1 shows the lower tail of the wage distribution in the 19 states where the FMWA is binding in all stages of the phase-in. Figure 2 shows comparable estimates for the U.S. as a whole. To begin our simulations we identify the low-wage workers in this subset of states and award each minimum wage worker a legally appropriate hourly wage increase. As discussed below, other low-wage workers located near the minimum (slightly above or below) in the distribution receive *spillover* or *ripple effect* wage increases. The wage increases are then traced to family income and poverty and other distributional impacts are measured. It deserves emphasis that in analyzing poverty and distributional issues we use the full sample for the 50 states and the District of Columbia. But the minimum wage is rising and wage spillovers are occurring in only the 20 states impacted in Stage 1 of the FMWA.

Table 1.1 shows that in Stage 2 the $6.55 FMWA minimum is binding in 25 states, which together contain just over 40 percent of the U.S. population. Compared to Stage 1, six additional states are affected by the $6.55 federal minimum. One state, New Mexico, that is affected in Stage 1 is no longer impacted in Stage 2 due to a scheduled increase in its minimum wage required by state legislation adopted in early 2007. Table 1.1 also shows that wages in the newly impacted states do not rise by the statutory 70-cent federal increment. Due to prevailing state laws, the minimum wage increases in these marginally affected states are as follows: Arkansas = $0.30, Maryland= $0.40, Minnesota = $0.40, Montana = $0.27, North Carolina = $0.40, and Wisconsin = $0.05. Thus, the percent increases in the minimum wage in these six states range from less than one percent to slightly more than six percent. Of course, 19 of the 20 states that are affected in Stage 1 receive an additional 70-cent increase. Using the Stage 2 subsample of states affected by the federal minimum and the national sample that includes all states, we proceed as in Stage 1 and measure the effects on poverty.

In the final stage of the FMWA the federal minimum is binding in 35 states containing approximately 70 percent of the U.S. population.[7] Compared to Stage 2, minimum wage workers in 25 states receive 70-cent (10.7 percent)

[5]In 2006 and the first half of 2007, twenty-seven states adopted new minimum wage laws or amended existing statutes that raised the minimum wage.

[6]Five states (AL, MS, LA, SC, and TN) do not have minimum wage laws, so the federal minimum is necessarily binding.

[7]In two states, HI and IA, the $7.25 federal minimum in the final stage is exactly equal to the state minimum that prevailed before the new federal minimum takes effect so there is no marginal impact in these states.

TABLE 1.1: Minimum Wages and Binding Federal Increases By State, 2007-2009 *Takes Into Account State Laws as of July 24, 2007 and Assumes No Future Changes*				
States	Effective Minimum Wage January 1, 2007	Changes Required By Fair Minimum Wage Act of 2007		
		Stage 1 July 24, 2007	Stage 2 July 24, 2008	Stage 3 July 24, 2009
Alabama	$5.15	$0.70	$0.70	$0.70
Alaska[1]	$7.15	State is Binding	State is Binding	State is Binding
Arizona*	$6.75	State is Binding	State is Binding	$0.19
Arkansas	$6.25	State is Binding	$0.30	$0.70
California	$7.50	State is Binding	State is Binding	State is Binding
Colorado*	$6.85	State is Binding	State is Binding	$0.11
Connecticut[1]	$7.65	State is Binding	State is Binding	State is Binding
Delaware	$6.65	State is Binding	State is Binding	$0.10
Florida*	$6.67	State is Binding	State is Binding	$0.29
Georgia	$5.15	$0.70	$0.70	$0.70
Hawaii	$7.25	State is Binding	State is Binding	None
Idaho	$5.15	$0.70	$0.70	$0.70
Illinois	$7.50	State is Binding	State is Binding	State is Binding
Indiana	$5.15	$0.70	$0.70	$0.70
Iowa	$6.20	State is Binding	State is Binding	State is Binding
Kansas	$5.15	$0.70	$0.70	$0.70
Kentucky	$5.15	$0.70	$0.70	$0.70
Louisiana	$5.15	$0.70	$0.70	$0.70
Maine	$6.75	State is Binding	State is Binding	$0.25
Maryland	$6.15	State is Binding	$0.40	$0.70
Massachusetts[1]	$7.50	State is Binding	State is Binding	State is Binding
Michigan	$7.15	State is Binding	State is Binding	State is Binding
Minnesota	$6.15	State is Binding	$0.40	$0.70
Mississippi	$5.15	$0.70	$0.70	$0.70
Missouri*	$6.50	State is Binding	State is Binding	$0.48
Montana*	$6.15	State is Binding	$0.27	$0.70
Nebraska	$5.15	$0.70	$0.70	$0.70
Nevada*[1]	$6.33	State is Binding	State is Binding	State is Binding
New Hampshire[2]	$5.15	State is Binding	State is Binding	State is Binding
New Jersey	$7.15	State is Binding	State is Binding	$0.10
New Mexico[2]	$5.15	$0.70	State is Binding	State is Binding
New York	$7.15	State is Binding	State is Binding	$0.10
North Carolina	$6.15	State is Binding	$0.40	$0.70
North Dakota	$5.15	$0.70	$0.70	$0.70
Ohio*	$6.85	State is Binding	State is Binding	$0.09
Oklahoma	$5.15	$0.70	$0.70	$0.70

Oregon*	$7.80	State is Binding	State is Binding	State is Binding
Pennsylvania	$7.15	State is Binding	State is Binding	$0.10
Rhode Island	$7.40	State is Binding	State is Binding	State is Binding
South Carolina	$5.15	$0.70	$0.70	$0.70
South Dakota	$5.15	$0.70	$0.70	$0.70
Tennessee	$5.15	$0.70	$0.70	$0.70
Texas	$5.15	$0.70	$0.70	$0.70
Utah	$5.15	$0.70	$0.70	$0.70
Vermont	$7.53	State is Binding	State is Binding	State is Binding
Virginia	$5.15	$0.70	$0.70	$0.70
Washington*	$7.93	State is Binding	State is Binding	State is Binding
West Virginia[3]	$5.85	$0.70	$0.70	$0.70
Wisconsin	$6.50	State is Binding	$0.05	$0.70
Wyoming	$5.15	$0.70	$0.70	$0.70
District of Columbia[1]	$7.00	State is Binding	State is Binding	State is Binding

*Indicates states with annual January or July COLA adjustments to their minimum wages. Congressional Budget Office estimates of future changes in the CPI are used to adjust state minimum wages and estimate any binding increase required to comply with the federal minimum wage law.

Notes:

1. AK, CN, DC, MA, and NV have provisions in their laws and ordinances that adjust state minimum wages so that they are always greater than the federal minimum. AK and DC minimum wages exceed the federal by $1. MA and CN laws provide, respectively, for the state minimums to be 10 percent greater and ½ of 1 percent greater than the federal minimum. NV's minimum wage rises by the amount of any federal increase during a calendar year. If there is no federal increase, NV's minimum wage rises based on changes in the CPI with an upper limit of three percent.

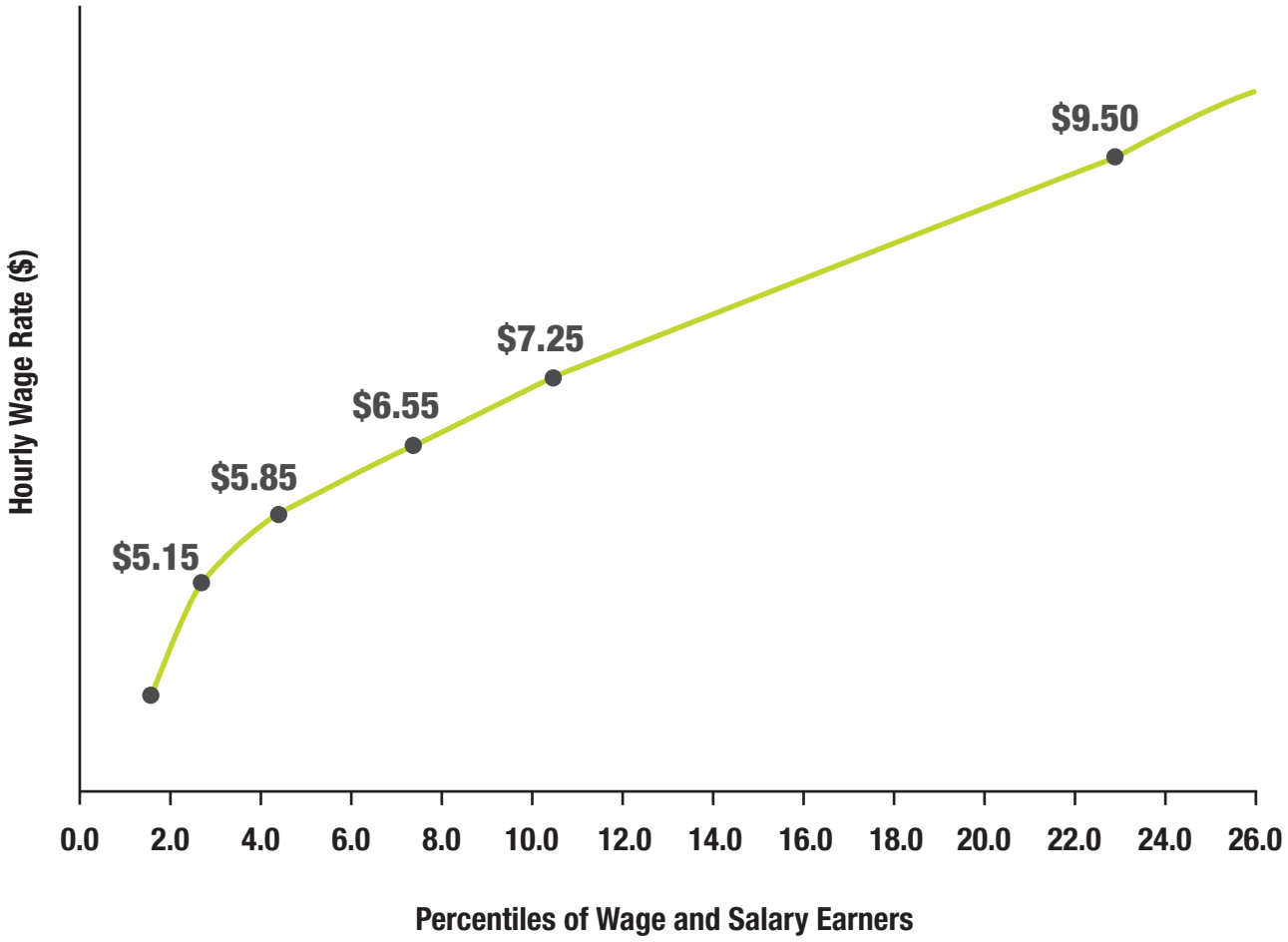
2. NH and NM exhibit a mixture of binding state and federal minimums during Stage 1 and 2 of the federal phase-in. The NH minimum increased to $6.50 effective September 1, 2007. As a consequence, the stage 1 federal minimum was binding in NH for 38 days. The federal minimum again become briefly binding in Stage 2 (a 5-cent increment for 38 days), but the state minimum became binding when the NH minimum wage rose to $7.50 on September 1, 2008. NM's minimum increased to $6.50 on January 1, 2008 and rose to $7.50 on January 1, 2009. Thus, in Stage 1 of the phase-in the $5.85 federal minimum was binding in NM for 160 days in the latter half of 2007. NM's state minimum then was binding from January 1, 2008 until July 24, 2008 at which point the federal Stage 2 minimum of $6.55 became binding and required a mandatory 5-cent increment. We simulate these partially binding effects during part of a year by using the "number of binding days" as a fraction of all days to estimate a share of the full federal increment that represents the "Binding Federal Increment." The following tabulation illustrates the procedure.

	NH		NM	
	Stage 1	**Stage 2**	**Stage 1**	**Stage 2**
Binding Days Fraction	38/365	38/365	160/365	160/365
Full Federal Increment	$0.70	$0.05	$0.70	$0.05
Binding Federal Increment	$0.07	$0.005	$0.31	$0.02

Note that the Binding Federal Increment = Binding Days Fraction x Full Federal Increment.

3. West Virginia's minimum wage rose to $6.55 on July 1, 2007 and rose again to $7.25 on July 1, 2008. As a consequence, it appears that the WV minimum is binding in all three stages of the phase-in. However, WV law does not apply to employees of private firms in which 80 percent or more of the workers are covered by the federal minimum or other provisions of the Fair Labor Standards Act (FLSA). Due to the broad coverage of FLSA almost all private employees are exempt from WV's higher state minimum. We are unable to identify workers that are subject to the WV and federal minimum wages, but we know that the federal minimum is binding on far more WV workers than is the higher state minimum. Therefore, we assume the federal minimum is binding in all three stages.

Figure 1: The Wage Distribution Among Low-wage Workers for the 19 States Where the Federal Minimum is Always Binding, 2006*



*Estimated using the matched and merged March CPS and Annual Earner Study Files

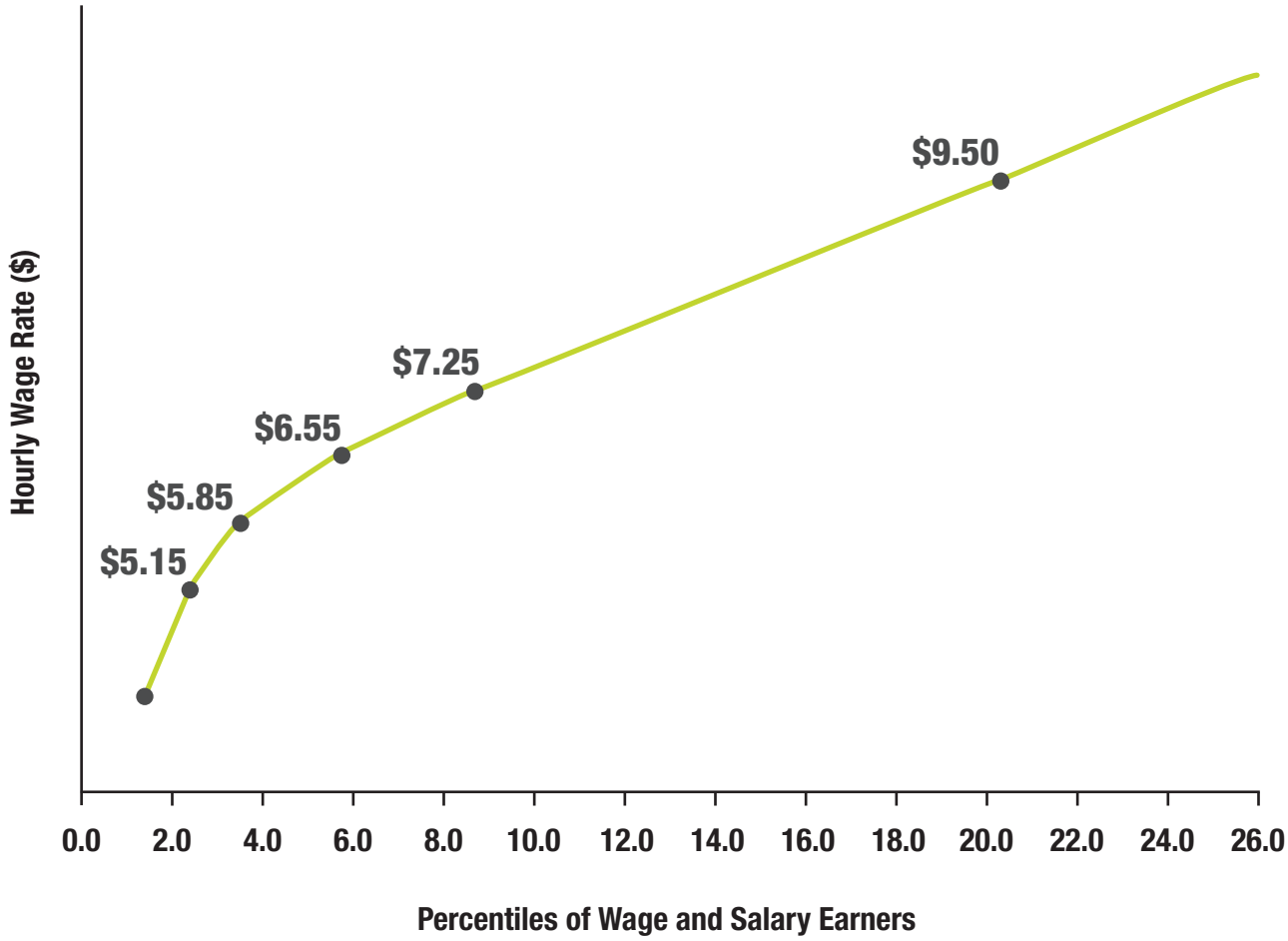
hourly increases and workers in 10 additional states with almost 30 percent of the total population receive increases ranging from $0.10 to $0.48 per hour. However, in six of the 10 states minimum wage workers receive increases of $0.11 an hour or less. Again, using the Stage 3 subsample of 35 states impacted by the federal minimum we trace the minimum wage gains to family incomes and use the national sample that includes all states to measure the effects on poverty and the distribution of family income.

In simulating the hypothetical $9.50 federal minimum wage we assume it is adopted after the FMWA is fully implemented. We also assume that the hypothetical $9.50 minimum is binding in all states.[8]

A final point concerning state minimum wage laws and the simulations of the effects the FMWA reported below is in order. As noted above, we assume the state laws prevailing on July 24, 2007 do not change as the FMWA is phased in.

[8]Several state minimum wage laws (AK, CN, DC, MA, and NV) contain provisions that mandate increases that keep the state minimum larger than any federal minimum. Since we are interested in evaluating the poverty reducing effects and cost-effectiveness of the hypothetical federal minimum of $9.50, we ignore these induced changes in state minimum wages in analyzing the effects of a $9.50 federal minimum wage.

Figure 2: The Wage Distribution Among Low-wage Workers for the U.S. as a Whole, 2006*



*Estimated using the matched and merged March CPS and Annual Earner Study Files

However, a number of these state laws contain provisions that change the state minimum wage after July 24, 2007, either independently or as a result of a federal phase-in of the FMWA (see the notes to Table 1 and fn. 6). We simulate these state-mandated changes in the minimum wage and add them to our matched and merged data set *between Stages 1 and 2 and again between Stages 2 and 3 of the FMWA phase-in*. However, we do not report these simulations of state minimum wage increases occurring during the FMWA phase-in. Thus, the simulations for each stage of the FMWA reported below reflect *only* the effects of the marginal rise in the federal minimum wage, which builds upon and is in addition to earlier mandated state and federal increases.

The Matched and Merged March CPS and Earner Study Data

To our knowledge we are the first researchers to merge the Annual Demographic File (March CPS) with the Annual Outgoing Rotation Group (ORG) files, which are also referred to as the Earner Study files. We use the March 2007 CPS, which provides observations of family incomes in calendar year 2006, and match and merge it with the 2006 Earner Study (ORG) files of the Current Population Survey. The resulting matched and merged file provides a large and nationally representative data set that contains the best available information for evaluat-

ing the effects of a rising minimum wage on poverty and the distribution of income. In studying the impacts of the FMWA, the matched and merged data set has all the advantages of both the March CPS and the Earner Study files. Furthermore, the merged file avoids the problems encountered if either the March CPS or Earner Study files alone are used to evaluate the effects on poverty as the minimum wage increases. We briefly discuss the advantages and the shortcomings of the March CPS and follow this by outlining the benefits and major disadvantages of using the Earner Study files.[9] We then discuss how matching and merging the March CPS and Earner Study files eliminates major shortcomings inherent in the use of one of these data sources independently of the other. We first provide some general background information on the Current Population Survey (CPS), which facilitates understanding of the advantages of matching and merging the March CPS and Earner Study files.

The March CPS and Earner Study files are both derived from the monthly Current Population Survey (CPS), which is conducted by the U.S. Census Bureau for the Bureau of Labor Statistics. Each month approximately 72,000 households containing about 200,000 individuals are interviewed. The CPS sample design is stratified by states and nationally representative. The CPS sample uses a rotating 4-8-4 panel design. Once selected for the survey, households are interviewed for four consecutive months, then rotate out of the CPS for eight months, reenter and are interviewed for four additional months at which time they permanently rotate out. Households in the fourth and eighth month of their interviews are referred to as "outgoing rotation groups" (ORG). In any given month, the CPS sample consists of eight sub-samples corresponding to the eight rotation groups, two of which are outgoing. Each of the eight subsamples consists of approximately 9,000 households and the outgoing rotation group subsample is 18,000.

A common core of questions is asked each respondent every month. Supplemental questions are asked in most months and of all outgoing rotation groups. The March CPS supplemental questions provide detailed information on income, earnings, and hours worked in the previous calendar year as well as a wealth of other demographic, geographical, and economic information. Households in the outgoing rotation groups (ORG) are asked a different set of supplemental questions dealing with work including wages, hours, and weekly earnings. Responses to the ORG supplemental questions are used to classify persons age 16 and over as either a "Wage and Salary Worker" or "Not a Wage and Salary Worker." The self-employed are in the latter category. Wage and Salary workers are included in the Earner Study and assigned an ***Earnwt*** value that can be used to create reliable and accurate measures of the number of U.S. workers and their wage rates, hours worked, and weekly earnings as well as annual earnings.

The March CPS has several advantages for studying the effects of minimum wage changes on poverty. It is the largest and most reliable U.S. income survey and has been used for more than five decades to make official U.S. government measures of poverty. In addition, the overall CPS sample is of sufficient size that researchers can create large subsamples involving combinations of states that are representative of the underlying population of interest. For example, state identifiers within the March CPS permit us to construct large subsamples of states in which the FMWA is binding in each of the three phase-in stages of the law. Another advantage is that in addition to the

[9]We emphasize that the shortcomings of the March CPS and Earner Study files that we discuss arise only in the context of studying the effects of rising minimum wages or other labor market policies on aggregate poverty or the distribution of income. Both the March CPS and Earner Study are more than adequate when used alone in many research applications. The problems arise when a policy affects wage rates and/or hours worked and the research seeks to evaluate the impact of the policy on poverty or the distribution of income.

Census Bureau's measures of family cash income (before tax and noncash transfers), which is the cornerstone of the official poverty statistics, the March CPS contains detailed microdata on noncash benefit values (food stamps, housing subsidies, energy subsidies, school lunch subsidies etc.), property taxes, other state taxes, federal taxes, with separate values for income taxes, FICA taxes, and EITC benefit amounts. Using this additional information allows the researcher to construct better measures of family resources and more reliably estimate aggregate poverty and the distribution of income. A final advantage of the March CPS is that it contains hierarchical information on household, families, and individual persons. The sampling unit is the household, but researchers can easily extract observations of family and person microdata. This makes it possible to trace the effects of a change in individual wage rates to family and household incomes and ultimately to aggregate effects on poverty and the distribution of income.

The major disadvantage of the March CPS is that much, but not all, of its information on worker wage rates and hours worked is noisy and not of the same quality as the Earner Study (ORG) data. Of course, some households in the March CPS are in the fourth and eighth months of their interviews and are therefore a part of the Earner Study. But most workers in the March CPS do not have ***Earnwt*** values with the result that using the entire CPS to simulate the FMWA will lead to imprecise and potentially misleading results.[10] One approach to avoiding this problem is adopted by Burkhauser and Sabia (2004), who restrict their analysis of proposed federal minimum wage increases and poverty to the subset of the March CPS that overlaps the Earner Study, i.e., to households that are in outgoing rotation groups. The advantage of the Burkhauser and Sabia methodology is that it is fairly easy to implement, but the difficulty is that it results in a relatively small sample. If the small sample is then partitioned and attention focused on states in which the FMWA is binding, the resulting subsamples border on being too small to be representative of the underlying populations of interest.

The advantage of the Earner Study (ORG) files is that it provides a large sample containing the most reliable measures of wage rates, hours worked, and earnings available. The file also contains the labor force and employment series information for more than 30,000 individuals each month. As noted above, the ***Earnwt*** values supplied for wage and salary workers in the ORG files allow the researcher to accurately measure the aggregate number of workers with specific hourly wage rates and earnings. At the end of a calendar year the Census Bureau prepares a summary file containing the combined outgoing rotation group interviews for the entire year. Thus, the overall sample size is more than 360,000 persons. These are the data that we match and merge with the March CPS. The difficulty with the Earner Study files alone is that they provide only personal level data with limited demographic information. As a consequence, it is not possible to use the ORG files alone to measure poverty, nor can a researcher trace the effects of a minimum wage change to family income.

By matching and merging the March CPS and ORG files we create a large sample with the appealing characteristics of both data sets and with none of the major disadvantages of either. The resulting data allow us to track the earnings of individual workers and gauge the impact of rising minimum wages and alternative labor market policies on comprehensive family incomes and poverty. To match and merge the March CPS and Earner Study files we use Unicon Corporation's CPS Utilities software Version 5.5. Specific files we merge are Unicon's March 2007 CPS, which is extracted from the Annual Social and Eco-

[10]While much of the wage and hour data in the March CPS are not as reliable as in the Earner Study files, Baum-Snow and Neal (2009) present evidence that it contains less misreporting than the decennial Census long forms and the American Community Survey.

nomic March Statistics, 1962-2007 and the 2006 Earner Study Outgoing Rotations, which is also extracted from the 1962-2007 file. The tabulation immediately below shows the sample sizes of the original March CPS file and the matched and merged March CPS and ORG files for calendar year 2006.

Sample Sizes		
	March CPS	Matched & Merged March CPS and ORG Files
Households	75,477	50,815
Families	83,543	55,943
Persons	206,639	127,368

As noted above, the original sample is "Households," but we include a count of "Families" and "Persons" because they are an integral part of our simulations and analysis of the FMWA. Note that the matched and merged data set contains approximately two-thirds of the "Households" and "Families" in the March CPS and 62 percent of the "Persons." The overall family sample size of the matched and merged data exceeds 55,000. To put this sample size in perspective we point out that it is larger than virtually all national income surveys of other countries and twice the size of most.

Three additional points concerning the matched and merged data warrant emphasis. First, in a manner consistent with our earlier work on poverty, income distributions, and minimum wages (FBK, 2002 and 2005), we use microdata to define and analyze families in a somewhat different manner than does the Census Bureau. The major difference is that our definition includes related subfamilies as a part of the primary family as long as they are within the same households. With the exceptions explained in Appendix A, unrelated subfamilies within a household are treated as separate families. Second, each of the wage and salary workers in the matched and merged data set has an ***Earnwt*** value, which means the wage rates, hours worked, and earnings data have the same quality characteristics as the Earner Study statistics collected in the outgoing rotation group interviews. Third, to match and merge the March CPS and Earner Study data, we began with the procedure suggested by Unicon Corporation's technical documentation, which suggests a relatively straightforward matching procedure. We quickly determined that Unicon's suggested procedure was not adequate in deriving reliable matches between ORG person data and the hierarchical data files in the March CPS. The matching process proved to be neither simple nor straightforward. After much experimentation, we supplemented the Unicon-suggested procedure by requiring matches between race, gender, age, and other variables in the two data sets. Appendix A provides additional information and details on the matching process.

We conclude the discussion of the matched and merged March CPS and Earner Study data by commenting on two tables that provide information on the number of workers in the data set and their demographic characteristics. Table 2.1 shows that when the ***Earnwts*** are applied to the matched and merged sample there are slightly fewer than 125 million workers. Table 2.1 shows the average annual hours worked and wage earnings for all workers and groups of very low-paid workers at or near the federal minimum wage in 2006. Tables 2.1 and 2.2 use the same low-paid wage rate groups appearing in two of our earlier studies (FBK, 2002 and 2005) that report 1999 and 2001 calendar year findings, respectively. However, the earlier work used only March CPS files, whereas Tables 2.1 and 2.2 are based upon the higher quality matched and merged 2006 data set. Table 2.1 shows that in 2006 slightly more than four (4.2) percent of all U.S. workers earned 125 percent of the federal minimum wage or less. This includes workers that are both affected and unaffected by the FMWA. Of this 4.2 percent, 1.2 percent are in the *minimum wage worker* category (90-110 percent of the federal minimum wage), 1.3 percent are *sub-min-*

imum wage workers, and 1.8 percent are *near-minimum wage workers*. Table 2.1 shows that in the matched and merged data the typical (mean) *minimum wage worker* is employed for 1,472 hours and earns $7,647 annually. It also shows that *minimum wage workers* are employed for fewer hours each year compared to other wage groups. Overall, *minimum wage workers* work 30 percent fewer annual hours than the average U.S. worker.

Ripple Effects, Wage Spillovers, and Simulation Procedures

It is reasonable to expect increases in the minimum wage to affect workers whose wage rates are below and somewhat above the legal minimum. A number of researchers have discussed this likely outcome and refer to as it as a "ripple effect" or a "wage spillover." In our recent work (FBK, 2005), we distinguish between two distinct types of wage spillovers, referring to them as "trickle-down" effects, which impact sub-minimum wage workers, and "trickle-up" effects on low-wage workers earning near, but above, the legal minimum wage. As explained below, we estimate and simulate the trickle-up and trickle-down ripple effects using distinct methods. Before discussing these, however, we briefly explain why such spillovers are expected to accompany increases in the minimum wage.

Gramlich (1976) was the first to suggest wage spillover and mentions two related theoretical reasons for expecting ripple effects as minimum wages rise. Gramlich (1976, p. 421) first notes that Walrasian supply and demand adjustments could push the wages of non-minimum wage workers higher. Later (1976, p. 427), he suggests that spillovers could occur "... through a more traditional demand-supply route following substitution by employers away from low-wage workers toward more skilled labor." To better understand the conventional demand-supply ar-

TABLE 2.1: Wage Rates, Hour Worked and Wage Earnings of U.S. Workers, Age 16 and Over in the Matched and Merged March CPS and ORG Data, 2006

	Workers with Hourly Wages Equal to or Less Than 125% of the Minimum Wage				All U.S. Workers (5)
	Wage Rates, Hour Worked and Wage Earnings of U.S. Workers, Age 16 and Over	Minimum Wage Workers $4.65 ≤ *w* ≤ $5.66 (2)	Near–Minimum Wage Workers $5.67 ≤ *w* ≤ $6.44 (3)	All Workers Paid Less Than $6.45 per hour (4)	
Number of Workers (1,000s)[1]	1,616	1,457	2,211	5,284	124,703
Average Annual Hours Worked	1,670	1,472	1,593	1,583	1,928
Average Annual Wage Earnings	$5,403	$7,647	$9,655	$7,801	$40,647
% of all Workers with w < $6.45	30.6	27.6	41.8	100.0	—
% of all Workers	1.30	1.17	1.77	4.24	100.0

[1]The number of workers is calculated using earnings weights.

TABLE 2.2: Demographic Characteristics of U.S. Workers, Age 16 and Over in the Matched and Merged March CPS and ORG Data, 2006					
Number of Workers (1,000s)[1]	Workers with Hourly Wages ≤ 125% of the Minimum Wage				All U.S. Workers (5)
	Sub Minimum Wage Workers $w <$ $4.64 (1)	Minimum Wage Workers $4.65 ≤ w ≤ $5.66 (2)	Near Minimum Wage Workers $5.67 ≤ w ≤ $6.44 (3)	All Workers Paid Less Than $6.45 per hour (4)	
All Workers	1,616	1,457	2,211	5,284	124,703
Male	558	578	850	1,986	64,778
Female	1,058	879	1,361	3,298	59,925
White	1,327	1,141	1,715	4,183	102,093
Nonwhite	289	316	496	1,101	22,610
Hispanic	217	232	436	885	17,204
Teenagers	403	392	528	1,323	5,590
Age 65 and Over	76	68	114	258	4,251
Age 20-64	1,137	997	1,569	3,703	114,862
Less than 12 Years of School	483	542	790	1,815	14,683
12 and more Years of School	1,133	915	1,421	3,470	110,020
Workers Age 20-64	1,137	997	1,569	3,702	114,862
Male	337	386	580	1,303	59,816
Female	800	611	989	2,399	55,046
White	938	760	1,183	2,881	93,597
Nonwhite	199	238	385	822	21,265
Hispanic	166	184	356	706	16,107
Less than 12 Years of School	206	233	340	779	10,862
12 and More Years of School	930	765	1,229	2,924	104,001

[1]The number of workers is calculated using earnings weights.

gument, consider the following simple model of low-wage labor markets. Suppose there are two classes of workers, which we refer to as minimum wage and near-minimum wage workers. Further, employers can and will substitute among workers from the different classes depending upon relative wage rates and worker productivity. Competitive labor markets determine wage rates that reflect compensating differentials in labor productivity. Mandated increases in the minimum wage rate disturb the equilibriums prevailing in low-wage labor markets, which leads unequivocally to substitutions of near-minimum wage workers for the now relatively more costly, but less productive, minimum wage workers. As a consequence, the demand for near-minimum wage workers rises and their wages increase,

which results in wage spillovers. In contrast, the demand for minimum wage workers decreases, and disemployment occurs among minimum wage workers. Thus, wage ripple effects impacting near minimum wage workers and disemployment of minimum wage workers are linked as substitution effects and a new set of compensating wage differentials are incorporated into low-wage labor market equilibriums.[11]

The theoretical scenario outlined above is both logical and consistent with FBK's (2005) best estimates of the employment and disemployment effects of rising minimum wages and the accompanying substitutions among workers that take place in low-wage labor markets as minimum wages rise.[12] Furthermore, papers by DeNardo et al. (1996) and Lee (1999) strongly suggest that minimum wage increases have important spillovers, but they do not investigate their magnitude. In addition, a comprehensive survey by Converse et al. (1981) following the 9.4 percent and 6.8 percent federal minimum wage increases of 1979 and 1980 revealed that 40 percent of all business establishments employing minimum wage workers reported paying higher wages to their workers earning above the minimum wage immediately following the change in the law. Thus, there is both a theoretical rationale and empirical evidence suggesting that spillover effects accompany rising minimum wages.

The difficulty in simulating a minimum wage ripple effect, of course, is in knowing its size, duration, and how far out into the wage distribution the spillover extends. In their simulation of federal minimum wage increases in the 1960s, Johnson and Browning (1981, 1983) acknowledge the possibility of an upward ripple, but consider only spillovers on sub-minimum wage workers in their analysis. In contrast, in their simulations FBK (2005) follow in the path of earlier research of Katz and Krueger (1992), Van Giessen (1994), and Card and Krueger (1995) and make reasonable assumptions about trickle-up wage spillovers. Neumark et al. (2004) address the size and duration of the spillovers finding that while initially large, they diminish with time and have little lasting impact. Recent work by Wicks-Lim (2005) suggests that the spillovers from the state and federal minimum wage increases which averaged 12 percent before the FMWA extended out to the 15th percentile of the wage distribution. This suggests that the 13.6 percent increase of Stage 1 the FMWA may extend out to about the 15th percentile. The 12 percent and 10.6 percent the FMWA increases in Stages 2 and 3 are likely to extend out slightly further into the wage distribution.

Since the exact wage spillovers cannot be known with certainty we analyze two general types of simulated ripple effects. One set of simulations follows Johnson and Browning (1981, 1983) and considers only trickle-down spillovers and zero trickle-up effects. In these simulations the minimum wage increase impacts sub-minimum and minimum wage workers, but has no effect on workers above, but near the minimum. Further, workers with wage rates between the old and new minimum wage receive increases that raise them only to the new minimum. For example, in Stage 1 of the FMWA, the minimum wage rises by $0.70, but a worker earning $5.50 receives only a $0.35 raise, which brings the earner to the new minimum of $5.85. Assuming no other changes, this worker's wage would rise to $6.55 in Stage 2 of the FMWA and $7.25 in Stage 3. In a second set of simulations, we estimate both trickle-down and trickle-up spillovers, with the Stage 1 FMWA ripple extending out to the 15th percentile of the wage distribution. In this simulation, a worker earn-

[11]Wicks-Lim (2005) advances a second argument suggesting spillovers. She maintains that labor market institutions combined with equity considerations lead to minimum wage ripple effects. However, the exact mechanism that ensures such equity-based wage spillovers is unclear.

[12]See fn. 3 above and Section V below for more information on Formby et al.'s (2005) estimates of employment, disemployment, and substitutions among low-wage workers.

ing $5.50 when Stage 1 of the FMWA is implemented receives a $0.64 increase to $6.14. In Stages 2 and 3 of the FMWA, the same worker's wage goes to $6.79 and $7.45. For reasons explained below, we use different procedures to estimate the trickle-up and trickle-down wage spillovers. We first discuss the trickle-up effects and follow this with a brief description of our estimation of trickle-down effects on sub-minimum wage workers.

In estimating the trickle-up effects, there are three important issues. First, how far out into the wage distribution does the ripple effect extend? Second, how are individual worker trickle-up spillovers calculated? Third, since the trickle-up effects phase out at some point in the wage distribution, how are the dampening effects modeled as the trickle-up effect diminishes to zero at some higher wage rate? As noted above, in Stage 1 of the FMWA, we allow the trickle-up effects above the $5.85 minimum wage to phase out at approximately the 15th percentile of the wage distribution. Estimating an individual worker's exact trickle-up wage increase and modeling the dampening effect as the ripple fades out are clearly related and we use the following state-specific trickle-up estimation procedure to address them. Table 1.1 shows clearly that many states have minimum wages that exceed the FMWA minimum across time. Further, in a number of states, changes in the state minimum are often triggered by changes in the federal minimum. This suggests the need to estimate different trickle-up effects for the various states. However, it is well known that the CPS does not have sufficient state sub sample sizes to allow reliable regression equation estimates of wage distributions in most states. To circumvent this difficulty we use separate regressions passing through each state's minimum wage estimated using the entire matched and merged March CPS and ORG sample.

To estimate individual state trickle-up effects, we employ the following procedure, which is summarized as a four-step process. In step 1, we fit a log-linear function to the bottom 15 percent of the wage distribution. To improve the fit of the regression, we allow the percentile cut-off around 15 percent to vary until we maximize R^2. Using the bottom 15.47 percent of the wage distribution (workers with hourly wages below $8.55), we obtain the following result:

1 $$E(\text{wage}) = 11.5152 + 1.6633 \log (F)$$[13]

Here, F is the truncated c.d.f. and $R^2 = 0.994$. It turns out that the log-linear specification provides a good fit for the lower tail of the wage distribution. In the second step, we use the intercept estimated from the overall log-linear equation and fit separate regressions that pass through the new minimum wage of particular states—again using the entire dataset, not a state sub-sample. We note that at some point (in our case the 14.23th percentile) the actual wage is greater than the regressed wage and we call this point z. To estimate changes in an individual's wage, we differentiate between workers with wages above and below point z. If the observed wage is less than or equal to z, the trickle-up wage increase is:

2 $$\Delta \textit{ wage} = \textit{simulated wage} - \textit{regressed wage}$$

However, when the observed wage is greater than z, the trickle-up increase is:

3 $$\Delta \textit{ wage} = \textit{simulated wage} - \textit{actual 2007 wage}$$

Therefore, our final value for the individual wage rate is: *Final wage* = *actual wage* + Δ *wage*. Using this procedure the trickle-up spillovers diminish monotonically and are zero at wages above $8.55 per hour.

[13]In the matched and merged March CPS and ORG data the observed *wage* is the *ernhr* value.

In step 3, we repeat the trickle-up estimation procedures described above using the $6.55 FMWA minimum wage. In calculating the ripple effects accompanying the $6.55 FMWA minimum, we employ the state minimum wages prevailing from July 2008 to July 2009. Further, in these estimations we allow the trickle-up effects to phase out (go to zero) at $8.85 per hour, which is at approximately the 17.5th percentile of the wage distribution. Finally, in step 4 we again repeat the estimation procedures using the $7.25 FMWA minimum wage. This step employs the state minimum wages scheduled to prevail in July 2009 and phases out the trickle-up spillovers at $9.25 per hour, which is at approximately the 20th percentile of the wage distribution.

Compared to estimating trickle-up wage increases, the procedure for estimating trickle-down ripple effects for sub-minimum wage workers is both different and more straightforward. We do not use the same procedure to estimate trickle-down effects as we employ in calculating trickle-up increases because the log-linear method, while appealing in estimating the upward ripple effect, would result in wage increases for sub-minimum workers that exceed the 70-cent federal minimum wage increment. In some cases this would result in previously sub-minimum wage workers leapfrogging minimum wage workers in the wage distribution. While some trickle-down effect is to be expected, it is unreasonable to estimate increases that exceed $0.70. Instead of the log-linear method, we model the trickle-down effect by applying a procedure originally employed by Johnson and Browning (1981, 1983). Each sub-minimum wage worker is awarded a trickle-down wage increase that maintains the ratio of the worker's observed hourly wage-to-legal minimum wage. For example, for a worker earning $4.50 per hour in 2006 who resides in a state where the FMWA is binding, the ratio of the observed hourly wage-to-legal minimum wage is $4.50/$5.15, which is 0.874. When the FMWA raises the minimum wage by $0.70, the worker receives a trickle-down increase of $0.61, which is 87.4 percent of the federal increment. Thus, workers with wages below the legal minimum receive trickle-down increases, but always remain in the sub-minimum wage category. Additional information on the number of workers in various wage classes is provided below.

Wage Rates and Simulated FMWA Induced Changes

Table 3.1 provides conditional mean wage rates before the FMWA is implemented and the associated FMWA-induced changes for selected classes of workers. The changes in wages include both trickle-up and trickle-down ripple effects. The following wage classes are used in reporting the impact of the FMWA on average hourly rates of pay earned by low-wage workers:

- Workers with wages below $5.15
- Workers with wages between $5.15 and $5.85
- Workers with wages between $5.86 and $6.55
- Workers with wages between $6.56 and $7.25
- Workers with wages between $7.26 and $9.50
- All workers with wages below $9.50

For purposes of comparison, the mean value for all workers in the matched and merged March CPS and ORG data set is also shown. It deserves emphasis that the number of workers in the various wage classes changes as the FMWA is implemented. This is the case for two reasons. First, as discussed above, the FMWA is initially binding in only 20 states. In Stages 2 and 3 of the FMWA, additional workers in 16 more states are impacted. The workers in these marginally impacted states are used in calculating the simulated means in columns 3-6 of Tables 3.1 and 3.2. Second, the wage spillovers lift some workers into a higher wage class.

TABLE 3.1: Mean Hourly Wage Rates and FMWA-Induced Changes for Groups of Workers within Selected Wage Classes Simulated Using Trickle-up and Trickle-down Wage Spillovers[1]

Workers with Initial Hourly Wage Rates	Mean Wage Rates and FMWA-Induced Changes					
	Stage 1		Stage 2		Stage 3	
	Initial[2] Wage Rate (1)	FMWA Δ Wage (2)	Initial[3] Wage Rate (3)	FMWA Δ Wage (4)	Initial[4] Wage Rate (5)	FMWA Δ Wage (6)
Below $5.15	$3.70	0.17	$3.69	0.16	$3.74	0.22
$5.15 ≤ $5.85	5.47	0.32	5.49	0.24	5.48	0.23
$5.86 ≤ $6.55	6.23	0.22	6.23	0.32	6.24	0.23
$6.56 ≤ $7.25	6.96	0.10	6.93	0.19	6.94	0.37
$7.26 ≤ $9.50	8.25	0.02	8.28	0.08	8.31	0.16
Below $9.50	7.20	0.09	7.36	0.13	7.52	0.20
All Workers	21.19	0.02	21.22	0.04	21.25	0.04

[1]The Table includes minimum wage changes as well as the associated trickle-up and trickle-down spillovers, which affect workers below the old minimum wage and above the new minimum wage.

[2]The initial wage rate is the hourly wage prevailing immediately before Stage 1 of FMWA. Stage 1 includes workers in 20 states. The trickle-down and trickle-up wage spillovers cause some workers to move up to higher wage classes.

[3]The initial wage rate is the hourly wage prevailing immediately before Stage 2 of FMWA. Additional workers are impacted in six more states. Workers in one state, NM, are no longer affected. Further, the trickle-down and trickle-up wage spillovers cause some workers to move up to higher wage classes. The combined effects of upward movement and additional workers result in the initial mean wage being lower in Stage 2 as compared to Stage 1 for workers in the below $5.15 hourly wage class. Similarly, the additional workers and upward movement causes the initial wage rates of the $5.15-$5.85 class to differ by only $0.02 between Stages 1 and 2 of FMWA. ($5.49 versus $5.47).

[4]The initial wage rate is the hourly wage prevailing immediately before Stage 3 of FMWA. Again, more workers are added in Stage 3 as FMWA affects additional states. Stage 3 of FMWA continues to have both trickle-up and trickle-down spillovers, which lead to upward movement of workers into higher wage classes.

Three additional points relating to Tables 3.1 and the simulations underpinning it are worth noting. First, the number of workers within wage classes used to calculate the conditional means reported in Table 3.1 is generally not the same as the numbers underpinning Table 3.2. The reason for this is that the trickle-up effects in Table 3.1 result in greater upward movement of workers to higher wage classes. Additional information on the number of workers in the various wage classes is provided in the next section. Second, the differences in wage rates and the FMWA-induced changes reported in Tables 3.1 and 3.2 reflect the impact of our simulated trickle-up wage spillovers on hourly wage rates. Finally, as long as minimum wage increases are confined to the lower tail of the wage distribution, we have greater confidence in the simulations that include both trickle-up and trickle-down spillovers. For this reason we discuss the results for these simulations first.

The Effects of the FMWA Compared to Alternative Labor Market Policies

This section provides the first set of simulation results estimated by applying the minimum wage increases mandated by the FMWA to the matched and merged March CPS data and Earner Study files for 2006. The results reported here focus on simulations that incorporate our

TABLE 3.2: Mean Hourly Wage Rates and FMWA-Induced Changes for Groups of Workers within Selected Wage Classes Simulated Using Only Trickle-down Wage Spillovers						
Workers with Initial Hourly Wage Rates	Mean Wage Rates and FMWA Induced Changes					
	Stage 1		Stage 2		Stage 3	
	Initial[1] Wage Rate (1)	FMWA Δ Wage (2)	Initial[2] Wage Rate (3)	FMWA Δ Wage (4)	Initial[3] Wage Rate (5)	FMWA Δ Wage (6)
Below $5.15	$3.70	$0.17	$3.70	$0.14	$3.72	$0.18
$5.15 ≤ $5.85	5.47	0.20	5.50	0.24	5.48	0.21
$5.86 ≤ $6.55	6.23	0.00	6.16	0.28	6.24	0.27
$6.56 ≤ $7.25	6.98	0.00	6.96	0.00	6.83	0.37
$7.26 ≤ $9.50	8.30	0.00	8.29	0.00	8.28	0.00
Below $9.50	7.19	0.03	7.27	0.06	7.35	0.12
All Workers	21.19	0.01	21.20	0.01	21.22	0.02

[1]The initial wage rate is the hourly wage prevailing immediately before Stage 1 of FMWA. Stage 1 includes workers in 20 states. The trickle-down wage spillovers cause some workers to move up to the $5.15-$5.85 wage class.

[2]The initial wage rate is the hourly wage prevailing immediately before Stage 2 of FMWA. Additional workers are impacted in six states when we move from Stage 1 to Stage 3. Workers in one state, NM, are no longer affected. Further, the trickle-down wage spillover causes some workers to move up to a higher wage class.

[3]The initial wage rate is the hourly wage prevailing immediately before Stage 3 of FMWA. Again, more workers are added in Stage 3 as FMWA affects additional states. Stage 3 of FMWA continues to move some workers into higher wage classes.

best estimates of the disemployment effects of the minimum wage increase and what we believe to be the best estimates of wage spillovers accompanying the FMWA, which impact workers with wages just below and slightly above the federal minimum. We also report some of the estimates for the zero disemployment simulations and contrast these with the simulations that are based on the most likely disemployment effects.[14]

We begin by classifying low-wage workers into five wage group classes below $9.50 per hour, which is just slightly above the $9.25 upper limit of our FMWA spillovers. For each wage rate class, we report the number of workers, annual hours worked, and annual earnings. To understand the impact of the FMWA on poverty, we track each affected worker to their family and then estimate how minimum wage changes affect family well-being and the overall family distribution of income. To do this, we count both the number of poor families that include at least one low-wage worker and the number of poor families that contain no low-wage workers.

We first report results showing the FMWA-induced changes in the number of workers, the number of hours worked, and average wage rates in each of the five wage classes. We then use the individual worker wage increases to calculate the changes in comprehensive family income of both the FMWA and two labor market policy alternatives, an EITC expansion and a FICA tax rebate. Finally, we consider the relative cost-effectiveness and policy-effectiveness of the FMWA as compared to the EITC expansion and the FICA tax rebate policies.

[14]Most of the zero disemployment simulations are reported in the Appendix B. Generally, for each table discussed in this section there is a comparable table in Appendix B reporting simulations for the case of zero disemployment effects. There are only small differences in the best estimates simulations and zero disemployment simulations.

TABLE 4.1: The Effects of the Fair Minimum Wage Act of 2007 on Groups of Workers at Different Hourly Wage Rates Simulations Based on the Best Estimates of Disemployment Effects and Wage Spillovers

4.1.a Stage 1 – Federal Minimum Wage Rises from $5.15 to $5.85

	Group Means of Workers Classified by Hourly Wage Rates						All Workers (7)
	Wage Rates Below $5.15[1] (1)	Wage Rates $5.15 – $5.85[2] (2)	Wage Rates $5.86 – $6.55[2] (3)	Wage Rates $6.56 – $7.25[2] (4)	Wage Rates $7.26 – $9.50[3] (5)	All Workers Paid < $9.50 (6)	
Number of Workers (1,000s)	3,211	1,394	2,785	3,918	15,943	27,252	134,272
FMWA-Induced Change	-291	-397	-196	-55	938	0	0
Hourly Wage Rates $	3.70	5.47	6.23	6.96	8.29	7.20	21.19
FMWA-Induced Change	0.17	0.32	0.22	0.10	0.02	0.09	0.02
Annual Hours Worked	1,444	1,452	1,545	1,603	1,768	1,667	1,904
FMWA-Induced Change	-4	-5	-2	-1	0	-1	0
Annual Wage Earnings $	5,244	7,925	9,588	11,090	14,675	12,183	41,279
FMWA-Induced Change	222	433	328	171	37	128	26
% of All Workers	0.0239	0.0104	0.0207	0.0292	0.1187	0.2030	1.0000
FMWA-Induced Change	-0.0022	-0.0030	-0.0015	-0.0004	0.0070	0.0000	0.0000
% of Workers with Wages < $9.50	0.1178	0.0512	0.1022	0.1438	0.5850	1.0000	0.0000
FMWA-Induced Change	-0.0107	-0.0146	-0.0072	-0.0020	0.0344	0.0000	0.0000

1. FMWA moves 291,000 workers to the next higher wage group.
2. FMWA moves some workers into this group from below and others to the next higher wage group.
3. The wage spillovers from FMWA move 938,000 workers into this wage group.

The Impact of a Mandated Rise in the Federal Minimum Wage on the Low-wage Distribution

In our simulations the FMWA raises the earnings of nearly all low-wage workers either because the law directly affects their wages or through spillovers, which we also consider as a part of the direct costs. This of course induces changes in the bottom of the wage distribution. We estimate the lower tail of the wage distribution using five wage-rate classes, defined as follows: below $5.15 per hour, $5.15 to $5.85, $5.86 to $6.55, and $6.56 to $7.25 (the three phases of the minimum wage increase), and $7.26 to $9.50 (the upper end of the low-wage distribution). Using these wage classes we estimate the FMWA-induced changes in the number of workers, the number of hours worked, the average wage, and annual wage earnings in each of the five wage-rate classes and for each of the three phases of mandated federal minimum wage increases.

Table 4.1 uses the five wage groups below $9.50 per hour to show the changes in the low-wage distribution as the FMWA is phased in. The table is in three distinct parts, which show the separate effects of the FMWA's three stages. In reviewing this table the reader should keep three

caveats in mind. First, the simulations allow for spillover or wage distribution ripple effects, which include both "trickle-up" and "trickle-down" effects. Second, when the minimum wage changes, a dynamic element is inserted into the wage distribution. Sub-minimum wage workers receive a wage boost and some move from the *Below $5.15* class into the *$5.15–$5.85* class. Similarly, some workers previously earning between $5.15 and $5.85 move above that wage range and enter the next higher wage group. Third, as the successive 70-cent increments to the federal minimum wage are phased in, additional states and the workers in them are impacted by the FMWA. Thus, the marginally impacted states in Stage 2 and Stage 3 of the FMWA create a second dynamic element, which needs to be kept in mind as Table 4.1 is reviewed.

Table 4.1.a shows the impact of the first 70-cent FMWA increment on the low-wage distribution. Recall that Stage 1 of the FMWA affects only 20 states containing 30 percent of the U.S. population, which is built into the simulations used to estimate Table 4.1.a. Beginning with column 2, which shows workers with wages between $5.15 and $5.85, we see an average wage of $5.47 immediately before Stage 1. The FMWA induces a 32-cent average hourly increase for workers in this group. The new group mean, $5.79, is less than the $5.85 minimum wage because thousands of previously sub-minimum wage workers have moved into the $5.15-$5.85 wage range. These sub-minimum wage workers receive a trickle-down wage increase, but it is smaller than the full 70-cent FMWA increment. Table 4.1.a shows that, on average, the trickle-down effect is $0.17; the trickle-up effects are $0.22, $0.10, and $0.02 as we move up the low-wage distribution. The average low-wage worker gains $0.09. Note that 291,000 workers are moved from the below $5.15 group to the $5.15-$5.85 group, 397,000 workers move from $5.15-$5.85, 196,000 workers move from $5.86-$6.55 to $6.56-$7.25 and 55,000 workers move up and out of the $6.56 to the $7.25 class. In total 938,000 workers are added to the $7.26-$9.50 group as a result of the minimum wage increase and its spillovers. This is approximately six percent of the total number of workers in this group (938/15,943).

While the implementation of the FMWA raises average wages for low-income workers, it also generates disemployment effects that we model as a reduction in annual hours worked. Using our best estimates of the disemployment effects we find only a small hours effect. In the first stage of the FMWA, workers earning between $5.15 and $5.85 suffer an average loss of only five hours per year. Likewise, their annual earnings grow by only $433 or about five percent of their pre-FMWA earnings ($433/$7925). All low-wage workers, those directly affected by the minimum wage increase, and those receiving spillovers, receive an average increase in annual earnings of $128, or about one percent of their annual earnings.

Table 4.1.b simulates the low-wage distribution for the second phase of the minimum wage increase ($5.86-$6.55). For the $5.86-$6.55 group, we again find a 32-cent increase. The trickle-down effects are $0.24 and $0.16 as we go down the wage distribution. The trickle-up effects are $0.19 and $0.08; the average low-wage worker gains $0.13 cent. As with the first phase of the minimum wage increase, the increase in the minimum wage to $6.55 along with the ripple effects moves workers up the low-wage distribution. Further, additional workers from the marginally impacted states are incorporated in Table 4.1.b. The combined effect of these two dynamics is that there are 895,000 fewer workers in the $5.86-$6.55 wage class. The combined effects of the two forces increases the number of workers in the $7.25-$9.50 class by 1,124,000, or about six percent (1,124/17,631).

The second phase of the FMWA, like the first phase, produces only a modest reduction in annual hours worked. In the second phase the directly affected workers in the

TABLE 4.1 (Cont'd.): The Effects of the Fair Minimum Wage Act of 2007 on Groups of Workers at Different Hourly Wage Rates Simulations Based on the Best Estimates of Disemployment Effects and Wage Spillovers

4.1.b Stage 2 – Federal Minimum Wage Rises from $5.85 to $6.55

	Group Means of Workers Classified by Hourly Wage Rates						All Workers (7)
	Wage Rates Below $5.15 (1)	Wage Rates $5.15 – $5.85 (2)	Wage Rates $5.86 – $6.55 (3)	Wage Rates $6.56 – $7.25 (4)	Wage Rates $7.26 – $9.50 (5)	All Workers Paid < $9.50 (6)	
Number of Workers (1,000's)	2,755	951	2,348	3,569	17,631	27,252	134,272
FMWA-Induced Change[1]	-155	-183	-895	108	1,124	0	0
Hourly Wage Rate $	3.69	5.49	6.23	6.93	8.28	7.36	21.22
FMWA-Induced Change	0.16	0.24	0.32	0.19	0.08	0.13	0.03
Annual Hours Worked	1,457	1,318	1,483	1,562	1,762	1,666	1,903
FMWA-Induced Change	-4	-2	-4	-2	0	-1	0
Annual Wage Earnings $	5,240	7,097	9,129	10,671	14,543	12,370	41,317
FMWA-Induced Change	221	325	424	302	138	199	40
% of All Workers	0.0205	0.0071	0.0175	0.0266	0.1313	0.2030	1.0000
FMWA-Induced Change	-0.0012	-0.0014	-0.0067	0.0008	0.0084	0.0000	0.0000
% of Workers with Wages < $9.50	0.1011	0.0349	0.0861	0.1310	0.6469	1.0000	0.0000
FMWA-Induced Change	-0.0057	-0.0067	-0.0328	0.0040	0.0412	0.0000	0.0000

[1]In Stage 2 The FMWA induced changes in the number of workers within wage groups is the net effect of worker movement between wage groups and the addition and subtraction of workers in marginally impacted states. As shown in Table 1.1, FMWA becomes binding in Stage 2 in six states are: AR, MD, MN, MT, NC, and MT. Due to a scheduled changes in a state minimum wage law FMWA is not binding in New Mexico in Stage 2.

$5.86 to $6.55 wage class gain $424 in annual earnings, an increase in earnings of 4.6 percent. All low-wage workers gain an average of $199 in annual earnings, or slightly less than two percent.

Table 4.1.c provides results for the third stage of the FMWA, which raises the minimum wage from $6.55 to $7.25. For workers in the $6.55 to $7.25 group the average wage rises by $0.37. The trickle-down effects are $0.28, $0.23, and $0.22. The trickle-up effect is $0.16. The average low-wage worker gains $0.20 in Phase 3. After Phase 3 there are 232,000 fewer workers below $5.15 and 2,246,000 more workers above $7.25. The growth of the $7.25-$9.50 group is approximately 12 percent (2,246/19,076). All low-wage workers receive an average 2.5 percent increase in annual earnings, or $306.

The Effects of the FMWA and Alternative Labor Market Policies on Family Income

Our simulation results indicate that low-wage workers experience increases in annual earnings between one and 2.5 percent in each of the three phases of minimum wage increases. These estimates include the combined effects of wage spillovers and disemployment accompanying the

TABLE 4.1 (Cont'd.): The Effects of the Fair Minimum Wage Act of 2007 on Groups of Workers at Different Hourly Wage Rates Simulations Based on the Best Estimates of Disemployment Effects and Wage Spillovers

4.1.c Stage 3 – Federal Minimum Wage Rises from $6.55 to $7.25

	Group Means of Workers Classified by Hourly Wage Rates						All Workers (7)
	Wage Rates Below $5.15 (1)	Wage Rates $5.15 – $5.85 (2)	Wage Rates $5.86 – $6.55 (3)	Wage Rates $6.56 – $7.25 (4)	Wage Rates $7.26 – $9.50 (5)	All Workers Paid < $9.50 (6)	
Number of Workers (1,000s)	2,518	807	1,398	3,452	19,076	27,252	134,272
FMWA-Induced Change[1]	-232	-38	-302	-1,675	2,246	0	0
Hourly Wage Rate $	3.74	5.48	6.24	6.94	8.31	7.52	21.25
FMWA-Induced Change	0.22	0.23	0.28	0.37	0.16	0.20	0.04
Annual Hours Worked	1,490	1,188	1,503	1,513	1,746	1,664	1,903
FMWA-Induced Change	-6	-3	-3	-4	-1	-2	0
Annual Wage Earnings $	5,464	6,357	9,156	10,344	14,447	12,586	41,361
FMWA-Induced Change	324	275	374	516	262	306	62
% of All Workers	0.0188	0.0060	0.0104	0.0257	0.1421	0.2030	1.0000
FMWA-Induced Change	-0.0017	-0.0003	-0.0022	-0.0125	0.0167	0.0000	0.0000
% of Workers with Wages < $9.50	0.0924	0.0296	0.0513	0.1267	0.7000	1.0000	0.0000
FMWA-Induced Change	-0.0085	-0.0014	-0.0111	-0.0614	0.0824	0.0000	0.0000

[1]In Stage 3 of FMWA the induced changes in the number of workers within wage groups is the net effect of worker movement between wage groups and the addition of workers in marginally impacted states. As shown in Table 1.1, FMWA becomes binding in ten additional states in Stage 3: AZ, CO, DE, ME, MO, NJ, NY, OH, and PA.

FMWA. In this section, we report the impact of these increases in earning on low-income families, defined as families with comprehensive income below twice the official poverty line. We also compute and report the indirect effects on family incomes as the FMWA causes changes in family EITC benefits and FICA tax liabilities.

After estimating the impact of the FMWA on family incomes, we then simulate equal cost increases in the EITC payments and FICA tax rebates. Following FBK (2005), we limit the equal-cost FICA tax rebates to workers in families below 200 percent of the official poverty line.

It is now generally well understood that there is no strong connection between hourly wage rates of low-paid workers and the well-being of low-income families.[15] The principle reason for this is that many low-income families do not contain a low-wage worker. Table 4.2 provides evidence from the matched and merged March CPS and Earner Study files on numbers and proportions of low-income families with at least one low-wage worker. Col-

[15]Stigler (1946) was first to emphasize this point. It has also been stressed by Burkhauser, Couch and Wittenburg (1996), Burkhauser and Sabia (2004, 2005), and FBK (2002, 2005).

TABLE 4.2: Number of Families, Low-income Families, and Families Directly Affected By the Fair Minimum Wage Act of 2007			
Stages of FMWA	**Total Number of Families (millions) (1)**	**Number of Directly Affected Families[2] (millions) (2)**	**Percent of Families Directly Affected by FMWA (3)**
Stage 1			
All Families	124.95	5.49	4.4
Low-income Families[1]	40.95	2.55	6.2
Stage 2			
All Families	124.95	8.02	6.4
Low-income Families	40.85	3.58	8.8
Stage 3			
All Families	124.95	14.18	11.4
Low-income Families	40.76	5.93	14.5

1. Low-income families are defined as those below twice the official poverty line.
2. Directly affected families include those with minimum wage workers and low-wage workers receiving spillovers.

umn 3 shows that in the first stage of the FMWA, 4.4 percent of all families and 6.2 percent of low-income families contain at least one low-wage worker. With each successive phase of the FMWA the percent of families directly affected by the increase in the minimum wage (and associated spillovers) increases. In the second phase of the FMWA, 6.4 percent of all families and 8.8 percent of low-income families are directly affected by the FMWA. In the third phase of the FMWA, these percentages rise to 11.4 percent of all families and 14.5 percent of low-income families. Alternatively stated, even after the third stage of the FMWA, more than 85 percent of low-income families are not directly affected by the minimum wage increase and its spillovers. This finding has implications that warrant emphasis: *for most (but not all) poor and low-income families, there is little relationship between poverty and low-wage work.*

Table 4.3 provides simulation results for the minimum wage increases mandated by the FMWA and compares them to the equal-cost alternative labor market policies that provide equiproportionate increases in EITC benefits and equiproportionate rebates of FICA taxes. Table 4.3.a provides results for Stage 1 of the FMWA. To see the equal cost nature of our simulation, examine the last row of the table. If we assume no disemployment effects, each policy adds $21 to average family income—hence equal cost comparisons. If we use the best estimates of the disemployment effects the minimum wage increase adds $20 to each family while the EITC and FICA policies add $19 each.[16] Given the small differences between the estimates based on zero disemployment effects and those incorporating adverse employments effects, we focus on the changes in family income based on the best estimates of the disemployment effects.

The top of Table 4.3.a restricts the analysis to those families that have incomes less than 200 percent of the official US poverty line. For these low-income families we find that while the average family gains $20 from the first phase of the FMWA, the families on which we focus fare slightly better, gaining $29 on average. We can compare this $29 increase to low-income families due to the FMWA with the equal-cost EITC expansions ($46) and

[16] This implies that the disemployment effects of the different policies vary slightly across programs.

TABLE 4.3: Simulated Effects of Stage 2 of the Fair Minimum Wage Act of 2007 and Alternative Equal Cost Labor Market Policies on Family Comprehensive Incomes of Selected Low-income Groups, Quintiles of All Families and the Top Five Percent

4.3.a Stage 1 – Federal Minimum Wage Rises from $5.15 to $5.85)

Four Subgroups[1] of Low-income Families, Quintiles of Families, and the Top 5%	Shares of All Families (1)	Mean Comprehensive Income (2)	Changes in Comprehensive Family Income					
			Simulation Assuming Zero Disemployment Effects			Simulation Using Best Estimates of Disemployment Effects		
			Minimum Wage (3)	EITC (4)	FICA (5)	Minimum Wage (6)	EITC (7)	FICA (8)
Low-Income Groups								
1. Below 50%	0.038	3,120	8	7	6	8	6	6
2. 50-100%	0.071	9,959	27	33	24	25	30	22
3. 100-150%	0.098	16,298	42	66	56	40	61	52
4. 150-200%	0.121	24,048	28	60	112	28	55	102
All Families < 200%	0.327	16,264	30	50	64	29	46	59
Quintiles & the Top 5%								
1st Quintile	0.200	11,450	30	43	35	29	39	32
2nd Quintile	0.200	26,098	28	50	70	27	46	64
3rd Quintile	0.200	38,466	24	9	0	23	8	0
4th Quintile	0.200	57,436	14	3	0	13	2	0
5th Quintile	0.200	114,883	8	1	0	8	1	0
Top 5%	0.050	195,021	4	1	0	4	0	0
All Families	1.000	49,668	21	21	21	20	19	19

[1]Low-income family subgroups are categorized by the size of family comprehensive income relative to the official U.S. Government definition of poverty. Thus the group 50–100% includes all families with comprehensive equal to or below the poverty line, but above 50% of the value of the poverty line.

FICA rebates ($59). *Both the EITC expansion and the FICA tax rebate policy provide more benefits to low-income families at the same total cost.*

A clear explanation of why the minimum wage performs relatively poorly as an anti-poverty program can be seen in the bottom half of Table 4.3.a. These three policies are simulated as "equal cost"; however, by our design the FICA tax reductions go only to low-income families. Hence the FICA rebate benefits flow only to the bottom two quintiles of families ($32 and $64, respectively) and are zero above the second quintile (see column 9). Likewise, the EITC is targeted for the most part to families in the bottom two quintiles ($39 and $46, respectively), with only small amounts spilling over into the higher quintiles. In contrast, more of the benefits of the minimum wage accrue to upper quintile families. For example, the $23 received by the third quintile due to the minimum wage increase is greater than the average cost of the policy ($20). Clearly, our simulations verify the conventional wisdom that the minimum wage is not "well-targeted."

Table 4.3.b provides simulation results for the second phase of the FMWA. The average cost of the second round increase in the minimum wage is $31 per family (see col-

TABLE 4.3 (Cont'd.): Simulated Effects of Stage 2 of the Fair Minimum Wage Act of 2007 and Alternative Equal-cost Labor Market Policies on Family Comprehensive Incomes of Selected Low-income Groups, Quintiles of All Families and the Top Five Percent

4.3.b Stage 2 – Federal Minimum Wage Rises from $5.85 to $6.55

Four Subgroups[1] of Low-income Families, Quintiles of Families, and the Top 5%	Shares of All Families (1)	Mean Comprehensive Income (2)	Changes in Comprehensive Family Income					
			Simulation Assuming Zero Disemployment Effects			Simulation Using Best Estimates of Disemployment Effects		
			Minimum Wage (3)	EITC (4)	FICA (5)	Minimum Wage (6)	EITC (7)	FICA (8)
Low-Income Groups								
1. Below 50%	0.038	3,107	9	11	9	8	10	9
2. 50-100%	0.070	9,968	35	51	37	32	47	35
3. 100-150%	0.098	16,289	57	103	88	56	94	81
4. 150-200%	0.121	24,051	47	94	175	46	86	159
All Families < 200%	0.326	16,283	43	78	100	41	71	92
Quintiles & the Top 5%								
1st Quintile	0.200	11,493	40	67	54	39	61	50
2nd Quintile	0.200	26,135	46	77	109	44	71	99
3rd Quintile	0.200	38,500	39	14	0	37	13	0
4th Quintile	0.200	57,452	25	4	0	23	3	0
5th Quintile	0.200	114,902	13	1	0	12	1	0
Top 5%	0.050	195,021	7	1	0	6	1	0
All Families	1.000	49,698	33	33	33	31	30	30

[1]Low-income family subgroups are categorized by the size of family comprehensive income relative to the official U.S. Government definition of poverty. Thus the group 50–100% includes all families with comprehensive equal to or below the poverty line, but above 50% of the value of the poverty line.

umn 7, last row). The benefits accruing to low-income families in Stage 2 are somewhat higher at $41. An equal-cost EITC expansion provides the typical low-income family $71 in benefits and the FICA reduction provides these families $92. Again, we find that both the equal-cost EITC expansion and FICA tax rebates concentrate more of their benefits on low-income families.

Table 4.3.c examines the impact of the third phase of the FMWA. In this case the average family receives an additional $48 due to the minimum wage increase. Examining the impact of Stage 3 of the FMWA on low-income families only, we find that the minimum wage increase adds $59 to family income while the EITC expansion adds $111, and the FICA tax rebate adds $142.

To this point in our analysis we have considered the low-income population families as a single group. Using this approach leads to the conclusion that the FICA rebate policy provides the greatest benefits to the low-income population, followed by the EITC expansion with the FMWA a distant third. However, the distribution consequences of these three policies within the low-income population are quite different. These distributional

TABLE 4.3 (Cont'd.): Simulated Effects of Stage 2 of the Fair Minimum Wage Act of 2007 and Alternative Equal Cost Labor Market Policies on Family Comprehensive Incomes of Selected Low-income Groups, Quintiles of All Families and the Top Five Percent

4.3.c Stage 3 – Federal Minimum Wage Rises from $6.55 to $7.25

Four Subgroups[1] of Low-income Families, Quintiles of Families, and the Top 5%	Shares of All Families (1)	Mean Comprehensive Income (2)	Changes in Comprehensive Family Income					
			Simulation Assuming Zero Disemployment Effects			Simulation Using Best Estimates of Disemployment Effects		
			Minimum Wage (3)	EITC (4)	FICA (5)	Minimum Wage (6)	EITC (7)	FICA (8)
Low-Income Groups								
1. Below 50%	0.037	3,105	12	17	14	11	15	13
2. 50-100%	0.070	9,972	48	78	57	45	72	54
3. 100-150%	0.097	16,285	77	157	136	74	144	126
4. 150-200%	0.121	24,037	73	148	271	71	135	247
All Families < 200%	0.326	16,297	62	121	155	59	111	142
Quintiles & the Top 5%								
1st Quintile	0.200	11,528	54	103	84	52	95	78
2nd Quintile	0.200	26,175	73	119	168	71	109	154
3rd Quintile	0.200	38,559	60	23	0	57	20	0
4th Quintile	0.200	57,479	43	6	0	40	5	0
5th Quintile	0.200	114,920	22	2	0	20	1	0
Top 5%	0.050	195,095	13	1	0	11	1	0
All Families	1.000	49,733	50	50	50	48	46	46

[1]Low-income family subgroups are categorized by the size of family comprehensive income relative to the official U.S. Government definition of poverty. Thus the group 50–100% includes all families with comprehensive equal to or below the poverty line, but above 50% of the value of the poverty line.

consequences are similar across all three phases of the FMWA, so without loss of generality we focus on Stage 3 (Table 4.3.c).

For the poorest families, those below 50 percent of the official poverty line, the 70-cent increase in the minimum wage (along with our simulated spillovers) in Stage 3 adds $11 (column 7) to comprehensive family income. Those families in the 50 to 100 percent subgroup gain $45 from the minimum wage increase. The largest gain due to the minimum wage increase accrues to the 100 to 150 percent subgroup ($74), followed closely by the 150 to 200 percent subgroup, which gains $71.

The low-income subgroup gains due to the FMWA can be contrasted with the same subgroup gains using the EITC expansion and FICA rebate policies. In each subgroup comparison we find that both the EITC expansion and the FICA tax rebates are larger than the minimum wage benefits. For example, in the 100 to 150 percent subgroup federal minimum wage increases and spillovers raise family income by only half of the EITC policy ($74 vs. $144). In the 150 to 200 percent subgroup the FMWA raises family income by only one-third of the FICA policy ($71 vs. $247). In sum, at every low-income cutoff we find that both the EITC expansion and the FICA rebates provide higher benefits at the same aggregate cost.

The results show both the EITC expansion and FICA rebate alternatives dominate the increases in the federal minimum wage mandated by the FMWA. When the EITC and FICA alternatives are compared, no unambiguous conclusion can be drawn from Table 4.3. The EITC equal-cost alternative provides larger benefits to each poverty subgroup below the 150-200 percent subgroup, but the FICA does better for low-income families in the subgroup between 150 and 200 percent of the official poverty line. It does appear, however, that the FICA rebates are highly concentrated among the most well off of the low-income families.

TABLE 4.4: The Cost of FMWA and Alternative Labor Market Policies for Equal Reductions in Poverty Simulations Based Upon Best Estimates of Disemployment Effects and Wage Spillovers

Stages of FMWA[1] and Alternative Poverty Lines[2]	Comprehensive Income Sen Index of Poverty		Total Costs of Alternative Labor Market Policies ($ Billions)[3]		
	Before Policy (1)	After Policy (2)	FMWA (3)	EITC (4)	FICA (5)
FMWA Stage 1					
50%	0.02360	0.02354	2.5	1.3625	2.4975
100%	0.05477	0.05461	2.5	1.02125	2.2275
150%	0.09913	0.09877	2.5	1.4475	1.85625
200%	0.15826	0.15787	2.5	1.02125	1.4850
FMWA Stage 2					
50%	0.02351	0.02345	3.875	2.7175	3.885
100%	0.05454	0.05434	3.875	1.52875	2.96750
150%	0.09865	0.09820	3875	1.78375	2.59625
200%	0.15769	0.15712	3.875	1.78375	2.34875
FMWA Stage 3					
50%	0.02344	0.02340	6.0	2.03125	3.95
100%	0.05433	0.05399	6.0	2.53875	4.44375
150%	0.09815	0.09756	6.0	2.15750	3.21
200%	0.15707	0.15626	6.0	2.58125	3.21
FMWA – All Stages					
50%	0.02360	0.02340	12.375	6111.25	10332.50
100%	0.05477	0.05399	12.375	5088.75	9638.75
150%	0.09913	0.09756	12.375	5388.75	7662.50
200%	0.15826	0.15626	12.375	5386.25	7043.75

[1]The federal minimum wage rises by $0.70 in each stage of FMWA and by $2.10 across all stages.
[2]Alternative poverty lines are defined as a percentage of the official poverty cutoff and measured using comprehensive family income.
[3]These costs are computed by multiplying the average costs per family (for Stage 1, $20) by 125 million American families ($2.5 billion in Stage 1). We note that the costs of the FMWA do not vary across poverty lines as these are the poverty reductions that occur at each poverty line, given the cost of each stage of mandated increase in the federal minimum wage.

[17]We define and briefly discuss the Sen Poverty index in the Appendix C.

The Cost-effectiveness and Policy-effectiveness of the FMWA of 2007

The objective is to compare the FMWA to two alternative policies, an increase in the EITC and a rebate of FICA taxes. In this section we compare these three policies in two different ways. The first approach evaluates *relative cost* and *reports cost-effectiveness ratios*. To evaluate relative cost we first calculate the poverty-reducing effects of the FMWA and its associated costs. Our poverty metric is the Sen Poverty Index, which is sensitive to not only the much-discussed headcount ratio of poor persons but to average income shortfalls as well as the distribution of income among the poor.[17] We then ask how much it would cost to expand the EITC or to rebate FICA taxes and achieve *aggregate poverty reductions (as measured by the Sen Poverty Index) that are equivalent to the FMWA*. The answers to

TABLE 4.5: The Policy Effectiveness of Alternative Labor Market Policies in Moving Persons Out of Poverty Simulations Based Upon Best Estimates of Disemployment Effects and Wage Spillovers

Stages of FMWA[1] and Alternative Poverty Lines[2]	Proportions and Number of Persons in Poverty		Number Raised Above the Poverty Line by Alternative Labor Market Policies		
	Headcount Ratio (1)	Number (millions) (2)	FMWA (1000's) (3)	EITC (1000's) (4)	FICA (1000's) (5)
FMWA Stage 1					
50%	0.0338	10.14	30	60	60
100%[3]	0.0936	28.08	90	270	120
150%	0.1805	54.15	210	420	300
200%	0.3008	90.24	90	240	780
FMWA Stage 2					
50%	0.0336	10.05	30	60	30
100%[3]	0.0931	28.08	120	270	150
150%	0.1796	53.88	240	630	540
200%	0.3002	90.06	240	330	1170
FMWA Stage 3					
50%	0.0335	10.05	30	60	30
100%[3]	0.0927	27.81	240	480	360
150%	0.1786	53.58	330	900	810
200%	0.2993	89.79	330	600	1680
FMWA – All Stages					
50%	—	—	90	180	120
100%	—	—	450	1020	540
150%	—	—	780	1950	1650
200%	—	—	660	1170	3630

[1]The federal minimum wage rises by 70 cents in each stage of FMWA and by $2.10 across all stages.
[2]Alternative poverty lines are defined as a percent of the official poverty cutoff and poverty measures are defined in terms of comprehensive family income.
[3]100% is the Official poverty line, but here it is measured in terms of comprehensive income rather than cash income.

these questions for four alternative poverty lines and each stage of the FMWA are provided in Table 4.4.

A second and related approach to evaluating the FMWA is to assess its *policy effectiveness* vis-à-vis alternative labor market policies. To gauge the policy effectiveness of raising the minimum wage we first count the number of persons lifted out of poverty by the FMWA using four alternative poverty lines. Next we ask how many people would be moved above the poverty line using the EITC

TABLE 4.6: The Relative Cost- and Policy-effectiveness of the Fair Minimum Wage Act of 2007 Compared to Alternative Labor Market Policies – Simulations Based Upon Best Estimates of Disemployment and Wage Spillovers

Alternative Poverty Lines[1]	The Relative Effectiveness of FMWA					
	Cost Effectiveness Ratios[2]			Labor Market Policy Effectiveness Ratios[3]		
	FMWA's Change in the Minimum Wage (1)	Alternative Labor Market Policies with the Same Poverty Reducing Effects as FMWA		Total Costs of FMWA's Minimum Wage Increases[3] (4)	Alternative Labor Market Policies with the Same Total Costs of Reducing Poverty as FMWA	
		FICA (2)	EITC[2] (3)		FICA (5)	EITC (6)
Stage 1 of FMWA						
50%	1.83	1.83	1.00	1.00	2.00	2.00
100%	2.44	2.18	1.00	1.00	1.33	3.00
150%	1.73	1.28	1.00	1.00	1.43	2.00
200%	2.45	1.45	1.00	1.00	8.67	2.67
Stage 2 of FMWA						
50%	1.43	1.43	1.00	1.00	1.00	2.00
100%	2.53	1.94	1.00	1.00	1.25	2.25
150%	2.17	1.46	1.00	1.00	2.25	2.63
200%	2.17	1.32	1.00	1.00	4.88	1.38
Stage 3 of FMWA						
50%	2.95	1.94	1.00	1.00	1.00	2.00
100%	2.36	1.75	1.00	1.00	1.50	2.00
150%	2.78	1.49	1.00	1.00	2.45	2.73
200%	2.32	1.24	1.00	1.00	5.09	1.82
All Stages Combined						
50%	2.02	1.69	1.00	1.00	1.33	2.00
100%	2.43	1.89	1.00	1.00	1.20	2.27
150%	2.30	1.42	1.00	1.00	2.12	2.50
200%	2.30	1.31	1.00	1.00	5.50	1.77

**** = no effect of min wage on poverty

[1]Alternative poverty lines are defined as a percent of the official poverty cutoff.

[2]The EITC is the low-cost policy alternative. For each poverty line considered, the cost of the EITC is set equal to 1.00.

[3]FMWA is the least-effective policy, and its costs are set equal to 1.00 for each poverty line considered.

and FICA tax rebate policies that have *aggregate costs exactly equal to the FMWA*. The answers to these questions are provided in Table 4.5.

Table 4.4 provides information on simulated costs for equivalent reductions in poverty for the FMWA and alternative policies, with results reported in terms of billions of dollars. Table 4.5 provides similar information for thousands of persons elevated above poverty lines with equivalent aggregate costs. Additional insights that are useful in policy analysis are provided by focusing on the relative cost-effectiveness (holding aggregate reductions in the Sen Poverty Index constant) and relative policy-effectiveness (holding aggregate costs constant) of the FMWA compared to alternative policies that expand EITC and rebate FICA taxes. The relative cost-effectiveness ratios and policy-effectiveness ratios are reported in Table 4.6.

The relative costs of the FMWA compared to alternative labor market policies that have the same poverty-reducing effects are shown by the cost-effectiveness ratios in columns 1, 2, and 3 of Table 4.6. The cost-effectiveness ratios are calculated from information in Table 4.4, which shows the cost of the FMWA and alternative labor market policies for equal reductions in the Sen Poverty Index. Columns 1 and 2 show the reductions in the Sen Poverty Index for each stage of the FMWA and all stages combined for four alternative poverty lines. Columns 3-5 of Table 4.4 report the aggregate cost of equal poverty reductions achieved by alternative labor market policies. These costs are based on the best estimates of disemployment and wage spillovers.

To understand our cost estimation procedure, it is useful to return to Table 4.3. Columns 7-9 of the last row show the average family benefit received from each of the three alternative labor market policies. When viewed from another perspective, these average benefits to families are the *average direct policy costs*. The logic of this is straightforward; for each dollar of gross benefits redistributed by the FMWA, there must be at least one dollar of costs. In addition, there may be indirect costs.[18] For the FMWA (best disemployment estimates) these costs per family are $20 (Table 4.4.a) in Stage 1 of the FMWA, $31 (Table 4.4.b) in Stage 2, and $48 (Table 4.4.c) in Stage 3. In the base year of our simulation (2006) we find that there are approximately 125 million American families. Multiplying the average policy cost for each phase by 125 million families results in the FMWA costs of $2.5 billion in Stage 1, $3.875 billion in Stage 2, and $6.0 billion in Stage 3 (see Table 4.5, column 3). For all three phases of the FMWA these costs sum to $12.375 billion. We note that the costs of the FMWA do not vary across poverty lines as these are the poverty reductions that occur at each poverty line, given the cost of each phase of mandated increase in the federal minimum wage.

The next step is to estimate the costs of equivalent poverty reductions achieved by the EITC expansion and FICA rebate alternatives. It is apparent that these policies will have unique distributional affects which will vary depending upon the poverty cutoff selected. This requires that we conduct separate simulations for each policy, each stage of the FMWA, and each of the four poverty lines we consider. In each simulation, we require a poverty reduction equal to that achieved by the FMWA. As with the FMWA, the average cost per family is estimated and multiplied by the number of families in 2006.

The costs of equivalent poverty reductions using EITC expansion and FICA tax rebates are summarized in Table 4.4, columns 4 and 5. As noted above, Table 4.6 normalizes the costs, and we will use this table to compare the relative merits of the three alternative labor market policies. That said, we note that the total cost of an equal poverty

[18]The indirect costs of the FMWA are discussed and measured in Section V below.

reduction using an EITC expansion is less than half the cost of the FMWA, *regardless of the poverty line selected*. At the official poverty line this is a *savings of $7.286 billion* ($12.375 billion less $5.089 billion).

Before discussing the cost-effectiveness ratios in Table 4.6, we briefly comment on the estimation procedure used in calculating the policy-effectiveness ratios reported in columns 4, 5, and 6 of Table 4.6. To compare the policy-effectiveness of the three alternative labor market policies, we begin by counting the number of persons lifted out of poverty for each of the four alternative poverty lines. In each simulation we maintain the aggregate cost so that it is exactly equal to the costs of the FMWA in each stage of the phase-in (e.g., $2.5 billion in the first stage as shown in Table 4.4). Our simulations estimate the headcount poverty ratios before and after each stage of the FMWA for four alternative poverty lines. We then multiply the differences in before and after poverty rates by the 2006 US population (approximately 300 million persons in 2006) to obtain estimates of overall reductions in the number of poor persons at each poverty line.

The first column of Table 4.5 provides the pre-simulation headcount ratios at each stage of the FMWA for four alternative poverty lines. Using our comprehensive family income measure we find that 9.36 percent of individuals in the US lie below the official poverty threshold (100 percent).[19] This results in 28.08 million poor individuals in 2006 before the implementation of the FMWA. Column 3 of Table 4.5 shows our best estimate of the number of persons lifted out of poverty by the FMWA. Beginning with Stage 1, we see that 90,000 individuals are moved above the official poverty threshold. We find the largest absolute reduction in poverty at 150 percent of the official poverty threshold (210,000 persons). Moving to the bottom of column 3 we find that, for all three phases of the FMWA, 450,000 persons are lifted above the official poverty line. Furthermore, if the poverty line is drawn at 150 percent of the official poverty cutoff, then 780,000 persons escape poverty due to the FMWA.

The number of persons lifted out of poverty by the EITC and FICA tax rebate policies that have aggregate costs exactly equal to the FMWA are shown in columns 4 and 5 of Table 4.5. As noted above, Table 4.6 normalizes the costs, and we will use this table to compare the relative merits of the alternative labor market policies. With reference to Table 4.5, we note that a comparison of the EITC (column 4) and the FMWA (column 3) reveals that far more persons would escape poverty if the equal-cost EITC policy were used rather than mandating a rise in the federal minimum wage. An EITC expansion would lift 1.02 million persons out of poverty if using the 100 percent federal poverty line. At 150 percent, the EITC would lift 1.95 million out of poverty—2.5 times the poverty-reduction achieved by the FMWA.

Table 4.6 summarizes our finding on the relative cost-effectiveness and policy-effectiveness of the FMWA as compared to alternative labor market policies for simulations that incorporate our best estimates of disemployment and wage spillovers. Table 4.6 is designed in a manner similar to Tables 4.4 and 4.5, showing all three phases of the FMWA and a total of all stages combined. Columns 1-3 of Table 4.6 show the cost-effectiveness ratios. Recall that cost-effectiveness measures the relative cost involved in expanding the EITC or rebating FICA taxes while achieving *equal aggregate poverty reductions* as compared to the FMWA.

[19]The official U.S poverty statistic for 2006 was 12.3 percent, which is significantly greater than the 9.36 percent calculated using comprehensive family incomes. The explanation for the difference is as follows. The Census Bureau uses only cash income (wages and salaries + dividends, rents and interest + self-employment income + cash transfers + other cash income items) in estimating the official number of poor. This ignores the market values of noncash transfers (food stamps, housing subsidies, energy subsidies, school lunch subsidies, EITC benefits, and implicit returns on home equity. It also ignores taxes. However, for the poor the value of noncash benefits far exceeds their direct taxes, so family resources are significantly understated by cash income. Therefore, the poverty headcount ratio is considerably overstated. See Appendix C for further discussion of comprehensive family incomes.

Columns 4-5 show policy-effectiveness ratios. In contrast to cost-effectiveness, policy-effectiveness measures the relative number of persons lifted above the poverty line using EITC expansions and FICA tax rebates that have *equivalent aggregate cost* as compared to the FMWA.

In columns 1, 2, and 3 of Table 4.6, cost-effectiveness is normalized with the low-cost policy alternative set equal to 1.0. As shown in Table 4.4, the EITC is the low-cost policy alternative and comparisons of columns 1 and 3 in Table 4.6 reveal that *the EITC policy is more cost-effective than the FMWA at every poverty line considered and in each stage of the phase-in*. While the FMWA is consistently the least cost-effective of the alternatives simulated, its degree of effectiveness varies depending on the stage of the phase-in and the poverty line. Inspection of the cost-effectiveness ratios reveals that the FMWA is relatively more effective, i.e., less ineffective, in Stage 2 (ratio = 1.43) when the poverty line is set at one-half of the official level. In contrast, its relative ineffectiveness is greatest in Stage 3 (ratio = 2.95) at a poverty line that is also half the official poverty line. Examining all stages combined of the FMWA, we conclude that reducing poverty by raising the minimum wage "costs" roughly twice as much as reducing poverty using the ETIC, at all poverty lines considered. Furthermore, for all stages combined the FICA tax rebate policy dominates the FMWA in terms of cost-effectiveness. Finally, *the FICA tax rebate policy is consistently less cost-effective than the EITC expansion*.

Holding aggregate policy costs constant at the level determined by the FMWA, we normalize on the policy alternative that is least effective in reducing the number of poor persons. Thus, the number of persons moved out of poverty by the FMWA is set equal to 1.0 in column 4 of Table 4.6. The poverty reductions achieved by the two equal-cost policy alternatives are expressed relative to this normalized value. Comparing columns 4 and 6 of Table 4.6 reveals that the EITC alternative generally lifts twice the number of people out of poverty for the same costs as raising the minimum wage. The highest EITC policy-effectiveness ratio (3.00) is in the first stage of the FMWA, at the official poverty line. In contrast, the lowest EITC policy-effectiveness ratio (1.38) is at the 200 percent poverty line of Stage 2.

Using the number of persons lifted out of poverty as our policy-effectiveness measure highlights the effects of the FICA tax rebate policy. Most of the benefits of this policy are concentrated among the higher-income poor, which includes those between 150 and 200 percent of the official poverty line. Recall from Table 4.3 that the FICA tax rebate policy results in nearly twice as much additional income as the EITC expansion for families in this income range. Thus, in column 5 of Table 4.6 we see very large policy-effectiveness ratios, as high as 8.67 in the first phase of the FMWA.

While the FICA tax rebate is very effective in moving people above the 200 percent poverty line, Table 4.6, column 3 shows that this is not a very cost-effective policy when compared to the EITC policy. It is the fact that the FICA tax rebate is focused on the highest income families that reduces its cost-effectiveness; we measure cost-effectiveness using the Sen Poverty Index which is sensitive to both the shortfalls from the poverty line and the distribution of income among the poor, while the headcounts used to measure policy-effectiveness are not distribution sensitive.

To conclude, simulation results that incorporate the best estimates of disemployment effects and wage spillovers are consistent with Stigler's (1946) conjecture and evidence presented by Burkhauser et al. (1996), Burkhauser and Sabia (2004, 2005), and FBK (2002, 2005). A policy of increasing the minimum wage is poorly targeted on the poor and other low-income families. The simulations based upon our best estimates of disemployment and

[20]At poverty lines drawn at 150% of the official poverty line and below the EITC is also the most policy-effective of the alternatives.

wage spillovers reveal that the FMWA is unambiguously dominated by both the EITC expansion and FICA tax rebate policy alternatives. The FMWA is *neither cost-effective nor policy-effective when compared to the alternative labor market policies that we consider*. Further, we conclude that the EITC is unambiguously the *most cost-effective* of the policy alternatives considered.[20]

Indirect Costs of the FMWA

The costs used in simulating both the cost-effectiveness and policy-effectiveness of the FMWA vis-à-vis alternative labor markets is the direct cost incurred by paying the higher wages mandated by federal law plus the wage spillovers. However, if minimum wage increases lead to disemployment of workers there are additional indirect costs, which we briefly discuss in this section. The new minimum wage school of thought [Card and Krueger (1995) and Katz and Krueger (1992)] asserts that small changes in the minimum wage do not lead to disemployment effects. However, most of the empirical literature on the minimum wage is consistent with small disemployment effects with estimated elasticities ranging from -0.1 to -0.65 for groups of young workers whose employment is adversely affected by rising minimum wages.

In our research, the disemployment effects accompanying the FMWA are modeled as a reduction in hours of work rather than unemployment per se. We use the best estimates of FBK (2005) who find small negative elasticities for six groups of young workers and even smaller positive elasticities for two groups of low-paid adult workers who gain hours. The positive elasticities indicate that rising minimum wages lead to the substitution of low-paid adult workers for teenagers and young adults. Thus, young workers lose hours while some low-paid adults gain hours. However, on balance, there is an overall decrease in hours of work, which necessarily leads to an indirect cost. The source of the cost is the resource misallocation accompanying increases in the minimum wage. As the FMWA distorts market wage rates, the accompanying disemployment effects create a deadweight loss (DWL) in economic efficiency. We discuss this indirect cost and our estimates of it in more detail below.[21]

The Allocative Inefficiency of the FMWA

If the FMWA reduces hours of work, there is an unambiguous DWL, which is a part of the social cost of raising the minimum wage. A key issue is: how large are these costs? When wage spillovers are simulated both above and below the FMWA's minimum wage we find that the total direct costs in our zero disemployment and best elasticity estimates of disemployment simulations differ by approximately 5 percent. These direct cost differences are equal to $\Delta w(\Delta H)$. If the demand curve in the disemployment case were linear, then the allocative inefficiency (hereafter DWL) from the FMWA's wage distortion would be:

1

$$DWL = \frac{1}{2}(\Delta w\, \Delta H)$$

[21]It may seem that there is an additional indirect cost when disemployment accompanies increases in the minimum wage. Some low-wage earners are forced to work less at the higher minimum wage and the associated loss in earnings could be thought of as a cost of involuntary unemployment. However, in our modeling of the FMWA there is no unemployment per se, only a reduction in hours of each affected worker. Further, due to inelastic demand for low-wage work, the earnings of all adversely affected workers (teenagers and young adults) necessarily rise plus each worker has more leisure time. While it is true that the earnings of these affected workers increase by less than they would have if there had been zero disemployment, there are no indirect costs from lost earnings. Even if some workers are involuntarily unemployed (i.e., their hours go to zero), the loss in earnings would provide only an upper bound estimate of the costs to these workers, This is the case because the reduced hours of work are accompanied by increased hours of leisure. The value of the leisure is subjective, but it is almost certainly positive. Therefore, any cost is less than the loss in earnings. If the worker were indifferent to working and the leisure provided by not working then there would be no costs associated with the loss in earnings due to involuntary unemployment.

This is about 2.5 percent of the direct costs. In the zero disemployment case the total direct costs for all three stages of the FMWA is $18 billion, implying a *DWL* of $900 million. However, demand is not linear, and the *DWL* costs are almost certainly a great deal less than $900 million.

Harberger's (1954) classic framework can be used to more closely approximate the *DWL* of rising minimum wages. Harberger's original analysis was developed in the context of monopoly pricing and later applied to estimate the excess burden of taxes (Harberger, 1974). However, the framework is fairly general and can be adapted to estimate the *DWL* of wage rate distortions accompanying minimum wage changes. The wage distortion of the FMWA is $d = \frac{\Delta w}{w}$. We know the change in hours is small and if we assume Δw is also small then the elasticity is:

2

$$\varepsilon = \frac{\Delta H}{H} \Big/ \frac{\Delta w}{w} = \frac{\Delta H}{H} \Big/ d$$

which can be written as,

3

$$\Delta H = \varepsilon \, d \, H$$

Substituting $wd = \Delta w$ and equation (3) into equation (1) we obtain

4

$$DWL = \left(\frac{1}{2} w\right) H \varepsilon \, d^2$$

Where,

w = minimum wage before the FMWA

H = Hours before the FMWA that are distorted

ε = FBK's (2005) best estimates and $d^2 = \left(\frac{\Delta w}{w}\right)^2$

The values of ε are known and d^2 is easily calculated. These values are: (see Table A and B below)

Further, the value of H for each worker in the eight affected worker groups is a part of our simulations and can be used in estimating the *DWL*.

TABLE A

	Negative Elasticities (Disemployment)						Positive Elasticities	
	Teenagers			Young Adults Aged 20-24				
	White Males (1)	White Females (2)	Nonwhite & NonHispanic (3)	White Males (4)	White Females (5)	Nonwhite & NonHispanic (6)	All Hispanic Workers (7)	NonHispanic High School Dropouts (8)
ε	-0.2	-0.3	-0.65	-0.1	-0.1	-0.3	0.05	0.05

TABLE B

	Stage of FMWA		
	Stage 1	Stage 2	Stage 3
$d = \Delta w/w$	13.59%	11.97%	10.69%
d^2	0.0185	0.0143	0.0114

TABLE C

	Stage 1	Stage 2	Stage 3	Total
Deadweight Loss ($ millions)	$6.50	$7.50	$11.25	$24.75

Designating the stage of the FMWA as *j* and the affected groups of workers as *i* we can calculate *DWL* by aggregating. Thus,

5

$$DWL = \frac{1}{2}\sum_{i-1}^{n}\sum_{j-1}^{m} w_{ij} H_{ij} \varepsilon_j d_{ij}^2 = \frac{1}{2}\sum_{i-1}^{n}\sum_{j-1}^{m} \Delta w_{ij} \Delta H_{ij}$$

where *n* and *m* denote the number of the FMWA stage and the affected groups of workers, respectively. Inserting the values of H_i , ε_j, and d^2 into equation (5) allows us to calculate the *DWL* of the FMWA. Using equation 5 and the values of ε and d^2 discussed above, our estimates of the deadweight loss for the FMWA simulations with trickle-up and trickle-down wage spillovers are shown in the following tabulation (see Table C below).

These indirect costs are less than 3 percent of the $900 million suggested by 1/2(ΔwΔH). Further, the *DWL* estimates are only 1/7 of one percent of the $17.2 billion in direct costs of the combined trickle-up and trickle-down wage spillover in all three stages of the FMWA. Thus, while the indirect costs from deadweight losses due to wage distortions are not zero, they are extremely small. As in Harberger's (1954, 1974) classic papers we find small values for the estimated allocative inefficiency caused by price/wage distortions. The basic explanation of our findings is the same as in Harberger's work; when you square the price/wage distortion, the resulting value of d^2 is tiny.

Simulations of a $9.50 Minimum Wage and an Overview of Research Findings

This section presents an alternative set of simulation results that incorporate only trickle-down wage spillover estimates of the FMWA, which are extended to evaluate the poverty-reducing effects and cost-effectiveness of a hypothetical $9.50 minimum wage.[22] In addition, this section summarizes and compares the estimates reported in section IV and V to the results for the simulations based on trickle-down wage spillovers only and to the hypothetical $9.50 minimum wage. Thus, this section provides an overall summary of key research findings.

The logic underpinning the consideration of smaller wage spillovers that exclude trickle-up ripple effects is threefold. First, Neumark et al. (2004) present evidence indicating that initial wage spillovers are temporary phenomena that soon erode away. Second, Johnson and Browning (1981, 1983) argue that while upward spillovers are possible, reliably estimating them is problematic. Third, the methods applied to estimate the upward wage spillovers described in Section III and reported in Section IV are, in our judgment, probably not appropriate for a minimum wage of the $9.50 magnitude. As shown in Figure 1, a $9.50 minimum wage is beyond the 20th percentile of the wage distribution observed in the 2006 matched and merged March CPS and Earner Study dataset. We are confident that the estimation of wage spillovers applied in Section IV is reliable for the lower tail of the wage distribution. However, extending these estimation procedures beyond the 20th percentile of wage rates as would be required to simulate the trickle-up effects of a $9.50 minimum wage seems problematic.

To estimate the smaller wage spillovers, we apply the methods employed by Johnson and Browning (1981, 1983) and simulate trickle-down wage spillovers only. We first replicate the procedure applied in Section IV to simulate the effects of the FMWA and alternative policies, but without the upward wage spillovers. We then assume that after the Fair Minimum Wage Act is fully phased in (effective date July 24, 2009), the Fair Labor Standards Act is amended and a new $9.50 federal minimum wage is mandated (affecting workers in all 50 states). We then evaluate the poverty-reducing effects of a one-shot, $2.25 increase in the federal minimum wage and make cost-effectiveness comparisons to alternative labor market policies.

[22]The simulations discussed in this section are supplementary to the main results presented in Section IV above. If the minimum wage increases are confined to the lower tail of the wage distribution, we are confident that the results in Section IV provide the best estimates of the FMWA. However, if and when federal minimum wage increases are extended beyond the bottom quintile of hourly wage rate distribution, then we have less confidence in the estimates of upward wage spillovers.

TABLE 5.1: Simulated Estimates of the Costs, Poverty-reducing Effects and Policy-effectiveness of Raising the Federal Minimum Wage					
	Percentage Reduction in Aggregate Poverty[1] (1)	Estimated Costs of Raising the Federal Minimum Wage		Measures of Minimum Wage Effectiveness Compared to the EITC	
		Direct Costs $ Billions (2)	Deadweight Loss $ Millions (3)	Policy Effectiveness Ratios[2] (4)	Cost Effectiveness Ratios[3] (5)
FMWA with Both Trickle-up & Trickle-down Wage Spillovers	1.4	$17.2	$25.5	2.42	2.47
FMWA with Trickle-down Wage Spillovers	0.9	$8.0	$18.75	3.46	2.12
Hypothetical $9.50 Federal Minimum Wage with Trickle-down Wage Spillovers[4]	3.3	$61.4	$230	1.89	2.57

[1]Reductions in the Sen Index of poverty measured at 100% of the official poverty thresholds using comprehensive family income and Orshansky equivalent scale adjustments for family size and composition.

[2]A policy-effectiveness ratio measures the relative reduction in poverty headcounts achieved by an equiproportionate EITC policy compared to the policies that increase the federal minimum wage and the policies have the same aggregate direct costs. The poverty headcounts used in calculating the reported ratios are measured at 100% of the official poverty thresholds using comprehensive family income and Orshansky-equivalent scale adjustments for family size and composition.

[3]A cost-effectiveness ratio measures the relative cost of achieving the same reduction in aggregate poverty using a minimum wage increase compared to an equiproportionate EITC policy that has the same poverty-reducing effects.

[4]The simulation of the hypothetical $9.50 minimum wage assumes that the FMWA is fully phased in, there are no trickle-up ripple effects and the new minimum wage is binding in all states.

The Cost-and Policy-effectiveness of the FMWA with Simulated Zero Trickle-up Spillovers

Since the methodology used to simulate the effects of the FMWA and alternative labor markets—with one exception (trickle-up wage spillovers)—is the same as that applied in Section IV above, we focus immediately on the empirical results. Tables of the Johnson and Browning type (zero trickle-up effects) that exactly parallel Tables 4.1 through 4.6 are reported in Appendix D. The only difference in table content is that Tables D4.1 through D4.6 do not include trickle-up wage spillovers, but they do include the hypothetical extension of the federal minimum wage to $9.50. The parallel between Tables 4.1 through 4.6 and the tables reported in Appendix D facilitates easy assessment of the influence of including and excluding upward wage spillovers in the evaluation of the cost-effectiveness and poverty-reducing effects of raising the federal minimum wage. For example, to determine how upward wage spillovers affect the cost-effectiveness of the FMWA vis-à-vis the alternative EITC policy, compare Table 4.6 in Section IV to Table D4.6 in Appendix D. Similarly, a comparison of Table 4.4 in Section IV to Table D4.4 in Appendix D reveals the impact of upward wage spillovers on aggregate poverty.

Table 5.1 and 5.2 provide summaries of our simulation findings. The first thing to note is that Table 5.1 makes it clear that trickle-up wage spillovers "matter," especially when the focus is on total policy costs of increasing the minimum wage. The direct cost of the FMWA, when upward wage spillovers are included in the simulations, is $17.2 billion, compared to $8.0 billion when the trickle-up ripple effects are removed from the simulations. Thus, upward wage spillovers more than double the costs of

TABLE 5.2: Summary of Simulation Results of Increasing the Federal Minimum Wage*							
Estimated Impacts	Fair Minimum Wage Act of 2007						Hypothetical $9.50 Minimum Wage[1] (7)
	With Trickle-up and Trickle-down Wage Spillovers			With Only Trickle-down Wage Spillovers			
	Stage 1 (1)	Stage 2 (2)	Stage 3 (3)	Stage 1 (4)	Stage 2 (5)	Stage 3 (6)	
1. Directly affected families (millions)	5.5	8.0	14.2	1.5	3.1	3.6	21.5
2. Directly affected low-income families	2.6	3.6	5.9	0.72	1.5	2.5	9.0
3. Average family income increase	$20	$33	$48	$7	$13	$27	$348
4. Average income increase of poor families	$19	$24	$33	$10	$14	$23	$227
5. Share of total income increase accruing to poor families	10.4%	8.4%	7.5%	16.5%	11.9%	9.2%	6.9%
6. Average low-income family income increase	$29	$41	$59	$10	$19	$37	$416
7. Share of total income increase accruing to all low-income families	47.2%	43.3%	40.1%	53.7%	48.1%	43.1%	38.9%
8. Average income increase for top 5% families	$4	$6	$11	$1	$2	$4	$100
9. Share of total income increase accruing to top 5% of families	1.0%	0.97%	1.1%	0.76%	0.78%	0.74	1.44%
10. Equal-cost EITC transfers to low-income families[2]	$46	$71	$111	$15	$29	$62	$798

* Simulations are based upon the best estimates of disemployment effects. Simulations based on zero disemployment effects differ slightly.
[1]Simulations in this column assume that the increase to $9.50 occurs after the FMWA is fully staged in and that there are no trickle-up wage spillovers. Hence, the estimates in column 7 can be thought of as an extension of the impacts shown in column 6. Note that some of the families affected by a $9.50 minimum wage are also impacted by the FMWA minimum wage increases.
[2]This shows simulations of the equal-cost EITC alternative to raising the federal minimum wage.

the FMWA. Along with the larger direct costs there are both more indirect costs (deadweight losses) and a larger number of persons lifted above the official poverty line. However, excluding trickle-up wage spillovers from the simulations does not change our finding that raising the federal minimum wage is both less cost-effective (it costs more to achieve the same aggregate poverty reduction) and less policy-effective (it lifts fewer people out of headcount poverty at the same cost) compared to alternative labor market policies. Thus including or excluding the trickle-up spillovers in the simulations matters in terms of overall costs, but does not matter in ranking alternative policies in terms of their effectiveness in reducing poverty and improving the well-being of low-income families.

Table 5.1 also provides some of the highlights from the hypothetical $9.50 minimum wage increase. Most importantly, it shows that there is a dramatic increase in both the direct and indirect (deadweight loss) costs. Moving from $5.15 to $7.25 resulted in aggregate direct costs of between $8 billion and $17.2 billion depending upon whether trickle-up wage spillovers are included in

the simulations. In contrast, a $9.50 minimum wage is estimated to have direct costs of over $61 billion, assuming no trickle-up wage ripple effects. Furthermore, the deadweight losses increase by a factor of 10 from just under $25 million to $230 million. While the $2.25 rise in the minimum wage does reduce poverty, we once again find that it is both more cost-effective and more policy-effective to replace the minimum wage policy with an increase in the EITC.

Table 5.2 collects key results reported in earlier tables and from Appendix D to highlight our major findings. The table presents results for the FMWA with and without trickle-up wage spillovers and for the hypothetical $9.50 minimum wage. The rows of the table can be grouped together. Rows 1 and 2 present the numbers of directly affect families, by income. Rows 3-9 show the dollar value of family income increases and shares of increases for various income levels. Rows 9-13 compare the EITC and the minimum wage outcomes. Finally, rows 14-16 provide the direct costs, worker benefits, and deadweight losses.

The first two rows of Table 5.2 show the number of families affected by a minimum wage increase for each stage of the FMWA and the hypothetical $9.50 minimum wage. Recall that in 2006 there were a total of 125 million families in the U.S., 41 million of which are low-income families. This means that at most 14 percent of low-income families were affected in the third stage of the FMWA (5.9 / 41). A $9.50 minimum wage would directly affect 9 million families, or about 20 percent of all low-income families.

Rows 3-9 provides the average family income increase for all families, poor families, low-income families, and the top five percent of all families, along with their corresponding shares of the total income increase. The table provides results for all three stages of the FMWA; we focus on Stage 3. In this case the average family income increase is $48 with trickle-up and $27 without trickle-up wage. Low-income families gain $59 with trickle-up and $37 without trickle-up. Poor families (those below 100 percent of the official poverty line measured in terms of family comprehensive income) gain $23 in the no trickle-up simulations and $33 in the simulations with both trickle-up and trickle-down wage spillovers. In terms of shares of total income, the poor receive 8.4 percent of the total income increase with trickle-up and 9.2 percent without trickle-up. The shares accruing to low-income families are similar in both cases—40.1 percent with trickle-up and 44.3 percent without trickle-up. Finally, we note that in all stages of the FMWA the top five percent of families capture approximately one percent of the total income increase generated by higher federal minimum wages.

Compared to Stage 3, the $9.50 minimum wage provides family income increases approximately 10 times greater—$348 (for all families), $225 (for poor families), and $416 (for low-income families). Poor families receive 6.9 percent of the total income increase, while low-income families garner 39 percent of the total income increase. The share accruing to the top five percent (1.44 percent) is the higher than in any stage of the FMWA and almost twice as large as the percentage received in the no trickle-up FMWA simulations. The implications of these finding are clear; the $9.50 minimum wage is more poorly targeted on the poor and low-income families than are the increases mandated by the FMWA. Stated differently, the FMWA is poorly targeted on families at the bottom of the income distribution and the $9.50 minimum wage is even worse.

Row 10 provides the dollar value of equal-cost EITC transfers to low-income families. A comparison of row 10 to row 6 shows the additional dollars that would flow to low-income families if the minimum wage hikes were replaced by equiproportional additions to the EITC. For example, in Stage 3 the EITC provides $62 to each low-income family or 40 percent more than the minimum wage. For a $9.50 minimum wage the EITC provides $798, or 48 percent more income, to low-income families.

Rows 11-12 compare the policy-effectiveness of the minimum wage to the EITC. Our summary measure of policy-effectiveness is the number of persons moved above the official poverty line by the minimum wage increases.[23] Row 11 provides these counts for the minimum wage increases, while row 12 counts the persons escaping

[23]The counts in rows 11 and 12 are those who jump above the official poverty line and are meant to be used to compare the two programs. Clearly, other poor families are affected by the minimum wage increase.

TABLE 5.2 (Cont'd.): Summary of Simulation Results of Increasing the Federal Minimum Wage*							
Estimated Impacts	Fair Minimum Wage Act of 2007						Hypothetical $9.50 Minimum Wage[1] (7)
	With Trickle-up and Trickle-down Wage Spillovers			With Only Trickle-down Wage Spillovers			
	Stage 1 (1)	Stage 2 (2)	Stage 3 (3)	Stage 1 (4)	Stage 2 (5)	Stage 3 (6)	
11. Persons moved above official poverty line by the minimum wage increase (1,000s)	90	120	240	30	30	120	1,200
12. Persons moved above official poverty line by an equal-cost EITC increase (1,000s)	270	270	480	120	120	270	2,200
13. Minimum wage cost-effectiveness ratio (disadvantage) at the official poverty line[3]	2.53	2.53	2.36	1.75	2.72	1.89	2.57
14. Total wage cost of the minimum wage increase ($ billions)[4]	$3.5	$5.4	$8.3	$1.1	$2.2	$4.7	$61.4
15. Total worker benefit of the minimum wage increase ($ billions)[4]	$2.5	$3.9	$6.0	$0.9	$1.6	$3.4	$43.5
16. Deadweight loss of the minimum wage increase ($ millions)	$6.50	$7.50	$11.25	$3.75	$5	$10	$230

* Simulations are based upon the best estimates of disemployment effects. Simulations based on zero disemployment effects differ slightly.
[1]Simulations in this column assume that the increase to $9.50 occurs after the FMWA is fully phased in and that there are no trickle-up wage spillovers. Hence, the estimates in column 7 can be thought of as an extension of the impacts shown in column 6. Note that some of the families affected by a $9.50 minimum wage are also impacted by the FMWA minimum wage increases.
[2]This shows simulations of the equal cost EITC alternative to raising the federal minimum wage.
[3]This shows how much more costly an increase in the minimum wages is compared to an equiproportional EITC alternative that achieves the same reduction in aggregate poverty.
[4]The total direct wage cost is greater than the total direct worker benefits due to state and federal income taxes, FICA taxes, and the losses in EITC benefits as earnings rise.

poverty under an alternative equal-cost increase in the EITC. In all cases the EITC moves at least twice as many people above the official poverty line at costs equal to the minimum wage increases. Further, we note that while the $9.50 minimum wage increase would have a much greater impact on poverty than any stage of the FMWA, an equal-cost increase in the EITC is still a far more effective poverty-reducing policy.

Row 13 provides a cost-effectiveness ratio for the minimum wage and the EITC. Cost-effectiveness is measured by estimating the cost of an equal decrease in the Sen Poverty Index (a distribution-sensitive poverty measure described above) using the EITC as a policy alternative to raising the minimum wage. The cost-effectiveness ratio varies from 1.75 to 2.72; a cost-effectiveness ratio of 2.0 implies that the same reduction in aggregate poverty can be accomplished

with the EITC at one-half the cost of the minimum wage increase. These large ratios clearly demonstrate the superiority of the EITC as a poverty-reducing tool.

Rows 14-16 summarize the costs of the FMWA and the hypothetical $9.50 minimum wage. Row 14 provides the total wage cost of the minimum wage increases while row 15 provides the total worker benefit of the minimum wage increases. These two numbers diverge as increases in minimum wage are accompanied by increases in income taxes, payroll taxes, and possible reductions in the EITC benefits. Columns 1-3 of rows 14 and 15 provide total wage cost and worker benefits under the assumption of trickle-down and trickle-up wage spillovers while columns 4-6 assume trickle-down wage spillovers only. The differences in costs under different spillover assumptions are substantial, but diminish from a factor of three to a factor of two with successive stages of the FMWA. For Stage 3 with trickle-up the total wage costs are $8.3 billion and the total worker benefit is $6.0 billion; without trickle-up the total wage costs are $4.7 billion and the total wage benefits are $3.4 billion. In both scenarios, total benefits are 72 percent of total wage costs.

Finally, the total wage costs and worker benefits are dramatically larger for the hypothetical $9.50 minimum wage—costs of this scenario are estimated to be $61.4 billion while worker benefits are estimated at $43.5 billion. Similar to Stage 3 of the FMWA, the ratio of total benefits to total wage costs is 71 percent.

The last row of Table 5.2 (row 16) summarizes the deadweight loss estimates. As noted above, the deadweight losses are quite small relative to the total direct costs of raising the minimum wage. While deadweight losses are higher with trickle-up wage spillovers (columns 1-3) they are not substantially greater than the deadweight losses of trickle-down wage spillovers only. Finally, we note that the hypothetical $9.50 minimum wage has total deadweight losses of $230 million, or more than 12 times that of the no trickle-up FMWA estimates. This compares to $61.4 billion in total directs costs of the $9.50 minimum wage, which is 7½ times greater than the no trickle-up FMWA direct costs. Nevertheless, the deadweight costs of the hypothetical $9.50 minimum wage remain less than 4/10th of one percent of the direct cost.

Conclusions and Policy Implications

There is a long history of skepticism in economics concerning claims asserting beneficial effects of the minimum wages on poor and low-income families. For much of the 20th century, it was believed that unavoidable disemployment effects accompanying increases in the minimum wage made the poor worse off. Some economists continue to cling to this view today, but beginning with the work of Katz and Krueger (1992) and Card and Krueger (1995), a series of contributions establish that relatively modest increases in the minimum wage have small beneficial distributional effects on poor and low-income families. The new minimum wage literature [Katz and Krueger (1992), Card (1992a, 1992b), Card, Katz and Krueger (1994), and Card and Krueger (1995)] is best known for its finding and insistence that there are no disemployment effects of modest increases in the minimum wage. More recent work by Burkhauser, Couch, and Wittenburg (1996), Neumark and Wascher (1994, 2001, 2004), Abowd et al. (2000), and FBK (2005) find that small disemployment effects almost certainly accompany even modest rises in the minimum wage. However, FBK (2005) provide evidence that even the most extreme estimates of the small disemployment effects do not completely offset the income gains by families in the lower tail of the income distribution. Thus, the issue of whether poor and low-income families gain or lose is largely settled and the questions of interest now are as follows: Exactly how much do they gain? What does it cost? How effective are minimum wage increases compared to alternative labor market policies?

The current research investigates these questions by applying simulation studies to analyze the poverty-reducing effects, income redistributions, costs, and effectiveness of three alternative labor market policies. The principal focus and starting point for the analysis is the three-stage minimum wage increase mandated by the Fair Minimum Wage Act of 2007 (FMWA). Successive 70-cent increments to the federal minimum wage are applied to a high quality microdata set created by matching and merging the Annual Demographic File (March CPS) with the Annual Earner Study (ORG) files of the Current Population Survey. The hierarchical March CPS files provide the best available data for studying the impacts of policies on pov-

erty and income distribution, while the Earner Study files contain the best information on worker's wages, hours, and earnings. The data set we create consists of almost 56,000 families and more than 127,000 persons. The data are adjusted to reflect changes in state minimum wage laws across time, and the FMWA-mandated wage increases are applied to individual workers in specific states, then tracked to family incomes and aggregated.

Several simulations are applied to the matched, merged, and state minimum wage-adjusted March CPS and Earner Study data. First, two general sets of disemployment effects are simulated. We apply FBK's (2005) best estimates of disemployment among specific groups of teenagers and young adults and zero disemployment effects of the sort Card and Krueger (1995) find in their work. Second, we simulate alternative sets of ripple effects of wage spillovers following the FMW-mandated increases in the federal minimum wage. One set of simulations applies wage increases to both subminimum wage workers (a downward wage ripple) and to low-wage workers earning slightly more than the federal minimum (an upward wage ripple). In addition, we consider a simulation that includes only downward wage spillovers on workers earning subminimum wages. Each of the four simulations described above is applied to each stage of the FMWA. In addition, for the simulations that include only trickle-down minimum wage spillover, we analyze a hypothetical increase of the federal minimum wage to $9.50, which is assumed to go into effect after the FMWA is fully phased in. Thus, we consider a $2.25 one-shot rise in the federal minimum wage from $7.25 to $9.50.[24]

All simulations of minimum wage increases include two alternative labor market policies that could have been adopted in lieu of the FMWA and the hypothetical $9.50 federal minimum wage—an increase in EITC subsidies and a rebate of FICA payroll taxes. Further, two versions of the alternative policies are considered. The first version takes the poverty-reducing effects of the FMWA as a given and simulates what it would cost to accomplish the same poverty reduction using the EITC and FICA policy alternatives. These simulations are used to measure the *relative cost-effectiveness* of raising the federal minimum wage vis-à-vis the EITC and FICA alternatives. The second version takes the costs of the FMWA as a given and simulates the poverty-reducing effects of equalcost of the EITC and FICA policy alternatives. The equal-cost simulations are used to measure what we refer to as the relative policy-effectiveness of raising the federal minimum wage.

Major Conclusions

Section VI above provides a summary of the empirical results of the research and discusses key findings. In brief, our major conclusions are as follows.

- All three alternative labor market policies—raising the minimum wage, increasing the EITC, and rebating a portion of the payroll taxes paid by workers in low-income families—increase the comprehensive incomes of persons and families at or near the bottom of the income distribution and have measureable poverty-reducing effects.

- For most, but not all, poor and low-income families there is little relationship between poverty and low-wage work. In all but one of the simulations more than half of the total benefits of rising minimum wages accrue to families above the low-income cutoff (twice the official poverty line).[25] Thus, most of the benefits of a minimum wage go to families that are neither poor nor low-income.

- Poor and low-income families (the bottom 32.6 percent of families) do gain from rising minimum wages, but within this group those at the absolute bottom receive substantially fewer benefits. For

[24]We do not consider upward wage spillovers in analyzing the hypothetical $9.50 minimum wage. As explained above, a $9.50 minimum wage added on top of the FMWA increases takes us well beyond the bottom quintile of the wage distribution observed in the matched, merged, and state minimum wage adjusted 2006 data that we use in this study. We have less confidence in estimating upward wage spillovers of rising minimum wages as we go beyond the lower tail of the wage distribution, which we define as the bottom quintile of wage rates. See Sections III and VI for further details and discussion.

[25]The exception occurs in Stage 1 of the FMWA (the federal wage minimum rises from $5.15 to $5.85) and in the simulation that includes only trickle-down wage spillovers. Using the best elasticity estimates of disemployment effects, low-income families receive almost 54 percent of the total benefits with the remaining benefits going to higher income families.

example, in the simulations with both trickle-up and trickle-down wage spillovers families below the official poverty line receive less than 10 percent of the total income gains from all stages of the FMWA, whereas other low-income families receive over 30 percent. Higher income families receive the remaining share of the gains from higher minimum wages.

- The poverty-reducing effects of raising the federal minimum wage are quite small, but not zero. As the FMWA is phased in, our simulations reveal that the poverty-reducing effects are expanded slightly. However, in the 2nd and 3rd stages of the FMWA the societal costs of the minimum wage rise much faster than the aggregate poverty rate falls. The hypothetical $9.50 minimum wage has much greater poverty-reducing effects than the FMWA, but this achievement comes at dramatically higher costs.

- Overall, the relationship between poverty-reductions for the poorest families and aggregate policy costs suggests that federal minimum wage increases are subject to decreasing returns and rising costs in fighting poverty. The greater the federal minimum wage, the lower is the return in poverty reduction per dollar spent to bring about the mandatory higher minimum wages.

- Measures of the relative cost-effectiveness of alternative labor market policies reveal that federal minimum wage increases are much more costly than either the EITC or FICA policies in achieving the same poverty-reducing objectives. Compared to the EITC, the minimum wage cost-effectiveness ratios vary from 2.4 to 2.5 for simulations that include both trickle-up and trickle-down wage spillovers. For the hypothetical $9.50 minimum wage the cost-effectiveness ratio is 2.6. Thus, the total costs of achieving the same reduction in aggregate poverty is approximately 2.5 times greater using a minimum wage policy instead of the more effective EITC policy.

- The estimates of the policy-effectiveness provide hard evidence for what a number of researchers have maintained since Card and Krueger (1995) first argued that increasing the minimum wage had beneficial effects on the poor—using the minimum wage to fight poverty is a poor tool compared to alternative labor market policies that have the same aggregate costs. In the simulations that include both trickle-up and trickle-down wage spillovers, an EITC policy with the *same aggregate costs* as the FMWA policy achieves approximately 2¼ times the poverty reduction (measured at the official poverty line). The hypothetical $9.50 minimum wage policy-effectiveness ratio vis-à-vis the EITC alternative is 1.9. Thus, for the *same aggregate costs* we can achieve almost twice the poverty reduction if the more-effective EITC policy is substituted for the $9.50 minimum wage.

- The costs of raising the minimum wage are substantial. In the simulations that include both trickle-up and trickle-down wage spillovers, the direct cost of all three stages of the FMWA is $17.2 billion. The upward wage spillovers account for more than $9 billion of this total. The hypothetical $9.50 minimum wage adds dramatically to the cost totals, with direct costs of more than $61 billion. In addition, there are indirect costs, widely referred to in the literature as deadweight losses (*DWL*), which occur as a result of the distortions in market wage rates that occur as minimum wage rates are increased. The *DWL* costs are zero if there are no disemployment effects and average less than one-half percent of the direct costs in the simulations that incorporate the best elasticity estimates of the disemployment effects.

- Trickle-up wage spillovers dramatically affect the total costs of raising the minimum wage, more than doubling them from $8 billion to $17.2 billion in the FMWA simulations. Further, in the trickle-up simulations we find that the federal minimum wage is even less well targeted than in simulations that include only trickle-down wage spillovers. Of course, policymakers have no influence on whether upward spillovers are included or excluded. Given a mandatory rise in the minimum wage, the size and extent of wage spillovers are determined by deci-

sions of employers and workers and their interaction in labor markets. Our simulations show that whether upward spillovers exist or do not exist, equiproportional EITC policies unambiguously dominate minimum wage policies in reducing poverty and improving the well-being of low-income families.

Why are the Poverty-reducing Effects of the FMWA so Small?

Increasing the federal minimum wage has small poverty-reducing effects for several different reasons. First, as Nobel Laureate George Stigler recognized long ago, there is an absence of any close relationship between the level of hourly wage rates and the amount of family income (1946, p.362.) As a consequence, many low-wage workers are members of families that are neither poor nor low-income. Moreover, numerous poor and low-income families have no minimum wage workers or receive only a small contribution to family income from the earnings of the minimum wage workers who are family members. Thus, most of the workers affected by the FMWA are not members of poor or low-income families. Second, the FMWA was adopted at a time when the federal minimum wage had been surpassed by many state minimum wage laws such that it was binding in only 20 states in which 30 percent of the U.S. population resides. Third, at the time the FMWA was enacted, fewer than 3.5 percent of all U.S. workers earned less than $5.85, the minimum imposed by FMWA in the initial stage of the three year phase-in. Another 2 percent of U.S. workers earned between $5.85 and $6.55 and a total of 7.5 percent earned less than $7.25, which is the final minimum wage mandated by the FMWA. Thus, the FMWA affected workers in only a subset of states, impacted relatively few workers, and most of those who received wage increases did not belong to poor and low-income families. All these factors combine to augur for relatively small impacts on aggregate poverty. The one-shot $2.25 rise in the minimum wage that accompanies the hypothetical extension of the FMWA to $9.50 is simulated to affect workers in all fifty states. More workers are affected and there are greater poverty-reducing effects. However, as noted above, these poverty reductions come at far higher costs.

Policy Implications

The simulations reported in this research provide new insights into labor market policies aimed at improving the economic well-being of poor and low-income Americans. The three policies we analyze—raising the minimum wage, increasing the EITC, and rebating a portion of the payroll taxes paid by workers in low-income families—are variants of the three-pronged policy initiative proposed by Barack Obama during his 2008 Presidential campaign. The specific versions of the alternatives to raising the federal minimum wage that we consider—equiproportional increases in the EITC and equiproportional rebates of FICA payroll taxes paid by workers in low-income families—differ from the Obama Administration's EITC and FICA policies. Nevertheless, our labor market simulations are relevant to the current policy debates.

The policy simulations discussed in this research report demonstrate that if the purpose of a new labor market policy is to reduce poverty or enhance equity in the distribution of income, then the EITC policy is unambiguously superior when compared to increasing the federal minimum wage. The results for poverty necessarily follow from our finding that the equiproportional EITC policy is both more cost-effective (achieves the same poverty reduction at lower costs) and more policy-effective (achieves greater poverty reduction at equivalent costs) compared to the minimum wage policy. While we have not emphasized "enhanced equity in the distribution of income" in our discussion of the research findings we point out that the superiority of the EITC policy vis-à-vis the minimum wage policy carries over to equality in the distribution of income. Thus, if Congress and the President are prepared to raise the federal minimum wage to $9.50 per hour, then working families and the nation as a whole will be far better off if the nominal minimum wage is held constant and the EITC is increased to accomplish the same policy objective.

The specific FICA tax rebate policy we consider is also superior in terms of cost-effectiveness and policy-effectiveness when compared to the simulated effects of the FMWA's mandatory increases in the federal minimum wage. It should be noted that policy-effectiveness com-

[26]On this point see Table 4.6 in Section IV.

parisons of the FICA rebate policy and the hypothetical $9.50 minimum wage are not possible because the costs of the minimum wage increase are far greater than the sum of all payroll taxes paid by workers in low-income families. Finally, we comment briefly on the policy implications of our simulations of the cost-effectiveness and policy-effectiveness of the equiproportional EITC increases and FICA tax rebate policies. The equiproportional EITC policy is consistently more cost-effective (i.e., it achieves the same poverty reductions at lower costs) in all simulations and at all poverty lines compared to FICA tax rebates. However, the policy-effectiveness finding is mixed. At some of the poverty lines we consider, the equiproportional FICA tax rebates are more policy-effective (it achieves greater poverty reductions at the same costs) than the EITC policy, while at other poverty lines equiproportional EITC increases are more policy-effective.[26]

We conclude by briefly commenting on the labor market policies of the Obama administration and drawing distinctions between the policies we investigate and those that have been proposed and enacted into law. During the Presidential campaign of 2008, then-candidate Obama proposed a multi-pronged approach aimed at making work pay for low and middle income Americans; he called for expanding the EITC by increasing the number of parents covered, and extending coverage to those supporting their family through child support payments; he called for increased benefits to certain (and unspecified) families and eliminating the EITC marriage penalty; he proposed a $9.50 minimum wage; finally, he recommended a $500 "Making Work Pay" payroll tax credit. We have simulated a $9.50 minimum wage and now have a good idea of both its costs, redistributive effects, and its shortcomings vis-à-vis an equiproportionate increase in the EITC. The Obama Administration's proposed revisions in EITC subsidies lacks sufficient specificity to know what they would cost and exactly how they would impact poverty and the distribution of income. A number of researchers [Horn and Sawhill (2001) and FBK (2005)] have called for eliminating the EITC marriage penalty. However, work on the related income tax marriage penalty (FBK, 2003) suggests such a policy will be both costly and "tricky" to implement. Great care will be required to avoid adverse redistributive effects in getting rid of the marriage penalty.

The American Recovery and Reinvestment Act (ARRA) of 2009 represents the first concrete step in implementing the Obama Administration's redistributive policies. ARRA includes FICA tax credits of up to $400 for individuals and $800 for married couples filing joint tax returns. The credits are refundable and equal to 6.2 percent of earned income with maximum values that depend upon tax filing status and a two percent phase-out based on Adjusted Gross Income (*AGI*). For individuals, the FICA tax credit is reduced by 2 percent for each dollar of *AGI* between $75,000 and $95,000. For married couples the credit is reduced by 2 percent for each dollar of *AGI* between $150,000 and $190,000. We point out that the FICA policy in ARRA is structured markedly different from the policy simulated in our research. Our FICA tax rebates are refundable, based on comprehensive family income and are confined to workers in low-income families (defined as families below 200 percent of the official poverty line). Further, our simulated FICA rebates are equiproportional to the amount paid by individual workers with the aggregate amount dependent upon the specific minimum wage policy to which it is compared. It is almost certainly the case that the FICA rebates in ARRA are *much less* cost-effective and policy-effective than either equiproportional increases in the EITC or equiproportional FICA tax rebates of the sort we simulate in the current research. Whether the FICA tax rebate policy in ARRA is better or worse in terms of cost-effectiveness and policy-effectiveness compared to a $9.50 federal minimum wage is an open question.

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APPENDIX A

Procedures Used in Extracting March CPS and ORG Data

The data we use are extracted from CPS Utilities, March 2007 CPS Files and Annual Earner Study files (ORG) for calendar year 2006, which are issued by the Unicon Research Corporation, Santa Monica, California, Version 5.5. The variables mentioned below use Unicon Corporation variable names, which are generally not the same as those appearing in the original CPS data released by the U.S. Census Bureau.

1. **DEFINITION OF THE FAMILY:** We define the family to include primary families and related subfamilies. Unrelated subfamilies within a household are treated as separate families except as follows:

    - When the age of the head of an unrelated subfamily (or unrelated individual) living in the household is less than 17, then the unrelated subfamily (or individual) is included as a member of the primary family (or primary individual).

    - When the age of the head of an unrelated subfamily (or unrelated individual) is above 17, but earnings are zero, the unrelated subfamily (or individual) is deleted from the sample.

    - When we need to recalculate some income variables relating to taxes (such as Federal Tax or EITC), we employ IRS definitions. Primary family and related subfamily are initially separated and taxes and EITC benefits are awarded and then recombined into extended family units.

2. **FAMILY INCOME:** Where possible, family income is calculated by summing up the incomes of each family member. To these totals we add values for the variables available only at the family and household level. These variables include:

    - Food Stamps
    - Housing Subsidies
    - Energy Subsidies
    - School Lunch Subsidies
    - Implicit Return on Home Equity, and Property Taxes

3. **COMPONENTS OF FAMILY INCOME:** Key components of family income are defined as follows:

    - Cash Income = the sum of wages and salaries, dividends, rents and interest, self-employment income, cash transfers and other cash income items.

    - Other Taxes = the sum of federal, state, and property taxes.

- Means Tested Transfers from the Government = the sum of supplemental security income + public assistance and welfare + market values of noncash benefits from food stamps, housing subsidies, energy subsidies, and school lunch subsidies.

- Other Transfers = Nonmeans Tested Transfers from the Government + Private Transfers.

- Payroll taxes = FICA + proportionate share of FedRet (payroll contributions to Federal retirement in lieu of FICA taxes).

4. EARNERS: Earners are defined as all adults age 16 and above who have positive wages or salaries.

5. HOURS WORKED: In general, Hours is the variable used to measure the number of hours worked per week. This variable denotes the number of hours worked in the week preceding the survey. In the following cases the hours variable is not used.

- If HOURSU (Total usual weekly hours, ORG variable) is reported, we use this variable to measure hours worked each week.

- When HOURSU is missing or 0, but ERNUSH (usual hours per week, ORG variable) or HOURS (Total hours worked last week, ORG variable) are reported, it is replaced by either ERNUSH or HOURS.

- When there is no information on hours worked in the ORG data, but ERNHR (hourly wage rate) and ERNWK (weekly earnings before deductions) are available, we calculate the hours worked by dividing ERNWK by ERNHR.

6. WAGE RATE: The procedure for determining the hourly wage is as follows:

- If an hourly wage is reported, we use the amount given by the variable ERNHR.

- When the ERNHR of a worker is missing or zero, we calculate the value by dividing the variable WKLYWG (average weekly earnings) by Hours (hours worked last week).

- Any worker with a wage rate less than $2.13 is treated as if they are self-employed and are not included among the wage and salary workers analyzed in this report. Any income generated by such workers is treated as if it were self-employment income.

7. MATCHING PROCESS – MARCH CPS AND EARNER STUDY (ORG) DATA:

- In the CPS, a household is in the survey for four consecutive months, rotates out for eight months, returns to the survey for four more months, and then permanently rotates out. The months in sample (variable name MIS=1-4 or 5-8) is used to identify the ORG data in the March CPS. The outgoing rotation groups are asked the earner study in their 4th (MIS = 4) and last (MIS = 8) surveys. To match the March File, we select the ORG sample by using appropriate interview month identified by the MIS variable.

- To match households, families and individuals in the March File with persons in the ORG File, the following variables are used:
    - MONTH: interview month
    - MIS: month in sample
    - STATE
    - HHID: Household ID (Part #1)
    - HHNUM: Household ID (Part #2)
    - HHSEQ: Household ID within file (March variable)
    - UNIQHH: Unique household identifier within any specific month (ORG variable that is corresponding to HHSEQ in March)
    - HHTYP: Type of household record
    - NUMBER: Number of persons in hourhold
    - LINENO: Person line number within a household
    - RACE, SEX, and AGE

- In matching the two data sets, one of the problems encountered is that the household id (variable name HHID) is not unique. That is, more than one household has the same household id (variable name HHID). In this case, we separate each household to create a unique identifier using HHSEQ in March and UNIQHH in ORG. Next, we match all possible combinations of households and select the best matching case by using the processes explained in the next step.

- When one set of household residents moves away and another set takes its place in the same house, the household is identified by using household number (variable name HHNUM) and deleted from our sample.

- To match the individuals within a household, we use the variables of household type (variable name HHTYP), number of persons in household (variable name NUMPER), line number within household (variable name LINENO), race, sex, and age. When all variables listed above are the same in both the Match and ORG data, each individual is then treated as "matched."

- We next calculate the matching percentage within a family. A 100 percent match of individuals within a family in both data sets is a perfect match. A zero matching percentage is a perfect nonmatch. All families with a zero matching percentages are deleted from the sample.

- For families for which there is neither a perfect match (100 percent) nor a perfect nonmatch (0 percent), a partial matching of individuals exists. For partially matched families we then focus on the earners within the family. If we are able to match all earners, the family is considered as matched and we include it in the sample. To accomplish this final step in the matching process we proceed as follows:

    - We count the number of earners. If the number of earners or household type (variable name HHTYPE) are not the same, the family is deleted from the sample.

    - For the remaining partially matched families, we compare the sex, race, and ages of earners and count the number of matches of these variables for each earner. When the difference of ages is less than two, we consider that the two ages are the same. Also, we sum the individual matches within a family and calculate the family matching percentage for all three variables.

    - Finally, we select the matching families. When there is at least one earner who has the same value for all three matching variables and the family matching percentage is above 50 percent, we treat it as matching and include it in the sample.

- In summary, to be included in the sample a family must satisfy one of the following matching conditions:

    - Have the same MIS, HHID, STATE, and have a 100 percent matching of individuals within a family.

    - Have the same MIS, HHID, STATE, HHTYPE, the same number of earners, at one earner matched perfectly on three personal variables (RACE, SEX, and AGE), and the family matching percentage above 50 percent.

    - Have MIS = 4 or MIS = 8 in the March data, because these cohorts have the key information on both family and household incomes and earner study data.

APPENDIX B

Results for Simulations with Zero Disemployment Effects Using the Best Estimate of Wage Spillovers

TABLE B4.1.a: The Effects of Stage 1 of the Fair Minimum Wage Act of 2007 on Groups of Workers at Different Hourly Wage Rates

Simulations Based on Zero Disemployment Effects and the Best Estimates of Wage Spillovers (Federal Minimum Wage Rises from $5.15 to $5.85)

	Group Means of Workers Classified by Hourly Wage Rates						
	Wage Rates Below $5.15[1] (1)	Wage Rates $5.15 – $5.85[2] (2)	Wage Rates $5.86 – $6.55[2] (3)	Wage Rates $6.56 – $7.25[2] (4)	Wage Rates $7.26 – $9.50[3] (5)	All Workers Paid < $9.50 (6)	All Workers (7)
Number of Workers (1,000s)	3,211	1,394	2,785	3,918	15,943	27,252	134,272
FMWA-induced Change	-291	-397	-196	-55	938	0	0
Hourly Wage Rates $	3.70	5.47	6.23	6.96	8.29	7.20	21.19
FMWA-induced Change	0.17	0.32	0.22	0.10	0.02	0.09	0.02
Annual Hours Worked	1,444	1,452	1,545	1,603	1,768	1,667	1,904
FMWA-induced Change	0	0	0	0	0	0	0
Annual Wage Earnings $	5,244	7,926	9,588	11,090	14,675	12,183	41,279
FMWA-induced Change	237	465	344	176	38	134	27
% of All Workers	0.0239	0.0104	0.0207	0.0292	0.1187	0.2030	1.0000
FMWA-induced Change	-0.0022	-0.0030	-0.0015	-0.0004	0.0070	0.0000	0.0000
% of Workers with Wages < $9.50	0.1178	0.0512	0.1022	0.1438	0.5850	1.0000	0.0000
FMWA-induced Change	-0.0107	-0.0146	-0.0072	-0.0020	0.0344	0.0000	0.0000

[1]FMWA moves 291,000 workers to the next higher wage group.

[2]FMWA moves some workers into this group from below and others to the next higher wage group. The FMWA-induced change net movement.

[3]The wage spillovers from FMWA move 938,000 workers into this wage group.

TABLE B4.1.b: The Effects of Stage 2 of the Fair Minimum Wage Act of 2007 on Groups of Workers at Different Hourly Wage Rates

Simulations Based on Zero Disemployment Effects and the Best Estimates of Wage Spillovers (Federal Minimum Wage Rises from $5.85 to $6.55)

	Group Means of Workers Classified by Hourly Wage Rates						All Workers (7)
	Wage Rates Below $5.15 (1)	Wage Rates $5.15 – $5.85 (2)	Wage Rates $5.86 – $6.55 (3)	Wage Rates $6.56 – $7.25 (4)	Wage Rates $7.26 – $9.50 (5)	All Workers Paid < $9.50 (6)	
Number of Workers (1,000s)	2,755	951	2,348	3,569	17,631	27,252	134,272
FMWA-induced Change[1]	-155	-183	-895	108	1,124	0	0
Hourly Wage Rate $	3.69	5.49	6.23	6.93	8.28	7.36	21.22
FMWA-induced Change	0.16	0.24	0.32	0.19	0.08	0.13	0.03
Annual Hours Worked	1,462	1,320	1,487	1,564	1,763	1,667	1,904
FMWA-induced Change	0	0	0	0	0	0	0
Annual Wage Earnings $	5,256	7,109	9,154	10,683	14,546	12,377	41,318
FMWA-induced Change	241	338	456	314	142	209	42
% of All Workers	0.0205	0.0071	0.0175	0.0266	0.1313	0.2030	1.0000
FMWA-induced Change	-0.0012	-0.0014	-0.0067	0.0008	0.0084	0.0000	0.0000
% of Workers with Wages < $9.50	0.1011	0.0349	0.0861	0.1310	0.6469	1.0000	0.0000
FMWA-induced Change	-0.0057	-0.0067	-0.0328	0.0040	0.0412	0.0000	0.0000

[1]In Stage 2 The FMWA-induced changes in the number of workers within wage groups is the net effect of worker movement between wage groups and the addition and subtraction of workers in marginally impacted states. As shown in Table 1.1, FMWA becomes binding in Stage 2 in six states: AR, MD, MN, MT, NC and MT. Due to a scheduled changes in a state minimum wage law, FMWA is not binding in New Mexico in Stage 2.

TABLE B4.1.c: The Effects of Stage 3 of the Fair Minimum Wage Act of 2007 on Groups of Workers at Different Hourly Wage Rates

Simulations Based on Zero Disemployment Effects and the Best Estimates of Wage Spillovers (Federal Minimum Wage Rises from $6.55 to $7.25)

	Group Means of Workers Classified by Hourly Wage Rates						All Workers (7)
	Wage Rates Below $5.15 (1)	Wage Rates $5.15 – $5.85 (2)	Wage Rates $5.86 – $6.55 (3)	Wage Rates $6.56 – $7.25 (4)	Wage Rates $7.26 – $9.50 (5)	All Workers Paid < $9.50 (6)	
Number of Workers (1,000s)	2,518	807	1,398	3,452	19,076	27,252	134,272
FMWA-induced Change[1]	-232	-38	-302	-1,675	2,246	0	0
Hourly Wage Rate $	3.74	5.48	6.24	6.94	8.31	7.52	21.25
FMWA-induced Change	0.22	0.23	0.28	0.37	0.16	0.20	0.04
Annual Hours Worked	1,499	1,193	1,507	1,519	1,748	1,667	1,904
FMWA-induced Change	0	0	0	0	0	0	0
Annual Wage Earnings $	5,497	6,385	9,177	10,389	14,457	12,604	41,364
FMWA-induced Change	353	294	394	548	270	320	65
% of All Workers	0.0188	0.0060	0.0104	0.0257	0.1421	0.2030	1.0000
FMWA-induced Change	-0.0017	-0.0003	-0.0022	-0.0125	0.0167	0.0000	0.0000
% of Workers with Wages < $9.50	0.0924	0.0296	0.0513	0.1267	0.7000	1.000077	0.0000
FMWA-induced Change	-0.0085	-0.0014	-0.0111	-0.0614	0.0824	0.0000	0.0000

[1]In Stage 3 of FMWA the induced changes in the number of workers within wage groups is the net effect of worker movement between wage groups and the addition of workers in marginally impacted states. As shown in Table 1.1, FMWA becomes binding in ten additional states in Stage 3: AZ, CO, DE, ME, MO, NJ, NY, OH, and PA.

TABLE B.4.4: The Cost of FMWA and Alternative Labor Market Policies for Equal Reductions in Poverty
Simulations Based Upon Zero Disemployment Effects and Best Estimates of Wage Spillovers

Stages of FMWA[1] and Alternative Poverty Lines[2]	Comprehensive Income Sen Index of Poverty		Total Costs of Alternative Labor Market Policies ($ millions)		
	Before Policy (1)	After Policy (2)	FMWA (3)	EITC (4)	FICA (5)
FMWA Stage 1					
50%	0.02360	0.02353	2,625.00	1702.50	2623.75
100%	0.05477	0.05460	2,625.00	1362.50	2623.75
150%	0.09913	0.09876	2,625.00	1490.00	1980.00
200%	0.15825	0.15786	2,625.00	1107.50	1485.00
FMWA Stage 2					
50%	0.02349	0.02344	4,125.00	2717.50	4946.25
100%	0.05453	0.05433	4,125.00	1528.75	3215.00
150%	0.09863	0.09816	4,125.00	1996.25	2720.00
200%	0.15768	0.15708	4,125.00	1868.75	2596.25
FMWA Stage 3					
50%	0.02343	0.02338	6,250.00	3385.00	6308.75
100%	0.05431	0.05396	6,250.00	3046.25	4691.25
150%	0.09810	0.09746	6,250.00	2453.75	3641.25
200%	0.15703	0.15621	6,250.00	2707.50	3457.50
FMWA– All Stages					
50%	—	—	13,000.00	7805.00	13878.75
100%	—	—	13,000.00	5937.50	10530.00
150%	—	—	13,000.00	5940.00	8341.25
200%	—	—	13,000.00	5683.75	7538.75

[1]The federal minimum wage rises by $0.70 in each stage of FMWA and by $2.10 across all stages.
[2]Alternative poverty lines are defined as a percentage of the official poverty cutoff and measured using Comprehensive Income.
[3]These costs are computed by multiplying the average costs per family (see Table B4.4.) by 125 million American families. We note that the costs of the FMWA do not vary across poverty lines as these are the poverty reductions that occur at each poverty line, given the cost of each phase of mandated increase in the federal minimum wage.

TABLE B.4.5: The Policy-effectiveness of Alternative Labor Market Policies in Moving Persons Out of Poverty

Simulations Based Upon Zero Disemployment Effects and Best Estimates of Wage Spillovers

Stages of FMWA[1] and Alternative Poverty Lines[2]	Poverty Measures[3]		Number Raised Above the Poverty Line by Alternative Labor Market Policies		
	Headcount Ratio (1)	Number (millions) (2)	FMWA (1000's) (3)	EITC (1000's) (4)	FICA (1000's) (5)
FMWA Stage 1					
50%	0.0338	10.14	60	60	60
100%[4]	0.0936	28.08	90	270	150
150%	0.1805	54.15	210	480	360
200%	0.3008	90.24	90	240	900
FMWA Stage 2					
50%	0.0355	10.65	0	30	0
100%[4]	0.0931	27.93	120	270	150
150%	0.1796	53.88	270	690	570
200%	0.3002	90.06	240	360	1260
FMWA Stage 3					
50%	0.0334	10.02	0	30	0
100%[4]	0.0927	27.81	240	510	360
150%	0.1785	53.55	390	990	840
200%	0.2993	89.79	330	660	1860
FMWA – All Stages					
50%	—	—	60	120	60
100%[4]	—	—	450	1050	660
150%	—	—	1320	2160	1770
200%	—	—	660	1260	4020

[1]The federal minimum wage rises by $0.70 in each stage of FMWA and by $2.10 across all stages.

[2]Alternative poverty lines are defined as a percentage of the official poverty cutoff and measured using Comprehensive Income.

[3]These costs are computed by multiplying the average costs per family (see Table B4.4.) by 125 million American families. We note that the costs of the FMWA do not vary across poverty lines as these are the poverty reductions that occur at each poverty line, given the cost of each phase of mandated increase in the federal minimum wage.

TABLE B.4.6: The Relative Cost and Policy-effectiveness of the Fair Minimum Wage Act of 2007 Compared to Alternative Labor Market Policies

Simulations Based Upon Zero Disemployment and Most Likely Wage Spillovers

Alternative Poverty Lines[1]	The Relative Effectiveness of FMWA					
	Cost-effectiveness Ratios[2]			Labor Market Policy Effectiveness Ratios[3]		
	FMWA's Change in the Minimum Wage (2)	Alternative Labor Market Policies with the Same Poverty-reducing Effects as FMWA		Total Costs of FMWA's Minimum Wage Increases[3] (5)	Alternative Labor Market Policies with the Same Total Costs of Reducing Poverty as FMWA	
		FICA (3)	EITC[2] (4)		FICA (6)	EITC (7)
Stage 1 of FMWA						
50%	1.57	1.57	1.00	1.00	1.00	1.00
100%	1.93	1.93	1.00	1.00	1.66	3.00
150%	1.76	1.32	1.00	1.00	1.71	2.29
200%	2.37	1.34	1.00	1.00	10.0	2.67
Stage 2 of FMWA						
50%	1.52	1.82	1.00	***	***	***
100%	2.70	2.10	1.00	1.00	1.25	2.25
150%	2.07	1.36	1.00	1.00	2.11	2.56
200%	2.21	1.39	1.00	1.00	5.25	1.50
Stage 3 of FMWA						
50%	1.85	1.86	1.00	***	***	***
100%	2.05	1.54	1.00	1.00	1.50	2.13
150%	2.55	1.48	1.00	1.00	2.15	2.54
200%	2.31	1.28	1.00	1.00	5.64	1.50
All Stages Combined						
50%	1.67	1.79	1.00	1.00	1.0	2.0
100%	2.19	1.77	1.00	1.00	1.47	2.33
150%	2.19	1.40	1.00	1.00	1.34	1.64
200%	2.28	1.33	1.00	1.00	6.09	1.91

**** = no effect of min wage on poverty

[1]Alternative poverty lines are defined as a percentage of the official poverty cutoff.

[2]The EITC is the low-cost policy alternative. For each poverty line considered the cost of the EITC is set equal to 1.00.

[3]FMWA is the least-effective policy and its costs are set equal to 1.00 for each poverty line considered.

APPENDIX C

Comprehensive Income and the Sen Index of Poverty

1. **FAMILY INCOME:** Where possible, family income is calculated as the sum of the incomes of each family member. See Appendix A for the precise definition of the family we use in all of our simulations. Cash income, including wages and salaries, dividends, rents, interest, self employment income, cash transfers, and other cash income items, are reported for each person. To these sums for all family members we add values for the variables available only at the family and household hierarchical levels. These variables include:

    - Food Stamps
    - Housing Subsidies
    - Energy Subsidies
    - School Lunch Subsidies
    - Implicit Return on Home Equity and Property Taxes

2. **COMPONENTS OF COMPREHENSIVE FAMILY INCOME:** Key components of family income that are not included in the Census Bureau's cash income concept include the following:

    - Earned Income Tax Credits.
    - Means Tested Transfers from the Government = the sum of supplemental security income + public assistance and welfare + market values of noncash benefits from food stamps, housing subsidies, energy subsidies, and school lunch subsidies.
    - Other Transfers = Nonmeans Tested Transfers from the Government + Private Transfers.
    - Implicit Return on Home Equity, and deductions of Other Taxes = the sum of direct federal, state, and property taxes (i.e., in arriving at comprehensive family income direct taxes are deducted.)

3. **SEN INDEX OF POVERTY:** To evaluate poverty we estimate three types of poverty statistics, the headcount ratio, the poverty (income) gap, and the Sen index. To estimate the headcount ratio, we let $\mathbf{H}(z)$ represent the proportion of the population at or below any poverty line, z. Specifically,

$$H(z) = q(z)/n \quad (1)$$

where q is the number of incomes in **X** that do not exceed z, and n is the population size.

To estimate the poverty gap, let I(z) represent the average of the shortfalls of income received by those below the poverty line, or

2

$$P(x; z) = \frac{1}{n(x)} \sum_{i=1}^{n} \frac{z - x_i}{z}$$

where x_i is the *i*th individual's income. It is also common to consider the product between the headcount ratio, H(z), and the income gap ratio, I(z), as a measure of poverty. The resulting measure is termed " the poverty gap ratio."

To incorporate all relevant dimensions of poverty, Sen proposes an index that is equal to the aggregated income gaps between each poor income and the poverty line, weighted by each individual's relative rank among the poor. Sen (1976) shows that such an index, which we denote as S, can be rewritten as,

3

$$S = H\{I + (1 - I)\, G_p[q/(q+1)]\}$$

where H is the headcount poverty ratio, I is the ratio of the average income compared to the poverty line (hereafter referred to as the income gap ratio), Gp is the Gini coefficient of income inequality among the poor, and q is the number of people below the poverty threshold. The Sen index is widely acknowledged to be an improvement over simple headcount measures of poverty, but is not without its own difficulties. For a general survey of distribution sensitive poverty indices, see Zheng (1997).

APPENDIX D

Results Simulations Based Upon Best Estimates of Disemployment Effects and No Trickle-up Wage Spillover

TABLE D4.1: The Effects of Stage 1 of the Fair Minimum Wage Act of 2007 on Groups of Workers at Different Hourly Wage Rates

Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

Table D4.1.a Stage 1—Federal Minimum Wage Rises from $5.15 to $5.85

	Group Means of Workers Classified by Hourly Wage Rates						
	Wage Rates Below $5.15[1] (1)	Wage Rates $5.15 – $5.85[2] (2)	Wage Rates $5.86 – $6.55[2] (3)	Wage Rates $6.56 – $7.25[2] (4)	Wage Rates $7.26 – $9.50[3] (5)	All Workers Paid < $9.50 (6)	All Workers (7)
Number of Workers (1,000s)	3,211	1,394	2,881	4,203	15,562	27,252	134,272
FMWA-induced Change	-291	-401	692	0	0	0	0
Hourly Wage Rate $	3.70	5.47	6.23	6.98	8.30	7.19	21.19
FMWA-induced Change	0.17	0.20	0.00	0.00	0.00	0.03	0.01
Annual Hours Worked	1,444	1,452	1,532	1,618	1,770	1,667	1,904
FMWA-induced Change	-4	-4	0	0	0	0	0
Annual Wage Earnings $	5,244	7,925	9,508	11,214	14,751	12,182	41,279
FMWA-induced Change	222	261	0	0	0	40	8
% of All Workers	0.0239	0.0104	0.0215	0.0313	0.1159	0.2030	1.0000
FMWA-induced Change	-0.0022	-0.0030	0.0052	0.0000	0.0000	0.0000	0.0000
% of Workers with Wages < $9.50	0.1178	0.0512	0.1057	0.1542	0.5711	1.0000	0.0000
FMWA-induced Change	-0.0107	-0.0147	0.0254	0.0000	0.0000	0.0000	0.0000

[1]FMWA moves 291,000 workers to the next higher wage group.

[2]FMWA moves some workers into this group from below and others to the next higher wage group. The FMWA-induced change net movement.

[3]The wage spillovers from FMWA move 938,000 workers into this wage group.

Note: Some small differences in starting value in number of workers and hourly wage from trickle-up results.

TABLE D4.1 (Cont'd.): The Effects of the Fair Minimum Wage Act of 2007 on Groups of Workers at Different Hourly Wage Rates

Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

Table D4.1.b Stage 2—Federal Minimum Wage Rises from $5.85 to $6.55

	Group Means of Workers Classified by Hourly Wage Rates						
	Wage Rates Below $5.15 (1)	Wage Rates $5.15 – $5.85 (2)	Wage Rates $5.86 – $6.55 (3)	Wage Rates $6.56 – $7.25 (4)	Wage Rates $7.26 – $9.50 (5)	All Workers Paid < $9.50 (6)	All Workers (7)
Number of Workers (1,000s)	2,781	922	3,351	3,978	15,221	27,252	134,272
FMWA-induced Change[1]	-155	-179	-1,906	2,239	0	0	0
Hourly Wage Rate $	3.70	5.50	6.16	6.96	8.29	7.27	21.20
FMWA-induced Change	0.14	0.24	0.28	0.00	0.00	0.06	0.01
Annual Hours Worked	1,463	1,298	1,520	1,600	1,768	1,666	1,904
FMWA-induced Change	-4	-2	-4	0	0	0	0
Annual Wage Earnings $	5,284	7,018	9,277	11,016	14,674	12,259	41,294
FMWA-induced Change	189	326	398	0	0	79	16
% of All Workers	0.0207	0.0069	0.0250	0.0296	0.1208	0.2030	
FMWA-induced Change	-0.0012	-0.0013	-0.0142	0.0167	0.0000	0.0000	
% of Workers with Wages < $9.50	0.1020	0.0338	0.1230	0.1460	0.5952	1.0000	
FMWA-induced Change	-0.0057	-0.0066	-0.0699	0.0822	0.0000	0.0000	

[1]In Stage 2 The FMWA-induced changes in the number of workers within wage groups is the net effect of worker movement between wage groups and the addition and subtraction of workers in marginally impacted states. As shown in Table 1.1, FMWA becomes binding in Stage 2 in six states: AR, MD, MN, MT, NC, and MT. Due to a scheduled changes in a state minimum wage law, FMWA is not binding in New Mexico in Stage 2.

TABLE D4.1 (Cont'd.): The Effects of the Fair Minimum Wage Act of 2007 on Groups of Workers at Different Hourly Wage Rates

Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

Table D4.1.c Stage 3—Federal Minimum Wage Rises from $6.55 to $7.25

	Group Means of Workers Classified by Hourly Wage Rates						
	Wage Rates Below $5.15 (1)	Wage Rates $5.15 – $5.85 (2)	Wage Rates $5.86 – $6.55 (3)	Wage Rates $6.56 – $7.25 (4)	Wage Rates $7.26 – $9.50 (5)	All Workers Paid < $9.50 (6)	All Workers (7)
Number of Workers (1,000s)	2,526	816	1,376	6,112	16,422	27,252	134,272
FMWA-induced Change[1]	-203	-51	-275	-4,324	4,853	0	0
Hourly Wage Rate $	3.72	5.48	6.24	6.83	8.28	7.35	21.22
FMWA-induced Change	0.18	0.21	0.27	0.37	0.00	0.12	0.02
Annual Hours Worked	1,490	1,216	1,493	1,559	1,768	1,665	1,903
FMWA-induced Change	-5	-3	-3	-4	0	-1	0
Annual Wage Earnings $	5,430	6,505	9,115	10,556	14,646	12,350	41,361
FMWA-induced Change	258	258	370	536	0	171	35
% of All Workers	0.0188	0.0061	0.0102	0.0455	0.1223	0.2030	1.0000
FMWA-induced Change	-0.0015	-0.0004	-0.0020	-0.0322	0.0361	0.0000	0.0000
% of Workers with Wages < $9.50	0.0927	0.0300	0.0505	0.2243	0.6026	1.0000	0.0000
FMWA-induced Change	-0.0075	-0.0019	-0.0101	-0.1586	0.1781	0.0000	0.0000

[1]In Stage 3 of FMWA the induced changes in the number of workers within wage groups is the net effect of worker movement between wage groups and the addition of workers in marginally impacted states. As shown in Table 1.1, FMWA becomes binding in ten additional states in Stage 3: AZ, CO, DE, ME, MO, NJ, NY, OH, and PA.

TABLE D4.1 (Cont'd.): The Effects of the Fair Minimum Wage Act of 2007 on Groups of Workers at Different Hourly Wage Rates

Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

Table D4.1.d Hypothetical $9.50 Minimum Wage—Federal Minimum Rises from $7.25 to $9.50

	Group Means of Workers Classified by Hourly Wage Rates						
	Wage Rates Below $5.15 (1)	Wage Rates $5.15 – $5.85 (2)	Wage Rates $5.85 – $6.55 (3)	Wage Rates $6.55 – $7.25 (4)	Wage Rates $7.25 – $9.50 (5)	All Workers Paid < $9.50 (6)	All Workers (7)
Number of Workers (1,000s)	2,323	765	1,101	1,789	21,275	27,252	134,272
FMWA-induced Change[1]	-961	-323	-532	-1,244	-17,566	-20,627	0
Hourly Wage Rate $	3.76	5.48	6.24	6.95	8.05	7.47	21.24
FMWA-induced Change	1.07	1.50	1.74	1.91	1.44	1.45	0.29
Annual Hours Worked	1,487	1,220	1,531	1,486	1,721	1,664	1,903
FMWA-induced Change	-21	-22	-14	-11	-9	-11	-2
Annual Wage Earnings $	5,505	6,480	9,353	10,059	13,874	12,520	41,347
FMWA-induced Change	1,515	1,633	2,558	2,712	2,300	2,252	457
% of All Workers	0.0173	0.0057	0.0082	0.0133	0.1584	0.2030	1.0000
FMWA-induced Change	-0.0072	-0.0024	-0.0040	-0.0093	-0.1308	-0.1536	0.0000
% of Workers with Wages < $9.50	0.0852	0.0281	0.0404	0.0656	.07807	1.0000	0.0000
FMWA-induced Change	-0.0353	-0.0119	-0.0195	-0.0456	-0.6446	-0.7569	0.0000

[1]In Stage 3 of FMWA the induced changes in the number of workers within wage groups is the net effect of worker movement between wage groups and the addition of workers in marginally impacted states. As shown in Table 1.1, FMWA becomes binding in ten additional states in Stage 3: AZ, CO, DE, ME, MO, NJ, NY, OH, and PA.

TABLE D4.2: Total Families and Families Directly Affected By the Fair Minimum Wage Act of 2007

Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

	Total Number of Families (millions) (1)	Number of Directly Affected Families[2] (millions) (2)	Percent of Families Directly Affected by FMWA (3)
Stage 1 of FMWA			
All Families	124.95	1.47	1.2
Low-income Families[1]	40.95	.718	1.8
Stage 2 of FMWA			
All Families	124.95	3.14	2.5
Low-income Families	40.92	1.49	3.6
Stage 3 of FMWA			
All Families	124.95	7.26	5.8
Low-income Families	40.88	3.19	7.8
Hypothetical $9.50 Minimum Wage			
All Families	124.95	21.50	17.2
Low-income Families	40.77	9.01	22.1

[1]Low-income families are defined as those below twice the official poverty line.
[2]Directly affected families include those with minimum wage workers and low-wage workers receiving spillovers.

TABLE D4.3: Simulated Effects of the Fair Minimum Wage Act of 2007 and Alternative Equal-cost Labor Market Policies on Family Comprehensive Incomes of Selected Low-income Subgroups, Quintiles of All Families and the Top Five Percent

Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

Table D4.3a Stage 1—Federal Minimum Wage Rises from $5.15 to $5.85[1]

Four Subgroups of Low-income Families,[2] Quintiles of Families, and the Top 5%	Shares of All Families (1)	Mean Comprehensive Income (2)	Changes in Comprehensive Family Income					
			Simulation Assuming Zero Disemployment Effects			Simulation Using Best Estimates of Disemployment Effects		
			Minimum Wage (3)	EITC (4)	FICA (5)	Minimum Wage (6)	EITC (7)	FICA (8)
Low-Income Subgroups								
1. Below 50%	0.038	3,120	4	2	2	4	2	2
2. 50-100%	0.071	9,959	14	11	8	13	10	7
3. 100-150%	0.098	16,298	14	22	19	13	20	17
4. 150-200%	0.121	24,048	9	20	37	9	18	33
All Families < 200%	0.327	16,264	11	17	21	10	15	19
Quintiles & the Top 5%								
1st Quintile	0.200	11,450	12	14	11	11	13	10
2nd Quintile	0.200	26,098	8	16	23	8	15	21
3rd Quintile	0.200	38,466	7	3	0	7	3	0
4th Quintile	0.200	57,436	5	1	0	4	1	0
5th Quintile	0.200	114,883	3	0	0	3	0	0
Top 5%	0.050	195,021	1	0	0	1	0	0
All Families	1.000	49,668	7	7	0	7	6	6

[1]Stage 1 of the FMWA affects workers in 20 states, but the impacts of the 70-cent rise in the minimum wage shown below are on the nation as a whole.

[2]Low-income family Subgroups are categorized by the size of family comprehensive income relative to the official U.S. Government definition of poverty. Thus the group 50–100% includes all families with comprehensive income equal to or below the poverty line, but above 50% of the value of the poverty line.

TABLE D4.3 (Cont'd.): Simulated Effects of the Fair Minimum Wage Act of 2007 and Alternative Equal-cost Labor Market Policies on Family Comprehensive Incomes of Selected Low-income Subgroups, Quintiles of All Families and the Top Five Percent

Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

Table D4.3.b Stage 2—Federal Minimum Wage Rises from $5.85 to $6.55[1]

Four Subgroups of Low-income Families,[2] Quintiles of Families, and the Top 5%	Shares of All Families (1)	Mean Comprehensive Income (2)	Changes in Comprehensive Family Income					
			Simulation Assuming Zero Disemployment Effects			Simulation Using Best Estimates of Disemployment Effects		
			Minimum Wage (3)	EITC (4)	FICA (5)	Minimum Wage (6)	EITC (7)	FICA (8)
Low-Income Subgroups								
1. Below 50%	0.038	3,106	5	5	4	4	4	3
2. 50-100%	0.071	9,965	20	21	15	19	19	14
3. 100-150%	0.098	16,301	28	43	36	27	39	33
4. 150-200%	0.121	24,060	18	39	73	17	35	65
All Families < 200%	0.327	16,280	20	32	41	19	29	37
Quintiles & the Top 5%								
1st Quintile	0.200	11,469	21	28	22	20	25	20
2nd Quintile	0.200	26,109	19	32	45	18	29	41
3rd Quintile	0.200	38,486	14	6	0	13	5	0
4th Quintile	0.200	57,445	9	2	0	8	1	0
5th Quintile	0.200	114,888	5	0	0	5	0	0
Top 5%	0.050	195,017	2	0	0	2	0	0
All Families	1.000	49,680	14	14	14	13	12	12

[1]Stage 2 of the FMWA affects workers in 26 states, but the impacts of the Stage 2 rise in the minimum wage shown below are on the nation as a whole.

[2]Low-income family Subgroups are categorized by the size of family comprehensive income relative to the official U.S. Government definition of poverty. Thus the group 50–100% includes all families with comprehensive income equal to or below the poverty line, but above 50% of the value of the poverty line.

TABLE D4.3 (Cont'd.): Simulated Effects of the Fair Minimum Wage Act of 2007 and Alternative Equal-cost Labor Market Policies on Family Comprehensive Incomes of Selected Low-income Subgroups, Quintiles of All Families and the Top Five Percent

Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

Table D4.3c Stage 3—Federal Minimum Wage Rises from $6.55 to $7.25[1]

Four Subgroups of Low-income Families,[2] Quintiles of Families, and the Top 5%	Shares of All Families (1)	Mean Comprehensive Income (2)	Changes in Comprehensive Family Income					
			Simulation Assuming Zero Disemployment Effects			Simulation Using Best Estimates of Disemployment Effects		
			Minimum Wage (3)	EITC (4)	FICA (5)	Minimum Wage (6)	EITC (7)	FICA (8)
Low-Income Subgroups								
1. Below 50%	0.037	3,106	10	10	8	9	9	7
2. 50-100%	0.070	9,972	33	45	33	31	41	30
3. 100-150%	0.098	16,302	46	91	77	45	83	71
4. 150-200%	0.121	24,035	43	83	154	42	75	139
All Families < 200%	0.327	16,290	38	69	88	37	62	80
Quintiles & the Top 5%								
1st Quintile	0.200	11,499	35	59	48	34	54	44
2nd Quintile	0.200	26,121	43	68	96	41	62	87
3rd Quintile	0.200	38,504	34	13	0	31	11	0
4th Quintile	0.200	57,457	20	4	0	19	3	0
5th Quintile	0.200	114,894	12	1	0	11	1	0
Top 5%	0.050	195,080	5	1	0	4	1	0
All Families	1.000	49,696	29	29	29	27	26	26

[1]Stage 3 of the FMWA affects workers in 35 states, but the impacts of the Stage 3 rise in the minimum wage shown below are on the nation as a whole.

[2]Low-income family Subgroups are categorized by the size of family comprehensive income relative to the official U.S. Government definition of poverty. Thus the group 50–100% includes all families with comprehensive income equal to or below the poverty line, but above 50% of the value of the poverty line.

TABLE D4.3 (Cont'd.): Simulated Effects of the Fair Minimum Wage Act of 2007 and Alternative Equal-cost Labor Market Policies on Family Comprehensive Incomes of Selected Low-income Subgroups, Quintiles of All Families and the Top Five Percent

Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

Table D4.3d Hypothetical $9.50 Minimum Wage—Federal Minimum Wage Rises from $7.25 to $9.50[1]

Four Subgroups of Low-income Families,[2] Quintiles of Families, and the Top 5%	Shares of All Families (1)	Mean Comprehensive Income (2)	Changes in Comprehensive Family Income					
			Simulation Assuming Zero Disemployment Effects			Simulation Using Best Estimates of Disemployment Effects		
			Minimum Wage (3)	EITC (4)	FICA (5)	Minimum Wage (6)	EITC (7)	FICA (8)
Low-Income Subgroups								
1. Below 50%	0.037	3,109	91	123	71	83	112	69
2. 50-100%	0.070	9,969	322	561	286	303	519	281
3. 100-150%	0.097	16,290	542	1,144	681	522	1,052	663
4. 150-200%	0.121	24,040	511	1,051	1,358	497	967	1,298
All Families < 200%	0.326	16,303	432	867	778	416	798	749
Quintiles & the Top 5%								
1st Quintile	0.200	11,531	379	746	421	362	687	411
2nd Quintile	0.200	26,159	509	853	847	495	786	810
3rd Quintile	0.200	38,540	427	163	0	408	148	0
4th Quintile	0.200	57,479	329	44	0	312	39	0
5th Quintile	0.200	114,904	174	11	0	161	10	0
Top 5%	0.050	195,091	111	9	0	100	8	0
All Families	1.000	49,725	363	363	254	347	334	244

[1]The hypothetical $9.50 minimum wage is assumed to affect low-wage workers in all states and the impacts of the rise in the minimum wage shown below are on the nation as a whole.

[2]Low-income family Subgroups are categorized by the size of family comprehensive income relative to the official U.S. Government definition of poverty. Thus the group 50–100% includes all families with comprehensive income equal to or below the poverty line, but above 50% of the value of the poverty line.

TABLE D4.4: The Costs of FMWA and Alternative Labor Market Policies Achieving Equivalent Reductions in Poverty

Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

Minimum Wage Increases[1] and Alternative Poverty Lines[2]	Comprehensive Income Sen Index of Poverty		Total Costs of Alternative Labor Market Policies ($ millions)[3]		
	Before Policy (1)	After Policy (2)	FMWA (3)	EITC (4)	FICA (5)
FMWA Stage 1					
50%	0.02360	0.02356	875	681	990
100%	0.05477	0.05469	875	500	1,239
150%	0.09913	0.09900	875	618	875
200%	0.15826	0.15813	875	341	500
FMWA Stage 2					
50%	0.02352	0.02349	1,625	1,625	1,984
100%	0.05464	0.05454	1,625	596	1,239
150%	0.09892	0.09870	1,625	851	1,239
200%	0.15803	0.15778	1,625	681	991
FMWA Stage 3					
50%	0.02349	0.02345	3,375	2,040	3,375
100%	0.05452	0.05430	3,375	1,785	3,375
150%	0.09865	0.09825	3,375	1,530	2,225
200%	0.15773	0.15723	3,375	1,445	1,983
Hypothetical $9.50 Minimum Wage					
50%	0.02345	0.02301	43,500	21,375	[4]
100%	0.05430	0.05252	43,500	16,950	[4]
150%	0.09825	0.09445	43,500	15,000	[4]
200%	0.15723	0.15198	43,500	16,500	[4]

[1]The federal minimum wage rises by 70-cents in each stage of FMWA and $2.25 with the hypothetical minimum wage of $9.50.
[2]Alternative poverty lines are defined as a percentage of the official poverty cutoff and measured using comprehensive family income.
[3]These costs are computed by multiplying the average costs per family (see Table B.4.4) by 125 million American families. We note that the costs of the FMWA do not vary across poverty lines as these are the poverty reductions that occur at each poverty line, given the cost of each phase of mandated increase in the federal minimum wage.
[4]The FICA cost is well below FMWA and EITC (see last row, Table D4.3d). This is because we restrict the FICA transfer to workers in families below 200 percent of the official poverty line and the maximum possible rebate to this group is less than the cost of the $9.50 minimum wage increase. Therefore, in analyzing the hypothetical $9.50 minimum wage we do not consider a FICA rebate alternative policy.

TABLE D4.5: The Policy Effectiveness of Alternative Labor Market Policies in Moving Persons Out of Poverty

Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

Minimum Wage Increases[1] and Alternative Poverty Lines[2]	Proportions and Number of Persons in Poverty		Number Raised Above the Poverty Line by Alternative Labor Market Policies		
	Headcount Ratio (1)	Number (millions) (2)	FMWA (1000's) (3)	EITC (1000's) (4)	FICA (1000's) (5)
FMWA Stage 1					
50%	0.0338	10.14	30	60	30
100%[4]	0.0936	28.08	30	120	60
150%	0.1805	54.15	30	90	90
200%	0.3009	90.27	30	120	270
FMWA Stage 2					
50%	0.0336	10.08	30	30	0
100%[4]	0.0933	27.99	30	120	60
150%	0.1803	54.09	120	210	210
200%	0.3007	90.21	60	180	450
FMWA Stage 3					
50%	0.0335	10.05	0	0	0
100%[4]	0.0931	27.93	120	270	240
150%	0.1798	53.94	240	570	510
200%	0.3004	90.12	210	300	1050
Hypothetical $9.50 Minimum Wage					
50%	0.02345	0.02301	43,500	21,375	[5]
100%	0.05430	0.05252	43,500	16,950	[5]
150%	0.09825	0.09445	43,500	15,000	[5]
200%	0.15723	0.15198	43,500	16,500	[5]

[1]The federal minimum wage rises by 70 cents in each stage of FMWA and by $2.10 across all three stages. A hypothetical $9.50 federal minimum wage is modeled as a $2.25 increase from the Stage 3 FMWA minimum of $7.25.

[2]Alternative poverty lines are defined as a percentage of the official poverty cutoff.

[3]All poverty measures are defined in terms of comprehensive family income.

[4]100% is the Official poverty line, but here it is measured in terms of comprehensive income rather than cash income.

[5]Note that the FFICA cost is well below FMWA and EITC (see last row, Table D4.3.d). This is because we restrict FICA transfers to workers in families below 200 percent of the official poverty line and the maximum possible rebate to this group is less than the cost of the $9.50 minimum wage increase. Therefore, in analyzing the hypothetical $9.50 minimum wage, we do not consider a FICA rebate alternative policy.

TABLE D.4.6: The Relative Cost- and Policy-effectiveness of the Fair Minimum Wage Act of 2007 and Alternative Labor Market Policies
Simulations Based on the Best Estimates of Disemployment Effects and No Trickle-up Wage Spillovers

Minimum Wage Increases and Alternative Poverty Lines[1]	The Relative Effectiveness of the Fair Minimum Wage Act					
	Cost Effectiveness Ratios[2]			Labor Market Policy Effectiveness Ratios[3]		
	FMWA's Change in the Minimum Wage (2)	Alternative Labor Market Policies with the Same Poverty-reducing Effects as FMWA		Total Costs of FMWA's Minimum Wage Increases[3] (5)	Alternative Labor Market Policies with the Same Total Costs of Reducing Poverty as FMWA	
		FICA (3)	EITC[2] (4)		FICA (6)	EITC (7)
Stage 1 of FMWA						
50%	1.28	1.45	1.00	1.00	1.0	2.0
100%	1.75	2.48	1.00	1.00	2.0	4.0
150%	1.42	1.42	1.00	1.00	3.0	3.0
200%	2.57	1.47	1.00	1.00	9.0	4.0
Stage 2 of FMWA						
50%	1.00	1.22	1.00	1.00	—	1.0
100%	2.72	2.08	1.00	1.00	2.0	4.0
150%	1.91	1.46	1.00	1.00	1.75	1.75
200%	2.39	1.46	1.00	1.00	7.5	3.0
Stage 3 of FMWA						
50%	1.65	1.65	1.00	1.00	—	—
100%	1.89	1.80	1.00	1.00	2.0	2.25
150%	2.21	1.45	1.00	1.00	2.13	2.38
200%	2.34	1.37	1.00	1.00	5.0	1.43
Hypothetical $9.50 Minimum Wage						
50%	2.03	4	1.00	1.00	[4]	1.63
100%	2.57	4	1.00	1.00	[4]	1.89
150%	2.90	4	1.00	1.00	[4]	2.70
200%	2.64	4	1.00	1.00	[4]	2.14

[1]Alternative poverty lines are defined as a percentage of the official poverty cutoff.
[2]The EITC is the low-cost policy alternative. For each poverty line considered the cost of the EITC is set equal to 1.00.
[3]FMWA is the least-effective policy and its costs are set equal to 1.00 for each poverty line considered.
[4]Note that the FICA cost is well below FMWA and EITC (see last row, Table D4.3d). This is because we restrict the FICA transfers to workers in families below 200 percent of the official poverty line and the maximum possible rebate to this group is much less than the cost of the $9.50 minimum wage increase. Therefore, in analyzing the hypothetical $9.50 minimum wage we do not consider a FICA rebate alternative policy.

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Employment Policies

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