Research

The Cumulative Impact of Regulatory Cost Burdens on Employment

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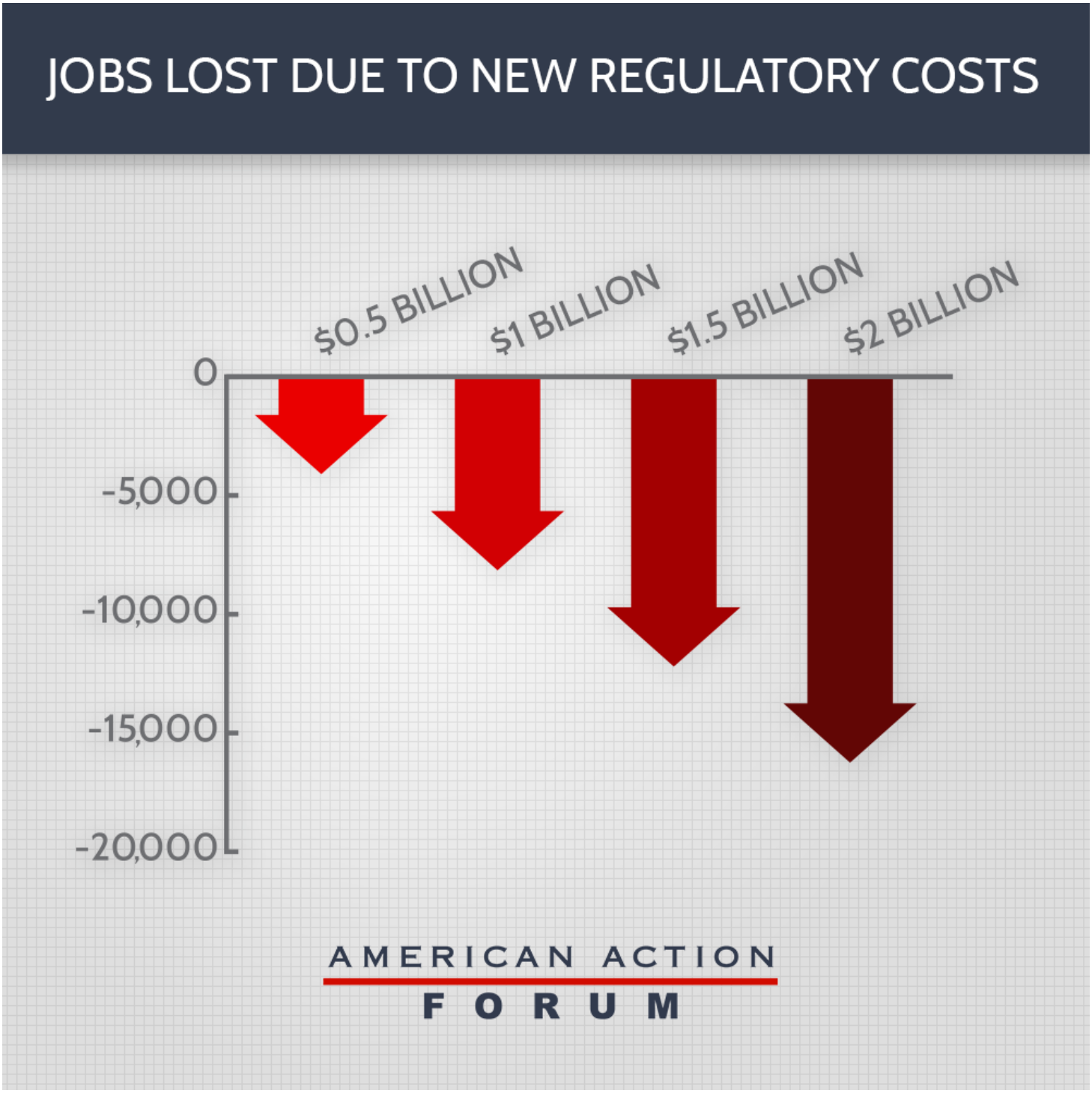
American Action Forum (AAF) research finds that for every billion dollars in regulatory compliance, affected industry employment declines by 3.6 percent. In two previous studies, AAF examined regulations with significant effects on small businesses and billion-dollar regulations. This study is far more comprehensive than the previous iterations, examining approximately 150 regulations during a twelve-year period. The interaction between regulation and industry employment is complex, and it's doubtful that any one regulation can significantly affect employment. However, AAF research finds that the total cost of all regulatory compliance is associated with lower industry employment. The figure below details how cumulative regulatory costs affect industry employment.



METHODOLOGY

This study examines the employment levels of 44 industries from 2001 to 2012, the period the Bureau of Labor Statistics made available for data. The sample of 44 industries accounted for approximately nine percent of total private employment in 2012. Instead of examining only large regulations, or rules that only affect small businesses, AAF recorded all final rules between 2001 and 2012 that agencies admitted would affect certain industries. Below are the 44 industries, paired with their North American Industry Classification System (NAICS) code.

(32511) Petrochemical Manufacturing	(44611) Pharmacies and Drug Stores	(221112) Fossil Fuel Power Generation
(324110) Petrochemical Refineries	(325193) Ethyl Alcohol Manufacturing	(325199) Basic Organic Chemical Manufacturing
(326199) Other Plastics Manufacturing	(331314) Smelting of Aluminum	(331491) Extruding of Nonferrous Metals
(331511) Iron Foundries	(331513) Steel Foundries	(333111) Farm Equipment Manufacturing
(333112) Lawn Equipment Manufacturing	(333120) Construction Machinery Manufacturing	(333131) Mining Machinery Manufacturing
(333132) Oil Field Machinery Manufacturing	(333414) Heating Equipment Manufacturing	(333618) Engine Equipment Manufacturing
(333924) Industrial Truck Machinery Manufacturing	(335222) Household Refrigerator Manufacturing	(335312) Motor Generator Manufacturing
(335911) Storage Battery Manufacturing	(336111) Automobile Manufacturing	(336112) Light Truck Manufacturing
(336340) Brake System Manufacturing	(336612) Boat Building	(423110) Automobile Wholesalers
(424690) Chemical Merchant Wholesalers	(424710) Petroleum Terminals	(424720) Petroleum Products Merchant Wholesalers
(484110) General Freight Trucking	(484220) Specialized Local Freight	(484230) Specialized Long-Distance Freight
(523930) Investment Advice	(524114) Health and Medical Insurance Carriers	(524292) Administration of Insurance and Pension Funds
(541330) Engineering Services	(541350) Building Inspection Services	(562910) Remediation Services
(622110) Medical and Surgical Hospitals	(624410) Child Day Care Services	(811111) General Automotive Repair
(811112) Automotive Exhaust System Repair	(811198) Other Automotive Repair and Maintenance	

Other studies have focused primarily on the relationship between employment and compliance with environmental regulations. However, AAF's sample represents a cross section of industries, from day care services, to hospitals, drug stores, and the manufacturing industry. These industries were regulated by more than just one agency. AAF's sample contains regulations from ten different federal agencies.

From 2001 to 2012, regulatory impact analyses from these agencies indicate there were 148 regulations that affected the 44 industries in the sample. AAF's previous studies examined only eight and 17 rules, respectively. The rules evaluated in this study range in cost from a few thousand dollars annually, to more than $10.8 billion per year.

As in its previous papers "Cumulative Impact of Regulation and Employment" and "Billion-Dollar Regulations: Trends and Employment Implications," AAF does not assume all regulations are created equal, particularly with respect to employment. While some regulations may have negligible effects on an industry, others may be more substantial and several regulations together could cumulatively have large effects. Previously, AAF focused on regulations presumed to have the largest industry impacts and evaluated how these "economically significant" or "billion-dollar" rules cumulatively impacted employment. In doing so, AAF employed binary variables to examine the cumulative impact of the number of new regulations on an industry.

Since not all regulations are the same in estimated cost and design, perhaps the best way to measure the impact of regulations on employment is to estimate how the cumulative projected costs of all regulations relates to job levels. Thus, this analysis examines the how the annual cost of several new regulations impact industry employment.

To examine the effect of new regulatory costs, AAF estimates the change in industry employment associated with an increase in the affected industry's regulatory cost burden. AAF employed industry-level data from the Bureau of Labor Statistics' Current Employment Statistics and used average annual employment of the 44 industries listed above for each year from 2001 to 2012. The regulatory cost estimate for each industry in a year is the sum of the projected costs of all new regulations an industry faced from the beginning of the time period to the given year. AAF also adjusts regulatory cost estimates for inflation, adjusting all to 2012 dollars.

Using these data, AAF performs a fixed effects cubic regression to estimate the effect of an increase in regulatory costs on the natural log of employment. AAF uses a cubic regression and natural log of employment to address a nonlinear relationship between industry employment and cumulative regulatory costs. In addition, the use of fixed effects controls for characteristics that vary across industries, but not over time. To account for macroeconomic forces that change over time, such as the loss in employment due to the Great Recession, AAF controls for year. In addition, to account for changes in prices over that time, AAF controls for industry chained Consumer Price Index. Also, any fixed effects model can face the problem of autocorrelation, in which a variable is correlated with itself over time and biases the results. AAF's model addresses this issue by using heteroskedasticity-and autocorrelation-consistent standard errors.

Below is the specific regression model:

$$\ln(Employment)_{it} = \beta_0 + \beta_1 Cost_{it} + \beta_2 Cost_{it}^2 + \beta_3 Cost_{it}^3 + \beta_4 ChainedCPI_{it} + \beta_5 Yr2_{it} + \beta_6 Yr3_{it} + \beta_7 Yr4_{it} + \beta_8 Yr5_{it} + \beta_9 Yr6_{it} + \beta_{10} Yr7_{it} + \beta_{11} Yr8_{it} + \beta_{12} Yr9_{it} + \beta_{13} Yr10_{it} + \beta_{14} Yr11_{it} + \beta_{15} Yr12_{it}.$$

The subscripts *i* and *t* denote the industry and year of the observations, respectively. There are three variables representing regulatory cost burden, including *Cost*, $Cost^2$, and $Cost^3$. *ChainedCPI* represents the annual average chained Consumer Price Index, which is reported by the Bureau of Labor Statistics. Finally, each *Yr* variable is a binary variable (0 or 1) representing the year of an observation. *Yr2* equals 1 when the year is 2002 and *Yr12* equals 1 when the year is 2012.[1]

FINDINGS

The cumulative regulatory cost burden is associated with a statistically significant reduction in industry employment.

Cost of New Regulations and Employment†	
Variable	**Coefficient**
Cost (in billions of dollars)	-3.6%*
*Jointly Significant at the 5% level	
†Average marginal effect of an increase in regulatory cost burden on employment, with industry and year fixed effects and controlling for chained CPI.	

In the regression, the coefficients on all three cost variables are jointly significant, suggesting that the total cost of new regulations on an industry has an impact on employment levels. The above table reveals that in an average industry, for every $1 billion in new regulatory costs, employment declines 3.6 percent. This figure is statistically significant at the five percent level. To put that in perspective, average industry employment in our sample was 225,035. If in the following years, the average industry faced $1 billion in new regulatory costs, it would lose 8,101 jobs.

Interestingly, the result yielded in this study is somewhat consistent with, but more conclusive than, what AAF found in the previous paper, “Billion Dollar Regulations: Trends and Employment Implications.” In that paper, AAF found that one $1 billion regulation was associated with a 3.0 percent decrease in employment. However, that result was statistically insignificant. In contrast, the results in this paper are slightly larger in absolute value (3.6 percent decline in employment for every $1 billion in new regulatory costs) and statistically significant. This perhaps underlines that the impact of regulations on employment is more associated with the actual cumulative cost of the new regulations than their mere existence.

CONCLUSION

Although past studies have examined the impact of regulation on employment among specific industries or regulations, it is doubtful that one rule by itself reduces jobs. This paper takes a much broader look at the effect of regulations by analyzing the impact of 148 regulations imposed on 44 industries from 2001 to 2012.

Moreover, this paper more precisely measures the cumulative impact of regulations by examining how the total cost burden of all new regulations is associated with employment. AAF finds $1 billion in new regulation is associated with a 3.6 percent decline in industry employment. This research demonstrates that the cumulative effect of regulation is significant and that policymakers should take into account existing regulatory burdens when writing new rules.

[1] To avoid perfect multicollinearity between the binary variables (otherwise known as the dummy variable trap), *Yr1*, which equals 1 for 2001, is purposefully absent from the model. As a result, all year binary variables are measured relative to *Yr1*.