The Economics of Minimum Wage Regulations

Jesús Fernández-Villaverde[*]

University of Pennsylvania

February 10, 2018

Abstract

This paper offers a brief review of some issues related to the economics of minimum wage regulations. More concretely, I will organize my discussion around two major headings: Why minimum wages? And what are the effects of minimum wages on employment, technological change, and inequality?

Keywords: Minimum wages, labor market regulations.

JEL classification: J01, J08, E30.

---

[*]Correspondence: jesusfv@econ.upenn.edu. The title of this chapter is, of course, an homage to George Stigler's classic 1946 paper.

1   Introduction

The 35 member countries of the Organisation for Economic Co-operation and Development (OECD) include all the rich, developed economies in the world. The member countries cover a bit less than 50 percent of world GDP. The only significant economies outside this select club are China, India, Brazil, and the major oil-producing economies (Russia and Saudi Arabia). Of the 35 countries in the OECD, 27 have statutory minimum wages. These include the U.S., Germany, the United Kingdom, France, and Spain. Among the remaining eight, five (Austria, Denmark, Finland, Iceland, and Italy) set up industry-specific minimum wages through collective bargaining that covers the vast majority of workers. Only three countries (Norway, Sweden, and Switzerland) do not have comprehensive regulations concerning minimum wages (although some cantons in Switzerland do). In other words, nearly all rich economies in the world have approved some form of minimum wage regulations. There is even an ILO convention, C131 - Minimum Wage Fixing Convention, 1970 (No. 131), which states in its *Article 1*:

1.   Each Member of the International Labour Organisation which ratifies this Convention undertakes to establish a system of minimum wages which covers all groups of wage earners whose terms of employment are such that coverage would be appropriate.

While the coverage, generosity, and updating of the rules governing these minimum wages vary across countries (the ILO convention, like most pieces of international legislation, is wonderfully ambiguous about whether it imposes any concrete obligation on states beyond repeating right-sounding platitudes), the widespread prevalence of such labor market regulation raises some crucial questions. Why do such minimum wage regulations appear? Why and under what circumstances do unions and voters support them? How do these regulations evolve? Are there alternatives to minimum wages that achieve better outcomes for workers? What is the empirical evidence about their impact on employment, technological change, and inequality?

In the next few pages, I will outline answers to these questions. Given the space constraints, the outlines will be brief guideposts to a lively literature that I cannot cover in detail, but that I will try to reference.[1] More concretely, I will organize my discussion around two major headings: Why minimum wages? And what are the effects of minimum wages on employment, technological change, and inequality?

---

[1]Book-length surveys of these topics include Card and Krueger (1997), Neumark and Wascher (2008), and Flinn (2010). In Fernández-Villaverde (2017), I develop some of the themes of this chapter in more depth.

2   Why minimum wages?

Prima facie, minimum wages are puzzling. The standard textbook model of a competitive labor market deals with the exchange of a concrete type of labor in a specific location. For example, we can analyze the market for low-skill work in the city of Philadelphia (the frontiers of the market, regarding both the type of labor and the location, are less sharp in reality; I will return to this point below). In this market, the wage is determined by the intersection of an increasing supply curve (i.e., when the wage rises, workers substitute away from leisure and other activities, such as education or work in different sectors and locations, toward labor in the specific market under study) and a decreasing demand curve (i.e., firms economize on labor when the wage is high by employing more of other input factors such as capital or by merely producing less output). When a regulation –promulgated either by the government or by a collective bargaining agreement– pushes the wage above its market-clearing level, the outcome is unemployment.
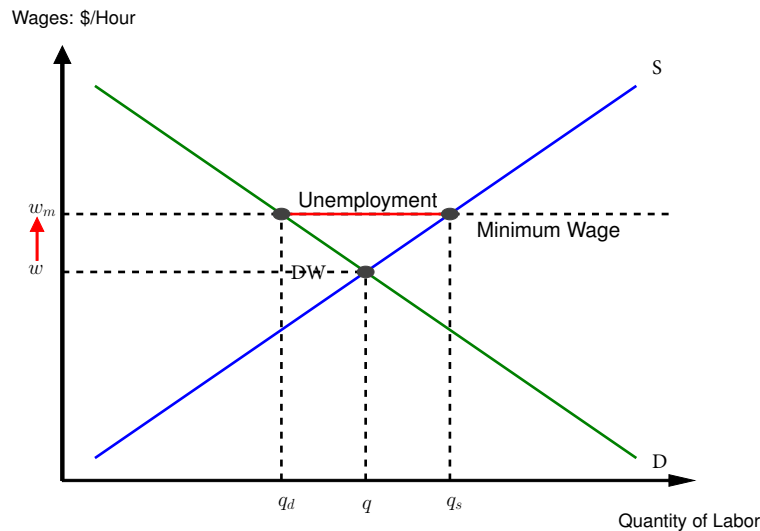
Wages: $/Hour

Figure 1: Labor market and effects of the minimum wage

Figure 1 captures this idea. There we see an increasing supply curve, S, a decreasing demand curve, D, a market-clearing wage w, and a quantity of labor contracted, q. At the minimum wage $w_m > w$, more workers supply their concrete type of labor at that location, q_s, than the desired amount of labor hired by firms, q_d, and, consequently, some workers remain without a job, $q_s - q_d$. Furthermore, the gains of workers (i.e., the additional worker surplus coming from higher wages) are smaller than the losses of the firms (i.e., the lower firm surplus triggered by lower employment) by a quantity represented by the triangle DW (for deadweight loss). Society, as a whole, is worse off.

2.1 Frictional labor markets

There are, at least, four strategies to address the puzzle of why we have minimum wages. The first strategy is to dispute the relevance of the standard textbook model of competitive labor markets. The real world is characterized by frictions such as behavioral biases by workers and firms, adjustment costs, asymmetries of information, search and matching problems, and nominal rigidities. Hence, the textbook model is not a useful guide to understanding minimum wages, and we need more advanced frameworks, such as those compiled in the outstanding review of contemporary labor economics by Cahuc and Zylberberg (2014).

This strategy, however, is not entirely compelling. Frictions easily justify some measures of labor market intervention. Think, for example, about search and matching problems (i.e., it takes time and effort for workers to find employers and for employers to find workers to fill vacancies). In such an environment, if workers do not have access to complete asset markets, there is a role for a public unemployment insurance scheme. It is desirable from an efficiency perspective that workers search for a sufficiently long period for a good job match instead of accepting the first position they are offered. We do not want aerospace engineers to work in fast-food restaurants (and have a harder time searching for a better match for their skills because their mornings are occupied busing tables) just because they need the cash to pay their mortgage this month. This unemployment insurance scheme must find the right trade-off between better employment matches and the lower search intensity that the transfers induce (Hopenhayn and Nicolini, 1997, and Acemoglu and Shimer, 1999, are classic references regarding the optimal design of unemployment insurance schemes).

It is harder, but not impossible, to rely on these frictions to justify a minimum wage. Flinn (2006) shows that in a model of search with Nash bargaining, there are parameter values for which minimum wage increases can be welfare-improving to labor market participants on both the supply and the demand sides of the labor market. The mechanism behind Flinn's result works through the stronger incentives created by a higher wage to search for a job. More search creates more matches and more generated surplus for the firms, even after paying higher wages.[2] Although the author finds some empirical support for this possibility for low minimum wages, welfare starts to fall quickly as soon as the minimum wage goes over $8.66 an hour (in 1997 prices, around $13.3 in current early 2018 prices). Also, since the model limits the firms' ability to substitute away from more expensive labor (there is, for example, no capital or labor-saving investment), the $13.3 figure is, most likely, a generous upper bound of the point at which the minimum wage starts delivering negative results for society.

---

[2]Technically, in a world with search and matching, prices do not play the same allocative role as in frictionless Walrasian markets. Therefore, one should not expect that the equilibrium prices, by default, satisfy an optimality condition.

Finally, and as a more general point, in labor markets with frictions, there are other policy levers that get around the nefarious consequences of these frictions with better welfare consequences. A sophisticated analysis of some of these ideas and the relative trade-offs between tax systems and minimum wages appear in Lee and Saez (2012) and Cahuc and Laroque (2014).

2.2 Unequal bargaining power

The second strategy to justify a minimum wage, related but slightly different from the previous one, is to deny that we are studying a competitive labor market. In this view, firms have so much bargaining power that they can appropriate a disproportionate share of the surplus created by the job match. In the context of a monopsony firm, this point goes back at least to Robinson (1933), Stigler (1946), and Manning (2003). There is an analogous case when firms pay workers "efficiency wages" (Shapiro and Stiglitz, 1984) to induce good behavior when supervision is less than perfect and, thus, they have an incentive to hire fewer workers than would occur under a higher wage. Workers, limited in their ability to find alternative occupations, must accept the wage offers they receive. By setting up a minimum wage, the government can rebalance the bargaining power of each side and ensure that workers receive a "just" compensation (where the operational definition of "just" is often a matter of heated debate). In the extreme case of a monopsonist, a minimum wage can even increase employment.

This scenario has some explanatory power. Historically, many labor transactions have been mediated through some degree of coercion, from the limitations in workers' effective choices existing in many "company towns" to the extreme violence of slavery (Acemoglu and Wolitzky, 2011). More recently, Azar, Marinescu, and Steinbaum (2017) have shown a correlation between firm concentration in a concrete labor market and wages posted by firms at CareerBuilder.com. However, it is hard to evaluate the causality of such a correlation (the author's instrumental variable strategy is not sharp).

In any case, bargaining power differentials would suggest location- and occupation-specific interventions (i.e., in rural areas for some occupations with few employees), not minimum wages in large cities. In the latter case, there are plenty of employment options for workers at the lower end of the spectrum of occupational choices. These workers are usually highly movable across industries because of their low general and firm-specific human capital. In modern advanced, highly urbanized economies, where workers are protected by active judges against fraud and coercion, it is hard to see bargaining power differentials as a strong motivation of high minimum wage regulations.

2.3   Redistribution

The third strategy to defend minimum wages is to argue that they redistribute income from firms and high-wage workers toward lower-income workers. We already saw such redistribution effects in Figure 1: workers who keep their jobs are better off due to higher wages and firms are worse off. The case against minimum wages implicit in Figure 1 is not about their inability to redistribute income. The case is that such redistribution is paid for, in part, by those workers who cannot get jobs $(q_s - q_d)$ at the current minimum wage and by the deadweight loss to society DW. That is why many economists would argue that, if our goal as a society (for whatever reason) is to redistribute income, the minimum wage is not the best way to go. Targeted transfer programs such as a negative income tax, social expenditure on health and education, and a well-designed tax system are better ways to achieve the same redistribution outcomes at a lower cost.[3]

A preference for redistribution can explain minimum wages only if either voters and politicians do not understand the possibility of implementing those different redistribution schemes or the political process cannot deliver them. In that situation, a higher minimum wage might be the only "feasible" policy given the agents' constraints and beliefs. For instance, Aghion, Algan, and Cahuc (2011) present a model where a high minimum wage is a consequence of the poor quality of labor relations and of distrust between workers and firms, which prevents the implementation of superior cooperative rules.

2.4   Bootleggers and Baptists

The fourth strategy to account for the existence of minimum wages builds on the hypothesis postulated by Smith and Yandle (2014) of a coalition of "bootleggers and Baptists": the powerful combination of two pressure groups that stand to gain from regulations.

"Bootleggers" include all of those who have material gains from introducing a minimum wage. For example, unions know that high minimum wages reduce the competition for their workers from less-skilled workers (the young, the less educated, often women and minorities) and have considerable cascade effects over the whole wage structure (see Lee 1999, Autor, Manning, and Smith, 2016, and Kearney and Harris, 2014). In rich countries, unions tend to represent middle- and high-skill industrial workers, both in terms of membership and, more

---

[3]There is a subtle point that deserves additional discussion. Alternative redistribution policies such as a negative income tax or the earned income tax credit (EITC) also create distortions (for example, those caused by the taxes required to finance them). It is possible that those distortions are bigger than the deadweight loss from minimum wages. That is why I added "well-designed" to "tax systems" in the main text. It is highly unlikely that low distortion taxes such as the VAT or tax on land would trigger higher deadweight losses than a minimum wage.

saliently, in terms of leadership.[4] Basic lessons from public choice theory suggest that such a structure of membership and leadership will result, more often than not, in union strategies that do not prioritize the interests of the lowest-paid workers, but of the median member and leader. In fact, two of the countries without minimum wages (Norway and Sweden) are countries where the labor movement has historically included most workers, including the lowest-paid ones, and where labor relations have developed in a quasi-corporatist manner that incorporates the concerns of the whole spectrum of voters.

The "Baptists," in comparison, are mainly interested in defending their understanding of the public interest (although humans have an extraordinary ability to convince themselves that the public interest is best served by those measures that, indeed, protect our private interests; ask any full professor you know about the importance of tenure for public welfare). Their gains are, thus, ideological. A higher minimum wage is an intuitive way to redistribute income toward workers and protect them from abusive firms, especially for many voters who do not fully appreciate the subtle ways in which markets operate.

My reading of the empirical evidence is that this fourth strategy is the most successful explanation of why minimum wages are prevalent and of how they evolve, i.e., responding to the varying fortunes of the coalition of "bootleggers and Baptists." The world is messy, and, across countries and times, one can find examples where the other three strategies account for some of the enacted legislation. But, by and large, a mix of unions interested in increasing wages for their members even at the cost of higher unemployment and the concern for the public interest of those who distrust markets is the best explanation of why we observe minimum wages.

3   What are the effects of minimum wages?

Regardless of which of the four previous explanations of the prevalence of minimum wage regulations one favors, most of us should be interested in a more empirical set of questions: What are the impacts of minimum wages on employment, technological change, and inequality? If we go back to Figure 1, we can see that how significant, for instance, $q_s - d_d$ is depends crucially on the slope of the supply and demand functions (their "elasticities"). Different elasticities may result in minimal effects of minimum wages or huge ones.

---

[4]Richard Trumka, the current president of the U.S. AFL-CIO, has a BA from Pennsylvania State University and a law degree from Villanova University and received a total compensation of \$304,121 in 2015. Similarly, the current general secretary of the English and Welsh Trades Union Congress, Frances O'Grady, has a BA Honors in politics and modern history from Manchester University and a total remuneration, in the most recent return to the Certification Officer, of £152,365. While I do not have any reason to doubt the benevolence of these union leaders, their daily networks of engagement, their cognitive frames, and their social predispositions are different from those of the lowest-paid workers.

3.1 Effects on employment

Let us start with the effects of minimum wages on employment. The traditional view among economists, summarized by Brown, Gilroy, and Kohen (1982, p. 505), was that *"on balance, a 10 percent increase in the minimum wage is estimated to result in about a 1-3 percent reduction in total teenage employment."* This was an important, but not tremendous effect. Similar (and more recent) findings are reported by Bazen and Marimoutou (2002) and Dolado, Kramarz, Machin, Manning, Margolis, Teulings, Saint-Paul, and Keen (1996). Kramarz and Philippon (2001) use longitudinal data from the French Labor Force survey to document that an increase of 1 percent of the cost of jobs compensated at the minimum wage implies, roughly, an increase of 1.5 percent in the probability of transitioning from employment to non-employment for the workers being paid a at such rate.

This consensus view was challenged by Card and Krueger (1994) and their companion book, *Myth and Measurement* (Card and Krueger, 1997). Card and Krueger exploited what economists call a "quasi-natural experiment." On April 1, 1992, New Jersey increased the state minimum hourly wage from $4.25 to $5.05. Pennsylvania did not implement such an increase, and its minimum wage stayed at $4.25. Card and Krueger used this variation to survey, by phone, the employment levels, ten months later, of 410 fast-food restaurants (heavy employers of minimum wage workers) in the area. With the survey data, the authors compared the employment levels before and after the minimum wage increase. Card and Krueger argued that, since both New Jersey and eastern Pennsylvania experienced a similar socio-economic environment during the subsequent ten months, the differential changes in employment would cast light on the employment effects of minimum wages. This technique of comparing the evolution of a variable of interest in a control and a treatment group is known as difference in differences.

Card and Krueger's results became a *cause célèbre* overnight because they found a relative *increase* in employment in New Jersey of 2.75 full-time equivalent (FTE) employees per restaurant. Not only did a higher minimum wage not cause a fall in employment in New Jersey, but it also increased it. One could have one's cake and eat it too (well, at least a fast-food restaurant cake). The breathtaking 2,577 Google citations of Card and Krueger (1994) as of February 2018 attests to how important the economics profession and related fields considered Card and Krueger's work.

Not surprisingly, many researchers jumped into the controversy. Neumark and Wascher (2000) showed that administrative payroll data in a similar sample of fast-food restaurants lead to conclusions opposite to those in the original study, based on phone survey data, namely, a drop in employment of between 11 percent and 16.8 percent in New Jersey's

restaurants relative to Pennsylvania's. Given that restaurants are under legal obligations to accurately report taxable income, there is a presumption that administrative data are more reliable than phone surveys (see, nevertheless, the reply in Card and Krueger, 1998). Other authors have questioned the assumption of common trends for New Jersey and Pennsylvania before the change in legislation (Deere, Murphy, and Welch, 1995) or the distinction between effects of changes in the minimum wage on levels versus growth rates of employment (Meer and West, 2016).[5]

But the most damaging arguments against an over-optimistic interpretation of Card and Krueger's results are developed in Sorkin (2015) and Aaronson, French, Sorkin, and To (2018). Economists distinguish between short-run responses and long-run responses to a change in relative prices. The difference is important because often production technologies are flexible *ex ante*, but not *ex post*. These are called *putty-clay* technologies (Johansen, 1959): technologies are putty before installation (i.e., flexible), but become clay (i.e., rigid) after it. For example, fast-food restaurant owners may organize their kitchens or their counters in many different ways, some more intensive in capital and some more intensive in labor. But once the production technology has been selected (i.e., which equipment to install in the kitchen), it is costly to reverse it. Thus, one should not expect that the effects on employment of a change in the minimum wage after ten months, the period waited by Card and Krueger, would be large enough to be econometrically identified. Fast-food restaurants are stuck in the short run with their clay technology.

However, in the long run, technologies are substituted. The next time the restaurant needs to be remodeled or the owner is deciding whether to exit (or expand) the business, the relative price of labor (the higher minimum wage) will play a central role. In a quantitative model, Sorkin (2015) shows that an elasticity of employment of -0.002 in response to a temporary increase in the minimum wage (such as the one observed in New Jersey, since the new wage was not indexed to inflation) is consistent with an elasticity after 6 years of -0.252 for a permanent increase (as in recent changes to local minimum wages, which are indexed to inflation). Similarly, Aaronson, French, Sorkin, and To (2018), using data from the Quarterly Census of Employment and Wages (QCEW) to analyze the effects of five hikes in state minimum wages in the early and mid-2000s in fast-food restaurants, find that after a 10 percent increase in the minimum wage, the exit rate of fast-food restaurants increases from 5.7 percent percent a year to 7.1 percent.

---

[5]There are also a number of additional margins of adjustment that economists have explored and that we do not have time to review in detail. For instance, firms can respond to changes in minimum wages by reducing perks (how many free burgers you can get from the restaurant?), changing policies such as leniency toward late arrivals or no-shows, and imposing faster work schedules, responses that headline compensation data are bound to miss.

3.2 Effects on technological change

There are reasons to think that even the two studies we just discussed underestimate the substitution between labor and capital triggered by changes in minimum wages. Since the pioneering work of Schmookler (1966), economists interested in technological change have emphasized the role that potential profitability plays in the invention and development of new technologies. Far from being random, new technologies respond to market incentives. Higher minimum wage statutes lead to the appearance of labor-saving technologies. It has happened countless times in history, and it will happen again. For example, Allen (2009) put Britain's relative high wages at the center of his explanation of why the Industrial Revolution happened in Britain and not in France or Asia. British entrepreneurs searched for and adopted new labor-saving technologies precisely because wages were higher (and the cost of energy lower) in Britain than in other regions.[6]

3.3 Effects on inequality

As I discussed above, minimum wages redistribute income. Some workers (those who see their wages increase and retain their jobs) are better off, while others (those who lose their jobs or those who have to pay for more expensive fast-food meals) are worse off. Similarly, some businesses benefit (the sellers of machinery that substitutes for labor, supermarkets that sell more food because fewer people go to fast-food restaurants) and others lose (the fast-food restaurants with costly adjustments). Tracking down all these effects is next to impossible, but economists have tried to measure some more concrete effects. Lee (1999) estimates that, in the U.S., the observed reductions in the real minimum wage account for more than 100 percent of the change in the ratio of the 50th to the 10th wage percentile. More recently, Autor, Manning, and Smith (2016) find smaller, but still significant effects. See also Kearney and Harris (2014). MaCurdy (2015) assesses the efficacy of a minimum wage as an antipoverty policy tool and reaches a negative conclusion. Brown (1999) is an excellent survey of what we know about these redistribution effects, although, unfortunately, it does not incorporate many of the findings of the last two decades.

---

[6]Let me complete this argument with an anecdote that I have told in other papers: When I arrived in Minnesota, in 1996, to study for my Ph.D., I was shocked at the absence of automatic payment machines at parking lots in downtown Minneapolis. Instead, all parking lots had an attendant in a booth accepting payment. In Madrid (Spain), automatic payment machines had been in widespread use since the late 1980s. The reason, of course, was not the technological superiority of Madrid over Minneapolis, but the higher relative minimum wage in Spain. Automatic payment machines were introduced in the U.S. years later when their relative price fell enough.

4 Concluding remarks

Economists have traditionally displayed much less enthusiasm toward minimum wages than members of other academic fields and most voters. While there are a few situations where a minimum wage may improve the market allocation, in a modern economy these cases must be put in perspective as (usually) being of little empirical relevance. Also, the redistribution effects of minimum wages, while a positive outcome for those with equalitarian predispositions, are often achieved at a much higher cost than the one incurred by more straightforward, less intrusive alternatives such as a negative income tax.

As we move toward an economy with strong tendencies toward automation and the extensive use of machine learning and artificial intelligence, the optimal design of labor market policies that achieve society's goal of maximizing welfare is more important than ever. The preponderance of the evidence, at this moment, suggests that minimum wages are not a useful tool for such goals.

References

AARONSON, D., E. FRENCH, I. SORKIN, AND T. TO (2018): "Industry Dynamics and the Minimum Wage: A Putty-Clay Approach," *International Economic Review*, forthcoming.

ACEMOGLU, D., AND R. SHIMER (1999): "Efficient Unemployment Insurance," *Journal of Political Economy*, 107(5), 893–928.

ACEMOGLU, D., AND A. WOLITZKY (2011): "The Economics of Labor Coercion," *Econometrica*, 79(2), 555–600.

AGHION, P., Y. ALGAN, AND P. CAHUC (2011): "Civil Society and the State: the Interplay between Cooperation and Minimum Wage Regulation," *Journal of the European Economic Association*, 9(1), 3–42.

ALLEN, R. C. (2009): *The British Industrial Revolution in Global Perspective*. Cambridge University Press.

AUTOR, D. H., A. MANNING, AND C. L. SMITH (2016): "The Contribution of the Minimum Wage to US Wage Inequality over Three Decades: A Reassessment," *American Economic Journal: Applied Economics*, 8(1), 58–99.

AZAR, J., I. MARINESCU, AND M. I. STEINBAUM (2017): "Labor Market Concentration," Working Paper 24147, National Bureau of Economic Research.

BAZEN, S., AND V. MARIMOUTOU (2002): "Looking for a Needle in a Haystack? A Reexamination of the Time Series Relationship between Teenage Employment and Minimum Wages in the United States," *Oxford Bulletin of Economics and Statistics*, 64, 699–725.

BROWN, C. (1999): "Minimum Wages, Employment, and the Distribution of Income," in *Handbook of Labor Economics, v. 3*, ed. by O. Ashenfelter, and D. Card, pp. 2101–2163. Elsevier.

BROWN, C., C. GILROY, AND A. KOHEN (1982): "The Effect of the Minimum Wage on Employment and Unemployment," *Journal of Economic Literature*, 20(2), 487–528.

CAHUC, P., AND G. LAROQUE (2014): "Optimal Taxation and Monopsonistic Labor Market: Does Monopsony Justify the Minimum Wage?," *Journal of Public Economic Theory*, 16(2), 259–273.

CAHUC, P., AND A. ZYLBERBERG (2014): *Labor Economics*. MIT Press.

CARD, D., AND A. B. KRUEGER (1994): "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania," *American Economic Review*, 84(4), 772–93.

——— (1997): *Myth and Measurement*. Princeton University Press.

——— (1998): "A Reanalysis of the Effect of the New Jersey Minimum Wage Increase on the Fast-Food Industry with Representative Payroll Data," Working Paper 6386, National Bureau of Economic Research.

DEERE, D., K. MURPHY, AND F. WELCH (1995): "Employment and the 1990-1991 Minimum-Wage Hike," *American Economic Review*, 85(2), 232–37.

DOLADO, J., F. KRAMARZ, S. MACHIN, A. MANNING, D. MARGOLIS, C. TEULINGS, G. SAINT-PAUL, AND M. KEEN (1996): "The Economic Impact of Minimum Wages in Europe," *Economic Policy*, 11, 319–372.

FERNÁNDEZ-VILLAVERDE, J. (2017): "The Economic Consequences of Labor Market Regulations," *University of Chicago Legal Forum*, 2017, 119–141.

FLINN, C. (2006): "Minimum Wage Effects on Labor Market Outcomes under Search, Matching, and Endogenous Contact Rates," *Econometrica*, 74(4), 1013–1062.

FLINN, C. J. (2010): *The Minimum Wage and Labor Market Outcomes*. MIT Press.

HOPENHAYN, H., AND J. P. NICOLINI (1997): "Optimal Unemployment Insurance," *Journal of Political Economy*, 105(2), 412–38.

JOHANSEN, L. (1959): "Substitution versus Fixed Production Coefficients in the Theory of Economic Growth: A Synthesis," *Econometrica*, 27(2), 157–176.

KEARNEY, M. S., AND B. H. HARRIS (2014): "The "Ripple Effect" of a Minimum Wage Increase on American Workers," Discussion paper, Brookings.

KRAMARZ, F., AND T. PHILIPPON (2001): "The Impact of Differential Payroll Tax Subsidies on Minimum Wage Employment," *Journal of Public Economics*, 82(1), 115–146.

LEE, D., AND E. SAEZ (2012): "Optimal Minimum Wage Policy in Competitive Labor Markets," *Journal of Public Economics*, 96(9-10), 739–749.

LEE, D. S. (1999): "Wage Inequality in the United States During the 1980s: Rising Dispersion or Falling Minimum Wage?," *Quarterly Journal of Economics*, 114(3), 977–1023.

MACURDY, T. (2015): "How Effective Is the Minimum Wage at Supporting the Poor?," *Journal of Political Economy*, 123(2), 497–545.

MANNING, A. (2003): *Monopsony in Motion: Imperfect Competition in Labor Markets*. Princeton University Press.

MEER, J., AND J. WEST (2016): "Effects of the Minimum Wage on Employment Dynamics," *Journal of Human Resources*, 51(2), 500–522.

NEUMARK, D., AND W. WASCHER (2000): "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania: Comment," *American Economic Review*, 90(5), 1362–1396.

——— (2008): *Minimum Wages*. MIT Press.

ROBINSON, J. (1933): *The Economics of Imperfect Competition*. McMillan.

SCHMOOKLER, J. (1966): *Invention and Economic Growth*. Harvard University Press.

SHAPIRO, C., AND J. E. STIGLITZ (1984): "Equilibrium Unemployment as a Worker Discipline Device," *American Economic Review*, 74(3), 433–44.

SMITH, A., AND B. YANDLE (2014): *Bootleggers and Baptists: How Economic Forces and Moral Persuasion Interact to Shape Regulatory Politics*. Cato Institute.

SORKIN, I. (2015): "Are There Long-Run Effects of the Minimum Wage?," *Review of Economic Dynamics*, 18(2), 306–333.

STIGLER, G. J. (1946): "The Economics of Minimum Wage Legislation," *The American Economic Review*, 36(3), 358–365.