# A Game Theory Analysis on Policy to Negotiate Lower Drug Prices for Medicare Part D

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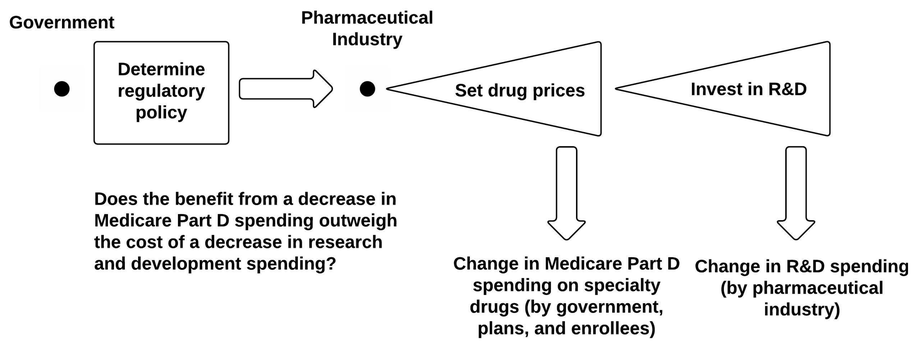
## Introduction

Medicare Part D is a set of prescription drug plans administered by private insurance companies that is available to all Americans eligible for Medicare (over age 65). Currently, Part D relies exclusively on free market competition to bring down drug prices for its beneficiaries. However, an increasingly common pharmaceutical class known as specialty drugs lack therapeutic substitutes to provide this sort of competition. Other price regulation mechanisms are possible, but current US policy gives Part D plans little bargaining power when negotiating specialty drug prices. This project seeks to model the effects of proposed regulatory policy aimed at improving the negotiation of specialty drug prices.

## Game Model




## Assumptions

- Price data in the US and UK for the sample of 30 specialty drugs are representative of prices for all specialty drugs.
- The US can negotiate the same discounts on drugs as the UK under similar regulatory policy.
- Disease prevalence in the US is the same as in the UK for those over 65.
- Total Medicare Part D spending is directly proportional to pharmacy purchasing price.
- Specialty drug prices in the US for all insurance plans will follow those of Medicare Part D if regulatory policy changes.
- International drug prices will remain constant after the implementation of new regulatory policy in the US.

## Conclusions

We estimated the following effects of new regulatory policy aimed at negotiating lower specialty drug prices for Medicare Part D:

- Change in total Medicare Part D spending
- Change in pharmaceutical industry revenues and profits

To determine the feasibility of a given regulatory policy, our game model requires us to find the resulting changes in Part D spending and in pharmaceutical R&D spending. If the societal benefit from a decrease in Part D spending outweighs the societal cost from a decrease in R&D spending, the proposed policy can be considered viable.

Our model demonstrates a clear benefit from the proposed regulatory policy in the form of reduced Part D spending by the government, insurance plans, and their enrollees. It projects that total spending on specialty drugs by these groups would drop by nearly 90 percent.

We did not directly calculate how R&D spending would be affected by the proposed policy, but we can make some good inferences by analyzing how projected pharmaceutical industry revenues and profits change under the new policy. Our model projects that under the proposed policy, profits of the five largest pharmaceutical companies would remain positive (and in the billions). Therefore, it can be argued that there would be no essential financial reason for lowering R&D spending if the regulatory policy in question were passed.

However, it is difficult to predict how pharmaceutical executives would respond to such changes in profitability. Further investigation is warranted to better understand decision making regarding R&D investment given such regulatory action. Ultimately, this model can be used to argue that the proposed regulatory policy would provide a clear benefit in the form of reduced Medicare Part D spending and that its economic impact on the pharmaceutical industry does not necessitate a reduced level of R&D investment.

## Policy Proposal

- Transition into a value-based pricing system.
- Loosen formulary restrictions on Medicare Part D plans to increase government bargaining power.
- Allow government to negotiate on behalf of Medicare Part D.

## Methodology

Apply the game model to the above regulatory policy. This requires an estimation of the change in Medicare Part D spending on specialty drugs and the change in R&D spending by the pharmaceutical industry resulting from the proposed policy. The following steps were taken in this pursuit:

- Sample 30 specialty drugs approved by the FDA between 2009 and 2012.
- Conduct a disease burden analysis between the UK, a country that uses regulatory policy similar to the proposal in question, and Medicare Part D.
- Develop a model to estimate US drug prices under new regulatory policy, based on UK price data and relative disease burden between the two populations.
- Estimate Medicare Part D spending under new regulatory policy.
- Estimate the impact of new policy on profits and revenues in the pharmaceutical industry.

## Results

**Total Medicare Part D Spending on Sample of 30 Specialty Drugs Based on Regulatory Policy**

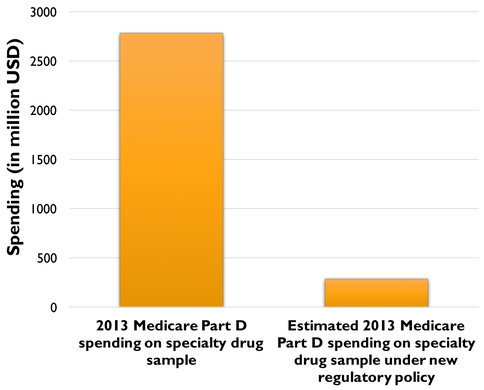



Figure 1. The first column reflects total Medicare Part D spending in 2013 (by government, plans, and enrollees) on the study's sample of 30 specialty drugs. This data is drawn from the Medicare Part D Prescriber Data CY 2013 released by the Centers for Medicare and Medicaid Services. The second column reflects the study's estimation of what 2013 Part D spending would be for the same sample of drugs under the regulatory policy modeled in this project. For each drug in the sample, an estimated pharmacy purchasing price under the proposed regulatory policy was calculated by adjusting the UK purchasing price based on the relative disease populations between the UK and Medicare Part D. The estimate of 2013 Medicare Part D spending for each drug under the modeled regulatory policy was calculated by multiplying the actual 2013 Part D spending by the proportion of the modeled purchasing price to the current purchasing price.

**Pharmaceutical Industry Revenue Based on Regulatory Policy**

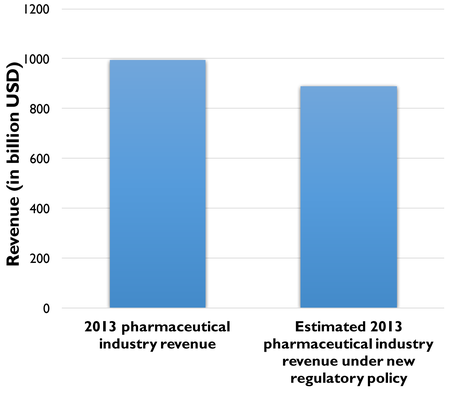



Figure 2. The first column reflects total global revenue from the pharmaceutical industry in 2013, as reported by the German Pharmaceutical Industry Association. The second column reflects an estimation of what 2013 pharmaceutical industry revenue would be under the proposed regulatory policy. The calculation of this second column figure is done using the estimated change in specialty drug spending by Medicare Part D under the new policy, the actual 2013 global pharmaceutical revenue, the proportion of global pharmaceutical revenues earned in the US, and the proportion of US pharmaceutical revenues earned from specialty drugs.

**Revenues/Profits of the Five Largest Pharmaceutical Firms Based on Regulatory Policy**

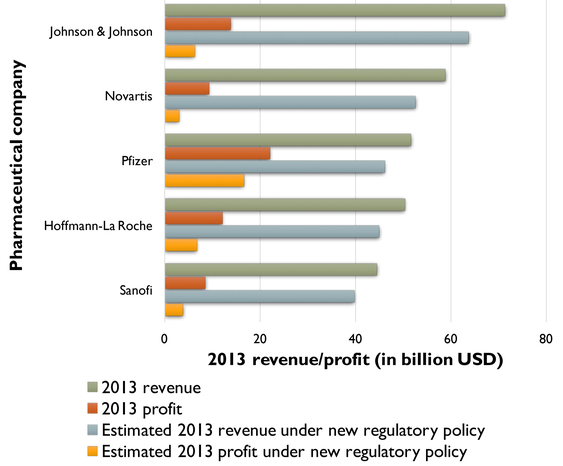



Figure 3. The above graph concerns the five largest pharmaceutical firms globally in terms of total revenue. For each company, the first and second row reflect their 2013 revenue and profit, respectively. This data is drawn from a 2014 BBC business report that references the pharmaceutical research firm, GlobalData. For each company, the third and fourth row reflect estimations of what their 2013 revenue and profit would be, respectively, under the regulatory policy proposed. The calculation of these estimated revenues and profits are based on each company's actual 2013 revenue and profit and the estimated change in total pharmaceutical industry revenue under regulatory policy.

## Literature Cited

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## Next Steps

- Examine the relationship between pharmaceutical revenue/profit and R&D investment.
- Predict if and how R&D investment will change if the proposed regulatory policy is implemented.