Comparing Business Cost Policy Variables

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The REMI model has several different types of Business Cost policy variables available, the impacts of which vary by both type and industry. This analysis compares five different policy variables:

1. Production Cost - The Production Cost policy variables change the Relative Production Costs of the specified industry. They should be used when a specific policy will affect the cost of doing business in a region without directly changing the relative costs of factor inputs (labor, capital, and/or fuel).

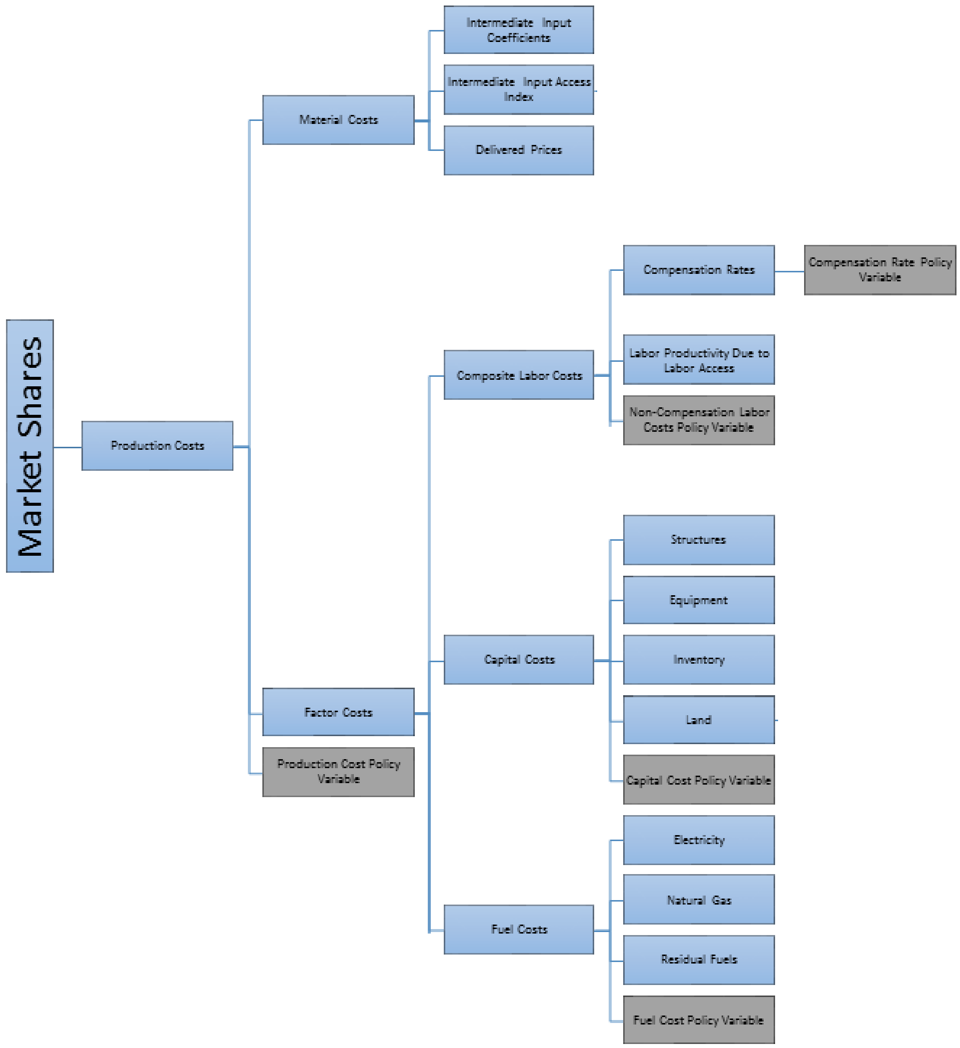
2. Capital Cost - The Capital Cost policy variables change the Capital Costs within the specified industry. These policy variables should be used when a policy scenario is expected to change the implicit rental cost of capital, thus resulting in substitution between capital and labor usage.

3. Fuel Cost (Electricity) - The Fuel Cost policy variables change the Relative Fuel Cost to the specified user group. The Relative Fuel Cost of the specified fuel is then weighted by the purchased fuel weight for that fuel along with the other fuel types, resulting in substitution between types of fuel, to determine the aggregate relative fuel cost of the region.

4. Labor Cost (Compensation Rate) - The Compensation Rate policy variables change the average nominal Compensation Rate within the specified industry by the proportion or percentage of average industry compensation entered. These policy variables should be used when a policy scenario is expected to change the compensation rate for all employees in an industry, thus resulting in substitution between capital and labor usage.

5. Non-Compensation Labor Cost - The Non-Compensation Labor Costs (share of compensation rate) policy variables change the non-compensation Labor Costs of the specified industry by the proportion or percentage of the average industry compensation rate entered. These policy variables should be used when a policy is expected to change the cost of labor to employers without changing the compensation received by employees.

Each of these policy variables enter the model through different equations, and can have quite different effects. The following flow chart illustrates how each policy variable enters the model, and the specific economic variable it directly impacts. The production cost policy variable directly enters the production cost equation, and does not bias the costs to favor or disfavor any of the factor inputs of production. Therefore there will not be any direct substitution between the factors of production as a result of a production cost change. The effect will feed directly into market shares as a result of a change in industry competitiveness due to the change in cost.



The three types of variables representing individual factor costs (labor, capital, fuel) all result in some substitution between the factors of production, as well as subsequently impacting production costs and ultimately market shares.

For comparison, each of the five distinct policy variables were changed in a single region 70 sector model of Oregon (v2.1) for three separate industries. In each scenario, a total cost increase of $10 million (fixed national 2009$) was entered for each year for the ten year period 2016 to 2025.

Computer and electronic product manufacturing

The industry employment results from the five scenarios (Production Cost, Capital Cost, Fuel Cost, Labor Cost, and Non-Compensation Labor Cost) vary substantially. While the Production, Capital, and Fuel Cost scenarios all have similar results, the Labor and Non-Compensation Labor Cost scenario results are dramatically more negative.

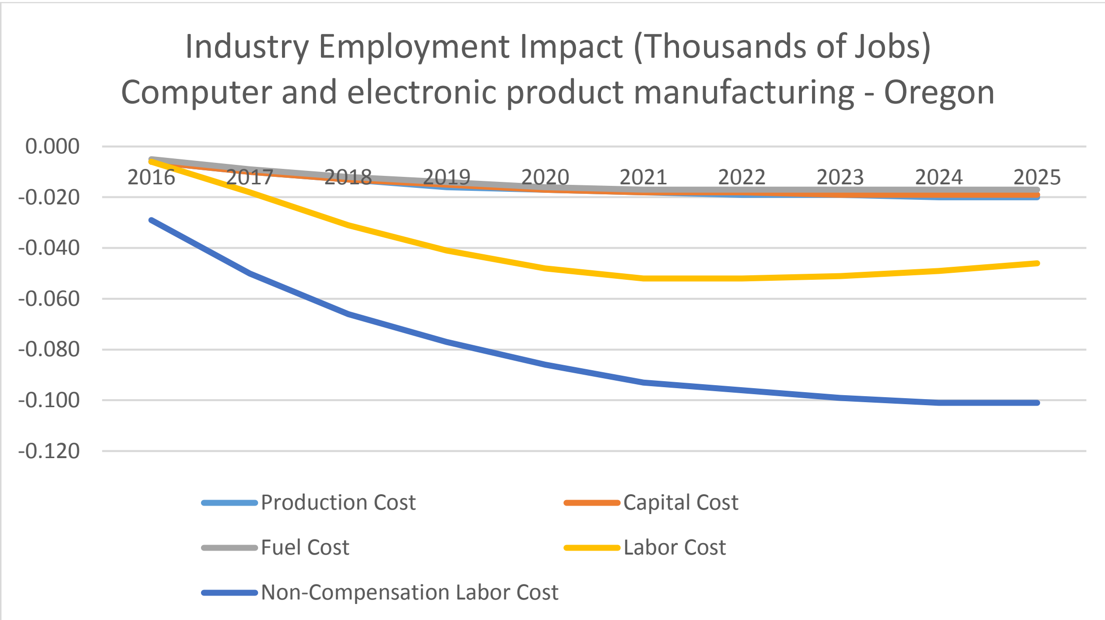


Figure 1. Computer manufacturing employment impacts from a $10 million cost change

For this industry, the labor-related scenarios are more negative because labor is a relatively large component of production (45% in 2016) and the average compensation rate is already high (greater than $150k in 2016) which leads to an immediate shift away from labor towards the less expensive capital and fuel, and also the price elasticity of demand is relatively high, which leads to a stronger and more immediate loss of market share. The Labor Cost scenario is less negative than the Non-Compensation Labor Cost scenario due to the stimulatory effect of the additional spending of the increased wage by the employees receiving it. The Non-Compensation Labor Cost variable does not lead to a direct increase in employee wages, but rather represents a labor cost to the employer that does not translate into higher wages for the employee.

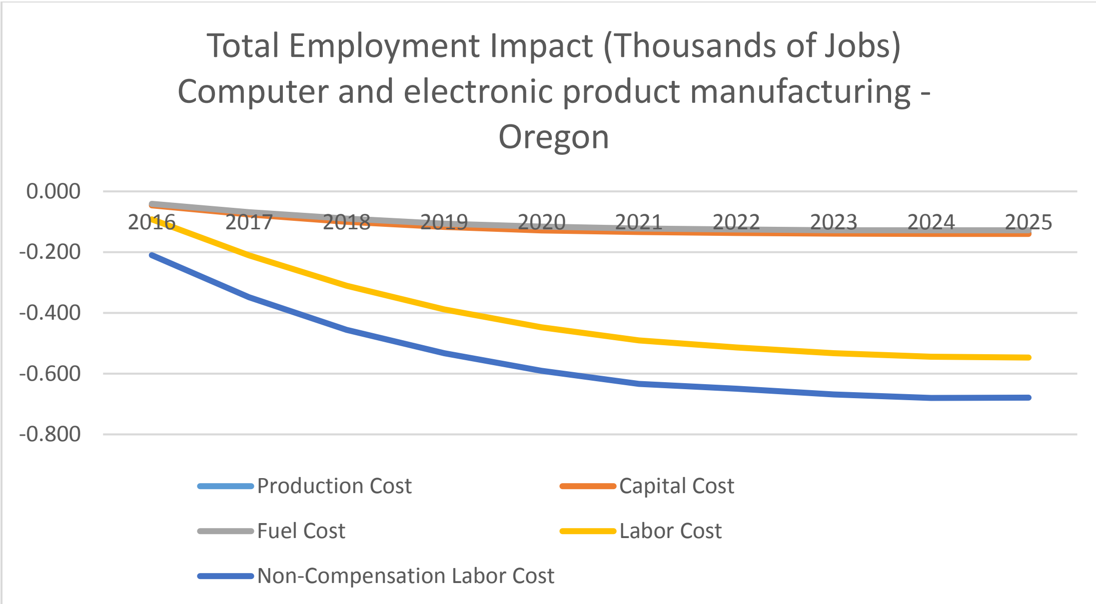


Figure 2. Total employment impacts from a $10 million cost change in Computer manufacturing

The relative comparisons of the total employment impacts are very similar to the industry-specific impacts in this industry, but of course are more negative due to the multiplier effect.

Telecommunications

The industry employment results from the five scenarios vary less in magnitude in the Telecommunications industry than they did in the Computer manufacturing industry.

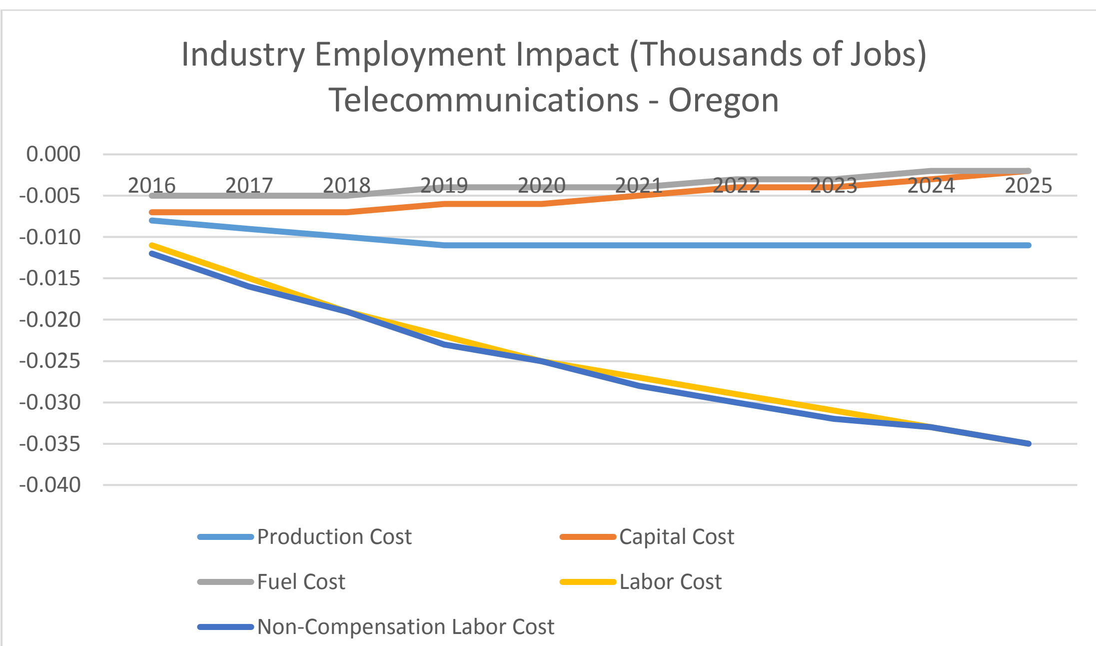


Figure 3. Telecommunications employment impacts from a $10 million cost change

The behavior of this industry in terms of its impact on the total economy is quite different from that of the computer manufacturing industry. Increasing the labor-related costs actually leads to a net gain in total jobs which on the surface is counter intuitive. However, the Telecommunications industry is relatively investment-intensive, so when the production function shifts away from labor towards capital, this leads to a positive investment impact which is seen in the total employment response. As with the previous scenario, the Labor Cost response is higher than the Non-Compensation Labor Cost response due to the direct spending in the economy of the additional wages.

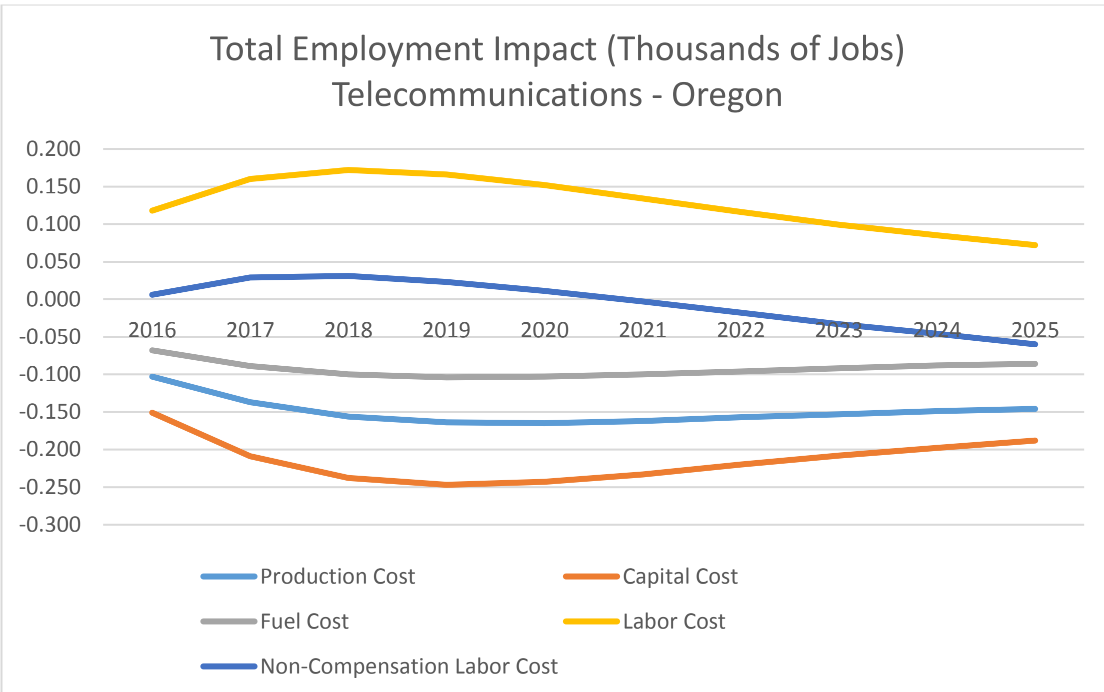


Figure 4. Total employment impacts from a $10 million cost change in Telecommunications

The Capital Cost scenario is the most negative due to the investment-intensive nature of Telecommunications which affects the local supply chain (the construction industry is hit the hardest) as the industry shifts more towards labor. The Fuel Cost scenario is substantially less negative because the industry can substitute between the higher priced electricity and other types of fuel, as well as with other factor inputs. The Production Cost scenario impact is approximately between the Fuel and Capital.

Professional, scientific, and technical services

The industry employment results from the five scenarios vary both in magnitude and sign but the trends are similar to what was seen in the previous two industries.

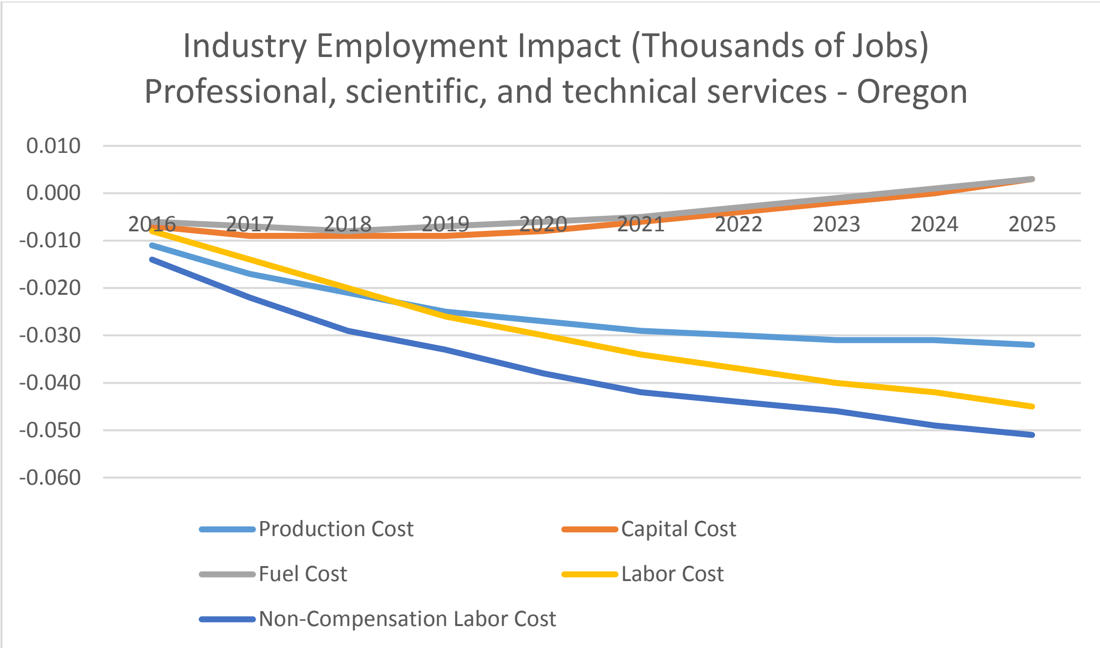


Figure 5. Professional, scientific, and technical services employment impacts from a $10 million cost change

When looking at just the affected industry, the Labor Cost related scenarios are the most negative, the Capital and Fuel Cost scenarios are the least negative, and the Production Cost scenario is somewhere in-between.

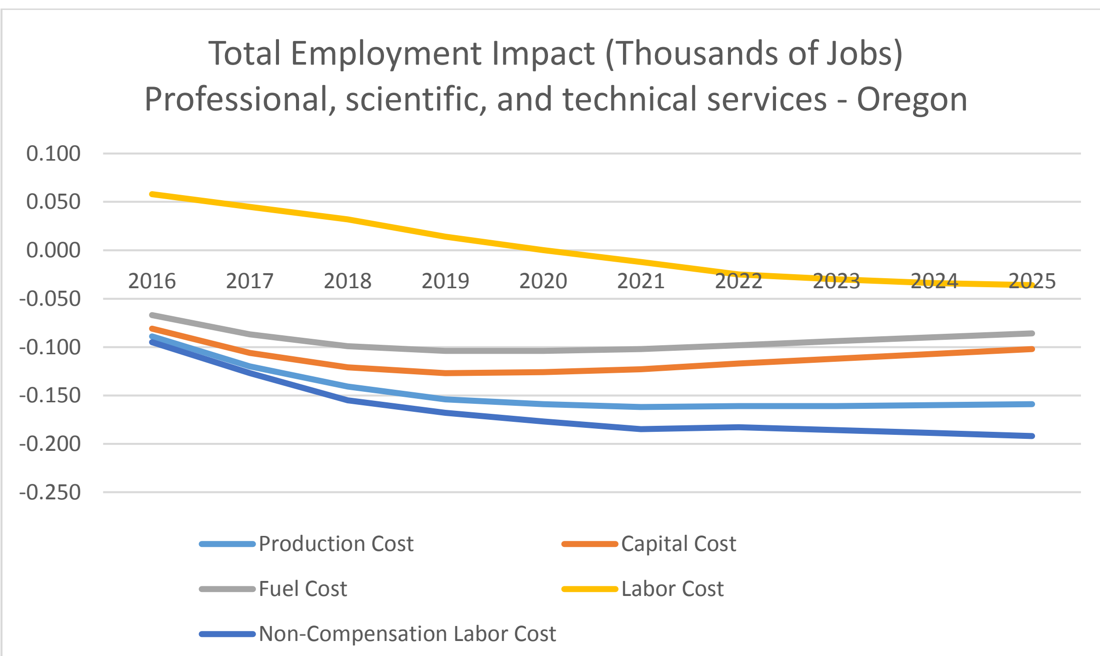


Figure 6. Total employment impacts from a $10 million cost change in Professional, scientific, and technical services

The total employment impacts of the five scenarios differ quite substantially from each other as well as from the other industries. The Labor Cost scenario is initially positive, turning negative after five years. This contrasts substantially with the Non-Compensation Labor Cost scenario, which is the most negative. Due to the relatively lower price elasticity of demand for this industry, the negative competitive effect of the higher labor cost results in a smaller market share, so the spending of the additional wages leads to a temporary gain in overall jobs. Since the Non-Compensation Labor Cost scenario provides no spending of additional wages, the impact is initially negative, and grows more so as the full competitive effect kicks in. The additional labor-related cost also leads to a substitution away from labor towards other factors of production, which is why the Capital Cost and Fuel Cost scenarios are less negative. The Production Cost scenario lies in between those and the Non-Compensation Labor Cost.

The primary purpose of this paper is not to explain how the model works, but rather to illustrate the often significant differences in simulation results depending on the nature of the Business Cost and/or industry selected (as well as the geographic region, although that is not demonstrated here). When modeling a Business Cost, it is important to select the policy variable that matches as closely as possible the specific type of cost under consideration.