Congressional Budget Office
Washington, D.C.

The Minimum Wage in Competitive Markets and Markets With Monopsony Power—Supplemental Material for *The Effects on Employment and Family Income of Increasing the Federal Minimum Wage*

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In this document, the Congressional Budget Office describes circumstances in the labor market under which a minimum wage causes employment to decrease; it also describes circumstances under which a minimum wage increases employment and the available evidence on the prevalence of such circumstances. That exposition supplements CBO's analysis in *The Effects on Employment and Family Income of Increasing the Federal Minimum Wage* (July 2019), www.cbo.gov/publication/55410.

In *The Effects on Employment and Family Income of Increasing the Federal Minimum Wage*, the Congressional Budget Office examined how increasing the federal minimum wage from $7.25 per hour for most workers by 2025 would affect employment and family income.[1] According to CBO's median estimate, raising the minimum wage to $15 per hour would cause 1.3 million workers who would otherwise be employed to be jobless in an average week in 2025. CBO estimates that there is a two-thirds chance that the change in employment would lie between about zero and a reduction of 3.7 million workers.

This document describes circumstances in the labor market under which a minimum wage causes employment to decrease; it also describes circumstances under which a minimum wage increases employment and the available evidence on the prevalence of such circumstances. (Whereas CBO's report focused on the effects of minimum-wage increases, this discussion focuses on the effects of minimum wages more broadly. Note that imposing a minimum wage is similar to increasing the minimum wage—that is, it raises the minimum from zero.)

In a competitive labor market—a market with many employers, many employees, and few frictions, such as burdens associated with changing jobs—a minimum wage would lead to a reduction in employment. However, in a labor market in which the employers have market power, they pay lower wages than they otherwise would by hiring fewer workers. Such monopsony power occurs, for example, when many employees are competing for jobs offered by relatively few employers. But even in such a labor market, there is a limited range of circumstances under which a minimum wage would lead to an increase in employment.

Monopsony power is one of several factors that determine how a minimum wage would affect employment. Another is how customers would respond to an increase in prices. For example, if customers did not reduce purchases much in response to higher prices, then employers could cover the cost of higher wages by raising prices without substantially reducing employment. Yet another factor is how much the shift in income from business owners (who tend to be in relatively high-income families that spend a smaller share of their income) to low-wage workers (who tend to be in lower-income families that spend a larger share of their income) would boost the economywide demand for goods and services and, thus, boost employment in the short run.[2]

What Is the Effect of a Minimum Wage on Employment in a Competitive Labor Market?

In a competitive market, a minimum wage reduces the employment of low-wage workers if it increases their wages. If the minimum pushes wages above the level at which the amount of

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[1] Congressional Budget Office, *The Effects on Employment and Family Income of Increasing the Federal Minimum Wage* (July 2019), www.cbo.gov/publication/55410.

[2] Ibid., Appendix A.

labor that workers supply equals the amount that firms demand (from W_0 to W_1) in the perfectly competitive model of the labor market, employment at a typical firm falls (from E_0 to E_1).[3] (See Figure 1.) To compete for workers in such a market, an employer pays a wage equal to the marginal revenue product—that is, the revenue an additional worker would generate for the business. If the minimum wage forces the employer to offer a wage that is higher, that employer can no longer afford to employ as many workers and lowers costs by reducing employment.

What Is the Effect in a Market With Monopsony Power?

Monopsony power—that is, market power that allows employers to set wages below the marginal revenue product—can arise from several sources. In some localities, there is only one employer of workers in certain occupations, and therefore such workers would have to commute longer distances or move to get a higher wage. Even workers who live near multiple potential employers may face substantial costs from changing jobs, such as having to leave coworkers they like or having to put in the time and effort required to search for a new job. Other potential sources of monopsony power include employers that collude to keep wages low or require employees to sign "noncompete" agreements, which limit workers' ability to change employers. Monopsony power can also arise when state or local governments require workers in particular occupations to obtain certifications. Workers in such occupations who want a job in a different locale may have to obtain new certifications.

Such frictions allow employers to pay lower wages if they are willing to hire fewer workers. Whereas in a competitive market almost all workers choose employers that pay a wage near the marginal revenue product, employers with monopsony power can hire and retain a substantial number of workers (E_{MP}) at a lower wage (W_{MP}). If they offered a higher wage, such as a wage equal to the marginal revenue product (W_{MRP}), they would hire more workers, but their profits would be lower. (See Figure 2.) Hiring more workers would reduce the employers' profits because the cost of hiring an additional worker would exceed that worker's wages. The employer would have to offer a higher wage to the next worker than it was paying its current workers because the supply of workers willing to work at the current wage would be limited by the cost of changing jobs or other frictions. In addition, the employer would have to increase the pay of

[3] Labor markets are not perfectly competitive, but they might be competitive enough for the perfectly competitive model to accurately predict the effects of increasing the minimum wage.

current employees because it would lose many of those employees if it paid them less than the new hire.[4]

In such a market, a relatively low minimum wage could lead to an increase in employment. However, a sufficiently large minimum wage would reduce employment.

If the employers of low-wage workers have monopsony power, then a minimum wage could increase employment as well as wages. Employers would raise wages for all current employees whose wages were below the minimum, regardless of whether additional workers were hired. If those employers then sought to hire new workers, they would have already incurred the cost of increasing the wages of current employees, so the cost of hiring additional workers would be lower. If the minimum wage was small enough that it did not exceed the additional revenue from the production of the additional workers, then employment would increase (from E_0 to E_1). (See the left-hand panel of Figure 3.) However, for employment to increase overall, the gains in employment at firms that remained in business would need to exceed the losses in employment from firms that closed because of the cost increase imposed by the minimum wage. Even firms with monopsony power could become unprofitable under a minimum wage if there was substantial competition for customers.

A sufficiently large minimum wage would reduce employment. (See the right-hand panel of Figure 3.) That would occur if the minimum wage was large enough to exceed a firm's marginal revenue product even if the firm did not hire additional workers. To raise the marginal revenue product to the minimum wage, the employer would reduce employment.[5]

How Prevalent Is Monopsony Power in Low-Wage Labor Markets?

Numerous studies have found evidence that some employers in low-wage labor markets possess a substantial amount of monopsony power. The most relevant research is a recent study in which Azar and others (2019) examined the largest sector in the retail trade industry. That study found evidence that increases in the minimum wage increased employment in areas where a small number of employers hired most workers and decreased employment in areas where the market was less concentrated. Other studies have found evidence of employers restricting competition and of substantial frictions in the labor market. In contrast, fewer studies have found evidence

[4] Researchers found that many low-wage workers quit a national retailer in response to their colleagues' receiving raises that were slightly larger. That finding suggests that some employers have a substantial incentive to pay the same wages to all employees doing similar work. Other employers might pay more to new hires. Such employers would not increase employment in response to a higher minimum wage. See Arindrajit Dube, Laura Giuliano, and Jonathan Leonard, "Fairness and Frictions: The Impact of Unequal Raises on Quit Behavior," *American Economic Review*, vol. 109, no. 2 (February 2019), pp. 620–663, https://doi.org/10.1257/aer.20160232.

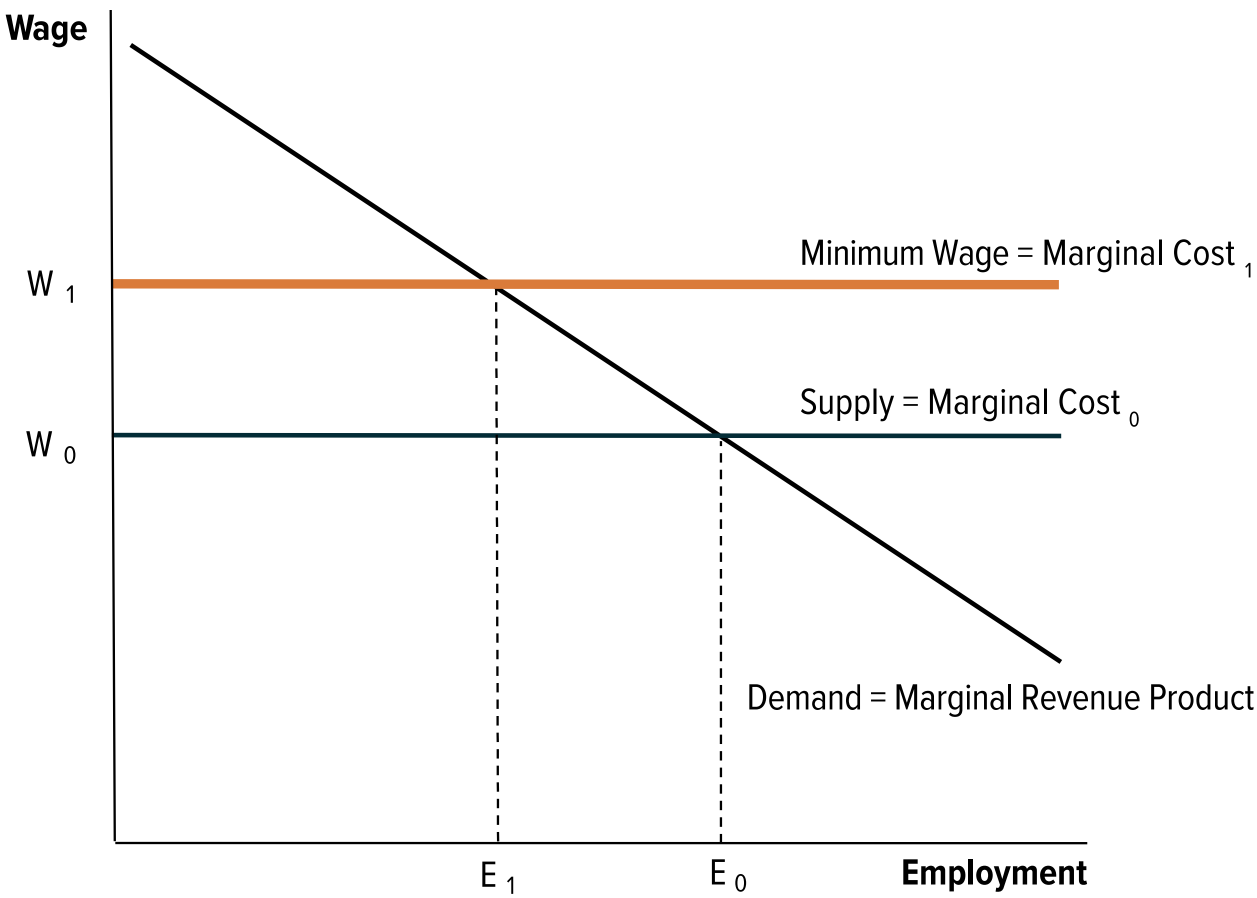
[5] Reducing employment can raise the productivity of workers by increasing the amount of other inputs to production, such as machines, that each remaining worker has at his or her disposal.

that is inconsistent with monopsony power's being prevalent. (For examples of the evidence, see the appendix.)

However, the literature on monopsony power does not provide a complete description of the market for low-wage workers, so CBO's analysis was primarily based on studies that directly estimated the effect of the minimum wage on employment. Generally, those studies measured labor markets' responses to changes in the minimum wage without making assumptions about the amount of monopsony power. Thus, they are representative of the amount of monopsony power that actually exists.

Figure 1: The Effects of a Minimum Wage for a Typical Firm in a Competitive Labor Market

In what economists typically refer to as the perfectly competitive model, the amount of labor that workers are willing to supply depends on wages in the labor market. A typical firm is too small (relative to the overall market) to affect wages or the total amount of labor supplied. Thus, the firm faces a flat labor supply curve. In such a market, a minimum wage increases wages and decreases employment by increasing the cost of an additional worker, or marginal cost.

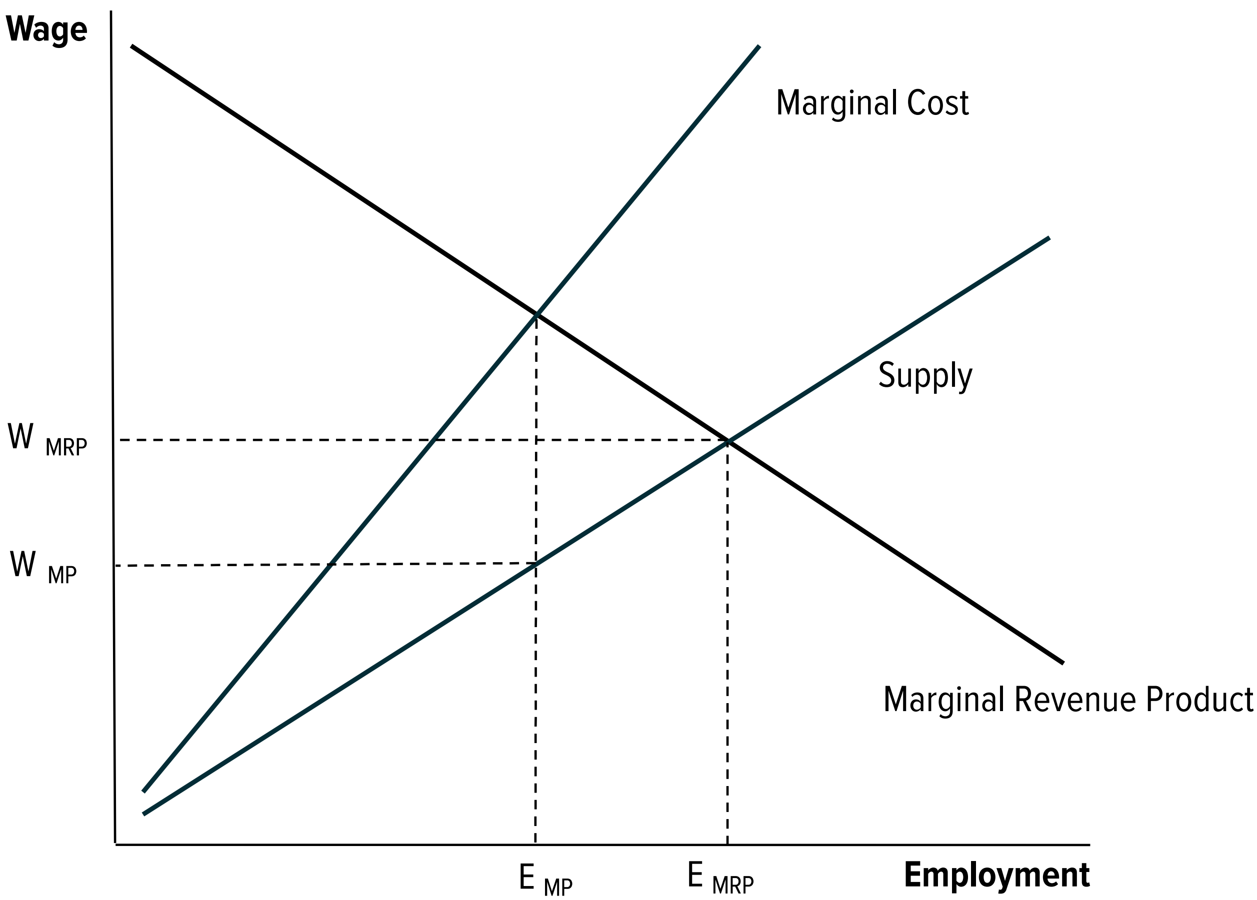


Source: Congressional Budget Office.

E_0 = employment in the absence of a minimum wage; E_1 = employment under a minimum wage; W_0 = wage in the absence of a minimum wage; W_1 = wage under a minimum wage.

Figure 2: Employment and Wages in a Market With Monopsony Power

> Like an employer in a competitive market, an employer with monopsony power chooses its number of workers such that the cost of an additional worker, or marginal cost, equals the revenue generated by that worker, or marginal revenue product. But the bargaining power of employers with monopsony power leads to workers' receiving a wage that is less than the marginal revenue product. If the employers instead offered a higher wage that equaled the marginal revenue product, employment would rise.

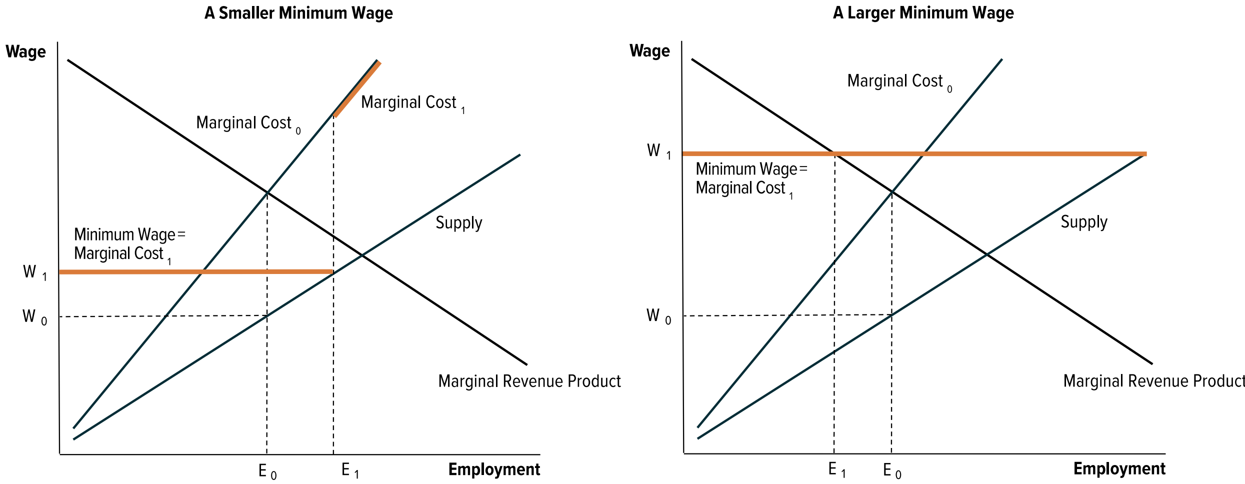


Source: Congressional Budget Office.

E_{MP} = employment at which the number of workers equates the marginal revenue product with the marginal cost; E_{MRP} = employment at which the number of workers equates the the marginal revenue product with the wage required to attract an additional worker; W_{MP} = wage that attracts the number of workers needed to equate the marginal revenue product with the marginal cost; W_{MRP} = wage that attracts the number of workers needed to equal the marginal revenue product.

Figure 3: The Effects of a Minimum Wage in a Market With Monopsony Power

A smaller minimum wage would increase wages and employment by decreasing the cost of an additional worker, or marginal cost. In contrast, a larger minimum wage would reduce employment by increasing the marginal cost.



Source: Congressional Budget Office.

E_0 = employment in the absence of a minimum wage; E_1 = employment under a minimum wage; W_0 = wage in the absence of a minimum wage; W_1 = wage under a minimum wage.

Appendix: Research About Monopsony Power in Low-Wage Markets

To inform its view on the prevalence of monopsony power, the Congressional Budget Office drew on the following research.

Review Articles

The following review articles synthesize information from many studies of monopsony power.

Anna Sokolova and Todd A. Sorensen, "Monopsony in Labor Markets: A Meta-Analysis," Discussion Paper 11966 (Institute of Labor Economics, November 2018), https://tinyurl.com/qnmwwzt.

Alan Manning, "Imperfect Competition in the Labor Market," in Orley Ashenfelter and David Card, eds., *Handbook of Labor Economics* (Elsevier, 2011), pp. 973–1041, https://doi.org/10.1016/S0169-7218(11)02409-9.

V. Bhaskar, Alan Manning, and Ted To, "Oligopsony and Monopsonistic Competition in Labor Markets," *Journal of Economic Perspectives*, vol. 16, no. 2 (Spring 2002), pp. 155–174, www.jstor.org/stable/2696501.

Recent Original Research

Many of the following original studies are too recent to have been covered by reviews.

Studies Estimating the Responsiveness of the Labor Supply to Changes in the Wages an Employer Offers

Arindrajit Dube and others, "Monopsony in Online Labor Markets," *American Economic Review: Insights* (forthcoming), https://tinyurl.com/vt3wdax.

Claus C. Portner and Nail Hassairi, *What Labor Supply Elasticities Do Employers Face? Evidence from Field Experiments*, working paper (Seattle University and University of Washington, December 2018), https://tinyurl.com/w5b2lmp (PDF, 1.6 MB).

Sydnee Caldwell and Emily Oehlsen, *Monopsony and the Gender Wage Gap: Experimental Evidence From the Gig Economy*, working paper (Massachusetts Institute of Technology, November 2018), https://tinyurl.com/yx7yp8jp (PDF, 3.5 MB).

Michael R. Ransom and Ronald L. Oaxaca, "New Market Power Models and Sex Differences in Pay," *Journal of Labor Economics*, vol. 28, no. 2 (April 2010), pp. 267–289, www.jstor.org/stable/10.1086/651245.

Studies Estimating the Prevalence of Anticompetitive Behavior by Employers
Evan Starr, J.J. Prescott, and Norman Bishara, *Noncompetes in the U.S. Labor Force*, Law and Economics Research Paper 18-013 (University of Michigan Law School, April 2019), http://dx.doi.org/10.2139/ssrn.2625714.

Alan B. Krueger and Orley Ashenfelter, *Theory and Evidence on Employer Collusion in the Franchise Sector*, Working Paper 24831 (National Bureau of Economic Research, July 2018), www.nber.org/papers/w24831.

Studies Estimating the Prevalence of Labor Market Frictions
Ioana Marinescu and Roland Rathelot, "Mismatch Unemployment and the Geography of Job Search," *American Economic Journal: Macroeconomics*, vol. 10, no. 3 (July 2018), pp. 42–70, https://doi.org/10.1257/mac.20160312.

Morris M. Kleiner and Alan B. Krueger, *The Prevalence and Effects of Occupational Licensing*, Working Paper 14308 (National Bureau of Economic Research, September 2008), www.nber.org/papers/w14308.

Studies Examining Whether Higher Minimum Wages Have a Disproportionately Negative Effect on Employment
Anna Godoey and Michael Reich, *Minimum Wage Effects in Low-Wage Areas*, Working Paper 106-19 (Institute for Research on Labor and Employment, July 2019), https://tinyurl.com/raesjkw.

Doruk Cengiz and others, "The Effect of Minimum Wages on Low-Wage Jobs," *The Quarterly Journal of Economics*, vol. 134, no. 3 (May 2019), pp. 1405–1454, https://doi.org/10.1093/qje/qjz014.

Ekaterina Jardim and others, *Minimum Wage Increases, Wages, and Low-Wage Employment: Evidence From Seattle*, Working Paper 23532 (National Bureau of Economic Research, May 2018), www.nber.org/papers/w23532.

Jeffrey Clemens and Michael R. Strain, "The Short-Run Employment Effects of Recent Minimum Wage Changes: Evidence From the American Community Survey," *Contemporary Economic Policy*, vol. 36, no. 4 (February 2018), pp. 711–722, https://tinyurl.com/yxe4s5z4.

Studies Examining the Prevalence of Monopsony Power in Other Countries
Michele Belot, Philipp Kircher, and Paul Muller, "How Wage Announcements Affect Job Search—A Field Experiment," Discussion Paper 13286 (Center for Economic and Policy Research, November 2018), https://ssrn.com/abstract=3278661.

Alan Manning and Barbara Petrongolo, “How Local Are Labor Markets? Evidence From a Spatial Job Search Model,” *American Economic Review*, vol. 107, no. 10 (October 2017), pp. 2877–2907, https://doi.org/10.1257/aer.20131026.

Other Studies

David Arnold, *Mergers and Acquisitions, Local Labor Market Concentration, and Worker Outcomes*, working paper (Princeton University, November 2019), http://dx.doi.org/10.2139/ssrn.3476369.

José Azar and others, *Minimum Wage Employment Effects and Labor Market Concentration*, Working Paper 26101 (National Bureau of Economic Research, July 2019), www.nber.org/papers/w26101.

Arindrajit Dube, Alan Manning, and Suresh Naidu, *Monopsony and Employer Mis-optimization Explain Why Wages Bunch at Round Numbers*, Working Paper 24991 (National Bureau of Economic Research, September 2018), www.nber.org/papers/w24991.