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Do Living Wages alter the Effect of the Minimum Wage on Income Inequality?

Abstract

Anker (2006) proposed a new methodology for calculating the living wage in countries around the world. By looking at OECD nations between 2000-2010, we look to see if countries with a national minimum wage higher than this living wage value see a notable difference in the effect of the minimum wage on income inequality. Our results show that countries with the minimum wage higher than the living wage value do see lower inequality, although there is a key value of the minimum wage, at which countries start to see disemployment effects that increase inequality.

Keywords

Minimum Wage, Income Inequality

Do Living Wages alter the Effect of the Minimum Wage on Income Inequality?

by Ben Litwin

Anker (2006) proposed a new methodology for calculating the living wage in countries around the world. By looking at OECD nations between 2000-2010, we look to see if countries with a national minimum wage higher than this living wage value see a notable difference in the effect of the minimum wage on income inequality. Our results show that countries with the minimum wage higher than the living wage value do see lower inequality, although there is a key value of the minimum wage, at which countries start to see disemployment effects that increase inequality.

This paper will focus on the question, does setting the minimum wage equal to or above the living wage impact income inequality? Many people agree that the idea behind the minimum wage is to reduce the poverty rate. Most minimum wage legislation and regulations focus on the idea that those who work, should be able to provide for themselves and their families.¹ This brings up the idea of a living wage, which is the wage that would be able to sustain a person at the lowest standards for an area. Richard Anker (2006) presented a new methodology for calculating the living wage in nations across the world by taking the poverty line in a country, and dividing it by the total hours the average person in that country works, along with accounting for average workers per household, and then adding 10 percent of that value to account for sustainability in the case of unforeseen expenses.² To test this model, we will include it into the

¹ Anker, Richard, 2006, "Living Wages Around the World: A New Methodology and Internationally Comparable Estimates" *International Labour Review* 145 (4): 309-10

² Ibid., 318

methods of previous research into the effect of the real minimum wage on income inequality. One of the main models used to look at this relationship is the one presented by John DiNardo, Nicole Fortin, and Thomas Lemieux (1996) who looked at wage differentials and saw how the decline in the real value of the minimum wage increased inequality.³

The next section of the paper will look at previous research, not only going more in depth about the results of Anker (2006) and DiNardo et al. (1996), but also more theories behind why the minimum wage could affect income inequality and how the living wage is added into the mix. This will be followed by a section about the methodological plan of this paper, including selection of explanatory, dependent, and control variables. The third section will look at the results of the models, and finally the last section will be a discussion about these results and concluding remarks.

Previous Research

One of the first models to show the effect of the real minimum wage on income inequality was presented by John DiNardo, Nicole Fortin, and Thomas Lemieux (1996) who used a Kernel density function. With the density function, they were able to see that there was a large compression of data at the minimum wage value, implying that the spread of income was being held up at the bottom by the minimum wage.⁴ DiNardo et al. compared the wage differentials for the 10th and 90th percentiles and the 10th and 50th percentiles, and looked at their change from 1979 to 1988 as

³ DiNardo, John, Nicole M. Fortin, and Thomas Lemieux. 1996. "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach." *Econometrica* 64 (5): 1002

⁴ Ibid., 1002

the real value of the minimum wage dropped by 27 percent.⁵ They found that just for the wage differentials in men, “the minimum wage explains 25 percent of the change in the 10-90 differential [and] 66 percent of the change in the 10-50 differential.”⁶ These values are even greater when looking at the results presented about women. By using similar methods, we will be able to see if this relationship holds on the international level and is affected by the living wage.

The main theory to explain the relationship between the minimum wage and income inequality is that the minimum wage is a tool for the redistribution of income. Richard Freeman (1996) lays out this theory by showing how other people and corporations pay for higher minimum wages.⁷ The theory presented is that there are three different groups that give up part of their wealth to help pay for an increase in the minimum wage, the consumers who pay for goods and services produced by minimum wage workers, the stakeholders in businesses that pay the minimum wage, and low wage workers that lose their jobs due to the higher wages.⁸ Although the basic economic theory, such as what is discussed by Scott Adams and David Neumark (2003), would suggest that raising the minimum wage would act as a price floor on labor and reduce its demand, Freeman shows that previous research on employment effects of actual increases to the minimum wage in the United States and the United Kingdom have shown the elasticity of demand for minimum wage workers to be around zero.⁹

⁵ Ibid., 1014

⁶ Ibid., 1030

⁷ Freeman, Ricahrd, 1996, “The Minimum Wage as a Redistributive Tool.” *The Economic Journal* 106 (May): 640

⁸ Ibid., 640-1

⁹ Adams, Scott and David Neumark, 2003, “Living Wage Effects: New and Improved Evidence,” *NBER Working Papers* no. 9702: 3 and Freeman, 1996, “The Minimum Wage as a Redistributive Tool,”: 641-2.

Therefore, the groups that mainly pay for higher minimum wages are the consumers and the businesses. This would show that, in theory, increases in the minimum wages take money from some people and redistribute it to others, causing a decrease in income inequality.

David Card and Alan Krueger (1995) also discuss the effect of the minimum wage on the distribution of wages in chapter nine of their book *Myth and Measurement*. After briefly mentioning that recent labor market data gives no support to the standard economic theory that discusses the disemployment effects of the minimum wage, Card and Krueger show how increases in the federal minimum wage halt and temporarily reverse the trend of growing income inequality in the United States over the last 30 years.¹⁰ The effects are only temporary, since in years after the minimum wage increases, the wage gap continues to rise again. Card and Krueger also warn that these changes to the level of income inequality are small since these increases tend to only increase the incomes of the lowest-paid workers by a fairly small amount, usually around 10-15 percent.¹¹ Therefore the effects tend to seem small, although they are statistically significant.

The other main theory for how the minimum wage affects income inequality is presented by Oren Levin-Waldman (2001) and deals with the overall wage structure. The idea behind his argument is that increases in the minimum wage apply upwards pressure on other low-wages, even if

¹⁰ Card, David and Alan B. Krueger, 1995, "How the Minimum Wage Affects the Distribution of Wages, the Distribution of Family Earnings, and Poverty," Chap. 9, In *Myth and Measurement*, Princeton, NJ: Princeton University Press, 276-9.

¹¹ Ibid., 277

¹² Levin-Waldman, Oren M, 2001, *The Case of the Minimum Wage*, SUNY Series in Public Policy, edited by Anne Schneider, Helen Ingram. Albany, NY: State University of New York Press: 32.

they are not directly affected by the statutory increase.¹² By increasing the wages at the lower end of the spectrum, while not having an effect on higher wages, the minimum wage closes the wage gap, thereby reducing income inequality.

Looking more into the living wage, Benjamin Page and James Simmons (2000) present an argument in their book, *What Government Can Do*, that focuses on cities across the United States, such as Baltimore, New York, Los Angeles, Chicago, Boston, and Milwaukee, all of which have passed living wage laws requiring companies with government contracts to pay their employees higher wages so that the workers do not live below the poverty line.¹³ The idea behind these living wage laws is that full time employees should not be living in poverty and minimum wages should be high enough to reduce poverty levels. Page and Simmons however do warn that minimum wages that are too high could possibly have a negative impact on employment and economic growth, but so far there has not been a situation among areas with living wage laws where this seems to have happened. All living wage levels have stayed “within the modest ranges” so that they can have “a positive contribution to the average incomes of poor Americans.”¹⁴

The model of the living wage presented by Anker (2006) is shown in the equation below.

$$\text{Living Wage} = \frac{\frac{\text{Poverty Line}}{\text{Hours worked}}}{\text{Workers per household}} + 10\%$$

¹³ Page, Benjamin I. and James R. Simmons, 2000, *What Government Can Do: Dealing with Poverty and Inequality*. American Politics and Political Economy, edited by Page, Benjamin I. Chicago: The University of Chicago Press: 226

¹⁴ Ibid: 226-7

Anker presents this as a suitable model to find a standard way of calculating a living wage since the living wage is meant to be an “hourly wage rate required to support a household at the poverty line.”¹⁵ Using this definition, Anker created the model being used along with factoring in an additional ten percent to account for unforeseen costs or personal savings for bigger purchases.¹⁶ Anker does discuss whether to use one worker per household or two, since the traditional family includes two working adults, but many low-income families only have one working adult due to the cost of childcare.¹⁷ Therefore we will look at the model using both one worker per family and two workers per family. Finally there are various ways to calculate the poverty line. For a basic measure, we will be using the World Bank’s relative poverty line, which is simply 50 percent of the country’s mean income.¹⁸ Although this is not the most exact measure of poverty, it will be sufficient to calculate a living wage.

Methodological Plan and Data

Using the formula for the living wage previously shown, we will be able to calculate the living wage for OECD nations and then compare this value to the actual federal minimum wage in these countries. This will divide OECD nations into two groups, countries with the minimum wage below the living wage, and countries with the minimum wage at or above the living wage. From this comparison we will be able to create a

¹⁵ Anker, 2006, “Living Wages Around the World”: 312

¹⁶ Ibid., 318

¹⁷ Ibid., 323

¹⁸ “Choosing and Estimating a Poverty Line,” Poverty Reduction and Equity, The World Bank Group, accessed November 16, 2014, <http://go.worldbank.org/AOCMSD1N30>

dummy variable equal to 1 if the minimum wage is at or above the living wage and 0 if the minimum wage is below the living wage. This will lead to the following regression.

$$WD_{it} = \beta_0 + \beta_1 MW_{it} + \beta_2 LW_{it} + \beta_3 MWLW_{it} + X + u$$

Where WD is the wage differential being measured, MW is the minimum wage, LW is the dummy variable for whether or not the minimum wage is at or above the living wage, and finally there is an interaction term to see if the effects of the minimum wage on the income inequality in countries where the minimum wage is above the living wage is different from other countries. X represents all other control factors that will be in the model, u is the error term, and i represents the different countries while t represents the different years.

The control factors being used will be modelled after the research of Ximing Wu, Jeffrey Perloff, and Amos Golan (2006) who show the effect of different governmental policies on income inequality in urban and rural areas.¹⁹ Since Wu et al. found a statistically significant difference between urban and rural populations, we will use this as one of our controls, along with the percentage of the population in different age groups, social expenditure, the national GDP, and the unemployment rate.²⁰ Finally, Card and Krueger (1995) found that the effect that the minimum wage has on income inequality significantly depends on the percentage of the population that would be affected by a minimum wage increase.²¹ To

¹⁹ Wu, Ximing, Jeffrey M. Perloff, and Amos Golan, 2006, "Effects of Government Policies on Urban and Rural Inequality," *Review of Income and Wealth* 52, no. 2

²⁰ Ibid., 231 for the results of their being a statistically significant difference between urban and rural areas and Ibid., 222 for the list of other control factors.

²¹ Card et al., 1995, Chap. 9, In *Myth and Measurement*, 297.

account for this, we will also use the percentage of the population below the poverty line.

As stated earlier, this model will be run using calculations for the living wage with one and two workers per family since the traditional family includes two working members, while many low-income families only have one worker due to the cost of child care. We will also be running separate regressions for the wage differentials for the 90th and 10th percentiles to measure full inequality, and 50th and 10th percentiles to measure lower tail inequality. This comes from the methods of DiNardo et al. (1996) since they not only found a compression of wages at the lower tail of the density function, but also big changes in the effect of the minimum wage when just looking at the lower end of the spectrum.²²

The data for this research will be collected from the OECD database for all variables except for the percentage of the population that lives in urban environments, since the OECD does not keep track of that data. Therefore urban population percentage data will come from the World Bank's database. We will be looking at data from the years 2000-2010 since many of the variables being observed do not have very consistent data points before that period, and some variables do not have any data reported after 2010. Finally, only 25 of the 34 OECD countries have been included in this study since the OECD does not have minimum wage values for the other nine. Therefore Austria, Denmark, Finland, Germany, Iceland, Italy, Norway, Sweden, and Switzerland will not be

²² DiNardo et al., 1996, "Labor Market Institutions and the Distribution of Wages."

included in this study due to the inability to compare their minimum wages with the living wage values calculated for them.

We have two main hypotheses for this model. The first hypothesis is that the minimum wage will help reduce income inequality. This is due to the redistributive effects of the minimum wage. Higher minimum wages will lead to more wealth being taken from consumers and businesses, and given to low-income workers, which would result in lower inequality. The second hypothesis is that minimum wages at or above the living wage will have a significantly higher effect on reducing income inequality than countries with lower minimum wages. This is somewhat an extension of the first hypothesis since the countries with minimum wages above their living wage value will have higher minimum wages, but also this hypothesis would provide evidence that the formula for the living wage created by Anker (2006) would be an effective calculation that showed how living wages help improve the relative standard of living for low-income workers in a particular country.

Results

By running the regression for the 90-10 wage differential using panel data methods to control for country and time fixed effects, we find the results shown in table 1. The first column represents the values when the regression is run using one working family member and the second column shows two working family members.

Table 1.
90-10 percentile wage differentials on variables altering
calculations for the living wage between one and two
working adults.

	One working adult	Two working adults
Minimum Wage	-0.0102	-0.0935**
Living Wage Dummy	-0.0000414	-0.350***
Min Wage·Living Wage Dummy	-0.000798	0.0768**
Social Expenditures	0.00002	0.000038
Urban Population	-0.00262	-0.00295
GDP	0.0000001****	0.0000000885****
Unemployment Rate	0.0234***	0.0154*
Poverty Rate	0.202****	0.202****
Population Under 18	3.70*	3.67*
Population 18-40	-0.662	-0.588
Population 41-50	-3.55	-4.76*
Population 51-65	-4.079	-4.55
Population 66-75	4.59	3.075
Population 76 and over	-3.34	-2.88
Constant	2.30*	2.95**

** $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$ **** $p < 0.001$*

This model shows that the effects of the minimum wage and living wage on income inequality, as measured by the wage differential between the 90th and 10th percentiles, is highly significant when calculating the living wage using two working adults in the house, while they are not significant when the living wage is calculated using one working adult. Looking closer at the data, this relationship could stem from the fact that there are very few observations where the minimum wage is equal to or higher than the one working adult living wage. Therefore, it is more accurate to look at the relationship while using the two working adult model. This provides evidence that not only do higher minimum wages significantly reduce overall income inequality, but also that the group of countries with minimum

wages at or above the two working adult living wage have significantly less inequality, but the minimum wage is less effective at reducing inequality in these countries, thereby showing that at a certain level, these higher minimum wages will start increasing inequality, as shown by the positive estimate on the interaction term. This was accurately predicted by Page and Simmons (2000), since minimum wages higher than a certain amount could start to have a stronger disemployment effect than redistribution effect.²³ Also, although many of the control variables do not appear to be significant, we found the joint significance of the control variables related to economic conditions (social expenditures, urban population, GDP, unemployment rate, and poverty rate) to be highly significant and the joint significance of the age variables to be highly significant.

Now that we see the influence of the minimum wage on income inequality for the whole population, we can look at the relationship when only looking at the lower tail of the income distribution. DiNardo et al. (1996) found that the minimum wage had a significant effect on overall inequality, but for the lower end of the wage spectrum, changes in the real minimum wage accounted for the overwhelming majority of changes in inequality for men, women, and pooled genders.²⁴ Expanding on these results, we can see how adding in the effects of a living wage changes this significance, results for which are shown in table 2. Again, the control variables are all jointly significant by group (economic conditions and age variables) even though many of these variables are individually not significant.

²³ Page et al., 2000, *What Government Can Do*, 226

²⁴ DiNardo et al., 1996, "Labor Market Institutions and the Distribution of Wages," 1030.

Table 2.
50-10 percentile wage differential on variables altering
calculations for the living wage between one and two
working adults.

	One working adult	Two working adults
Minimum Wage	-0.0111*	-0.081*
Living Wage Dummy	0.064	-0.0505
Min Wage-Living Wage Dummy	-0.00498	0.0117
Social Expenditures	0.00000778	0.00000784
Urban Population	-0.000703	-0.000781
GDP	0.0000000748	0.0000000916*
Unemployment Rate	0.00166	0.000954
Poverty Rate	0.077****	0.0772****
Population Under 18	1.83***	1.69***
Population 18-40	-0.265	-0.268
Population 41-50	0.0574	-0.075
Population 51-65	0.981	0.798
Population 66-75	0.943	0.844
Population 76 and over	0.0129	-0.126
Constant	0.729*	0.852**

** $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$ **** $p < 0.001$*

We still see the relationship found by DiNardo et al. (1996) since the real value of the minimum wage does have a statistically significant effect on this low tail wage differential. That being said, this relationship is only significant at the 10 percent level, which brings to question how they found over two thirds of the change in this wage differential to be a result of the falling value of the minimum wage. As for the effects of the living wage on the lower end of the income distribution, this data does not provide significant evidence that there is a change in the effect of the minimum wage on inequality when the minimum wage is at or higher than the living wage. This is further enhanced by the evidence shown that increases in the minimum wage do not affect the countries that fit into the living wage group

differently than the countries that do not. Another important observation to make is that, unlike with the 90-10 percentile wage differential, there is not a difference in significance when comparing the one working adult model to the two working adult model. Both show the minimum wage to be statistically significant, but not the living wage nor the interaction term.

Finally since we did find results that were less significant than those presented in the paper by DiNardo et al. (1996), this brings up the question of whether the different data sets have an effect (since they looked at the differences between the 50 states while we compared different OECD countries) or is adding the living wage variable and the interaction term into the equation changing the results. In order to see this, we run the regression without either of the variables that deal with the living wage, the results for which are found in table 3.

Table 3.

Both wage differential models without the living wage related variables

	90-10 differential	50-10 differential
Minimum Wage	-0.0024	-0.0143***
Social Expenditures	-0.00000469	0.0000108
Urban Population	0.00558	-0.000322
GDP	0.000000107****	0.00000000968**
Unemployment Rate	0.0249***	0.00114
Poverty Rate	0.208****	0.0742****
Population Under 18	3.32*	1.86****
Population 18-40	0.000000337****	-0.0000000337
Population 41-50	-2.88	0.0866
Population 51-65	-1.98	1.116*
Population 66-75	4.19	1.65**
Population 76 and over	-4.87*	-0.0657
Constant	1.31	0.572**

* $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$ **** $p < 0.001$

These results are very interesting, since the effect of the minimum wage on income inequality without using the living wage related variables becomes extremely more significant for the lower tail of the income distribution, but for overall distribution, the effect of the minimum wage becomes less significant without considering the living wage. This ambiguously answers why some of the results seen here are different than those observed by DiNardo et al. since the lower tail differential would state that including the living wage would be creating bias in the estimates and making the minimum wage become less significant, while the full income distribution differential would show that accounting for the living wage would help eliminate bias and show that changes in the real value of the minimum wage do affect income inequality.

Conclusion

The model presented by Anker (2006) for calculating the living wage does prove to show that there is a reduction in overall income inequality when a country sets its minimum wage equal to or higher than this value. That being said, this result only occurs when the living wage is calculated using the traditional two workers per family, as opposed to a one worker family which can be typically found in low-income households. However, the most likely explanation for this variation is that of the 231 observed minimum wages, 58.44 percent of them are above the living wage when calculated using two workers, while only 4.33 percent of them are above the living wage when calculated for one worker. This would show that there is probably not enough data to properly estimate

the effects of the one worker living wage on income inequality, since the calculation for one worker living wage produces a higher living wage, therefore countries that fall into the living wage category for one worker would have higher minimum wages. Based on all other findings, these extremely high minimum wages should produce even lower inequality, but the results were not significant. Finding more data that would include more observations for countries with minimum wages higher than the one worker living wage would provide for a more accurate estimation of the relationship and would be excellent for further research in to the subject.

As for the hypothesis that stated the minimum wage helps to reduce income inequality, we find that there is significant evidence to support this. Except for two of them, all of the regressions that were ran provide statistically significant estimations that show the negative relationship between the real value of the minimum wage and income inequality. The two that do not provide evidence supporting this hypothesis are the model that regressed the 90-10 differential on the one worker living wage (which was discussed earlier as to why these results could be biased due to a lack of observations) and the model that used the 90-10 differential but did not include living wage related variables. Although there is not a good theory as to why the second regression mentioned here provides different results, this one model should not disprove the findings that the minimum wage does reduce income inequality.

Our hypothesis that relates to the effect of the living wage is shown to be true for when looking at the full income distribution, but not when only looking at the lower tail distribution. Again, this is only looking at

the two worker living wage model. This shows that Anker's calculation for a living wage does lead to an effective estimate of the living wage since countries that have minimum wages at or above this level prove to have less income inequality, even though increases to the real value of the minimum wage past a certain level will eventually start to increase inequality in these countries due to disemployment effects of minimum wages that are too high. The fact that the estimate for the living wage's effect on the distribution of low tail incomes is not statistically significant does not disprove this hypothesis, but instead shows that minimum wage increase do not significantly change the income of minimum wage workers relative to other low wage workers. This could be a result of a spillover effect that were discussed earlier in the theory presented by Levin-Waldman (2001), which stated that "an increase in the minimum wage could exert an upward pressure on the wages of those earning above the new minimum wage."²⁵ Looking at the spillover effects of the minimum wage and seeing how they affect the lower tail of the income distribution would provide a good area for further research into this subject.

Overall, setting the minimum wage at or above the living wage does reduce income inequality. The policy implications of this would be that countries raising their minimum wages to be equal to the living wages calculated using Anker's model would help fight the rising income inequality. The idea is very simple, since the main objective of most minimum wage legislation, as stated earlier, is to reduce poverty.

²⁵ Levin-Waldman, Oren M, 2001, *The Case of the Minimum Wage*, 32.

Therefore, setting the minimum wage at a level that is found using the poverty line, as is done in the model presented by Anker (2006), would help to reduce poverty and inequality.

Works Cited

- Adams, Scott and David Neumark. 2003. "Living Wage Effects: New and Improved Evidence." *NBER Working Papers* (9702).
- Anker, Richard. 2006. "Living Wages Around the World: A New Methodology and Internationally Comparable Estimates." *International Labour Review* 145 (4): 309-338.
- Card, David and Alan B. Krueger. 1995. "How the Minimum Wage Affects the Distribution of Wages, the Distribution of Family Earnings, and Poverty." Chap. 9, In *Myth and Measurement*, 276-312. Princeton, NJ: Princeton University Press.
- "Choosing and Estimating a Poverty Line." Poverty Reduction and Equity. The World Bank Group, accessed November 16, 2014, <http://go.worldbank.org/AOCMSD1N30>
- "Data: Urban Population (% of Total)." The World Bank. World Bank Group 2014, <http://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS>.
- DiNardo, John, Nicole M. Fortin, and Thomas Lemieux. 1996. "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach." *Econometrica* 64 (5): 1001-1044.
- Freeman, Richard. 1996. "The Minimum Wage as a Redistributive Tool." *The Economic Journal* 106 (May): 639-649.
- Levin-Waldman, Oren M. 2001. *The Case of the Minimum Wage*. SUNY Series in Public Policy, edited by Anne Schneider, Helen Ingram. Albany, NY: State University of New York Press.
- OECD.StatExtracts: Complete databases available via OECD's iLibrary. Organization for Economic Co-Operation and Development 2014, <http://stats.oecd.org>.
- Page, Benjamin I. and James R. Simmons. 2000. *What Government can do: Dealing with Poverty and Inequality*. American Politics and Political Economy, edited by Benjamin I. Page. Chicago: The University of Chicago Press.
- Wu, Ximing, Jeffrey M. Perloff, and Amos Golan. 2006. "Effects of Government Policies on Urban and Rural Income Inequality." *Review of Income and Wealth* 52 (2): 213-235.