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POLICY

S T U D Y

NUMBER 2

OCTOBER 2, 2006

THE ECONOMIC EFFECTS OF MINIMUM WAGES

WHAT MIGHT MISSOURI EXPECT FROM PASSAGE OF PROPOSITION B?

By David Neumark

EXECUTIVE SUMMARY

In November, Missouri voters will vote on Proposition B, which would raise the state's minimum wage to \$6.50 per hour and thereafter index it to the Consumer Price Index, ensuring annual minimum wage increases of the same size (in percentage terms) as the rate of inflation. This paper provides an overview, based on a large body of existing research, of evidence on the effects of federal and especially state minimum wage increases.

The central goal of raising the minimum wage is to raise incomes of low-income families and reduce poverty. There are three reasons why raising the minimum may not help to achieve this goal. First, a higher minimum wage may discourage employers from using the very low-wage, low-skill workers that minimum wages are intended to help. Second, a higher minimum wage may hurt poor and low-income families rather

than help them, if the disemployment effects are concentrated among workers in low-income families. And third, a higher minimum wage may reduce training, schooling, and work experience—all of which are important sources of higher wages—and hence make it harder for workers to attain the higher-wage jobs that may be the best means to an acceptable level of family income.

The evidence from a large body of existing research suggests that minimum wage increases do more harm than good. Minimum wages reduce employment of young and less-skilled workers. Minimum wages deliver no net benefits to poor or low-income families, and if anything make them worse off, increasing poverty. Finally, there is some evidence that minimum wages have longer-run adverse effects, lowering the acquisition of skills and therefore lowering wages and earnings even beyond the age when individuals are most directly affected by a higher minimum.

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A higher minimum wage reduces employment among the least-skilled.

INTRODUCTION

The federal minimum wage was raised in 1997 to its current level of \$5.15. Since then, 18 states and the District of Columbia have implemented or maintained minimum wages higher than the federal level, which typically apply to most workers. In November, Missouri voters will vote on Proposition B, which would raise the state's minimum wage to \$6.50 per hour and thereafter index it to the Consumer Price Index, ensuring annual minimum wage increases of the same size (in percentage terms) as the rate of inflation.

The central policy goal of minimum wages is to raise the incomes of low-wage workers so as to reduce poverty. Senator Edward Kennedy of Massachusetts, a perennial sponsor of legislation to increase the minimum wage, has been quoted as saying, "The minimum wage was one of the first—and is still one of the best—anti-poverty programs we have" (quoted in Clymer, 1999, p. 449). That minimum wages would have these salutary impacts seems, on the surface, obvious. After all, a higher minimum wage must raise the wage a worker earns, and thus increase his income. And minimum wage workers must—given their low wages—be in poor or low-income families. Conversely, criticisms of proposals to raise the minimum wage may seem like nothing more than self-interested efforts on behalf of businesses that would foot the bill for a higher minimum wage.

However, although a higher minimum wage for low-wage workers may seem like a natural way to fight poverty, there are three reasons why raising the minimum

may not help to achieve this goal. First, a higher minimum wage may discourage employers from using the very low-wage, low-skill workers minimum wage proponents are trying to help. This, of course, is the most widespread argument against minimum wages, and the disemployment effects of minimum wages are subject to some dispute. However, for the United States, the preponderance of evidence points to disemployment effects from a higher minimum wage.

Second, a higher minimum wage may hurt poor and low-income families rather than help them. Allowing that there are some disemployment effects, minimum wages create "winners" and "losers." The winners get a higher wage with no reduction in employment (or hours); the losers, in contrast, bear the burden of the disemployment effects—losing their jobs, having their hours reduced, or finding it more difficult to enter employment. Furthermore, many minimum wage workers are not primary earners in poor or low-income families, but instead are secondary workers, such as teenagers in higher-income families. As a consequence, if the gains from minimum wages accrue to minimum wage workers in higher-income families, while the losses are borne by minimum wage workers in low-income families, minimum wages may have perverse distributional effects—possibly increasing, rather than decreasing, the number of poor or low-income families. Evidence for the United States from precisely the type of state minimum wage increase that Missouri is contemplating generally fails to demonstrate that minimum wages help the poor, and if anything suggests that

minimum wages increase the number of poor or low-income families.

Finally, while the discussion thus far has focused on the short-run effects of minimum wages, there are potential adverse longer-run effects. Labor economists agree that schooling, work experience, and workplace training are three of the principal sources of wage growth. However, minimum wages may act to reduce all three of these. They may reduce training provided by employers, in response to higher labor costs. They may reduce schooling by enticing those students who can find employment at the higher minimum to leave school. And they may reduce the accumulation of work experience directly via their disemployment effects. There is, in fact, evidence of all three of these types of effects. These do not necessarily fall on poor or low-income families. But these adverse effects of minimum wages on skill formation do imply that fewer workers will attain the higher-wage jobs as adults that are probably the single best means to an acceptable level of family income.

In sum, much evidence for the United States indicates that minimum wages are unlikely to achieve the goals of those who advocate a higher minimum wage. A higher minimum reduces employment among the least-skilled. Although offset in part by higher wages paid to some workers, the costs are borne by poor and low-income families, so that if anything a higher minimum wage increases poverty. And over the longer-term minimum wages lead to lower skill levels and therefore lower wages. Thus, voters interested in redistributing income toward poor and low-

income families should consider policy options other than a higher minimum wage.

The following sections provide the details on which these conclusions are based. After a brief review of the theory underlying the effects of minimum wages, empirical evidence is presented on the employment effects of minimum wages, their distributional effects, and their longer-run impact.

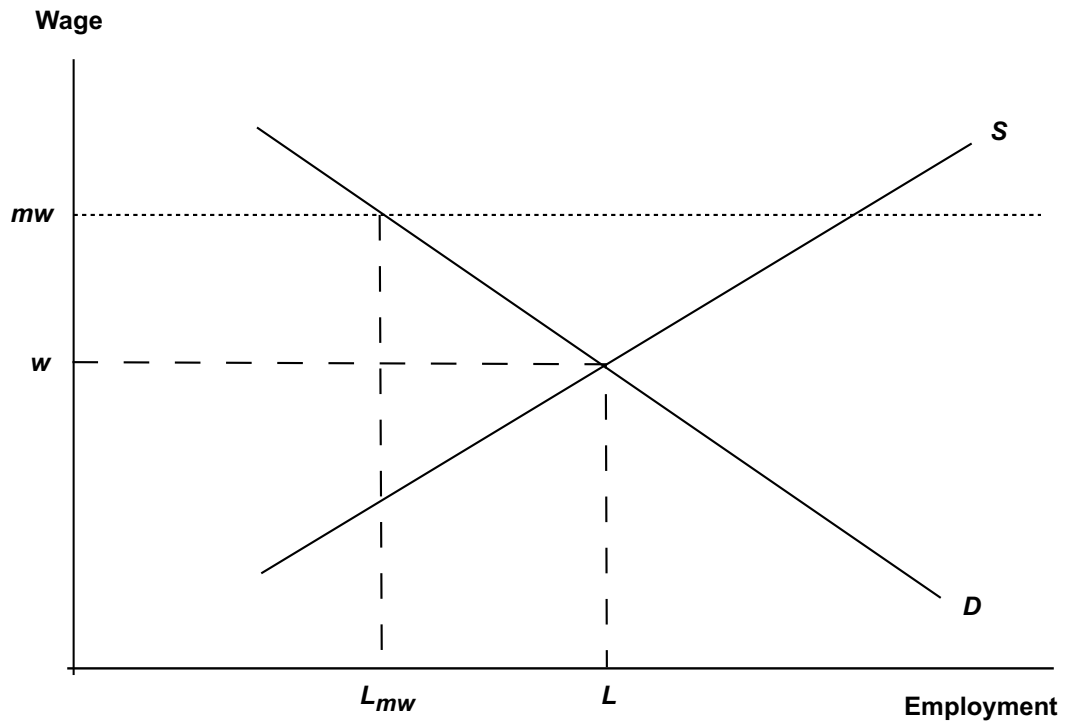
EMPLOYMENT EFFECTS: THEORY

The textbook economic model of the effect of the minimum wage is straightforward. In the textbook treatment, there is a competitive labor market for a single type of labor, for which there is an upward-sloping aggregate labor supply curve (S) and a downward-sloping aggregate labor demand curve (D). In the absence of a minimum wage, there is an equilibrium wage w and an equilibrium quantity of labor employed L , as depicted in Figure 1.

If a minimum wage mw is established at a level higher than w —so that the minimum wage is “binding”—then employers reduce their use of labor for two reasons. First, there is a substitution effect leading employers to use relatively less of the now-more-expensive labor and relatively more of other inputs (such as capital), in an effort to reduce production costs to their lowest possible level. Second, because costs must be higher with this new input mix (otherwise employers were not previously minimizing costs), the prices of the products firms

Over the longer-term minimum wages lead to lower skill levels and therefore lower wages.

Figure 1
The Textbook Treatment of Minimum Wages



For every 10 percent increase in the minimum wage, employment of teenagers falls by 1 percent to 2 percent.

produce must rise. This, in turn, reduces demand for each firm's product, leading to a reduction in the scale of operation. Consequently, both this scale effect and the substitution effect lead to lower employment, at the level $L_{mw} < L$.

In the research literature on minimum wages, employment effects are typically summarized in terms of the "employment elasticity." The employment elasticity is the ratio of the percentage change in employment to the percentage change in the wage induced by the wage floor, or in terms of the above notation:

$$\text{Employment elasticity} = \frac{\{(L_{mw} - L)/L\}}{\{(mw - w)/w\}}.$$

This summary measure is convenient because it can be used to predict the percentage change in employment resulting from a given percentage change in the minimum. Thus, for example, an

elasticity of -0.1 implies that a 10 percent increase in the wage floor reduces employment by 1 percent.

Of course the scenario depicted in Figure 1 is based on a model, and a simple one at that. Economists use models not because they believe the models are completely accurate descriptions of reality, but because they highlight key ideas. The key idea underlying the textbook model of minimum wages is that when something becomes more expensive people use less of it, and they accomplish this in part by substituting towards other alternatives. We see this ideal illustrated in myriad ways every day. A prime current example is the set of responses to higher gasoline prices, including reduced driving, increased demand for fuel-efficient cars (substituting alternative equipment for fuel), and

increased demand for alternative fuels such as ethanol (substituting non-petroleum for petroleum products). Similarly, employers of low-skill labor, when faced with a higher price for that labor, should be expected to substitute away from low-skill labor and towards other types of labor as well as towards labor-saving machinery.

However, the model depicted in Figure 1 may be overly simplistic, and a richer model may have different or at least more nuanced implications. Sticking to the baseline competitive model of labor markets, there are two reasons why a higher minimum wage may not produce a decline in employment, or at least not one that is large enough to be detectable. The first was hinted at above. Although Figure 1 was drawn as if there was only one kind of labor, labor is actually heterogeneous, with workers having varying skill levels. When there are different types of labor differentiated by skill level, employers may substitute from the least-skilled to slightly more-skilled labor after a minimum wage increase. For example, at a particular firm two more-skilled workers may be able to produce the same output as three less-skilled workers. But if the price of more-skilled labor is, for example, \$8 per hour, versus \$5 per hour for least-skilled labor, it is more profitable to hire three of the latter workers. However, if a minimum wage of \$6 is established, then because this is binding for the least-skilled workers their wage rises to \$6 per hour, and it will now be more profitable to replace three least-skilled workers with two more-skilled workers (paying a total of \$16 rather than \$18).

Even though employment declines (by one worker, in this example), the overall employment decline (one worker) is much smaller than the employment decline among unskilled workers (three workers). One can construct other examples in which there is a lot of substitution and the overall employment effect is quite small. Note, however, that among the workers the higher minimum wage is intended to help—those originally earning \$5 per hour—the disemployment effect is quite severe. This admittedly simple example illustrates an important point about minimum wages: one type of substitution they generate is “labor-labor” substitution. Substitution among different types of workers may mask disemployment effects for relatively broad groups of workers. But it entails sharp disemployment effects for the least-skilled.

THE MONOPSONY MODEL

A more fundamental challenge to the competitive model’s prediction that minimum wages will reduce employment comes from models of monopsony power in labor markets, in which a higher minimum wage could actually increase employment. In the competitive model depicted in Figure 1, the aggregate labor supply curve is upward-sloping, but employers are assumed to be small relative to the market and hence can hire all the labor they want at the existing wage. In the classical monopsony model, employers are large relative to the labor market and hence face upward-sloping labor supply curves. They must also pay

A higher minimum wage increased the probability that a teenager would leave school to look for a job.

Black and Hispanic teenagers were more likely to become idle following the minimum wage increase.

all workers the same wage (that is, they cannot price discriminate). Thus, when an employer wants to hire more labor the cost of doing so is higher than the wage required to attract a new worker, because the wage paid to all workers increases. Hence the marginal cost of labor exceeds the new worker's wage, and because a profit-maximizing employer hires up to the point where the marginal cost of labor equals the marginal product, employment is lower and wages are lower than in a competitive market. In this case a minimum wage higher than the equilibrium monopsony wage can increase employment by breaking the link between the wage and the marginal cost of labor curve.

This argument was originally offered by Stigler (1946), although he was skeptical of government's ability to predict the wage floor that would actually increase employment. More modern versions of monopsony models based on labor market frictions are presented in Manning (2003). The driving force behind monopsony—increased costs of employment of the existing workforce when a new worker is hired—can also arise from a need to supervise workers (Lang, 1987) and in workplaces with tipped employees (Wessels, 1997).

Monopsony models have attracted considerable interest in the last decade or so because there have been some studies of the employment effects of minimum wages—discussed below—that fail to find the predicted negative employment effects on low-skilled workers and sometimes even claim to find positive employment effects. As the

preceding discussion makes clear, such results are difficult to reconcile with the competitive model. They can, however, be explained by monopsony models, although even in monopsony models a minimum wage set too high will lead to employment declines. Thus, if there is in fact compelling evidence that at least over some range minimum wages do not reduce or even increase employment, then the competitive model may be called into question as a useful description of labor markets. However, my view of the existing research is that there is far more compelling evidence that minimum wages lead to disemployment effects, which is consistent with the competitive model.

EMPLOYMENT EFFECTS: EVIDENCE

Labor economists have written scores of papers testing the prediction that minimum wages reduce employment. Broadly speaking, there are three types of empirical studies of the employment effects of minimum wages. The literature is extensive, so here I provide a summary of the findings from each type of study, emphasizing the studies that are most important in terms of either influencing the policy debate or presenting the best evidence. (For a more extensive review, see Neumark and Wascher, in progress.)

Aggregate Time-Series Studies

The earliest studies used aggregate time-series data for the United States to estimate the effects of changes in the national minimum wage on employment

rates (the employment-to-population ratio) of young persons, typically focusing on 16-19 year-olds (“teens”) or 16-24 year-olds (“young adults”). These time-series studies rely on changes in the federal minimum wage to identify the effects of minimum wages. The statistical models used in these studies measure the association between the employment rates of these age groups and the level of the minimum wage relative to the average wage, accounting for changes in the aggregate economy (the business cycle) or other influences on youth labor markets aside from the minimum wage. These studies also have to grapple with influences on aggregate data such as seasonality (differences in youth employment rates across the calendar year) and the statistical properties of time-series data (such as persistence over time and trends). These can be difficult challenges in aggregate time-series analysis.

The focus on younger groups stems from the likelihood that if minimum wages have any effect on employment, it will be among those with low skills. There are many possible groups of low-skilled workers or workers more likely to have their wages influenced by the minimum wage, such as less-educated workers, minorities, etc. But the employment rates for teens and young adults were readily available when this research literature began to develop. Moreover, teens and young adults are strongly overrepresented among minimum wage workers, because most of them have yet to accumulate the workplace skills that would raise their wages above the minimum wage, so they provide natural subjects for

testing whether minimum wages reduce employment.

There was a flurry of time-series studies that culminated in the 1970s; these are sometimes referred to as “first generation” minimum wage studies. These studies were reviewed and summarized extensively in Brown, et al. (1982) and led to a relatively strongly-held consensus view that the elasticity of employment of low-skilled workers with respect to minimum wages was most likely between -0.1 and -0.3 for teenagers; that is, for every 10 percent increase in the minimum wage, employment of teenagers falls by 1 percent to 3 percent.

About a decade later, however, there was a challenge to the consensus based on the time-series studies. An update of this research by Wellington (1991), using a widely-accepted time-series model that emerged from work by Solon (1985), and extending the data studied through 1986, found employment elasticities ranging only from -0.05 to -0.09 for teenagers and from 0 to -0.02 for 20-24 year olds. In addition, across a variety of statistical analyses, only a minority of the estimates for teenagers—and none of the estimates for young adults—were statistically significant (meaning that we could have very little confidence that estimates differing from zero reflected real differences rather than the random variation that is present in any data).

Subsequent related studies found that estimating a similar time-series model with a dataset that included more recent observations produced a smaller elasticity of teen employment with respect to the minimum wage (for example,

Minimum wages may entice some teenagers (or young adults) to leave school.

The evidence points quite strongly toward negative employment effects of minimum wages.

Card and Krueger, 1995). Including other adaptations of the model to account for statistical properties of time-series data, as well as allowing for the possibility that previous statistical models had treated seasonality in the data too simply, these studies pointed to elasticities ranging from about 0 to -0.06 that were often statistically insignificant.

However, the most recent time-series studies find no evidence of a declining minimum wage effect in the aggregate data, and they find stronger evidence of disemployment effects that is consistent with the earlier consensus. In particular, Williams and Mills (2001) argue that previous time-series studies of the effects of the minimum wage on employment did not adequately account for statistical properties of the data and as a result are biased. To better address these issues, they estimated a correctly specified “vector autoregression model” and found that changes in the minimum wage are inversely related to changes in teen employment over the 1954-93 sample period, and that raising the minimum wage has an immediate negative effect on employment with an employment elasticity that rises to roughly -0.4 over a two-year period.

Finally, Bazen and Marimoutou (2002) present what we believe is one of the best recent time-series studies of minimum wage effects in the United States. They also argue that the models in the earlier time-series literature were dynamically misspecified. But these authors address this issue in a different manner than did Williams and Mills, using an approach closer to the original Solon model with

increased flexibility. In general, the data reject the more restrictive statistical model in favor of Bazen and Marimoutou’s. Using data extended to 1999, they find that the effect of the minimum wage on employment has been fairly constant over time, and that there are statistically significant negative effects of the minimum wage on teenage employment, with an elasticity of -0.12 in the short-run and -0.27 in the longer-run.

The recent time-series literature has begun to explore some quite technical issues with regard to estimating the employment effects of minimum wages, and further refinements may be made. However, as it stands now the time-series evidence confirms the negative effects of minimum wages on employment and suggests that the earlier range of elasticities for the effects of minimum wages on teenagers, from about -0.1 to -0.3 , is still a reasonable view. Most importantly, perhaps, the recent studies pose a clear challenge to claims that the time-series evidence for the United States does not show a detectable adverse effect of minimum wages on teenage employment (e.g., Bernstein and Schmitt, 2000).

National Studies Using Both State and Time-Series Variation

Beginning in the late 1980s, many state governments began to adopt their own minimum wages as the federal minimum wage had not increased for quite a while. By 1989, 12 states (plus the District of Columbia) had adopted their own minimum wages, and currently 18

states have minimums above the federal level. Quite a few more—including, of course, Missouri—are considering their own minimum wages. One implication of the proliferation of state minimum wages is that the aggregate time-series approach to estimating the employment effects of minimum wages is becoming increasingly obsolete, as the federal minimum wage is an increasingly poor measure of the binding wage floor faced by much of the workforce.

More significantly, though, beginning in the early 1990s researchers began to reexamine the effects of the minimum wage on employment by exploiting this state-level variation in minimum wages. This approach offered two principal advantages. First, aggregate time-series models face the limitation that there simply is not that much variation in the federal minimum wage, and estimates of the effects of any policy can be made more reliably when there is more policy variation. Second, state-level minimum wages provide a better opportunity to account for other influences on employment. For example, in the aggregate time-series approach it can be hard to distinguish between the effects of a change in the federal minimum wage and the effects of the business cycle. But with state-level data, all the states together (or perhaps the states in a region) are similarly affected by the business cycle, and the effects of minimum wages can then be identified from differences between the experiences of states that raise their minimums and states that do not, effectively holding constant the effects of the business

cycle. In addition, the statistical models used in this line of research look only at changes experienced by states, to account for the possibility that high-wage or high-employment states may tend to be the ones that pass minimum wages. The studies therefore avoid incorrect conclusions based on patterns with respect to which states raise their minimum wages and focus instead on the consequences of doing so. Because of these advantages, most research on the effects of minimum wages has pursued this strategy since substantial state-level variation in minimum wages emerged.

The number of studies using this approach is large, and the results are summarized relatively briefly. Among the earlier papers, Card (1992a) focused on the effects of the April 1990 increase in the federal minimum wage, taking advantage of the fact that differences in the distribution of wages across states (in part due to differences in state minimum wage laws) meant that the effects of the federal increase should be felt more in low-wage states than in high-wage states. However, when Card regressed the change in state-level teen employment-population ratios on a measure of the impact of the minimum wage in each state based on the share of workers initially below the minimum, he found no effect of the minimum wage on teen employment.

In contrast, Neumark and Wascher (1992) used a far more extensive data set covering most states from 1973 to 1989 and hence many more minimum wage increases. The results from this paper generally supported the earlier consensus that increases in the minimum wage

Most economists agree that the minimum wage is a “blunt instrument” for redistributing income towards low-income families.

Many poor families have no workers. Raising the minimum wage does nothing to help these families.

reduce employment among youths. In particular, the employment elasticities with respect to the minimum wage ranged from about -0.1 to -0.2 for teenagers and from -0.15 to -0.2 for 16-24 year-olds.

There was, subsequently, a good deal of scholarly exchange focused on the conflicting results in these early studies, dealing with how to treat and measure schooling, as well as with technical statistical issues (Card, et al., 1994; Neumark and Wascher, 1994, 1995, 1996; Baker, et al., 1999). One of the issues concerned whether and how one accounts for the share of teenagers and young adults in school. There were some legitimate criticisms of the measure used in Neumark and Wascher (1992), but a subsequent paper (Neumark and Wascher, 1994) showed that using a better measure of school enrollment led to employment elasticities for teenagers in the range of -0.11 to -0.22 that were statistically significant.

In subsequent work this issue was explored further, extending the analysis to study how both employment and school enrollment of teenagers respond to the minimum wage (Neumark and Wascher, 1995 and 1996). The evidence indicated that a higher minimum wage is associated with a net decline in employment, with the employment elasticity similar in size to the elasticity found by previous studies of employment alone. Moreover, the results suggested that the employment effects of the minimum wage fall largely on less-skilled workers. In particular, this study found that a higher minimum wage increased the probability that a teenager would leave school to look for

a job. Moreover, those who found jobs tended to displace less-skilled workers who had already dropped out of high school. This is precisely the “labor-labor” substitution discussed in the previous section. Indeed, the results indicated that an increase in the minimum wage raised the probability that non-enrolled teenage workers became both non-enrolled and non-employed (or “idle”) and reduced the probability that already non-enrolled/non-employed teenagers found jobs; these results were especially pronounced for blacks and Hispanics and for individuals who had lower wages prior to the increase in the minimum wage.

A few more recent papers have revisited and updated this evidence on the outcomes for teenage employment and enrollment. Neumark and Wascher (2003) updated their earlier analysis through 1998 and found qualitatively similar results, although the effects were a bit muted. Turner and Demiralp (2001) used an approach similar to Neumark and Wascher (1995) but focused, as in Card (1992a), on the early 1990s increase in the federal minimum wage. In particular, they examined employment-enrollment transitions between January-April 1991 and January-April 1992 in order to isolate the effects of the April 1991 increase in the federal minimum wage to \$4.25 per hour. Their results suggested that overall, the higher minimum wage induced some teenagers to leave school for employment, but that teenagers initially neither employed nor in school were also more likely to find jobs. However, this result was driven entirely by movements among nonminority teenagers living outside of

central cities. In contrast, Turner and Demiralp found that black and Hispanic teenagers were more likely to become idle following the minimum wage increase, especially if they lived in a central city. This evidence, again, points to labor-labor substitution as an important consequence of a higher minimum wage and suggests that the elasticities typically reported in the literature understate the effects of the minimum wage on the lowest-skilled groups of workers.

In sum, the evidence from this analysis suggests that the teenage employment elasticities typically reported in the literature likely understate the size of the disemployment effects on the lowest-skilled teenagers (minorities, those who have already dropped out of high school, etc.). Thus, further consideration of how to measure and treat enrollment as well as employment reinforced the conclusion that minimum wages adversely affect employment, and if anything strengthened this conclusion by pointing out that the least skilled suffer a large employment loss that is to some extent obscured by labor-labor substitution. In addition, the evidence indicated that minimum wages may entice some teenagers (or young adults) to leave school, an issue we return to below when we move beyond the simple employment effects of minimum wages.

Lagged Effects

The second issue taken up following the initial studies using state-level minimum wage variation was of a more technical nature, concerning whether one uses a statistical model that identifies

the effects of minimum wages only from relatively short-term, immediate effects on employment, or instead allows for effects that take somewhat longer (up to a year or even more) to occur. One might suspect that employment adjustments in the low-wage labor market are rapid, because low-wage workers turn over relatively quickly, so that even if the costs of firing workers prevent employers from firing many workers following a minimum wage increase, employment can adjust quickly through the hiring side (Brown, et al., 1982). However, minimum wage increases may entail longer-term shifts in how firms operate. Firms may substitute towards more capital-intensive methods (think of the large amount of equipment behind a fast-food counter), and such adjustments take time as firms both decide how to change production and implement the changes. Firms may also substitute toward higher-skilled labor, requiring new methods, hiring, and training. As long as these other inputs adjust slowly, employment of low-skilled labor will adjust slowly as well. If there are lagged employment effects, then estimates that focus only on short-run effects will fail to reveal the disemployment effects that actually occur.

Some of the original evidence in Neumark and Wascher (1992) as well as evidence from ensuing research showed that accounting for lagged employment effects led to stronger evidence of disemployment effects of minimum wages for teenagers and young adults. For example, Burkhauser, et al. (2000) re-estimated similar statistical models for

42.4 percent of low-wage workers were in families with incomes more than three times the poverty line.

Teenagers are especially likely to be low-wage workers for only a short while, before they acquire more skills that lead to increased wages.

a longer sample period and found strong evidence that disemployment effects were sharper once lagged, longer-term effects were allowed. Partridge and Partridge (1999) found similar results for the low-wage retail sector. Finally, Baker, et al. (1999) and Keil, et al. (2001) provide additional evidence that the disemployment effects of minimum wages occur with a lag, and the Baker, et al. paper is especially noteworthy because it explicitly reconsiders estimates from the earlier literature for the United States and shows that the estimates reported there are consistent with a framework in which teen employment responds (negatively) to longer-term rather than short-term changes in minimum wages. This is potentially significant for Proposition B, which through indexing would set in place a permanently higher minimum wage rather than a one-time increase. The Baker, et al. results suggest that the adverse employment effects of such a policy change are likely to be sharper.

In sum, the evidence from the national studies of state minimum wage increases, using both time-series and across-state variation in minimum wages, quite unambiguously points to disemployment effects of minimum wages on teens and young adults. Many of the estimates are in the range cited earlier, with elasticities between -0.1 and -0.3 , although there are also many refinements in terms of the effects on the least-skilled that may be sharper but masked by enrollment shifts, as well as estimates of longer-term effects that are sometimes larger.

Case Studies of Specific State Minimum Wage Increases

The final approach to estimating the effects of minimum wages on employment has focused on isolated examples of state minimum wage increases. Although there are some differences across studies, their unifying aspect is that they limit the analysis to a particular state in order to construct as reliable a control group as possible with which to compare the experiences of workers affected by a minimum wage increase. However, the distinction between these types of studies and those reviewed in the previous section is not sharp, as the panel data studies effectively use many state minimum wage increases, and also construct statistical control groups consisting of the same states in different periods as well as of other states. Thus, we refer to this last approach as the “case study” approach, echoing the authors of the most influential case study (Card and Krueger, 1994), to emphasize that the results apply to only one minimum wage increase in one particular location and may not generalize to proposed increases in other states in other time periods.

There were a number of early versions of these studies, with somewhat conflicting answers (Katz and Krueger, 1992; Card, 1992b; Kim and Taylor, 1995). However, by far the best known and most influential case study of a specific minimum wage increase—and the one cited most frequently by minimum wage advocates—is Card and Krueger’s (1994) investigation of the effects of the 1992 increase in New Jersey’s minimum wage.

Following Katz and Krueger's approach, Card and Krueger conducted surveys of fast-food restaurants in February 1992, roughly two months before the April 1992 increase in the New Jersey minimum wage to \$5.15 per hour, and then again in November of that year, about seven months after the minimum wage increase. Their most compelling strategy was to include in the sample a control group of restaurants in eastern Pennsylvania, where the minimum wage did not change. In addition, they used information on the minimum wage relative to the starting wage for restaurants in New Jersey to ask whether employment fell more in restaurants whose wages were likely more affected by the minimum wage increase.

Their results implied that the increase in New Jersey's minimum wage led to faster employment growth. For example, within New Jersey, stores that initially paid low starting wages showed significantly more employment growth between February and November than did stores that paid higher starting wages. Similarly, employment in the New Jersey sample rose over this period, while employment in the Pennsylvania sample fell. Card and Krueger constructed a wage gap measure equal to the difference between the initial starting wage and \$5.25 per hour for stores in New Jersey and zero for stores in Pennsylvania. Again, the results showed a positive and statistically significant effect of the minimum wage increase on employment growth, with an estimated elasticity of 0.73. Various other analyses led to the same general conclusion, leading them to interpret their results as "inconsistent with the

predictions of a conventional competitive model of the fast-food industry" (p. 790), and presumably also motivating them to title their subsequent book featuring this paper *Myth and Measurement* (Card and Krueger, 1995).

However, subsequent research on the findings of the New Jersey-Pennsylvania fast-food study uncovered serious problems with the data used in the study, based on comparisons with actual payroll records obtained from many of the same restaurants (Neumark and Wascher, 2000). The Card-Krueger data were obtained with a survey that asked managers or assistant managers, "How many full-time and part-time workers are employed in your restaurant, excluding managers and assistant managers?" This question is highly ambiguous, as it could refer to the current shift, the day, or perhaps the payroll period. In contrast, the payroll data referred unambiguously to the payroll period. Reflecting this problem, the data collected by Card and Krueger indicated far greater variability across the two observations than did the payroll data, with changes that were implausible and suggested that, indeed, one measurement might sometimes be employment on a shift, with the subsequent measurement employment in a payroll period.

Using the payroll data, estimates of models paralleling Card and Krueger's yielded elasticities of employment with respect to the minimum wage in the range of -0.1 to -0.25 , often statistically significant—in sharp contrast to the large positive elasticities Card and Krueger originally reported. In subsequent work, Card and Krueger (2000) turned to yet

A 10 percent increase in the minimum wage causes a 0.71 percentage point increase in the number of poor families.

Minimum wages cause families somewhat above the poverty line or the near-poverty line to slip below these levels.

another data source that was more reliable than their original data, and found estimated employment elasticities centered on zero. Since it might be difficult to judge between the latter two data sources, it appears that the safest conclusion is that this particular case study yields estimated elasticities between about 0 and -0.25 .

There have also been more recent case studies of the effects of minimum wages on employment, with somewhat variable findings. The paper that is closest to the original Card-Krueger study is Powers, et al. (2006), which revisited the question of the effects of the minimum wage on employment and hours in the fast-food industry, focusing on counties along the Illinois-Indiana border between the fall of 2003 and the fall of 2005, a period during which Indiana's minimum wage was unchanged, while Illinois' rose from \$5.15 (the federal minimum) to \$6.50, or 26.2 percent, in two steps. Powers, et al. used strategies that exactly paralleled those used by Card and Krueger, as well as some other approaches. Their estimates based on comparisons across states yielded an elasticity of around -0.26 , although the estimate is not very precise given the small sample of only 94 Illinois establishments and 52 Indiana establishments. There are somewhat sharper results for hours, however, with some specifications yielding evidence of significant reductions. The elasticities are large: in the range of -1 . In contrast, when they focused on data for Illinois only, based on variation in the initial wage relative to the minimum, they found positive employment effects. However,

they discount these estimates as likely influenced by other characteristics of establishments—such as proximity to a highway interchange—that are associated with initial wages as well as employment growth.

Finally, Singell and Terborg (2006) studied the eating and drinking sector more broadly, hoping their paper would help to resolve the dispute over the studies of the fast-food industry. They used data on Washington and Oregon over the period from 1994 to 2001, during which Oregon first raised its minimum in 1997, 1998, and 1999, and then Washington raised its minimum in 1999, 2000, and 2001. This period and these states provide two different “experiments” for evaluating the effects of minimum wage increases in states that, according to the authors, have very similar economies facing very similar conditions. They also studied the hotel and lodging industry to obtain evidence from a different industry in which wages are somewhat higher.

The results for the eating and drinking sector consistently indicate that minimum wage increases reduced employment, with an employment elasticity of around -0.2 . For hotel and lodging, however, the results are reversed, indicating a positive and significant effect, with elasticities of 0.15 to 0.16. The authors suggest that the results for the latter sector may reflect the fact that minimum wages in that sector are largely non-binding, although of course that does not explain the finding of a positive effect. However, they also present data from help-wanted ads, which permit them to better focus on the lowest-

paying housekeeping jobs in the hotel and lodging industry, for which minimum wages were binding, and for these jobs the estimated effect of the minimum wage on the number of want-ads is negative and significant, consistent with their argument.

Overall, what should we conclude from these case studies? The evidence appears to be most variable for the studies using this approach, and it is difficult to draw firm conclusions. For the most part, the better studies tend to show either no effects of a minimum wage, or negative effects, although there are exceptions.

There is, though, one serious limitation of these case studies that calls into question their importance. Economic theory makes no firm prediction about what will happen to employment in a very narrow industry. As the theory section explained, in the standard model the negative employment effects stem from cost increases for low-wage labor, which in turn increase prices and reduce labor demand. But this does not have to occur in every industry, especially in a narrow industry segment such as fast-food restaurants. As an example, suppose that fast-food restaurants compete with pizza shops, and that pizza shops are more intensive users of low-wage labor, perhaps because fast-food restaurants use a fair amount of capital to produce and prepare food. In that case, costs may be pushed up more for pizza shops than for fast-food restaurants, and demand for “low-end” food could shift *towards* fast-food restaurants, raising employment at those restaurants even though combined employment of the two types of restaurants falls.

This is only a hypothetical example, but it emphasizes that case studies of narrow industries may not be very informative about a central question policymakers ask when contemplating a minimum wage increase—namely, “Will employment of low-skilled workers fall, and by how much?” Although the accumulated evidence from many such studies could be informative, a single study is less informative, and the variability of results across studies might not establish much of anything. Coupled with the fact that results from one case study might not generalize to other proposed minimum wage increases, we view these studies as the least informative with respect to questions such as what might happen to employment of low-skill workers if—as contemplated in Missouri—a higher minimum wage were enacted. And the evidence from the other types of studies points quite strongly toward negative employment effects of minimum wages.

DISTRIBUTIONAL EFFECTS

Critics of minimum wages are often content to point to the evidence of disemployment effects in arguing against minimum wages. However, even though minimum wages do reduce employment, they may have distributional effects that might be viewed as beneficial. As noted earlier, minimum wages create winners and losers; in the first group are those whose wages and incomes increase, and in the latter those whose incomes fall, through either job loss or hours reductions (or increased difficulty of finding a job).

Minimum wages may actually have adverse distributional effects, if anything increasing the number of low-income families.

Poor primary breadwinners may bear most of the disemployment costs.

If all minimum wage workers were in poor or low-income families, then it is likely that minimum wage increases would on average help those families, as the wage gains experienced by many workers would increase incomes in many families, while the losses experienced by what would likely be a much smaller share of workers would lower incomes in only some families. This still may not be a desirable outcome, as the income losses, although concentrated on a small number of families, might be quite large, so that even if we had fewer poor and low-income families, the average income among poor families might have fallen. In fact, though, the situation is potentially more problematic than this, because low-wage workers are scattered throughout the income distribution, with many in quite high-income families. Indeed, the connection between low-wage work and poverty-level family income is rather weak, leading most economists to agree that the minimum wage is a “blunt instrument” (Card and Krueger, 1995, p. 285) for redistributing income towards low-income families.

Table 1 shows the distribution of all workers and of low-wage workers (those earning between \$5 and \$6.25) across family income-to-needs categories, in 2003. “Needs” is defined as the level of family income that puts a family of a given size and age structure at the poverty line, so families with an income-to-needs ratio of 1 are right at the poverty line, and so on. The table makes two key points. First, although around 10 percent of families in 2003 were poor (see www.census.gov/hhes/www/poverty/histpov13.html), only 4.4 percent of all workers were in poor families. In other words, many poor families have no workers. Raising the minimum wage does nothing to help these families, of course. Second, although low-wage workers are over-represented in poor families (with 14.2 percent of these workers in poor families), many low-wage workers are in non-poor families, and many are in families with high incomes. For example, 42.4 percent of low-wage workers were in families with incomes more than three times the poverty line (or approximately \$56,000 in 2003, for a family of four). Who are

Table 1
Low-Wage Workers and Household Income-to-Needs

Income-to-needs ratio	Percent of all workers	Percent of workers with wages between \$5 and \$6.25
<1	4.4	14.2
1 to 1.25	2.3	6.6
1.25 to 1.5	2.5	5.9
1.5 to 2	6.8	11.1
2 to 3	16.1	19.8
>3	67.9	42.4

Source: Burkhauser and Sabia (2005), Appendix Table 1A. Calculations based on March 2004 CPS files.

these minimum wage workers in high-income families? They clearly cannot be the primary breadwinners in their families, since full-time work at the minimum wage is unlikely to lift a family far above the poverty line. However, there are many low-wage workers who are teenagers or other secondary (or even tertiary) workers in their families. Teenagers are especially likely to be low-wage workers for only a short while, before they acquire more skills that lead to increased wages. In contrast, minimum wage workers in low-income families are likely to include many more low-skilled adults who are mired in low-wage work. (Carrington and Fallick (2001) provide evidence on types of minimum wage workers.)

Of course, if the winners from minimum wage increases were the low-wage workers in poor, low-income families, whereas the losers were the low-wage workers in high-income families, then minimum wages would redistribute income to low-income families. But the opposite is possible as well: poor breadwinners could lose their jobs while teenagers in middle-class families saw their wages rise, in which case the distributional effects could be quite adverse. Theory provides no guidance as to what we might expect. The only way to

answer the question of whether minimum wages help poor families is to look at the evidence directly.

There is surprisingly little research on the actual distributional effects of minimum wages. There are many studies that try to simulate these distributional effects, proceeding in two steps. First, researchers compute the distribution across the family income-to-needs distribution of low-wage workers likely to be affected by the increase in some period before a minimum wage increase. Second, based on assumptions about how these workers will be affected by the minimum wage increase, the effects on incomes of different types of families are simulated. Typically, such studies suggest that a good share of the gains from minimum wage increases will go to higher-income rather than lower-income families, for exactly the reasons discussed above—many low-income families have no workers, and many low-wage workers are in higher-income families. (Burkhauser and Sabia, 2005, is the most recent example of this type of study.) However, studies of this type are simulations; they do not directly observe the effects of minimum wage increases on the family income distribution.

Minimum wages may lower formal training among young workers—training that would increase wages.

Table 2
Percentage Point Change in Proportions of Families in
Ranges of Income-to-Needs Distribution, Minimum Wage Increase vs. No Increase

Income-to-needs = 0 to 1 (poor)	Income-to-needs = 0 to 1.5 (poor or near poor)	Income-to-needs = 1.5 to 3
0.71*	1.04**	-1.46**

Source: Neumark, et al. (2005), Table 2. The data set covers 1986-1995. Reported estimates are percentage point changes in proportion of families in cell. *** (**) superscript indicates estimate is statistically significant at five-percent (10-percent) level.

A typical state minimum wage increase reduces the incidence of training by about 0.9 percentage points, or about 9 percent.

In recent work, Neumark, et al. (2005) took a direct approach. This study examined both state and federal minimum wage increases over the period 1986-1995 (ending with the period of welfare reform) and used methods that provide very flexible estimates of how minimum wage increases change the distribution of income-to-needs. The results are summarized briefly in Table 2. The estimates shown are the effects of a typical minimum wage increase (in this period, about 10 percent); the units are percentage point changes. Thus, the estimates indicate that a 10 percent increase in the minimum wage causes a 0.71 percentage point increase in the number of poor families. For the sample covered by this paper, that represents a 3.9 percent increase in the number of poor families. If we look instead at the number of families below 1.5 times the poverty line (“poor” or “near-poor”), the estimates also indicate an increase—in this case of 1.04 percentage points. Because this estimate is larger than the effect on poverty, the implication is that the number of families between 1 and 1.5 times the poverty line increases as well. Finally, the estimates indicate that, as we might expect given the earlier results, minimum wages reduce the number of families between 1.5 and 3 times the poverty line. (In contrast, although not reported in the table, minimum wages have no effect on the number of families above 3 times the poverty line.)

Together, then, these estimates (and other results described in the paper) suggest that minimum wages cause families somewhat above the poverty

line or the near-poverty line to slip below these levels, which could occur because workers lose their jobs or have their hours reduced, or because workers who would normally enter employment (as others leave) find it more difficult to obtain a job. There are other estimates reported in the paper that either confirm the adverse distributional effects of minimum wages or at best provide no evidence that minimum wages reduce poverty or the number of low-income families.

These results offer a sharper criticism of minimum wages than the simulation studies that simply suggest that many of the gains from minimum wages go to higher-income families. Instead, they indicate that minimum wages may actually have adverse distributional effects, if anything increasing the number of low-income families. What could explain these results? Although direct evidence on the effects on low-skill workers differentiated by family income has not been offered, these results are consistent with more of the adverse effects of minimum wages falling on low-skill workers in poor and low-income families, while the gains accrue more to those in high-income families. Oversimplifying, the data are more consistent with teens in middle- and high-income families getting the higher wages from minimum wage increases while poor primary breadwinners bear the disemployment costs.

Other recent research also looks at these questions. Gundersen and Ziliak (2004) studied changes in state-level poverty over the 1980s and 1990s. Their study differed from previous ones in three important ways. First, it looked

at many more factors, including the macroeconomy, welfare reform, changes in the Earned Income Tax Credit, and changes in wage inequality (although given that the minimum wage also affects wage inequality (DiNardo, et al., 1996), it is harder to interpret the minimum wage effects). Second, they looked not only at the poverty count, but at what is called the “squared poverty gap,” which captures not only the number of poor families, but how far families are below the poverty line. And third, they reported results for after-tax income, which is most relevant for measuring families’ economic well-being.

Although some of their results indicated modest reductions in poverty from increasing the minimum wage, these results are often weak (for example, looking at either before-tax or after-tax poverty rates for all families, they found a significant negative effect on poverty, but the evidence for female-headed families or married-couple families considered separately was not significant). And in what is likely the most meaningful set of estimates in the paper—for the squared poverty gap, using after-tax income—the effect of minimum wages on poverty was small and insignificant in the aggregate, and positive for three of the four disaggregated analyses the authors report. Wu, et al. (2006) take a somewhat different approach, estimating the effects of a wide array of policies on a variety of income inequality measures, which can sometimes be given an interpretation in terms of economic welfare. They find that higher minimum wages either have no effect or increase inequality, and this occurs in such a way that when the

incomes of lower-income families weigh heavily in calculating social welfare, minimum wages reduce social welfare.

Overall, these results provide little basis for concluding that minimum wages reduce the proportion of families living in poverty or near-poverty, and if anything they indicate that minimum wages have adverse distributional effects, increasing poverty. Thus, to return to the point discussed at the beginning of this section, the negative employment effects of minimum wages do not appear to be offset by beneficial distributional effects. In fact, it seems that the winners from minimum wage increases are less likely to be in poor and low-income families, while the losers are more likely to be in such families.

LONGER-RUN EFFECTS

The evidence on minimum wage effects discussed to this point focuses on short-run effects, typically looking at effects at most a year after minimum wage increases. There are, however, potential effects of minimum wages in the longer-run. Why might these longer-run effects arise? First, minimum wages may lower formal training among young workers—training that would increase wages. Workers undergoing such training have lower productivity when the training is occurring. Such training is typically financed by lower wages, but if productivity while training falls below the minimum wage floor, firms may be deterred from training workers (Hashimoto, 1982; Feldstein, 1973). There is evidence from CPS data that minimum

Higher minimum wages may discourage school enrollment.

Workers who are exposed to a high minimum wage but remain employed may receive less training.

wages reduce formal training for 20-24 year-olds (Neumark and Wascher, 2001a), with the estimates implying that a typical state minimum wage increase reduces the incidence of training by about 0.9 percentage points, or about 9 percent. However, these results are not conclusive, with differing results reported in Acemoglu and Pischke (2003) and Fairris and Pedace (2004).

Second, given the evidence of negative effects of minimum wages on employment of teens and young adults, longer-run adverse effects could arise because of reduced accumulation of labor market experience, another source of wage growth. And finally, higher minimum wages may discourage school enrollment, as discussed above (and see also Chaplin, et al., 2003).

This is the least-explored area of minimum wage research, but the implications are potentially quite serious. Policymakers may not be particularly concerned with whether minimum wages cost teenagers and young adults jobs. But if minimum wages lead to lower wages and earnings among adults, via the effects just described, then their consequences may be more serious because they last into ages at which people are more likely to form families and have children. Moreover, the types of effects discussed here would not be reflected only in employment. For example, workers who are exposed to a high minimum wage but remain employed may receive less training.

To assess the overall effects of these longer-run influences, Neumark and Nizalova (forthcoming) estimate the effects of exposure to higher minimum wages at younger ages—when minimum wages were most likely to be binding—on outcomes for somewhat older individuals (25-29 year-olds). The estimates indicate that adults exposed to minimum wages as teens or young adults have lower wages and lower earnings, providing evidence that the net effects of reductions in training, experience, and schooling persist to disadvantage workers who were exposed to higher minimum wages when young. The effects are not trivial. For example, exposure to a typical higher state minimum wage through the teen years reduces average earnings of 25-29 year-olds by 0.8 percent. And exposure during ages 20-24, when training opportunities may be more prevalent, reduces average earnings of 25-29 year-olds by about twice this amount. Related evidence on the persistent effects of unemployment spells on later earnings, although without an explicit focus on minimum wages, is reported in Mroz and Savage (2006).

Thus, this evidence suggests that the potentially adverse effects of minimum wages extend beyond disemployment effects for the youngest individuals. This suggests that the focus of most research and policy debate on the contemporaneous, short-run effects of minimum wages on teens and young adults may be misplaced.

CONCLUSION

Where does all of this evidence leave us regarding the wisdom of raising the minimum wage? The evidence suggests that minimum wage increases do more harm than good. Minimum wages reduce employment of young and less-skilled workers. Although in principle the gains to those who keep their jobs could offset the losses to those who bear the disemployment effects, minimum wages deliver no net benefits to poor or low-income families, and if anything make them worse off, increasing poverty. Finally, minimum wages may also have longer-run adverse effects, lowering the acquisition of skills through various channels and therefore lowering wages and earnings even beyond the age at which individuals are most directly affected by a higher minimum.

It may simply be an uncomfortable fact that trying to help low-income families through mandating a higher minimum wage has negative consequences because such wage floors amount to a tax on the employment of these workers. Those interested in using economic policy levers to redistribute income to lower-income families should instead push for policy options that encourage work, that better target poor and low-income families, and that have a proven record of reducing poverty. The Earned Income Tax Credit, which is implemented at the federal level and supplemented by many states, appears to satisfy all of these criteria (Neumark and Wascher, 2001b; Hoffman and Seidman, 2003; Wu, et al., 2006), and thus is a better redistributive policy.

Minimum wages may also have longer-run adverse effects, lowering wages and earnings even beyond the age at which individuals are most directly affected by a higher minimum.

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