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Regressive Effects of Regulation on Wages in the US

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Executive Summary

Regulation is usually intended to protect consumers, improve safety for workers, or protect the environment. Unfortunately, it also comes with the downside of increasing the cost of doing business. These costs range from time the legal department must spend to review the regulation to purchases of expensive new machinery and software to comply with new rules. Regulation has been steadily increasing in recent years compounding firms' cost of compliance in a variety of industries.

The costs of regulatory compliance must be dealt with by firms somehow. To mitigate these expenses, companies are faced with the decision to (1) increase their prices, (2) decrease their wages and/or (3) lose profit margin. If firms decide to increase prices or decrease wages, the potential arises for regulation to have redistributive effects that benefit some socio-economic groups at the expense of others. Such unintended consequences of increasing levels of regulation would be considered regressive if they come at the expense of low-income households and benefit higher income households.

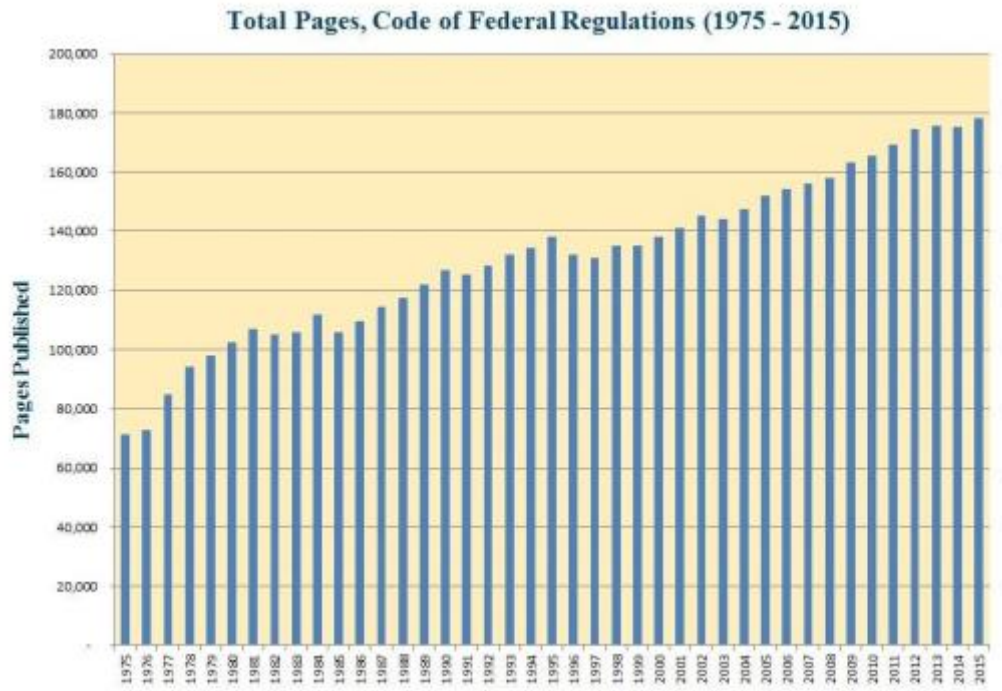
This paper reports the correlation between federal regulation and wages using regulation data from the Mercatus Center's *RegData* database and wage data from the Bureau of Labor Statistics from 2002-2014. I find a statistically significant negative relationship between wages and regulation, which suggests that wages decrease, on average, when regulation increases. More specifically, our results for different wage quintiles suggest that regulation reduces wages for low-wage workers while increasing wages for higher-wage workers. These results confirm that at least some of the cost of regulation are passed on to workers in the form of lower wages and that a disproportionate share of the costs is borne by low-wage workers.

Introduction

Regulatory intervention is usually intended to remedy some sort of market failure situation. Traditionally, regulation is the remedy chosen when transactions in unregulated markets have spillover effects on third parties (Pigou 1920). In addition, regulation is often used to assure health and safety of consumers and workers when they are unlikely to take proper precautions themselves. This may be the case because consumers and workers have less information than producers, or because producers and employers are able to take the proper precautions at lower average costs (Ackerlof 1995).

As shown in Figure 1, over the last 20 years, regulatory intervention in the economy has increased dramatically and few aspects of the life of a person in an advanced economy remain unregulated. While regulation can benefit consumers and employees, at least in theory, recent contributions to the literature in economics suggest that one of the negative unintended consequences of regulation may be that it aggravates and reinforces unequal distributions of income, especially when the rules in question represent the preferences of the wealthy but come at the expense of all households, or lower income households in particular.[1] This will be the case whenever regulation is designed to achieve an outcome higher income households desire, like certain environmental or safety standards (take for example the 2014 rearview camera mandate), while at the same time resulting in cost increases that are passed on to consumers, in the form of higher prices, or workers, in the form of lower wages.

Figure 1:



Courtesy of the Regulatory Studies Center at George Washington University

[1] Thomas (2012) explores such negative unintended consequences more generally and suggests specific examples of health and safety regulation that may be particularly regressive in this way.

Regressive Effects

The term 'regressive effect' relates to the effect a certain policy or rule has on those with lower income/wealth relative to those at a higher income/wealth level. Regressivity implies that a given piece of policy redistributes income from low to high earning households. The opposite of a regressive system would be a progressive system, which redistributes income from high to low earning households. The most well-known example of a progressive government policy may be the US tax code – which is a progressive code at least in theory. The tax code, using brackets, attempts to impose higher marginal tax rates as income increases.[2] This paper attempts to assess whether regulation has redistributive effects that are progressive or regressive by looking at wage data.

Literature Review

While the concept of regressive effects has been of interest to economists for decades, opportunities in empirical research of regressive effects of US regulation has recently spiked in large part due to *RegData,* a relatively new data set from the Mercatus Center at George Mason University. Because this data was only introduced in 2012 and was the first of its kind, modern research on regressive effects of regulation is still in its infancy.

Hoffer, Gvillo, Shughart II, and Thomas (2013) look at the regressive effects of regulation on the average consumer through prices as opposed to workers through wages. They divide the population into two groups, those collecting food stamps and those who do not. They then look at spending patterns for the two groups for a variety of food and drink consumption choices. The authors find that both samples, food stamp recipients and those not participating in the food stamp program, have a relatively inelastic income-expenditure factor, meaning both groups react to decreases in income with only small (and similarly small) adjustments in consumption of the items in question. In addition, the authors find that both low and high-income households respond similarly to changes in prices. Hoffer et al. (2013) conclude that because consumption is usually a larger share of a low-income person's overall budget, low-income households bear a larger relative burden of selective sales or excise taxes.

In a similar study, Chambers and Collins (2016) come to a corresponding conclusion for the effect of regulation on consumer prices. Using data across different industries they find a positive, statistically significant relationship between regulation and real consumer prices. This finding implies that a portion of the costs of regulation get passed onto consumers in the form of higher prices. They then find that low-income individuals actually spend a higher percentage of their income on goods produced by heavily regulated industries compared to high-income earners. Similar to Hoffer et al. (2014) they conclude that low-income households bear a much larger burden of price increases due to regulation than high-income households.

Unlike the papers discussed above, the goal of this paper is to estimate the effect of regulation on the wages of high as compared to low-income earners. Specifically, this paper first takes an exploratory dive into the effects of regulation on wages as a whole and then

[2] While the tax code is progressive in theory, empirical research suggest that it may actually be regressive (Piketty and Saez 2007).

breaks these effects down by income level. In doing so, I seek to answer two questions: First, what is the effect of regulation on wages overall? And second, what is the effect of regulation on wages of different income groups.

Data Set and Manipulation

I obtain hourly wage data from the Bureau of Labor Statistics by industry[3] and industry-level regulation data from the Mercatus Center's *RegData* database, which quantifies the regulatory burden by industry using the North American Industry Classification System (NAICS) codes. The database looks at the *Code of Federal Regulations*, counts restrictive words like "shall" or "must" and indexes the number of restrictions according to the regulation's relevance relating to each industry.

Our dataset includes regulation and inflation adjusted wage data for the years 2002-2014 (13 years).

Methodology

To answer the question of how regulation affects wages on average I ran a regression using the natural log of regulation for a given industry in a given year (*LnRegulation*) as an explanatory variable and the natural log of hourly wage in a given year, industry, and occupation (*LnHourlyWage*) as the dependent variable. Because *LnHourlyWage* has an occupational code component while *LnRegulation* does not, I need to panel the data on occupational code.

The simple OLS model is below:

$$LnHourlyWage_{Ind,Occ,Year} = LnRegulation_{Ind,Year} + Ind_{Year} + Occ_{Year} + Year + \varepsilon$$

Fixed effects of industries (NAICS code), occupations (occupational code) and years are accounted for in this model.

I rerun the same model with wage data divided up into quartiles by hourly wages in order to answer the second question of how regulation affects different wage groups.

If regulation does indeed have a regressive effect on wages, I would expect the relationship between *LnRegulation* and the lowest 25% of *LnHourlyWage* to be more inverse than the relationship between *LnRegulation* and the highest 25% of *LnHourlyWage*.

Results

The summary statistics and results for the first test are shown in Tables 1 and 2.

The results for the regression using the full dataset are reported in Table 2. The coefficient for *LnRegulation* as it relates to *LnHourlyWage* is negative, which suggests that there is an inverse relationship between regulation and hourly wages. More specifically, for every 1% increase in regulation in a certain industry from 2002-2014, there is a corresponding .0050136% decrease in real hourly wages in that industry, after adjusting for fixed effects. This result suggests that at least some of the costs of

[3] Industries are classified using the North American Industry Classification System (NAICS). NAICS replaced the old industry classification codes (SIC) in the United States in 1997. Since then, NAICS classification has been updated twice, once in 2002 and again in 2012.

Table 1: First Test's Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Year	112,992	-	-	2002	2015
Industry	112,992	-	-	-	-
Occupation	112,992	-	-	-	-
Regulation	71,275	334.0195	476.5682	.5526423	1980.68
HourlyWage	109,607	19.41491	10.01755	5.614679	98.81818
LnRegulation	71,275	4.710592	1.876511	-.5930443	7.591195
LnHourlyWage	109,607	2.855668	.4584291	1.725384	4.593282

Table 2: First Test's OLS Output

LnHourlyWage	Coefficient	Std. Err.	t	P>|t|	95% Conf. Interval
LnRegulation	-.0050136	.0003179	-15.77	0.000	-.0056368, -.0043905
Constant	2.902038	.0016113	1801.10	0.000	2.89888, 2.905196

68,957 observations

regulation are borne by workers in regulated industries in the form of lower wages.

The summary statistics and results for the second test are shown in Tables 3 and 4.

Any variable with a '1Q' before it in Table 3 represents the variable as it relates to the quartile of data associated with the lowest hourly wages and any variable with a '4Q' before it represents the variable as it relates to the quartile of data associated with the highest hourly wages. There is no significant variation in the summary statistics for regulation across the four quartiles.

The results for the second test using wage data by quartiles are reported in Table 4 above. As before, I find an inverse relationship between *LnRegulation* and *LnHourlyWage* for the first three quartiles. For the highest wage quartile, I find a positive relationship between regulation and wages, however. More specifically, for every 1% increase in regulation in a certain industry from 2002-2014, there is a corresponding .0027204%, .0028721% and .0026689% decrease in real hourly wages in that industry for the first, second, and third quartiles of earners respectively, after adjusting for fixed effects. Conversely, for every 1% increase in regulation in a certain industry from 2002-2014, there is a corresponding .0011019% *increase* in real hourly wages in that industry for the highest quartile of earners, after also adjusting for fixed effects. Those who are earning in the bottom 75% of the population are hurt, on average, by increased regulation in their industry, while those who are earning in the top 25% actually see increases in their wages when regulation increases in their industries. The first three quartiles' coefficients are all significant at a 99.9% level, while the fourth quartile's coefficient is significant only at a 97% level.

Table 3: Second Test's Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
1Q *Regulation*	17,238	354.448	479.5029	.5526423	1980.68
2Q *Regulation*	17,240	383.4565	528.1098	.5526423	1980.68
3Q *Regulation*	17,238	309.717	463.2157	.5526423	1980.68
4Q *Regulation*	17,241	301.7713	430.3139	.5526423	1980.68
1Q *HourlyWage*	17,238	10.21202	1.502493	5.614679	12.5325
2Q *HourlyWage*	17,240	14.81061	1.36435	12.53333	17.29752
3Q *HourlyWage*	17,238	20.46792	1.995183	17.3	24.35621
4Q *HourlyWage*	17,241	34.10021	9.845988	24.35652	94.96

Table 4: Second Test's OLS Output

LnHourlyWage	*LnRegulation*	Constant	Output Description
1st Quartile	-.0027204 (.0004533) -6.00 0.000 [-.0036089, -.0018319]	2.325176 (.0023229) 1001.00 0.000 [2.320622, 2.329729]	Coefficient Standard Error t Statistic P>|t| Test 95% Confidence Interval
2nd Quartile	-.0028721 (.0003207) -8.95 0.000 [-.0035007, -.0022434]	2.704988 (.0016518) 1637.58 0.000 [2.70175, 2.708226]	Coefficient Standard Error t Statistic P>|t| Test 95% Confidence Interval
3rd Quartile	-.0026689 (.0003461) -7.71 0.000 [-.0033473, -.0019905]	3.026438 (.0017098) 1770.07 0.000 [3.023086, 3.029789]	Coefficient Standard Error t Statistic P>|t| Test 95% Confidence Interval
4th Quartile	.0011019 (.0005067) 2.17 0.030 [.0001087, .0020951]	3.490954 (.0025279) 1380.96 0.000 [3.486, 3.495909]	Coefficient Standard Error t Statistic P>|t| Test 95% Confidence Interval

68,957 observations

Conclusion

Two major conclusions follow from the above analysis. First, I show that there is a statistically significant inverse relationship between increased regulations on industry hourly wages from 2002 to 2014, on average. Second, these decreases in hourly wages occurred only for the lower 75% of wage earners, with the highest 25% of earners actually seeing increases in their wages, on average, when regulation increased. These findings support the theory that costs associated with regulation are not borne

equally by all workers. Instead, regulation seems to disproportionately affect lower-wage workers while benefitting higher wage workers. One potential explanation for this disproportionate regressive effect on the wage structure is that regulatory hurdles increase the demand for those types of workers who can navigate increasingly complex legal environments and compliance, while also forcing firms to lower the cost of production by lowering wages or increase prices of final products in order to compensate for the higher cost of regulatory compliance. Taken together, these two pressures may push a firm to reduce wages across the board to cope with the higher cost of production that results from regulation, while at the same time increase compensation in the top quartile of wage earners in order to compensate them in a more complex legal and compliance environment.

This paper attempts to estimate the effect of regulation on wages by industry. The findings of this paper suggest that the wage gap in the United States has grown with increased government regulation for the past decade and a half. While the findings are statistically significant, they are relatively uncontrolled and subject to certain biases. Therefore, further controls will need to be added to make this argument more robust going forward. As far as the argument for regressivity is concerned, these results are convincing that there is something going on between regulation increases and the disproportionality of wages. If further research can find a degree of causality here, voters may want to be informed.

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