The employment effects of minimum wage across heterogenous labour markets

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MATIAS MÄKIRANTA

Link to the presentation: https://youtu.be/r75CnzeYXKU

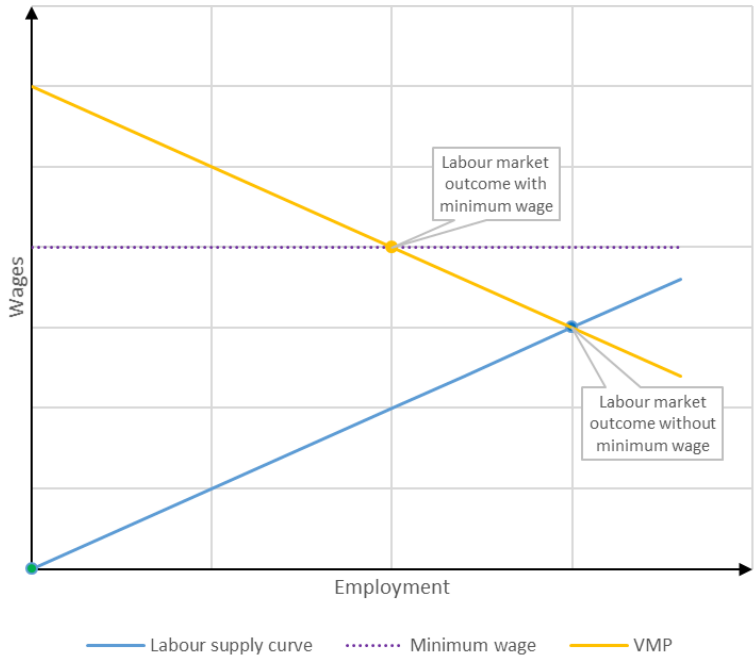
Introduction

The employment effect of minimum wage has been a disputed topic in labour economics for a long time. Some studies find that minimum wage has either a positive impact or no impact on employment (e.g., Card & Krueger, 1994; Reich et al., 2017) while others find that minimum wage decreases employment. (e.g., Jardim et al., 2017; Kreiner et al., 2020) This article investigates why some labour markets suffer negative employment impacts from an increase in the minimum wage while others don't. Understanding the employment impact of minimum wage is extremely important so that policymakers can make well-informed decisions about minimum wage policy.

Theoretical background

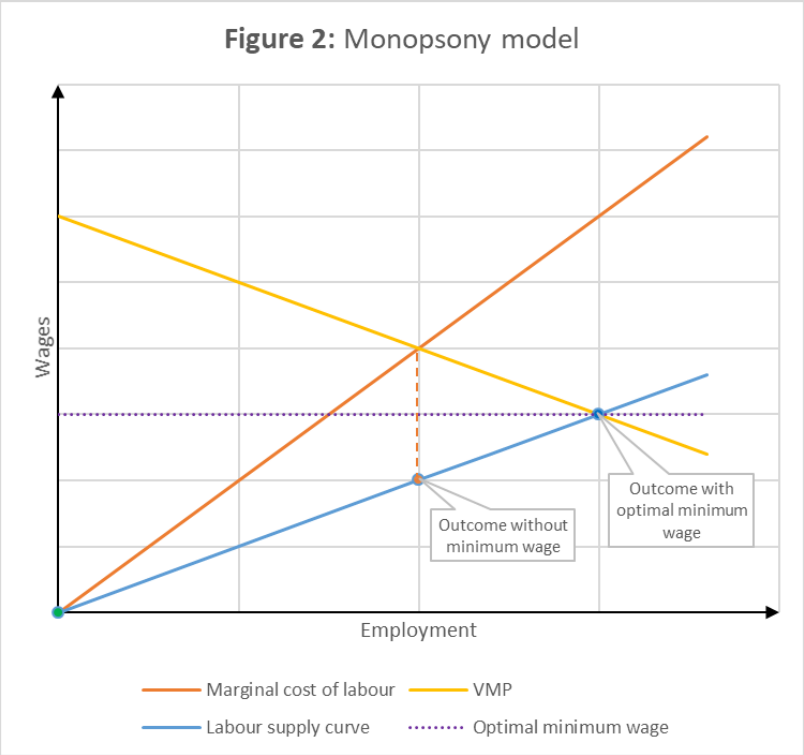
Before the 1990s many economists used the supply and demand model (Stigler, 1946) to analyse the employment effects of minimum wage. The model assumes perfectly competitive labour markets, which means that the minimum wage will always reduce employment if it is set higher than the equilibrium wage.

Figure 1: Supply and demand model



Card & Krueger (1994) showed that minimum wage might not always have negative employment effects. This increased the popularity of the monopsony model, which has been an important part of recent research. (Manning, 2020) A non-discriminating monopsonist, which acts as a price-taker in the output market maximizes profit at the point where the value of marginal product of labour equals marginal cost of labour. (Appendix 1) This leads to a labour market outcome where wages and

employment are lower than at the equilibrium of the supply and demand model and thus the minimum wage has potential to increase both wages and employment.



The bargaining model

The supply and demand model and the monopsony model take competition in the labour market as an exogenous part of the model. However, it is unlikely that a labour market is either perfectly competitive or consists of only one buyer of labour (pure monopsony), which is why we develop a new model which takes labour market concentration as an endogenous part of the model.

A key concept is the bargaining coefficient δ, which measures the bargaining power of workers. We first assume no unions and write the bargaining coefficient as a linear function of labour market concentration (L). When L=0, there is perfect competition and when L=1, there is a pure monopsony ($0 \leq L \leq 1$). Intuitively, the bargaining power of workers decreases when labour market concentration increases.

$$\delta = 1 - \mathrm{L}$$

We use the bargaining coefficient to combine the labour supply function from the supply and demand model with the marginal cost of labour function from the monopsony model. The resulting function is called the adjusted marginal cost of labour (AMC_E) because it considers the increase in marginal cost of labour when workers have more bargaining power.

$$AMC_E = \delta \mathrm{S(E)} + (1 - \delta) MC_E$$

Appendix 2 shows that

$$AMC_E = S(E) + (1 - \delta)\left(\frac{dS}{dE} \times E\right).$$

The model assumes that firms are price-takers in the output market, marginal product of labour is diminishing $\frac{dMP_E}{dE} < 0$ and the overall labour supply curve is upward-sloping $\frac{dS}{dE} > 0$. The labour market outcome is at the point where the adjusted marginal cost of labour equals the value of marginal product of labour.

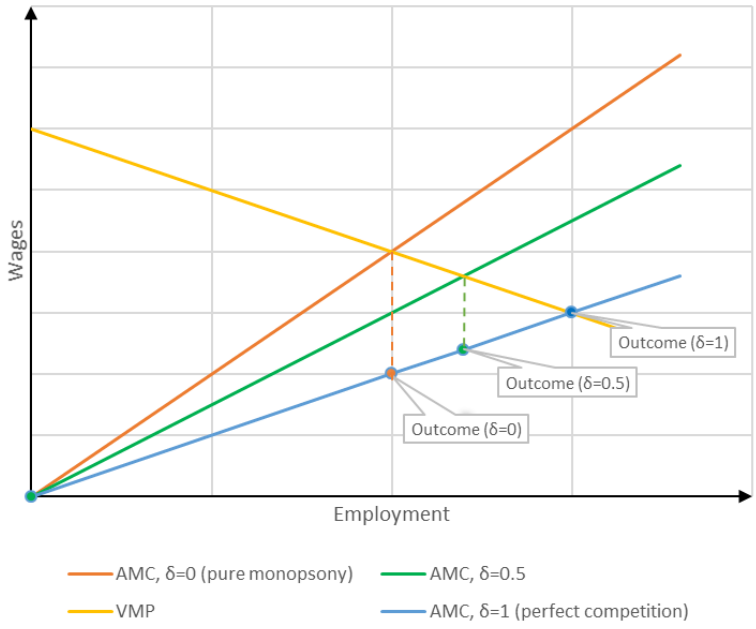
$$AMC_E = VMP_E = P \times MP_E$$

After the employment level is determined, the firm will choose the necessary wage to incentivize enough many workers to work by looking at the labour supply curve.

$$w = S(E)$$

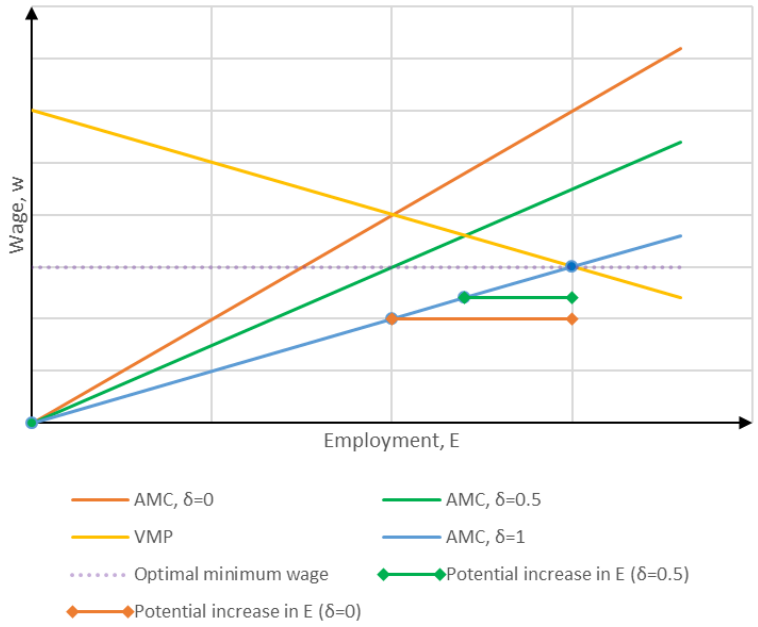
The model predicts that wages and employment increase when the bargaining coefficient increases. (Appendix 3)

Figure 3: Wage and employment increase as the bargaining coefficient δ increases



When workers have less bargaining power, the wages and employment are further from the equilibrium of the perfect competition model. (Figure 3) Thus, when workers have lower bargaining power, minimum wage is more likely to have a positive employment effect. (Figure 4) The minimum wage will have the maximum positive effect if it is set at the point where $S(E) = VMP_E$. Even if workers have low bargaining power, a too high minimum wage can still decrease employment.

Figure 4: Potential increase in employment if optimal minimum wage is adopted



When there is no perfect competition ($0 \leq \delta < 1$), all individual firms face an upward-sloping labour supply curve. This is actually how most labour economists define monopsony (Borjas, 2019; Manning, 2020) and in this model individual firms have some level of monopsony power, but the important difference is that the monopsony power decreases when δ increases. When there is perfect competition ($\delta = 1$) all individual firms face a flat labour supply curve and have no monopsony power.

To account for the impact of unions, we can modify the model by assuming that higher unionization rates increase bargaining power. Thus, we write $\delta = \max(1 - L + \rho(U), 1)$ where $\rho(U)$ is an increasing function of the unionization rate U. The function is written like this to ensure that the bargaining coefficient only takes values between 0 and 1.

Empirical evidence

The bargaining model predicts that the employment impact of minimum wage is different across heterogenous labour markets. A good example is the Seattle Minimum Wage Ordinance, which reduced employment in the overall labour market (Jardim et al., 2017) but had no employment impact in the food industry. (Reich et al., 2017; Jardim et al., 2017) Another example is the impact of minimum wage in youth employment. In Denmark the minimum wage increases substantially when a worker reaches age 18 and this increase in minimum wage is accompanied with a decrease in youth employment. (Kreiner et al., 2020) For comparison, I use data from the Netherlands, where the minimum wage increases with age until the worker turns 21. (Rijksoverheid.nl, 2022) In Netherlands

the youth unemployment rate decreases when minimum wage increases, with only one exception at the age of 18. (Figure 5) Statistics Netherlands uses data from the Labour Force Survey, which means that there is possibly a larger error in the results than in the tax data used by Kreiner et al. (2020) but the data gives some indication that the minimum wage has an opposite effect for youth employment in Netherlands compared to Denmark.

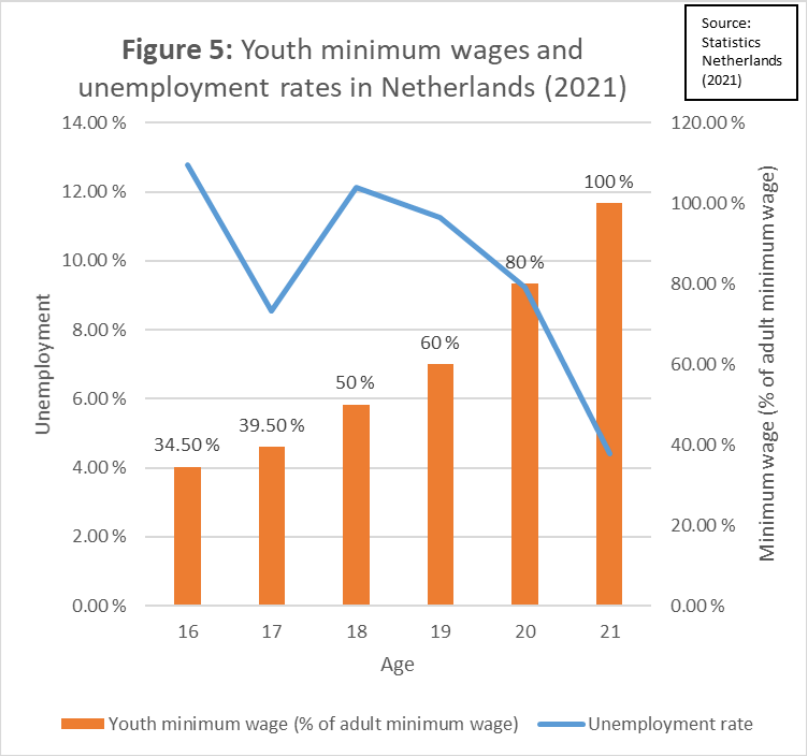


Figure 5: Youth minimum wages and unemployment rates in Netherlands (2021)

Recent studies use Herfindahl-Hirschman Index (HHI) to estimate labour market concentration and provide support for the bargaining model's prediction that wages decrease when labour market concentration increases. Azar, Marinescu and Steinbaum (2018) define HHI for labour market (m) and year quarter (t) as $HHI_{m,t} = \sum_{j=1}^{J} s_{j,m,t}^2$ where $s_{j,m}$ is the market share of the firm (j) in market (m). They collect data on posted vacancies from a US employment website and calculate labour market shares based on the number of vacancies posted by a given firm divided by the total number of vacancies posted. The study finds that going from 25th percentile to 75th percentile in labour market concentration decreases posted wages by 17%. Azar et al. (2020) use a similar method but with a dataset consisting of job postings from over 40 000 US websites and find that labour market concentration is negatively correlated with wages. Similar findings have been made in multiple other empirical studies, which use alternative methods to calculate the HHI. (Abel, Tenreyro and Thwaites, 2018; Benmelech et al., 2018; Rinz, 2018)

The modified model predicts that unionization increases wages and there is evidence that with higher unionization rates wages are higher even if labour markets are concentrated. Benmelech et al. (2018) report that the negative relation between labour market concentration and wages is lower if

unionization rates are high while Abel, Tenreyro and Twaites (2018) find that in the UK the correlation between concentration and wages disappears in most cases if workers are covered by a collective bargaining agreement.

There is also direct data supporting the prediction that minimum wage is more likely to have a positive employment impact if labour market concentration is high. Okudaira et al. (2019) estimate surplus between the value of marginal product of labour and wage rate of different Japanese plants and conclude that minimum wage reduces employment growth only in competitive labour markets. Azar et al. (2019) use the HHI calculations from the 40 000 US websites and find that in the US more concentrated labour markets experience more positive employment effects from the minimum wage than those with low concentration.

Conclusion

The bargaining model has three important results that policymakers should consider. Firstly, the minimum wage will have a different employment impact in different labour markets which is why adopting a general minimum wage might not be an optimal solution. To maximize employment, policymakers should attempt to set different minimum wages for different labour markets. A system close to this is applied in the Nordic countries, where minimum wage agreements are often differentiated by age, skill, or seniority. (Eldring & Alsos, 2012) Secondly, the model concludes that a minimum wage is especially needed in labour markets where there is high labour market concentration and no unions. Otherwise, wages and employment will remain below the optimal equilibrium level. Finally, even in concentrated labour markets with no unions setting up the minimum wage too high can still decrease employment.

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Appendix 1

Monopsony maximizes $\Pi = pq - wE - rK$

subject to $q = f(E, K)$ and $w = S(E)$

Holding capital at $\overline{K}$ and substituting the constraints into the function, we get

$$\Pi = f(E)p - S(E)E - r\overline{K}$$

This is maximized when $\frac{d\Pi}{dE} = 0$.

$$\frac{d}{dE}(f(E)p) - \frac{d}{dE}(S(E)E) = 0$$

$$VMP_E = MC_E.$$

Appendix 2

$$AMC_E = \delta \mathrm{S(E)} + (1 - \delta)MC_E$$

$$= \delta \mathrm{S(E)} + (1 - \delta)\frac{d}{dE}(S(E)E)$$

$$= \delta \mathrm{S(E)} + (1 - \delta)\left(S(E) + \frac{dS}{dE} \times E\right)$$

$$= \delta \mathrm{S(E)} + S(E) - \delta \mathrm{S(E)} + (1 - \delta)\left(\frac{dS}{dE} \times E\right)$$

$$= S(E) + (1 - \delta)\left(\frac{dS}{dE} \times E\right)$$

Appendix 3

$$AMC_E = VMP_E$$

$$S(E) + (1 - \delta)\left(\frac{dS}{dE} \times E\right) = VMP_E$$

$$S(E) = (\delta - 1)\left(\frac{dS}{dE} \times E\right) + VMP_E$$

We know that $\frac{dS}{dE} > 0$ and $E > 0$. Thus, labour supply $S(E)$ increases when δ increases. Because we are assuming $\frac{dS}{dE} > 0$, this means that wages must also increase.