Lily Robin

The $15 Minimum Wage and Unemployment

Intro

Fight for Fifteen is a movement fighting to raise the current federal minimum wage of $7.25 an hour to $15 an hour (Fight and BLS Report, 2014). Minimum wage is a price floor regulating the hourly wage of workers in the United States. The United States has a federal minimum wage, and state minimum wages are set at or above the federal minimum wage. Exceptions to the minimum wage include tipped workers like waitresses. Raising the federal minimum wage can help workers earn a wage that matches the cost of living. On the other hand, raising the minimum wage can increase unemployment. The long-run price elasticity of demand for unskilled labor is close to unit elastic. Doubling wages results in halving quantity of labor demanded, producing a vast increase in unemployment. We can see this process in some states which have instituted a $15 an hour minimum wage and through organizations claiming they will replace labor with capital in response to wage hikes (Worstall, 2015 and DePillis, 2015). My calculations, using an elasticity bounded between -.616 and -.791, estimate this policy will lead to unemployment of between about 10 million and 13 million workers out of a current 62.6 million unskilled laborers. This is about one sixth of currently employed unskilled workers. In addition, my findings estimate unemployment of around 90 percent of currently employed highly unskilled laborers.

Finding The New Quantity of Labor Demanded

In order to find the quantity of labor demanded after implementing the new minimum wage, I will use the equation for price elasticity of demand written below.[1]

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[1] See appendix for definitions

$$E_d = \frac{\%\Delta Q}{\%\Delta P} = \frac{\frac{Q_n - Q_o}{Q_o}}{\frac{P_n - P_o}{P_o}}$$

In order to calculate the estimated number of unskilled workers demanded at the proposed

minimum wage, I have rewritten the equation:

$$Q_n = (Q_o * (E_d * (\frac{P_n - P_o}{P_o}))) + Q_o$$

The estimated increase in unemployment due to the proposed policy will be the quantity

resulting from subtracting the new quantity demanded (Q_n) from the original quantity demanded

(Q_o). This does not account for any increase in supply of labor at the higher wage. Assuming that

supply of unskilled labor is relatively inelastic, the quantity of labor supplied at the higher wage

should not increase significantly. My calculated unemployment number is the number of workers

employed at the current federal minimum wage and estimated to be unemployed at the new

proposed federal minimum wage of $15 an hour.

Calculations

The average wage of a food service industry employee is $11.90 according to the Bureau

of Labor Statistics (Industries, 2015). Using food service employees to represent unskilled

workers, we see that the minimum wage of $7.25 is non-binding, and the market equilibrium

price is $11.90. Therefore, the original price input into the equation is $11.90. The new price

input into the equation is the proposed federal minimum wage of $15.00.

The original quantity is the number of unskilled workers demanded. As of October 2015,

the quantity of labor demanded was 149,120,000 (BLS News Release, 2015). Forty-two percent

of the current workforce earn under $15 an hour (Zillman, 2015). Therefore, 62,630,400

workers, earning below $15 an hour, will be affected by the higher price floor.

The proposed policy will only directly affect workers earning below $15 an hour, so the elasticity input should be an elasticity of demand for unskilled labor. Elasticity of demand for unskilled labor will be higher then elasticity for labor in general given that "demand for production workers [is] substantially more elastic than demand for nonproduction workers" (Rich, 2010). For this paper, the long-run price elasticity of demand for labor by production workers stands in in for that of all unskilled laborers. This is the closest elasticity estimate found in the available literature, but its use poses some problems that must be considered. Technological advances have already impinged on the demand for labor of production workers, but has just begun to affect the demand for labor in the service industry (Rich, 2010). This means production workers are more substitutable with capital investments in technology then service industry employees and will have a greater elasticity of demand.

This paper uses an estimate of the elasticity of demand for unskilled labor bound between -.616 and -.791. The literature shows a trend of elasticity of demand for production labor increasing over time, while elasticity of demand for non-production labor declines. From 1963 to 1996, Rich found elasticities of -.616, -.655, and -.751 respectively (Rich, 2010). Zucker calculated an elasticity of demand for low-wage production workers of -.791(Zucker, 1973). The more focused on unskilled labor and low wages the elasticity estimates are, the bigger the elasticity estimates become. But choosing the most elastic finding may not be accurate due to issues discussed above, so I have bound the elasticity between the lowest and highest findings specifically focused on unskilled, low-wage, and/or production workers.

$$-616 \leq E_d \leq -.791$$

Inputting the higher value for long-run price elasticity of demand for unskilled labor, the quantity of unskilled labor demanded, and the market equilibrium price, the equation reads:

$$Q_n = (62{,}630{,}400*(-.791 * (\tfrac{15-11.90}{11.90}))) + 62{,}630{,}400$$

This results in a new quantity of approximately 49,724,853.46. The quantity of labor demanded

drops due to the elastic nature of unskilled labor. Inputting this new quantity into the equation for

unemployment resulting from the new minimum wage yields 12,905,546.54 unemployed

workers employed under the current minimum wage.

With the same quantity and the lower elasticity, the equation reads:

$$Q_n = (62{,}630{,}400*(-.616 * (\tfrac{15-11.90}{11.90}))) + 62{,}630{,}400$$

This results in a new quantity of 52,580,062.87. With the lower elasticity, we still see a decrease

in quantity of labor demanded. Inputting this new quantity into the equation for unemployment

resulting from the new minimum wage yields a quantity of 10,050,337.13 unemployed workers

employed under the current minimum wage.

Out of 62,630,400 workers currently earning at or below $15 an hour, we can estimate

between 10,050,337.13 and 12,905,546.54 workers to be unemployed at the new wage proposed.

Fig. 1 in the appendix shows this additional unemployment at the proposed minimum wage of

$15 as well as a visual representation of the estimated unemployment of unskilled workers at a

federal minimum wage of $15 an hour. For simplification, the supply and demand curves are

linear. Fig. 3 is a table listing my findings.

The extra unemployment resultsing from this policy will likely disproportionately affect

highly unskilled workers earning lower wages because the elasticity of demand for labor appears

to be tied to wage and skill levels. Unskilled laborers are more substitutable with skilled laborers

and capital investments such as technology. Looking at highly unskilled labor as a separate

market, we can determine the effect the policy has on only these workers earning at or below the

current federal minimum wage. As of 2013, an estimated 3.3 million workers earned at or below

the federal minimum wage of $7.25 an hour (BLS Report, 2014). This quantity represents

workers most vulnerable to unemployment after the implementation of the proposed policy.

Assuming that their labor is even more substitutable than those earning $15 an hour or below,

this paper uses an elasticity estimate of -.883(0.05), the highest elasticity estimate found in

Rich's work, to calculate the effect the proposed policy will have on quantity of labor demanded

from this extremely vulnerable group (Rich, 2010).

$$Q_n = (3.3\ million*(-883 * (\tfrac{15-7.25}{7.25})))+ 3.3\ million$$

This results in a new quantity of approximately 185,141.38. That is a more then 90 percent

decline in demand for labor. An estimated 3,114,858.62 employed workers will be unemployed

under the proposed minimum wage of $15 an hour.[2] Due to the correlation between increased

elasticities of demand for labor and declining wages, and the larger increase in wages for this

highly unskilled labor market then in the unskilled labor market, my calculations estimate more

than 90 percent of laborers earning the lowest wages will be unemployed under the new

minimum wage proposed.

Conclusion

While the $15 an hour minimum wage has good intentions, it is possible that it may result in

higher unemployment rates hurting the lowest earning workers. The unintended consequence of

raising the minimum wage reduces the quantity of laborers demanded, and the reduction in

quantity depends on how elastic the demand for labor is and how much the wage is being raised

from the equilibrium, or binding price floor. In the case of the minimum wage, we are only

concerned with the elasticity of demand for unskilled laborers because the new price floor will

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[2] See Fig. 2 for a visual representation of these finding and unemployment

not directly affect workers that are already earning above the proposed minimum wage.[3] Also, the trend of the elasticity estimates indicates demand for labor becomes more elastic with laborers earning lower wages. Therefore, a likely outcome of raising the minimum wage to $15.00 an hour will not only be an increase in unemployment as demand for labor declines, but specifically an increase in unemployment of those already earning the lowest wages, many of the people the proposed policy intedns to help.

      My findings indicate about a sixth of currently employed unskilled workers will be unemployed at the new minimum wage and around 90 percent of highly unskilled workers will be unemployed. However, these findings do not necessarily mean the proposed policy will be ineffective. Unemployment must be balanced against how much the policy helps those that stay employed. There are also many other factors to considered such as the potentially vastly different impacts the proposed policy would have in different states and cities with different minimum wages and costs of living, and the possibility that companies will pass on part of the extra cost to consumers, curbing some of the decline in demand for labor. As companies shift to replace labor with capital, this may produce an increase in demand for skilled labor to create and implement the new technologies demanded. There are currently 7.9 million unemployed workers, and this new demand for skilled labor could help curb some of that current unemployment (BLS News Release, 2015).

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[3] The new minimum wage will have an effect on workers earning above the proposed minimum wage in that low and high wage earning laborers can be substitutes for each other. To look at the effect the policy has on workers earning above the proposed minimum wage we would look at cross-price elasticity of demand between workers earning above and below the proposed minimum wage.

Appendix

Definitions	
E_d	price elasticity of demand for unskilled/highly unskilled labor
P_o	the current minimum wage ($7.25/hr)
P_n	the proposed minimum wage ($15/hr)
Q_o	as the quantity of labor demanded at the current minimum wage
Q_n	the quantity of labor demanded at the proposed minimum wage

Fig. 1

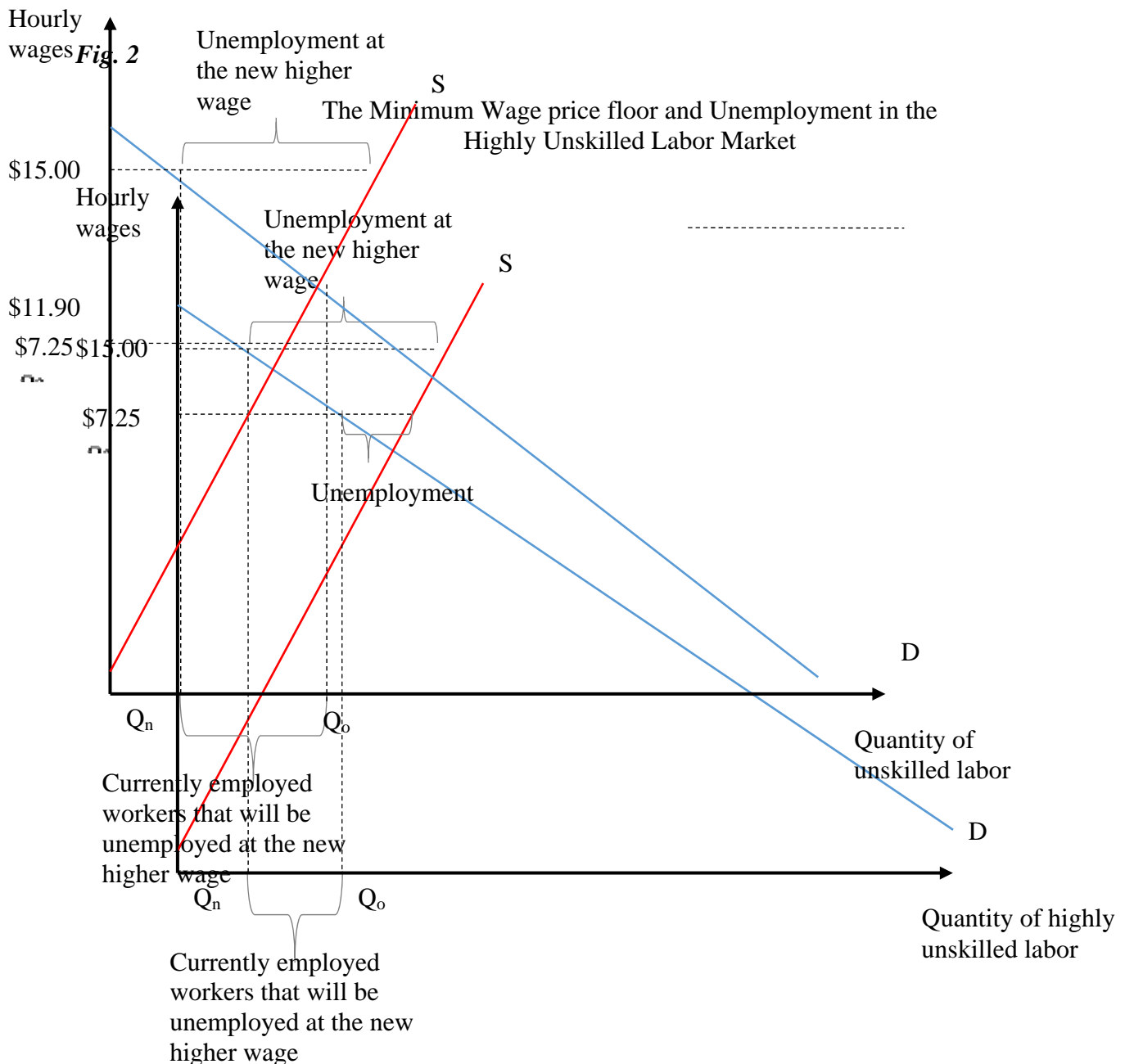The Minimum Wage price floor and Unemployment in the Unskilled Labor Market

Fig. 2

The Minimum Wage price floor and Unemployment in the Highly Unskilled Labor Market

Hourly wages

Unemployment at the new higher wage

S

$15.00

Unemployment at the new higher wage

$11.90

$7.25 $15.00

$7.25

Unemployment

Q_n Q_o

Currently employed workers that will be unemployed at the new higher wage

Q_n Q_o

Currently employed workers that will be unemployed at the new higher wage

Quantity of unskilled labor

Quantity of highly unskilled labor

S

D

D

Fig. 3

	E_d	Q_o Demanded	Q_n Demanded	Difference	P_o
Labor (wages at or below $15.00/hr)	-.791	62,630,400	49,724,853.46	12,905,546.54	$11.90
	-.616	62,630,400	52,580,062.87	10,050,337.13	$11.90
Labor (wages at or below $7.25/hr)	-.883	3,300,000	185,141.38	3,114,858.62	$15.00

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