

Why Does the Minimum Wage Have No Discernible Effect on Employment?

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Executive Summary

The employment effect of the minimum wage is one of the most studied topics in all of economics. This report examines the most recent wave of this research – roughly since 2000 – to determine the best current estimates of the impact of increases in the minimum wage on the employment prospects of low-wage workers. The weight of that evidence points to little or no employment response to modest increases in the minimum wage.

The report reviews evidence on eleven possible adjustments to minimum-wage increases that may help to explain why the measured employment effects are so consistently small. The strongest evidence suggests that the most important channels of adjustment are: reductions in labor turnover; improvements in organizational efficiency; reductions in wages of higher earners ("wage compression"); and small price increases.

Given the relatively small cost to employers of modest increases in the minimum wage, these adjustment mechanisms appear to be more than sufficient to avoid employment losses, even for employers with a large share of low-wage workers.

Introduction

The employment effect of the minimum wage is one of the most studied topics in all of economics. This report examines the most recent wave of this research – roughly since 2000 – to determine the best current estimates of the impact of increases in the minimum wage on the employment prospects of low-wage workers. The weight of that evidence points to little or no employment response to modest increases in the minimum wage. The report also reviews evidence on a range of possible adjustments to minimum-wage increases that may help to explain why the measured employment effects are so consistently small.

Empirical Research on the Minimum Wage

The volume of research on the employment impact of the minimum wage is vast and a complete review is beyond the scope of this report. Instead, I provide a quick summary of the state of the debate as of the early 2000s and then concentrate on the main developments over the last decade.

Pre-2000s

In 1977, the Minimum Wage Study Commission (MWSC) undertook a review of the existing research on the minimum wage in the United States (and Canada), with a particular focus on the likely impact of indexing the minimum wage to inflation and providing a separate, lower, minimum for younger workers. Four years and \$17 million later, the MWSC released a 250-page summary report¹ and six additional volumes of related research papers.² In their independent summary of the research reviewed in the MWSC, Brown, Gilroy, and Kohen, three economists involved in producing the report, distinguished between employment effects on: teenagers (ages 16-19), where they concluded that a 10 percent increase in the minimum wage reduced teen employment, most plausibly, from between zero and 1.5 percent; young adults (ages 20-24), where they believed the employment impact is “negative and smaller than that for teenagers”; and adults, where the “direction of the effect...is uncertain in the empirical work as it is in the theory.”^{3,4} Their summary of the theoretical and empirical research through the late 1970s suggested that any “disemployment” effects of the minimum wage were small and almost exclusively limited to teenagers and possibly other younger workers.

For a decade, the MWSC's conclusions remained the dominant view in the economics profession. By the early 1990s, however, several researchers had begun to take a fresh look at the minimum wage. The principal innovations of what came to be known as “the new minimum wage research” were the use of “natural experiments” and cross-state variation in the “bite” of the minimum wage.

1 Minimum Wage Study Commission (1981)

2 For an overview of the workings of MWSC and a review of its main findings, see Eccles and Freeman (1982). For a lengthy review of the MWSC's finding, prepared by three economists involved in preparation of the MWSC report, see Brown, Gilroy, and Kohen (1982).

3 Brown, Gilroy, and Kohen (1982), p. 524.

4 The employment impact on adults is uncertain in theory because an increase in the minimum wage might encourage employers to replace some (presumably lower productivity) teenagers with more (presumably higher productivity) adults.

Natural experiments sought to reproduce in the real world some of the features of a laboratory experiment. In the context of the minimum wage, these natural experiments typically measured the employment impact of a single instance of a policy change (an increase in a state or the federal minimum wage) by comparing a group of workers directly affected by the change (teenagers in a state where the minimum wage increased, for example) with a similar group that was not affected (teenagers in a neighboring state where the minimum did not change).

Without a doubt, the most influential of the studies using a natural experiment was David Card and Alan Krueger's (1994) paper on the impact on fast-food employment of the 1992 increase in the New Jersey state minimum wage.⁵ In advance of the 1992 increase in the New Jersey state minimum wage, Card and Krueger conducted their own telephone survey of fast-food restaurants in New Jersey and neighboring Pennsylvania. They repeated the survey after the increase had gone into effect and then compared the change in employment in New Jersey's restaurants (the minimum wage treatment group) with what happened in Pennsylvania (the control group). They found "no evidence that the rise in New Jersey's minimum wage reduced employment at fast-food restaurants in the state."^{6,7}

The "New Minimum Wage" research also emphasized research methods based on important differences in the "bite" of the federal minimum across the states. Any given increase in the federal minimum, the thinking went, should have more impact in low-wage states, where many workers would be eligible for an increase, than it would in high-wage states, where a smaller share of the workforce would be affected. Card, for example, divided the U.S. states into three groups – low-impact, medium-impact, and high-impact – according to the share of their teenage workforce that would be affected by the 1990 and 1991 increases in the federal minimum wage. His analysis concluded: "Comparisons of grouped and individual state data confirm that the rise in the minimum wage raised average teenage wages... On the other hand, there is no evidence that the rise in the minimum wage significantly lowered teenage employment rates..."⁸

Card and Krueger's book *Myth and Measurement: The New Economics of the Minimum Wage* is the best (though early) summary of these two strands of the "new minimum wage" research. Their detailed review of studies using a variety of methods and datasets to examine restaurant workers, retail employment, and teenagers, concludes: "The weight of this evidence suggests that it is very unlikely that the minimum wage has a large, negative employment effect."⁹

Myth and Measurement also inspired a considerable response from economists more critical of the minimum wage. David Neumark and William Wascher's book *Minimum Wages* brings together much of this critique, with an emphasis on their own work. In Neumark and Wascher's assessment, the most reliable recent research on the minimum wage has built on the earlier time-series analysis that informed the main conclusions of the MWSC. This new generation of time-series analysis typically

5 Other important studies along these lines include Card's (1992a) analysis of the impact of the 1988 increase in California's state minimum wage and Katz and Krueger's (1992) study of the impact of the 1990 and 1991 increases in the federal minimum wage.

6 Card and Krueger (1994), p. 792.

7 Economists David Neumark and William Wascher (2000) criticized Card and Krueger's study, arguing that the survey was poorly designed and implemented. Card and Krueger (2000) responded by confirming their original results using payroll records from a virtual census of fast-food restaurants in New Jersey and eastern Pennsylvania.

8 Card (1992b), p. 36.

9 Card and Krueger (1995), pp. 389-390.

applies modern econometric techniques to state-level data on teenagers (and sometimes less-educated workers). Neumark and Wascher's conclusion is that "...the preponderance of evidence supports the view that minimum wages reduce the employment of low-wage workers."¹⁰

Since the early 2000s

At the turn of the century, the minimum-wage debate had two poles: on the one side, researchers broadly identified with the "new minimum-wage research" (though without Card and Krueger, who, since their 2000 re-analysis of their famous New Jersey fast-food study, have not returned to write on the minimum wage); and critics of the minimum wage and the new minimum-wage research, the most prolific of whom have been Neumark and Wascher. The last decade has seen a continued outpouring of research from both camps, and the emergence of what economist Arindrajit Dube has called a "fourth generation" of research on the minimum wage that "tries to make sense of the sometimes contradictory evidence."¹¹

In the next two sections of this report, I first summarize the findings of two statistical "meta-studies" (studies of studies) and two, more qualitative, literature reviews of this research; then, take a closer look at several of the most important and influential studies published in the last decade.

Meta-studies

Meta-studies are "studies of studies" that use a set of well-defined statistical techniques to pool the results of a large number of separate analyses. Meta-study techniques effectively increase the amount of data available for analysis and can provide a much sharper picture of statistical relationships than is possible in any individual study. Meta-studies are widely used in medicine, where the results of many small clinical trials can be combined to produce much more accurate estimates of the effectiveness of different kinds of treatments.

Hristos Doucouliagos and T. D. Stanley (2009) conducted a meta-study of 64 minimum-wage studies published between 1972 and 2007 measuring the impact of minimum wages on teenage employment in the United States. When they graphed every employment estimate contained in these studies (over 1,000 in total), weighting each estimate by its statistical precision, they found that the most precise estimates were heavily clustered at or near zero employment effects (see **Figure 1**). Doucouliagos and Stanley's results held through an extensive set of checks, including limiting the analysis to what study authors' viewed as their best (usually of many) estimates of the employment impacts, controlling for possible correlation of estimates within each study, and controlling for possible correlation of estimates by each author involved in multiple studies. Doucouliagos and Stanley concluded that their results "...corroborate [Card and Krueger's] overall finding of an insignificant employment effect (both practically and statistically) from minimum-wage raises."¹² In

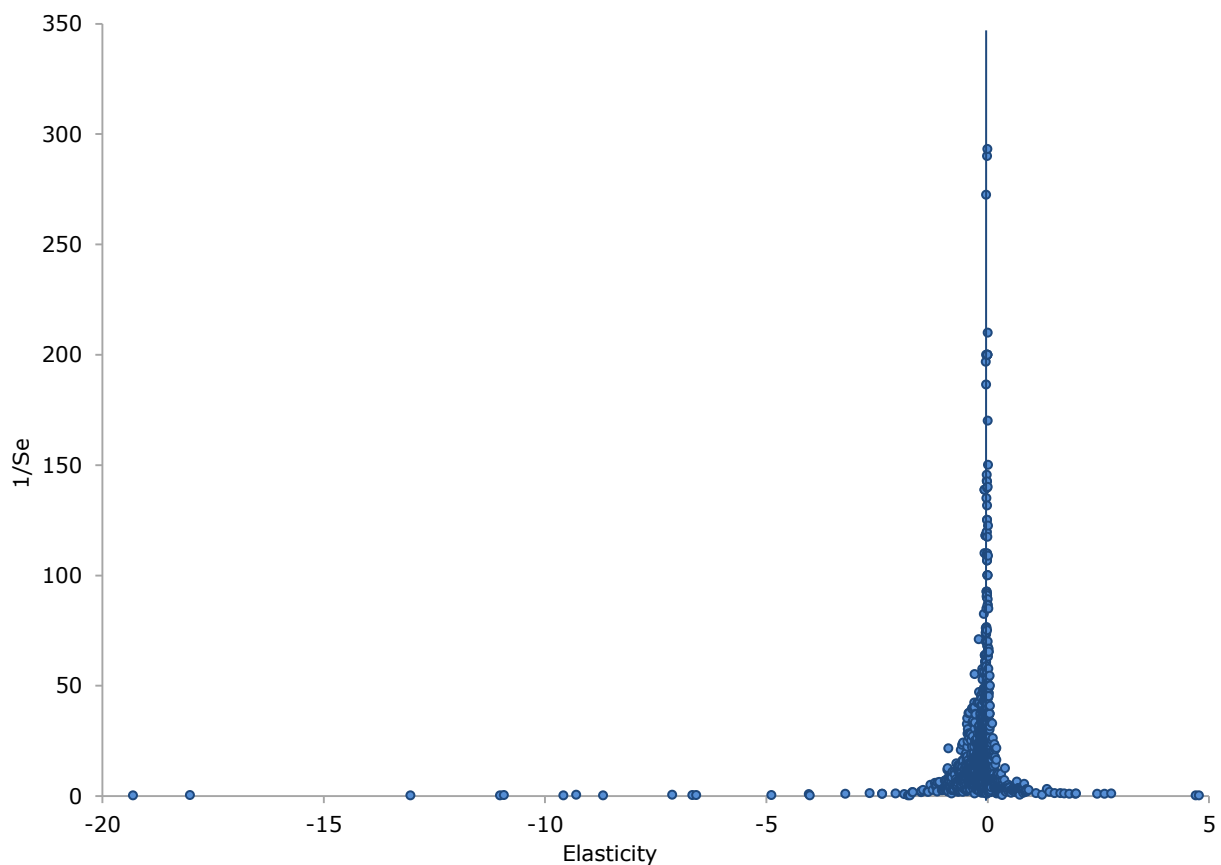
10 Neumark and Wascher (2008), p. 104.

11 Dube detects "...four generations of minimum wage research: the older time series literature, the first wave of the "new minimum wage" research that featured both case study and state-panel approaches, a third generation of follow-up work largely based on these two methodologies, and a fourth generation of recent work that tries to make sense of the sometimes contradictory evidence." (2011, p. 763)

12 Doucouliagos and Stanley (2009), p. 422. Doucouliagos and Stanley put the size of the effects they find into perspective: "A 10 per cent increase in the minimum wage reduces employment by about 0.10 per cent... But even if this adverse employment effect were true, it would be of no practical relevance. An elasticity of -0.01 has no meaningful policy implications. If correct the minimum wage could be doubled and cause only a 1 per cent decrease in teenage employment." (2009, pp. 415-16)

their view: "Two scenarios are consistent with this empirical research record. First, minimum wages may simply have no effect on employment... Second, minimum-wage effects might exist, but they may be too difficult to detect and/or are very small."¹³

FIGURE 1
Trimmed Funnel Graph of Estimated Minimum-Wage Effects (n = 1,492)



Source: Doucouliagos and Stanley (2009).

Paul Wolfson and Dale Belman have carried out their own meta-analysis of the minimum wage, focusing on studies published only since 2000. They identified 27 minimum wage studies that produced the necessary elasticity estimates and corresponding standard errors, yielding 201 employment estimates in total. They then produced a range of meta-estimates, controlling for many features of the underlying studies, including the type of worker analyzed (teens or fast food workers), whether the study focused on the supply or the demand side of the labor market, who the authors of the study were, and other characteristics. The resulting estimates varied, but revealed no statistically significant negative employment effects of the minimum wage: "The largest in magnitude

13 Doucouliagos and Stanley (2009), p. 422. Doucouliagos and Stanley also "find strong evidence of publication selection for significantly negative employment elasticities" (2009, p. 422) They conclude: "Even under generous assumptions about what might constitute 'best practice' in this area of research, little or no evidence of an adverse employment effect remains in the empirical research record, once the effects of publication selection are removed." (p. 423)

are... positive [and] statistically significant... Several are economically irrelevant though statistically significant and several others [are] slightly larger but...statistically insignificant."¹⁴

Reviews

Meanwhile, Neumark and Wascher (2006, 2007) conducted a qualitative review of the research since the early 1990s on the employment effects of the minimum wage in the United States, other OECD countries, several Latin American countries, and Indonesia.¹⁵ In their summary remarks, focusing on the U.S. experience, they note:

"What may be most striking to the reader who has managed to wade through our lengthy review of the new minimum wage research is the wide range of estimates of the effects of the minimum wage on employment, especially when compared to the review of the earlier literature by Brown et al. in 1982 [for the Minimum Wage Study Commission]. For example, few of the studies in the Brown et al. survey were outside of the consensus range of -0.1 to -0.3 for the elasticity of teenage employment with respect to the minimum wage. In contrast, even limiting the sample of studies to those focused on the effects of the minimum wage of teenagers in the United States, the range of studies comprising the new minimum wage research extends from well below -1 to well above zero."¹⁶

Based on their subjective weighting of the quality of the research and the reliability of the resulting estimates, Neumark and Wascher conclude:

"Although the wide range of estimates is striking, the oft-stated assertion that the new minimum wage research fails to support the traditional view that the minimum wage reduces the employment of low-wage workers is clearly incorrect. Indeed, in our view, the preponderance of the evidence points to disemployment effects."¹⁷

By their calculations, of the 33 studies "providing the most credible evidence; 28 (85 percent) ... point to negative employment effects."¹⁸

The Neumark and Wascher review, however, is considerably more subjective and arguably less relevant to the United States than the two meta-studies discussed earlier. Only 52 of the 102 studies reviewed by Neumark and Wascher analyzed U.S. data. Of these, Neumark and Wascher designated 19 as "most credible," five of which were their own studies.¹⁹ The Neumark and Wascher (2006) review also excludes several important papers that were not published until after the review was completed, including the important contributions of Arindrajit Dube, William Lester, and Michael Reich (2010) and Sylvia Allegretto, Dube, and Reich (2011) (to which we will return to below).²⁰

14 Wolfson and Belman (forthcoming), p. 10.

15 An abbreviated version of their findings, with a few additional studies added, appears in chapter three of Neumark and Wascher (2008). For a critical review of Neumark and Wascher's book, see Dube (2011).

16 Neumark and Wascher (2006), p. 120.

17 Neumark and Wascher (2006), p. 121.

18 Neumark and Wascher (2006).

19 Following the procedure that Neumark and Wascher appear to have used, I count Sabia (2006) as two studies because it has two separate entries in their Table 1.

20 In their subsequent book, Neumark and Wascher (2008) do critique a pre-publication version of the Dube, Lester, and Reich paper.

Wolfson and Belman (forthcoming) also produced an extensive qualitative review of minimum wage research since 2000, including a significant number of studies published too late for inclusion in Neumark and Wascher (2006, 2008). Of the studies they reviewed, 40 analyzed U.S. data. Fourteen of these found negative employment effects; thirteen found no effects; one found positive effects; and twelve, a mixture of negative, positive, and no effects. To sort out these conflicting findings, Wolfson and Belman appealed to their meta-study, which as noted earlier, concluded that there were no statistically and economically meaningful employment losses associated with the minimum wage.

A closer look at several key recent studies

This section takes a closer look at several of the most important studies conducted over the last decade.

Dube, Lester, and Reich (2010)

Probably the most important and influential paper written on the minimum wage in the last decade was Dube, Lester, and Reich (2010)'s study,²¹ which offered a comprehensive reappraisal of both the new minimum wage research and its critics. The study was built around a key methodological innovation, which essentially generalized Card and Krueger's New Jersey study to make it nationally representative, and identified a significant weakness in much of the earlier minimum-wage research based on the analysis of state employment patterns, which had failed to control for regional differences in employment growth that were unrelated to the minimum wage.

The most convincing critique of Card and Krueger's (1994, 2000) study of the increase in the New Jersey minimum wage (relative to Pennsylvania, where the minimum wage did not go up) was that it is difficult to generalize from a single case study. Even a perfect experiment will have random error that could affect the results in a single experiment. Imagine that the minimum wage had a small, but real, negative employment effect. Random errors will lead the results of separate tests to be distributed around this hypothetical negative employment effect, sometimes producing a larger disemployment effect than the "true" level, sometimes producing a smaller disemployment effect than what is "true" – even zero or positive measured disemployment effects. By this thinking, Card and Krueger's experiment could have been perfectly executed, but still represent only one result from a distribution of possible outcomes. Absent other information, the best estimate of the true effect of the minimum wage would be Card and Krueger's actual results, but we cannot convincingly rule out, based on that single case, that the effects were in truth larger or smaller than what was observed in the case of New Jersey in 1992.

In recognition of this problem, Dube, Lester and Reich (2010) essentially replicated Card and Krueger's New Jersey-Pennsylvania experiment thousands of times, by comparing employment differences across contiguous U.S. counties with different levels of the minimum wage. The three economists carefully constructed a data set of restaurant employment in every quarter between 1990 and 2006 in the 1,381 counties in the United States for which data were available continuously over the full period.²² They also matched these employment data with the level of the federal or state minimum wage (whichever was higher) in the county in each quarter of each year in the sample. They then compared restaurant employment outcomes across a subset of 318 pairs of bordering

21 The paper first circulated in 2007.

22 They drew the data from the Quarterly Census of Employment and Wages, which collects data from unemployment insurance records, a virtual census of employees in the United States. There were a total of 3,081 counties in total in the United States over the period they analyzed.

counties where the prevailing minimum wage could differ, depending on the level of the federal and state minimum wage.

Their methodology effectively generalizes the Card and Krueger New Jersey-Pennsylvania study, but with several advantages. First, the much larger number of cases allowed Dube, Lester, and Reich to look at a much larger distribution of employment outcomes than was possible in the single case of the 1992 increase in the New Jersey minimum wage. Second, since they followed counties over a 16-year period, the researchers were also able to test for the possibility of longer-term effects. Finally, because the relative minimum wage varied across counties over time, the minimum wage in a particular county could, at different points in time, be lower, identical to, and higher than the minimum wage in its pair, providing substantially more experimental variation than in the New Jersey-Pennsylvania (and many similar) studies. Using this large sample of border counties, and these statistical advantages over earlier research, Dube, Lester, and Reich "...find strong earnings effects and no employment effects of minimum wage increases."²³

Dube, Lester, and Reich's study also identified an important flaw in much of the earlier minimum-wage research based on the analysis of state-level employment patterns. The three economists demonstrated that overall employment trends vary substantially across region, with overall employment generally growing rapidly in parts of the country where minimum wages are low (the South, for example) and growing more slowly in parts of the country where minimum wages tend to be higher (the Northeast, for example). Since no researchers (even the harshest critics of the minimum wage) believe that the minimum wage levels prevailing in the United States have had any impact on the *overall* level of employment, failure to control for these underlying differences in regional employment trends, Dube, Lester, and Reich argued, can bias statistical analyses of the minimum wage. Standard statistical analyses that do not control for this "spatial correlation" in the minimum wage will attribute the better employment performance in low minimum-wage states to the lower minimum wage, rather than to whatever the real cause is that is driving the faster overall job growth in these states (good weather, for example). Dube, Lester, and Reich use a dataset of restaurant employment in all counties (for which they have continuous data from 1990 through 2006), not just those that lie along state borders and are able to closely match earlier research that finds job losses associated with the minimum wage. But, once they control for region of the country, these same earlier statistical techniques show no employment losses. They conclude: "The large negative elasticities in the traditional specification are generated primarily by regional and local differences in employment trends that are unrelated to minimum wage policies."^{24, 25}

Independently of Dube, Lester, and Reich, economists John Addison, McKinley Blackburn, and Chad Cotti used similar county level data for the restaurant-and-bar sector to arrive at similar conclusions. Addison, Blackburn, and Cotti found no net employment effect of the minimum wage in the restaurant-and-bar sector. More importantly, using reasoning similar to Dube, Lester, and Reich, they also concluded that the standard state panel-data techniques that have typically yielded negative employment effects of the minimum wage appear to be biased toward finding that result: "Our evidence does not suggest that minimum wages reduce employment once controls for trends in county-level sectoral employment are incorporated. Rather, employment appears to exhibit an

23 Dube, Lester, and Reich (2010), p. 961.

24 Dube, Lester, and Reich (2010), p. 962.

25 Note that several prominent studies since 2000 that use state panel data and estimation techniques of this type do not control for or address the "spatial heterogeneity" identified by Dube, Lester, and Reich. See, for example, Burkhauser, Couch, and Wittenburg (2000), Neumark and Wascher (2007), and Sabia (2009).

independent downward trend in states that have increased their minimum wages relative to states that have not, thereby predisposing estimates towards reporting negative outcomes."²⁶

Allegretto, Dube, and Reich (2011)

Sylvia Allegretto, Dube, and Reich (2011) applied the insights of Dube, Lester, and Reich (2010) to teen employment over the period 1990-2009. Their work made at least two important contributions to the policy debate. First, they analyzed teen employment, rather than industry employment, making their results more directly comparable to the bulk of earlier research on the minimum wage. Second, they included data covering the deep recession that ran from December 2007 through June 2009, allowing them to measure any possible interactions between the minimum wage and strong economic downturns.²⁷

Allegretto, Dube, and Reich analyzed data on teenagers taken from the Current Population Survey (CPS) for the years 1990 through 2009.²⁸ Because the CPS sample is smaller than the QCEW data used in the county-analysis, Allegretto, Dube, and Reich instead tracked teen employment at the state level. When they produced standard statistical analyses of the kind used in much of the research since the mid-1990s on teen employment, the three economists found results similar to those found in that earlier research (a 10 percent increase in the minimum wage reduces teen employment slightly more than 1 percent). But, once they controlled for different regional trends, the estimated employment effects of the minimum wage disappeared, turning slightly positive, but not statistically significantly different from zero.

Allegretto, Dube, and Reich also investigated whether the impact of the minimum wage is greater in economic downturns. They "...do not find evidence that the effects are systematically different in periods of high versus low overall unemployment."²⁹

Hirsch, Kaufman, and Zelenska (2011)

Barry Hirsch, Bruce Kaufman, and Tatyana Zelenska (2011) studied the impact of the 2007-2009 increases in the federal minimum wage on a sample of 81 fast-food restaurants in Georgia and Alabama. In principle, the size of the minimum-wage increase was identical across all the restaurants studied, but, in practice, the impact of the increase varied because there was significant variation in pay across the restaurants. Their paper makes an important contribution to the policy debate because it seeks to shift the discussion toward understanding why, in their words, "[d]espite decades of research, pinning-down the labor market effects of [the minimum wage] has proven elusive."³⁰ In particular, they propose looking at a range of possible "channels of adjustment" to minimum wage increases and examine evidence on some of these potential channels.

Hirsch, Kaufman, and Zelenska gathered two kinds of data. The first were electronic payroll data obtained from the three owners of the 81 establishments. The data covered a three-year period from January 2007 through December 2009, which brackets the July 2007, July 2008, and July 2009

26 Addison, Blackburn, and Cotti (2012), p. 412. This research first circulated in 2008, at about the same time that Dube, Lester, and Reich's work first appeared.

27 Of course, Dube, Lester, and Reich (2010) included data covering the 1990-91 and 2001 recessions.

28 The detailed data on restaurant employment that Dube, Lester, and Reich (2010) used in their study do not contain information on workers' characteristics such as age, so Allegretto, Dube, and Reich (2011) used the smaller CPS data set.

29 Allegretto, Dube, and Reich (2011), p. 238.

30 Hirsch, Kaufman, and Zelenska (2011), p. 1.

increases in the federal minimum wage. These data allowed the researchers to conduct before-and-after tests of changes in wages and employment at the restaurants. If the minimum wage had a negative effect on employment, they would expect to observe larger increases in wages at the lower-wage restaurants, accompanied by bigger declines in employment. In fact, they found: "...in line with other recent studies, that the measured employment impact is variable across establishments, but overall not statistically distinguishable from zero. The same absence of a significant negative effect is found for employee hours, even when examined over a three-year period."³¹

Hirsch, Kaufman, and Zelenska also collected data through separate interviews with managers and employees, using a survey designed to investigate channels of adjustment to the minimum wage – other than changes in employment or hours.³² The other channels they considered included: price increases; changes to the internal wage structure (including slower pay increases for higher-wage workers); reductions in turnover; "operational and human resource efficiencies;" reductions in non-labor costs; reductions in customer service; and lower profits.

After analyzing the establishment data on wages, employment, and hours, Hirsch, Kaufman, and Zelenska concluded that while wages did rise after the federal minimum-wage increase, any employment and hours changes were not statistically distinguishable from zero. Based on the rest of the information they gathered in their survey and interviews with employers and employees, they write:

"...our study offers a new [three-part] explanation for the small and insignificant [minimum wage] employment effects found in the literature... first... is that even large increases in the [minimum wage] may be modest as compared to other cost increases that business owners must routinely offset or absorb... The second is that a [minimum-wage] cost increase flows through more adjustment channels than economists have typically considered. And the third is that managers regard employment and hours cuts as a relatively costly and perhaps counter-productive option, regarding them as a last resort."³³

Hirsch, Kaufman, and Zelenska's empirical investigation of the wage, employment, and other impacts of the federal minimum wage is subject to a number of reasonable critiques. The most important of these (as was the case with Card and Krueger's 1994 and 2000 New Jersey studies) is that it is difficult to generalize from only one minimum wage experiment, particularly when the analysis is based on the experience of only 81 restaurants, all in the same chain, all owned by a only three franchisees in just two states. Nevertheless, the employment effects they find lie at the consensus estimate in the two most recent meta-studies: little or no negative employment outcomes. The key contribution of this paper, however, is its focus on the wide range of ways that employers respond to minimum-wage increases other than adjusting employment or hours.

Sabia, Burkhauser, and Hansen (2012)

Joseph Sabia, Richard Burkhauser, and Benjamin Hansen (2012) used research methods similar in spirit to the original Card and Krueger New Jersey study to analyze the effects of an increase (in three steps) in the New York state minimum wage from \$5.15 per hour in 2004, to \$7.15 per hour in 2007 (a cumulative 39 percent increase). They compared the effect of the increase on the

31 Hirsch, Kaufman, and Zelenska (2011), p. 32.

32 In the summer of 2009, they interviewed or surveyed 66 of the 81 managers and 1,649 of the 2,640 employees (Hirsch, Kaufman, and Zelenska, 2011, p. 12).

33 Hirsch, Kaufman, and Zelenska (2011), p. 33.

employment of less-educated 16-to-29 year olds in New York with similar workers in nearby Pennsylvania, Ohio, and New Hampshire, which experienced no increase in the minimum wage over the same period. The three economists also compared employment outcomes for less-educated 16-to-29 year olds in New York with better-educated New York state workers of the same age.³⁴

Their analysis shows that the minimum-wage increases in New York raised the wages of less-skilled younger workers relative both to similar workers in the control states and to better-educated workers of the same age in New York state. But, they also found: "...robust evidence that raising the New York minimum ... significantly reduced employment rates of less-skilled, less-educated New Yorkers." Their estimates implied "...a median elasticity of around -0.7, large relative to consensus estimates ... of -0.1 to -0.3 found in the literature."³⁵

The Sabia, Burkhauser, and Hansen study, however, is subject to the same critique applied to Hirsch, Kaufman, and Zelenska (and Card and Krueger before them). Sabia, Burkhauser, and Hansen analyzed only one experience of the minimum wage. Even if the effects of the minimum wage were, in truth, zero, we would expect to see a distribution of estimates around zero, including both positive and negative estimates. As Doucouliagos and Stanley demonstrated in their large meta-study of employment effects through the middle of the 2000s, the minimum-wage literature on teenagers showed a range of positive and negative effects, but also a large spike of the most accurate estimates at, or very near, zero. Wolfson and Belman's meta-study, which focused on the period from about 1990 through 2010, confirms Doucouliagos and Stanley's findings with more recent research. Given how far the Sabia, Burkhauser, and Hansen estimates lie outside this consensus range, the burden of proof would seem to fall on Sabia, Burkhauser, and Hansen to explain why their study of a single experiment with the minimum wage should outweigh the cumulative experience of scores of studies of the U.S. minimum wage since the early 1990s.

Adjustment Channels

The standard competitive model makes stark predictions about the employment effects of the minimum wage: a binding minimum wage will price at least some low-wage workers out of jobs and will unambiguously lower employment. Why, then, does the bulk of the best statistical evidence on the employment effects of the minimum wage cluster at zero or only small employment effects? This section attempts to answer that question, adopting and adapting the simple "channels of adjustment" framework proposed by Hirsch, Kaufman, and Zelenska.

Hirsch, Kaufman, and Zelenska argue for a "channels of adjustment" approach through which cost increases associated with the minimum wage change "...the behavior of firms, with impacts on workers, consumers, owners, and other agents."³⁶ Hirsch, Kaufman, and Zelenska analyze the possible channels of adjustment emphasized by three different theoretical approaches to the minimum wage: the standard competitive model; the "institutional" model; and the (dynamic) "monopsony" model.

34 Sabia, Burkhauser, and Hansen (2012) also constructed a synthetic control group of individuals drawn from a larger collection of states, designed to most closely match the characteristics of the "treated" New York state group. These tests produced qualitatively similar results to the ones discussed here.

35 Sabia, Burkhauser, and Hansen (2012), p. 23.

36 Hirsch, Kaufman, and Zelenska (2011), p. 1.

Competitive model

The competitive model generally emphasizes adjustment through declining employment (or hours). But, the same competitive model also allows for other possible channels of adjustment, including higher prices to consumers, reductions in non-wage benefits such as health insurance and retirement plans, reductions in training, and shifts in the composition of employment. If the only channel of adjustment available is employment, the competitive model implies that binding minimum wages will reduce employment. But, the existence of other possible channels of adjustment means that minimum wages could have little or no effect on employment, even within a standard competitive vision of the labor market.

Institutional model

The institutional model, as Hirsch, Kaufman, and Zelenska note, was the "dominant paradigm for evaluating the minimum wage" from the time the federal minimum wage was first established in the 1930s through the decade of the 1950s. The institutional view has several key features, including: "rejection of a well-defined downward sloping labor demand curve; labor markets that are imperfectly competitive, institutionally segmented, socially embedded, and prone to excess supply; and the importance of technological and psycho-social factors in firm-level production systems and internal labor markets ... as determinants of cost and productivity."³⁷

This institutional approach to the labor market allows for several additional channels of adjustment to a minimum-wage increase. Probably the most important of these concern productivity. Employers may respond to a minimum-wage increase by exerting greater managerial effort on productivity-enhancing activities, including the reorganization of work, setting higher performance standards, or demanding greater work intensity. In the competitive model, firms are assumed already to be operating at peak efficiency, but in the institutional framework, firms are assumed to often operate below their peak efficiency because it is costly to managers and to workers to identify, implement, and maintain practices that continuously maximize efficiency.³⁸ In this context, a minimum-wage increase gives new incentives to employers to undertake additional productivity-improving practices. Alternatively, a higher minimum wage may also boost productivity through "efficiency wage" effects. A strong theoretical and empirical basis exists for the idea that wages set above the competitive market rate can induce workers to work harder,³⁹ either to ensure that they keep their job⁴⁰ or in reciprocity for the higher wages paid.^{41, 42}

Another important potential channel of adjustment in the institutional model is the possibility that a higher minimum wage, by increasing spending power of low-wage workers, might act as a form of economic stimulus, spurring greater demand for firms' output, at least partially offsetting the rise in wage costs.⁴³

37 Hirsch, Kaufman, and Zelenska (2011), p. 5. For an excellent discussion of the institutional framework as it relates to the minimum wage, see Kaufmann (2010).

38 Kaufman (1999, 2010).

39 Katz (1986).

40 Shapiro and Stiglitz (1984).

41 Akerlof (1982).

42 See Hirsch, Kaufman, and Zelenska (2011), pp. 5-7 for additional possible channels of adjustment under the institutional model.

43 See Hall and Cooper (2012).

As a result of these various alternative channels of adjustment, the institutional model suggests that the minimum wage "may have, particularly in the short-run, an approximately zero or small positive employment effect."⁴⁴

Dynamic monopsony model

The dynamic monopsony model is a third theoretical approach to the labor market that opens up additional channels of adjustment.⁴⁵ The most important new channel is the possibility that the minimum wage reduces the costs of turnover to low-wage employers.

The key difference between the standard competitive model and the monopsony model concerns the circumstances employers face when it comes to recruiting and retaining staff. In the competitive model, employers can hire all the labor they desire by paying the prevailing market wage; and, in the event that a worker quits, employers can instantly replace that worker with an identically productive worker at the same wage. By contrast, in the dynamic monopsony model, employers, even those operating in low-wage labor markets, face real costs associated with hiring new workers. These costs flow from inevitable frictions in the labor market. Workers incur costs (time, effort, financial expenditures) to find job openings; and, workers must limit their job searches to openings that fit their geographic, transportation, and scheduling constraints. To overcome these frictions, employers must either pay above the going wage (to draw extra attention to the particular vacancy) or wait (with implied costs in lost output) until they are able to fill the vacancy with a worker willing to accept that particular opening at the going rate.

At first glance, these frictions seem to work against low-wage employers, who must pay higher wages to attract additional workers. In reality, however, these frictions put low-wage workers at a significant disadvantage relative to their employers. Employers must pay above the going rate to fill vacancies quickly (or wait longer until the vacancy is filled at the going rate) because unemployed workers face real barriers (transportation, scheduling, information, financial, and others) to locating suitable jobs. Low-wage employers are well-positioned to take advantage of these difficulties. Even though employers must pay new workers a higher wage to fill a vacancy quickly, employers are able to pay their current workers – who had to overcome various frictions to find their current job – below their "marginal product."

In the monopsony model, employers are unlikely to pay higher wages in order to fill vacancies because they would then have to raise the pay of their existing workers to match the pay offered to their last hire. As a result, in monopsonistic settings, employers habitually operate with unfilled vacancies, rather than raising the wage for their entire workforce. In this context, raising the minimum wage can actually increase employment by raising the wages of the existing workforce to the "competitive" level (no existing jobs are lost because these workers were being paid below their "marginal product") and filling existing vacancies (which increases overall employment).⁴⁶

44 Hirsch, Kaufman, and Zelenska (2011), p. 6, citing Lester (1946, 1960).

45 Traditional monopsony models assume that the labor market is characterized by a single employer who hires all of the large number of possible workers. The standard example is an isolated "company town" with many workers and only one large employer. By using the term "dynamic monopsony" economists are attempting to keep some of the analytical features of the standard monopsony model, while emphasizing that the source of the monopsony power does not flow from being a single employer, but rather from the dynamics –especially, the frictions– of the low-wage labor market.

46 For a detailed, technical discussion of dynamic monopsony, see Manning (2003).

TABLE 1
Total wage bill impact of recent minimum-wage increases

	Minimum wage (nominal dollars)	Legislated increase (percent)	Number of full-time equivalent workers affected (thousands)	Share of all employees (percent)	Share of all hours worked (percent)	Average hourly increase for workers receiving an increase (dollars)	Total annual cost of wage increase (billions of dollars)	Total annual wage bill, in sweep (billions of dollars)	Total annual wage bill, all workers (billions of dollars)	Total increase as share of wage bill, in sweep (percent)	Total increase as share of wage bill, all workers (percent)
1989	3.35										
1990	3.80	13.4	3,612,491	4.8	3.6	0.32	2.4	26.2	2,267.4	9.2	0.11
1991	4.25	11.8	4,199,152	5.6	4.2	0.34	3.0	34.2	2,369.0	8.7	0.13
1995	4.25										
1996	4.75	11.8	2,959,023	3.8	2.8	0.41	2.5	26.8	3,068.8	9.4	0.08
1997	5.15	8.4	4,902,738	6.0	4.5	0.26	2.7	49.9	3,242.7	5.3	0.08
2006	5.15										
2007	5.85	13.6	1,214,946	1.3	1.0	0.49	1.2	13.6	5,317.6	9.1	0.02
2008	6.55	12.0	1,936,789	2.1	1.6	0.45	1.8	24.5	5,536.5	7.4	0.03
2009	7.25	10.7	2,407,638	2.7	2.0	0.37	1.9	34.5	5,546.5	5.4	0.03

Notes: Authors' analysis of Current Population Survey.

Size of Adjustment

The three distinct theoretical approaches to the minimum wage suggest a large number of possible channels of adjustment. Before reviewing the evidence on these various channels, however, it is useful to have an idea of the size of the adjustment that a typical minimum-wage increase requires.

Table 1 presents data on the wage costs of last three rounds of federal minimum wage increases: the 1990-91 increases (from \$3.35 to \$4.25); the 1996-97 increases (from \$4.25 to \$5.15); and the 2007-2009 increases (from \$5.15 to \$7.25). Each of the annual increases in the statutory level of the minimum wage was in the range of about 10 percent per year (a low of 8.4 percent to a high of 13.6 percent – see column two). The average increase in the wage costs of affected workers, however, was in all cases smaller than the increase in the statutory rate, ranging from a low of 5.3 percent to a high of 9.4 percent (see next-to-last column). The lower average actual increase simply reflects that not all of the workers who receive a pay boost after a minimum-wage increase receive the full increase (because they are already earning something above the old federal minimum, but below the new federal minimum). Even more importantly, the total direct wage cost of each of these minimum-wage increases was tiny relative to the total wage bill paid by employers – consistently less than 0.1 percent of total wages paid. Relative to the wage costs of minimum-wage workers, the size of each recent minimum-wage increase was modest (between about 5 and 10 percent of total wage costs for minimum-wage workers).⁴⁷ Relative to the total wage costs in the economy (that is including the wages of all employees, not just those earning the minimum wage), the wages costs of recent minimum-wage increases are very small.⁴⁸

The size of these increases is directly relevant to the evaluation of possible channels of adjustment. For the typical minimum-wage increase, one or more of these alternative channels of adjustment – whether they are related to productivity increases, cuts in profits, reductions in earnings of higher earners, higher prices to consumers, or other mechanisms – must cope with what are relatively small total cost increases, when expressed as either a share of the total wages paid to minimum-wage workers or as a share of the total wages paid to all workers.

Possible Channels

1. Reduction in hours worked

The minimum wage does not raise the cost of hiring *workers* – it raises the cost of hiring an *hour of work* performed by those workers. Even within the competitive framework, employers might choose to respond to a minimum-wage increase by reducing workers' hours, rather by reducing the total number of workers on payroll.⁴⁹

If firms were to adjust entirely by cutting hours (that is, they used no other adjustment channel), a minimum-wage increase could still raise the living standard of minimum-wage workers, even in a competitive model of the labor market. Imagine, for example, that the minimum wage increased wages by 20 percent and lowered the number of hours worked by 10 percent. A part-time worker working, say 20 hours per week, would experience a 10 percent fall in hours to, 18 hours a week, but

47 Moreover, these increases were typically preceded and followed by years when the minimum wage did not change at all.

48 The cost of minimum-wage increases is even smaller when expressed as a share of total compensation – wages plus non-wage benefits such as health insurance.

49 Michl (2000).

would be paid 20 percent more for each of these 18 hours worked, for a net increase in weekly pay of 8 percent. Even if the reduction in hours was so large that it exactly offset the increase in the hourly wage, minimum-wage workers would still be better off after the increase because they would be earning exactly what they made before, but would now be working fewer hours per week to earn it. Hours adjustments would only reduce a worker's standard of living if the fall in hours were steeper than the rise in wages.⁵⁰

The empirical evidence on hours effects is not conclusive. Based on indirect evidence, Dube, Lester, and Reich's study of the minimum wage across contiguous counties tentatively suggests that "the fall in hours is unlikely to be large."⁵¹ Neumark and Wascher's review of the evidence concludes that "the question of how employers adjust average hours in response to a minimum wage increase is not yet resolved."⁵²

2. Reductions in non-wage benefits

Within the competitive framework, employers might respond to a minimum-wage increase by lowering the value of non-wage benefits, such as health insurance and pension contributions.

The empirical evidence, however, points to small or no effects along these lines. Based on their review of research as of the mid-1990s, Card and Krueger conclude: "The quantitative importance of nonwage offsets in response to a minimum-wage increase is an open question."⁵³ Their own study of fast-food restaurants in New Jersey showed no tendency for employers to cut the most common nonwage benefit offered, which was free or low-priced meals.⁵⁴ Simon and Kaestner's somewhat more recent review of the "relatively few studies of the effect of minimum wages on fringe benefits and working conditions"⁵⁵ also reports small or no effects of the minimum wage on nonwage benefits.⁵⁶ Simon and Kaestner's own analysis of data from the Current Population Survey found that: "...minimum wages have had no discernible effect on fringe benefits (specifically, on the receipt of health insurance, on whether the employer paid the whole premium cost, on whether family health insurance was provided, and on receipt of employer pensions)."⁵⁷

3. Reductions in training

Another channel of adjustment consistent with the competitive framework is the possibility that employers might reduce their expenditures on job training for low-wage workers.

The empirical evidence is not conclusive. In their review of the recent research on the minimum wage and training, Neumark and Wascher write: "Summing up all of the evidence on training, we

50 Given the high level of turnover in many low-wage jobs, the distinction between employment and hours adjustments might be less important than it first seems. If low-wage jobs are typically of short duration and low-wage workers cycle in and out of low-wage jobs during the course of the year, even a reduction in the number of low-wage jobs might, in practice, look to low-wage workers like only a reduction in hours. Low-wage workers would spend somewhat more time in between jobs, but be paid more for each job they did land. As a result, depending on the elasticities involved (the responsiveness of employment to minimum-wage changes), their annual hours could fall, but their annual incomes could rise.

51 Dube, Lester, and Reich (2010), p. 956.

52 Neumark and Wascher (2008), p.78.

53 Card and Krueger (1995), p. 169.

54 Card and Krueger (1994).

55 Simon and Kaestner (2004), p. 53.

56 Citing Wessels (1980); Alpert (1986); Card and Krueger (1994); Royalty (2000).

57 Simon and Kaestner (2004), p. 67.

can only conclude that the evidence is mixed. Our own research tends to find negative effects of minimum wages on training, but most of the other recent research finds little evidence of an effect in either direction."⁵⁸

One reason that the research has not identified clear effects of the minimum wage on training may be that the institutional model provides a better description of the labor market than the standard competitive model. In the institutional model, employers may respond to a higher wage floor by *increasing* training for low-wage workers in order to raise their productivity to a level commensurate with their new, higher earnings.⁵⁹

4. Changes in employment composition

Employers may adjust to a higher minimum wage by "upgrading" the skill level of their workforce, rather than cutting the level of their staffing. This process could conceivably work against the employment prospects of less-educated and less-experienced workers, especially, the argument goes, black and Latino teens. As Walter E. Williams argues:

"...when faced with legislated wages that exceed the productivity of some workers, firms will make adjustments in their use of labor. One adjustment is not only to hire fewer youths but also to seek among them the more highly qualified candidates. It turns out for a number of socioeconomic reasons that white youths, more often than their black counterparts, have higher levels of educational attainment and training. Therefore, a law that discriminates against low-skilled workers can be expected to place a heavier burden on black youths than on white ones."⁶⁰

Donald Deere, Kevin Murphy, and Finis Welch (1995) and Sabia, Burkhauser, and Hansen (2012) make arguments along these lines in their studies of workers with less than a high school degree.⁶¹

As Allegretto, Dube, and Reich note, however, a theoretical case can be made that minimum wages might instead *improve* the relative employment prospects of disadvantaged workers: "An alternative view suggests that barriers to mobility are greater among minorities than among teens as a whole. Higher pay then increases the returns to worker search and overcomes existing barriers to employment that are not based on skill and experience differentials."⁶² A higher minimum wage could help disadvantaged workers to cover the costs of finding and keeping a job, including, for example, transportation, child-care, and uniforms.

Allegretto, Dube, and Reich's (2011) own research on the employment effect of the minimum wage on teens looks separately at the effects on white, black, and Hispanic teens. For the period 1990 through 2009, which includes three recessions and three rounds of increases in the federal minimum wage, they find no statistically significant effect of the minimum wage on teens as a whole, or on any of the three racial and ethnic groups, separately, after they control for region of the country. Using a

58 Neumark and Wascher (2008), p. 207.

59 In their analysis of the minimum wage and training, Acemoglu and Pischke (2001) use a noncompetitive, but not explicitly "institutional" model and arrive at a similar conclusion: "In contrast, in noncompetitive labor markets, minimum wages tend to increase training of affected workers because they induce firms to train their unskilled employees."

60 Williams (2011), pp. 45-46

61 Deere, Murphy, and Welch also studied outcomes for minority youth.

62 Allegretto, Dube, and Reich (2011), p. 228, who cite Raphael and Stoll (2002) on this point.

similar methodology, Dube, Lester, and Reich (2012) detect no evidence that employers changed the age or gender composition in the restaurant sector in response to the minimum wage. In a study of detailed payroll records for a large retail firm with more than 700 stores, Laura Giuliano (2012) found that teens from more affluent areas increased their labor supply (and employment) after the 1996-1997 increases in the minimum wage, while employment of teens in less affluent areas experienced no statistically significant change in employment. Recent research by Sabia, Burkhauser, and Hansen (2012) finds job losses among younger, less-educated workers, but not older, less-educated workers. The Sabia, Burkhauser, and Hansen findings, however, are subject to the critiques mentioned earlier – they find job losses well outside the range of the bulk of earlier research and their results are based on a single state-level experiment with the minimum wage and may not be representative.

5. Higher prices

Employers may respond to a higher minimum wage by passing on the added costs to consumers in the form of higher prices. In a purely competitive economy, where all firms are experiencing the same increase in labor costs in response to a minimum-wage increase, economic theory predicts that at least a portion of the cost increase will be passed through to consumers.

Sara Lemos has conducted a comprehensive review of the 30 or so academic papers on the price effects of the minimum wage. She concludes: "Despite the different methodologies, data periods and data sources, most studies reviewed above found that a 10% US minimum wage increase raises food prices by no more than 4% and overall prices by no more than 0.4%"; and "[t]he main policy recommendation deriving from such findings is that policy makers can use the minimum wage to increase the wages of the poor, without destroying too many jobs or causing too much inflation."⁶³ Neumark and Wascher agree with Lemos's assessment about the likely price effects (while disagreeing with her conclusions about the overall usefulness of the minimum wage): "Both because of the relatively small share of production costs accounted for by minimum wage labor and because of the limited spillovers from a minimum wage increase to wages of other workers, the effect of a minimum wage increase on the overall price level is likely to be small."⁶⁴ Other recent research by Daniel Aaronson, Eric French, and James MacDonald on restaurant pricing, a sector with a high share of low-wage workers suggests that the price effects are likely to be lower than the upper bounds suggested by Lemos. Aaronson, French, and MacDonald "find that a 10 percent increase in the minimum wage increases prices by roughly 0.7 percent."⁶⁵

6. Improvements in efficiency

The "institutional" model of the labor market suggests that employers may respond to a minimum-wage increase with efforts to improve operational efficiency including "tighter human resource practices..., increased performance standards and work effort, and enhanced customer services."⁶⁶ Employers might prefer these kinds of adjustments to cutting employment (or hours) because employer actions that reduce employment can "hurt morale and engender retaliation"⁶⁷ In

63 Lemos (2008), p. 208.

64 Neumark and Wascher (2008), p. 248.

65 Aaronson, French, and MacDonald (2008), p. 697. In their study of the San Francisco citywide minimum wage, Dube, Naidu, and Reich found that prices "increased significantly" at fast-food restaurants, but not at table-service restaurants (2007, p. 542).

66 Hirsch, Kaufman, and Zelenska (2011), p. 7.

67 Hirsch, Kaufman, and Zelenska (2011), pp. 6-7.

institutional models – different from competitive models where firms are always assumed to be operating at peak efficiency – firms generally have some scope for increasing output, albeit usually at a cost of greater managerial effort.

Little direct evidence exists on operational and human resource efficiencies as a channel of adjustment. Hirsch, Kaufman, and Zelenska's study of the impact of the federal minimum-wage increase on 81 fast-food restaurants in Georgia and Alabama, however, asked fast-food managers specifically about scope for efficiency improvements in response to the minimum-wage rise. About 90 percent of managers indicated that they planned to respond to the minimum-wage increase with increased performance standards such as "requiring a better attendance and on-time record, faster and more proficient performance of job duties, taking on additional tasks, and faster termination of poor performers."⁶⁸ Roughly the same share of managers said that they sought to "boost morale" by presenting the minimum-wage increase as a "challenge to the store" and using this as a way "to energize employees to improve productivity"⁶⁹ Based on their interviews with store managers, Hirsch, Kaufman, and Zelenska suggest that a minimum-wage increase may function as a "catalyst or shock that forces managers to step out of the daily routine and think about where cost savings can occur."^{70,71}

7. "Efficiency wage" responses from workers

A higher minimum wage may also motivate workers to work harder, independently of any actions by employers to increase productivity. According to "efficiency wage" theory, wages above the competitive-market rate may elicit greater work effort for several reasons. As Carl Shapiro and Joseph Stiglitz (1984) have argued, higher pay increases the cost to workers of losing their job, potentially inducing greater effort from workers in order to reduce their chances of being fired.⁷² George Akerlof (1982), arguing from a more sociological point of view, has suggested that workers may see higher wages as a gift from employers, leading workers to reciprocate by working harder.⁷³

While a large body of research has attempted to test for the existence of "efficiency wages," few studies directly address the theoretical or empirical link between efficiency wages and the minimum wage. James Rebitzer and Lowell Taylor (1995), for example, have developed a formal model that demonstrates that a minimum wage in the context of efficiency wages "may increase the level of employment in low wage jobs." But, to my knowledge, there are no studies testing for efficiency wage effects in connection with the U.S. minimum wage.

68 Hirsch, Kaufman, and Zelenska (2011), p. 27.

69 Hirsch, Kaufman, and Zelenska (2011), pp. 28-29.

70 Hirsch, Kaufman, and Zelenska (2011), p. 29.

71 Card and Krueger report that the "Dollar General Corporation noted in its 1992 annual report that the impact of the 1992 minimum wage hike was minimized due to "greater employee productivity." (1995, p. 323) It is not clear whether Dollar General viewed these changes as related to management's cost-saving efforts or "efficiency wage" considerations (the next channel of adjustment considered here) or some other channel.

72 Shapiro and Stiglitz (1984).

73 Efficiency wages may work through other channels, some covered elsewhere here, others less relevant to the minimum wage, see, for example, Katz: "Efficiency wage theories suggest that firms may find it profitable to pay workers' wages above the market clearing level since such wage premiums can help reduce turnover, prevent worker malfeasance and collective action, attract higher-quality employees, and facilitate the elicitation of effort by creating feelings of equitable treatment among employees." (1986, pp. 270-271)

8. Wage compression

Employers faced with higher wage costs for their low-wage workers may also seek to make up for these costs by cutting the earnings of higher-wage workers. Large changes over time within the United States, as well as large differences across countries, in the relative pay of high- and low-wage workers suggest that employers have some scope in setting relative wages. In the specific context of a minimum-wage increase, Hirsch, Kaufman, and Zelenska found that almost half of the employers they interviewed said that, in the wake of a federal minimum-wage increase, they "would delay or limit pay raises/bonuses for more experienced employees."⁷⁴ Broader studies of the U.S. economy also conclude that the minimum wage compresses the overall wage distribution.⁷⁵ These empirical findings give some support to the possibility that employers may compensate for higher wage costs at the bottom by cutting wages of workers who nearer to the top.

9. Reduction in profits

Employers may also absorb the extra costs associated with a minimum-wage increase by accepting lower profits.⁷⁶ Unfortunately, "there is almost a complete absence of any study directly examining the impact of minimum wages on firm profitability"⁷⁷ Card and Krueger (1995) report the results of several attempts to analyze the impact of minimum-wage increases on firm profits in the United States, but found only a "mixed" and "tentative" effect. More recently, Mirko Draca, Stephen Machin, and John Van Reenen analyzed British firm-level data and concluded that "wages were significantly raised, and firm profitability was significantly reduced by the minimum wage introduction."⁷⁸

10. Increases in demand (minimum wage as stimulus)

Particularly when the economy is in a recession or operating below full employment, a minimum-wage increase may also increase demand for firms' goods and services, offsetting the increase in employer costs.

Since the minimum wage transfers income from employers (who generally have a high savings rate) to low-wage workers (who generally have a low savings rate), a minimum-wage rise could spur consumer spending. This increase in spending could potentially compensate firms for the direct increase in wage costs.

Doug Hall and David Cooper (2012), for example, estimate that an increase in the minimum-wage from its current level of \$7.25 per hour to \$9.80 per hour by July 2014 would increase the earnings low-wage workers by about \$40 billion over the period. The result, they argue, would be a significant increase in GDP and employment:

⁷⁴ Hirsch, Kaufman, and Zelenska (2011), p. 28.

⁷⁵ See, for example, DiNardo, Fortin, and Lemieux (1996), and Autor, Manning, and Smith (2010).

⁷⁶ In the competitive labor-market case, Neumark and Wascher note: "prices rise to match the increase in marginal costs associated with a higher minimum wage, but, as a result, output and profits decline." (2008, p. 243) In the case of dynamic monopsony, however, as Card and Krueger explain: "...if a minimum wage forces the firm to pay slightly more than its optimally-selected wage, then the firm will offset virtually all of this extra cost by savings from being able to fill vacancies more rapidly, having lower turnover, improved morale, etc. Any decline in profitability is of second-order magnitude..." (1995, p. 323).

⁷⁷ Draca, Machin, and Van Reenen (2011), p. 130.

⁷⁸ Draca, Machin, and Van Reenen (2011), p. 149. They also found "no significant effects on employment or productivity." (p. 130)

"Using... standard fiscal multipliers to analyze the jobs impact of an increase in compensation of low-wage workers and decrease in corporate profits that result from a minimum-wage increase, we find that increasing the national minimum wage from \$7.25 to \$9.80... would result in a net increase in economic activity of approximately \$25 billion over the phase-in period and... generate approximately 100,000 new jobs."⁷⁹

11. Reduced turnover

The "dynamic monopsony" model of the labor market is sometimes referred to as a "frictions model"⁸⁰ because these models take seriously the idea that workers and employers must contend with important deviations from the smooth functioning of the standard, perfectly competitive model. Perhaps the most important frictions in the low-wage labor market involve the high rate of turnover (which is assumed to be zero in the standard competitive model). Because many low-wage workers are constrained by scheduling responsibilities (child care, for example), transportation limitations (lack of a reliable car or inadequate public transportation), and only partial information about available vacancies in their local labor market, employers paying the "going wage" often face significant recruitment costs in the form of unfilled vacancies, rapid turnover, and related screening and training expenses.

In frictions models, a higher minimum wage makes it easier for employers to recruit and retain employees, lowering the cost of turnover. These cost savings may compensate some or all of the increased wage costs, allowing employers to maintain employment levels.⁸¹ Moreover, if the minimum wage reduces the number and the average duration of vacancies, the employment response to a minimum-wage increase could even be positive.⁸²

Dube, Lester, and Reich (2012) adapted their "contiguous counties" methodology (Dube, Lester, Reich, 2010), which they had used to measure the effect of differences in minimum wages on restaurant employment across U.S. counties, to look at the effect of the minimum wage on labor turnover among teens and restaurant workers. They find "...striking evidence that separations, new hires, and turnover rates for teens and restaurant workers fall substantially following a minimum wage increase..."⁸³ Their findings, using nationally representative data, are consistent with local case studies of the minimum wage and related "living wage" laws, including Dube, Naidu, and Reich's (2007) analysis of the San Francisco city-wide minimum wage; Fairris (2005) studying local government contractors in Los Angeles; Howes (2005) on homecare workers in California; and Reich, Hall, and Jacobs (2005) on workers at the San Francisco airport.⁸⁴

79 Hall and Cooper (2012), p. 9.

80 Dube, Lester, Reich (2012).

81 This raises the question of why employers don't already pay the higher wages. The short answer is that some firms already do so. The key issue here is that both strategies – lower wages and high turnover versus higher wages and low turnover – can both be profitable. Employers choose the strategy that they prefer or that works best for them, but both strategies can succeed, side-by-side, in the market place. The minimum wage limits employers' choices to strategies that are consistent with wages at least as high as the minimum wage.

82 The costs of turnover can be high, even for low-wage workers. See, for example, the CLASP-CEPR Turnover Calculator, http://www.cepr.net/calculators/turnover_calc.html or Boushey and Glynn (2012).

83 Dube, Lester, Reich (2010), p. 2.

84 All cited in Dube, Lester, and Reich (2012).

Discussion

Across all of the empirical research that has investigated the issue, minimum-wage increases are consistently associated with statistically significant and economically meaningful increases in the *wages* of affected workers. At the same time, what is striking about the preceding review of possible channels of adjustment – including employment – is how often the weight of the empirical evidence is either inconclusive (statistically insignificant or positive in some cases and negative in others) or suggestive of only small economic effects.

One plausible explanation for these findings is that employers (and workers) respond on multiple fronts to any increase in the minimum wage. Individual establishments will follow different paths that depend on a complex set of circumstances that economists – operating with what is, even in the best of circumstances, a limited set of data – cannot fully capture or explain. Some employers may cut hours; others, fringe benefits; still others, the wages of highly paid workers. Some employers may raise prices (particularly if their competitors are experiencing similar cost increases in response to the minimum wage). Some employers may see their profits fall (along with those of their competitors), while others may reorganize the work process in order to lower costs. Some of the strongest evidence suggests that many employers may experience declines in costly turnover. And workers may respond to the higher wage by working harder. Any of these channels might be sufficient to eliminate the need for employment cuts or reduce the size of employment cuts to a level below where they can be reliably measured.

Employers and workers at the same establishment may follow more than one of these adjustment paths at the same time. Given the modest costs associated with historical increases in the minimum wage, it seems entirely plausible that small adjustments across a few of these margins could more than compensate for the higher wage floor.

Some of these adjustment paths reduce the benefit of the minimum wage to affected workers (reductions in non-wage benefits or training), but most have an ambiguous effect (reductions in hours or increased work effort) or no effect (lower profits or wage compression within a firm) on the well-being of low-wage workers. And some adjustment channels arguably improve workers' well-being (lower turnover or increased consumer demand).

The strongest evidence suggests that the most important channels of adjustment are: reductions in labor turnover; improvements in organizational efficiency; reductions in wages of higher earners ("wage compression"); and small price increases.

Conclusion

Economists have conducted hundreds of studies of the employment impact of the minimum wage. Summarizing those studies is a daunting task, but two recent meta-studies analyzing the research conducted since the early 1990s concludes that the minimum wage has little or no discernible effect on the employment prospects of low-wage workers.

The most likely reason for this outcome is that the cost shock of the minimum wage is small relative to most firms' overall costs and only modest relative to the wages paid to low-wage workers. In the traditional discussion of the minimum wage, economists have focused on how these costs affect employment outcomes, but employers have many other channels of adjustment. Employers can reduce hours, non-wage benefits, or training. Employers can also shift the composition toward

higher skilled workers, cut pay to more highly paid workers, take action to increase worker productivity (from reorganizing production to increasing training), increase prices to consumers, or simply accept a smaller profit margin. Workers may also respond to the higher wage by working harder on the job. But, probably the most important channel of adjustment is through reductions in labor turnover, which yield significant cost savings to employers.

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