

# A Model of Lobbying and Social Welfare

Jacob Loree

Ryerson University, Canada

E-mail: [jacob.loree@ryerson.ca](mailto:jacob.loree@ryerson.ca)

Received: June 25, 2016

Accepted: December 16, 2016

Published: June 23, 2017

doi:10.5296/ieb.v3i1.10497

URL: <http://dx.doi.org/10.5296/ieb.v3i1.10497>

## **Abstract**

Lobbying is an immense part of the political process. The ability for firms and industries to influence public policy, however, has been seen as a societal ill – even when it benefits the industry. This paper investigates how different types of lobbying affects industries as well as society as a whole. This is one of the first papers in this field of research to investigate societal effects. The results vary by type of lobbying. Protection and regulation lobbying benefit the industry but harm society as a whole. Subsidy lobbying benefits both industry and society given that the government’s additional subsidy expenditure comes from a surplus. If not, society’s welfare is the same as it is shifting subsidy from one industry to another. Using these results, policy suggestions would be to move away from protectionism and removing regulation as a society benefitting technique to using subsidies to boost industries.

**Keywords:** Lobbying, Cournot, Competition, Oligopoly

## 1. Introduction

Lobbying the government has always been an avenue of private companies to influence industrial and public policy. Over \$3.2 billion was spent on lobbying activities with over 11,000 individuals identifying themselves as federal government lobbyists (OpenSecrets, 2016). As such, lobbying should be investigated in more depth. However, what this lobbying does to an economy is still mystifying to researchers. In general, lobbying is seen as a social ill - an increase in a small group's welfare to the loss of the rest of society. In general, lobbying allows certain firms (usually much larger firms) to be able to influence law makers to change public policy - usually directly in their favour. For example, an oil company would lobby to reduce environmental protection regulations in order to more cheaply operate – the excess pollution would harm society. However, lobbying as a function of a firm has not been researched in depth. While lobbying may be the social ill it is purported to be, theoretically this has not been modelled in depth.

The research field related to lobbying focuses on the strategies each firm employs to benefit their profit by utilizing lobbying. For example, if there exists a lucrative government contract, how much should each firm lobby to win the contract (Wachsman & Zhou, 2013)? This type of interaction is called strategic trade and demonstrates how industrial organization affects firm's willingness to expand. While strategic trade has made an overwhelming impact on this research field, we hope to expand this field by explicitly modelling lobbying as a firm choice. This will be done by implementing lobbying as an endogenous choice for firms that compete using quantity as originally described by Cournot (1897). Using this additional mechanism, we hope to more accurately describe real world competition. This more complex model helps explain why lobbying exists and how it affects the market and society as a whole. This paper looks to create a theory of lobbying as it pertains to societal welfare, using three separate types of lobbying.

## 2. Relevant Literature

Cournot competition has been a cornerstone of Microeconomic theory for the past century. In general, the number of firms indicate the level of competition in the market. An increase in firms leads to a decrease in price and increase in overall quantity (Maskin & Tirole, 1987). This, however, assumes symmetric costs. When costs are asymmetric, the lower cost firm is able to garner more of the market, and the higher cost firm produces less.

Lobbying has been modelled in terms of Cournot competition in a few different ways. Firstly, Wachsman and Zhou use game theory to analyze how firms should lobby in order to win a government contract. They find that the larger the contract, the more lobbying each firm will participate in. However, this paper does not determine effects on societal welfare-instead they focus on how firms lobby given an exogenous contract to bid for. Hillman et al (2001) look at Cournot competition where firms have a choice between lobbying and spending money to decrease cost. While most of the literature (including this paper) treat lobbying and cost synonymously, Hillman imposes a resource constraint on each firm. They can either lobby to increase protection and raise the market price, or spend to gain additional resources to produce more. They find that their results rely on the level of comparative advantage firms

hold in how they lobby. If a firm with high costs is relatively good at lobbying, they are able to reorder the profitability ratings of all firms in the industry. Again, this is partial equilibrium analysis that does not take into account how lobbying affects society past the particular industry.

There is a small area of the literature that investigates social welfare in a lobbying with Cournot model. Moore and Suranovic (1993) find that export subsidies do not definitively raise social welfare when lobbying costs are included when using a classic Brander/Spencer (1985) framework. This is because while the export subsidy allows domestic businesses to produce more (which is commonly thought to lower price and increase welfare), the lobbying could conceivably be used for more productive purposes. Krugman (1987) demonstrated this concept using political machinations as well. Using lobbying to create efficiency and improve welfare can easily be hijacked by special interests and be used to create rents and actually lead to additional inefficiency.

Peter Michaelis (1994) introduces reputational gains to explain firms lobbying for additional regulation-an empirical quirk. By allowing firms to vary their reputations, Michaelis finds that firms will face short term cost increases (as seen by regulation changes) in order to have long term product growth through increased reputation with consumers.

Protection in regards to lobbying and Cournot competition has been a large part of the field of research. Horst Raff (2001) finds that, contrary to popular belief, the least efficient foreign producers will lobby and be granted access to the domestic market. This is because the least efficient producers are more politically palatable to domestic markets, since they would be unable to take most of the market away from domestic producers. Low efficiency producers know this and are the only ones to lobby and gain entry. This result is also found by Grossman and Helpman (1995). William Brock and Stephen Magee (1978) add political economy to a lobbying model and find that lobbying benefits society through trickling down effects. For example, lobby leads to less competition, which leads to higher prices, which leads to higher profits, which are invested and raises wages. This creates a virtuous cycle. Still, this relies on all profits being invested and that the investments benefit everyone, which seems tenuous. This paper investigates protectionism by comparing free trade and autarky markets.

### **3. Model**

We investigate three types of lobbying, which we call subsidy lobbying, regulation lobbying, and protection lobbying. Each of these lobbying efforts will be defined below, as each one has a differing effect on the industry as well as social welfare.

#### *3.1 Subsidy Lobbying*

Subsidy Lobbying represents lobbying specifically to subsidize the industry. This type of lobbying is the industry demonstrating it requires additional help in staying in the market. This could be due to previous regulation or difficult market conditions. While this can be at the firm or industry level, this paper will only investigate industry level subsidies. This subsidy can be thought of as a decrease in marginal cost for each firm. This paper assumes

that the subsidy is uniform across firms in the industry.

### 3.2 Regulation Lobbying

Regulation lobbying represents lobbying specifically to repeal previous policy enacted on the industry. While similar to subsidy lobbying in that they both ultimately decrease cost, the main difference is that regulation lobbying as assumed in this paper creates negative externalities. For example, imagine an oil production plant that wishes to repeal environmental legislation. This would allow the plant to produce more and in turn pollute more. While this pollution has no price, it still affects consumers.

### 3.3 Protection Lobbying

Protection lobbying is lobbying specifically for protection from foreign firms entering the domestic market. While this can take many forms such as additional import taxes or quotas, what we care about is that the domestic firms have less competition. This will lead to a higher price than previously, as there is less competition in the market. This is exogenously imposed in the paper-firms lobby for protection and less firms are able to compete.

## 4 Results

Systematically, we will show results from imposing these three different lobbying restrictions. In general, all three assume Cournot competition with a duopoly of firms (without loss of generality) that are identical in cost structure and the product they produce. The inverse demand function given is  $P=a-bQ$ , where  $Q$  is total quantity and  $a$  and  $b$  are positive numbers.

### 4.1 Subsidy Lobbying

Firms are presented with a two-stage game. Firstly, they lobby the government for a subsidy. If the total lobbying from the industry is larger than an arbitrary  $L$  (where each firm contributes  $l$ ), they all receive a subsidy that will lower their marginal cost from  $c$  to  $d$  where  $c$  is a larger number than  $d$ . Otherwise they receive no subsidy. In the second stage, they compete with one another on quantity in the standard Cournot way. Using Sub Game Perfect Nash Equilibrium characterized by Reinhard Selten (1975), firms will solve optimal quantities to sell and then determine if it is worth the lobbying effort. Each firm's profit function is:

$$\pi_i = Pq_i - cq_i - t_i$$

and have first order conditions of:

$$\frac{\partial \pi_i}{\partial q_i} = a - 2bq_i - bq_j - c$$

Since firms are identical, we can impose symmetry such that both firms optimally produce a quantity of:

$$q_1 = \frac{a - c}{3b}$$

If the two firms are able to lobby past the subsidy point, then both firms optimally produce at:

$$q_1 = \frac{a - d}{3b}$$

Since  $d$  is smaller than  $c$ , this means the firm quantity produced when lobbying results in a subsidy is larger than without the subsidy. As such, the price given there is a subsidy is lower than without the subsidy since  $P=a-bQ$ .

In the first stage, firms decide if it is worth lobbying. Since the two firms are identical, they will both pay half of  $L$ . If what they pay in lobbying is less than the sum of the subsidy (or the decrease in cost), firms will decide not to lobby for the subsidy. However, this is a trivial case. The more interesting case is that firms find it worth it to lobby. In this case, the price decreases and the quantity increases.

If we assume a standard social welfare function, both decreasing price and increasing quantity increases consumer surplus. As such, a government subsidy benefits both industry and overall society. This paper does not investigate how the government is able to fund this subsidy, but this could be very important in regards to how much society benefits from the subsidy. If the subsidy is funded by cutting subsidies from other industries, the benefit to society is nulled from the loss of welfare from other goods. If the subsidy comes from a governmental surplus, then the subsidy fully benefits society with no ill effects. In this case, lobbying benefits society.

#### *4.2 Regulation Lobbying*

Regulation lobbying is similar to subsidy lobbying in what output the industry creates. Since both follow a framework of lobbying to a certain point and receiving a lower cost to produce, the optimal output they produce is identical. Instead of a subsidy lowering production cost, we can think of the change in cost related to having less regulation to deal with. For example, this could be an oil production plant that does not have to invest in air cleaning technology. This would allow them to lower the cost of oil from their plant.

As such, the results from subsidy lobbying hold here (without loss of generality). The price decreases while the quantity produced increases. As well, social welfare increases. However, there is one distinct difference between the two types of lobbying. Regulation lobbying incurs a negative externality that is not present in subsidy lobbying. A negative externality is an unintended consequence that negatively harms society. In the oil production example, this rollback of regulation leads to additional pollution that harms the population around the plant. If we assume the social welfare function finds these types of externalities harmful, then we should assume the welfare found from subsidy lobbying should be larger than regulation lobbying. As such, offering subsidies should be more palatable to society than repealing

regulation, even if both lead to the same price/quantity combination.

#### 4.3 Protection Lobbying

Protection lobbying decreases the amount of competition in a market internationally. By creating barriers to entry of a domestic market, less firms will be able to produce. Let us assume there are  $N$  number of total (domestic and foreign) firms that would like to produce in the domestic markets. After imposing these restrictions, we assume there is  $M$  domestic firms that remain where  $N$  is larger than  $M$ . Similar to the other models, firms contribute lobbying to the political body, and if the total lobbying is above  $L$  the protectionism policies go into effect. In this two-stage game, stage one allows all  $M$  domestic firms to choose lobby levels. Stage two allows all available firms ( $M$  if lobbying is successful or  $N$  otherwise) to compete on quantity. Each firm solves:

$$\pi_i = Pq_i - cq_i - l_i$$

and have first order conditions of:

$$\frac{\partial \pi}{\partial q_i} = a - 2bq_i - \sum_{j=1}^n b(n-1)q_j - c$$

Since all firms are identical by assumption, each firm's optimal quantity is:

$$q_i = \frac{a - c}{n + 1}$$

If the domestic firms are able to lobby successfully, each domestic firm optimal quantity is:

$$q_i = \frac{a - c}{m + 1}$$

Since  $N$  is larger than  $M$ , when the domestic firms are able to lobby to enact protectionism, the amount of quantity each firm produces increases. As such, the price under protection is higher than without protection. Following a standard social welfare function, the increase in price and decrease in quantity leads to society being worse off under protectionism. As such, protectionism measures in a fully formed industry harm societal well-being as opposed to the findings of Brock and Magee.

## 5. Conclusion

In conclusion, we find that most forms of lobbying actively harm (or at best remain neutral to) societal welfare. The exception is given the government is running a surplus and subsidizes the lobbying industry. In this case, the price decreases, quantity increases, and there are no overt externalities involved. While this paper has aimed to investigate and theoretically

model different versions of lobbying, there is still many avenues for future research. In this paper, once lobbying reaches an arbitrary plateau, the change is immediate and automatic. This can be extended by allowing a longer lag time between lobbying and results. As well, we could investigate a probability function of lobbying. That is, there is no binary lobbying plateau. Instead, more lobbying makes the change more likely, but at no point is it a sure thing.

In regards to public policy suggestions, this paper demonstrates that most types of lobbying contribute to social ills. However, if the government is running a surplus, subsidies benefit society. While determining which industry is deserving of a subsidy as opposed to others is beyond the scope of this paper, lobbying may serve as a signal of subsidy requirement. If firms are willing to decrease their own profits by spending money on lobbying, subsidies may be required. As such, lobbying could signal subsidy requirements.

While there is much to do in this field of research, lobbying seems to benefit the industry who is lobbying at the expense of the general populace. In most cases, the industry benefits from larger profits while social welfare falls. Without a governmental surplus to subsidize the industry, there is not a way for social welfare to increase under these assumptions.

## References

- Arrow, K. (1950). A Difficulty in the Concept of Social Welfare. *Journal of Political Economy*, 58(4), 328-346.
- Brander, J. A., & Spencer, B. (1985). Export subsidies and international market share rivalry. *Journal of International Economics*, 18, 83-100.
- Brock, W., & Magee, S. (1978). The Economics of Special Interest Politics: The Case of the Tariff. *The American Economic Review*, 68(2), 246-250.
- Cournot, A. (1897). *Recherches sur les Principes Mathématiques de la Théorie des Richesses*. Paris: 1838 English translation: (N. Bacon, trans.), *Researches into the Mathematical Principles of the Theory of Wealth*. New York: Macmillan & Company.
- Grossman, G., & Helpman, E. (1995). The Politics of Free-Trade Agreements. *The American Economic Review*, 85(4), 667-690.
- Hillman, A. L., Van Long, N., & Soubeyran, A. (2001). Protection, lobbying, and market structure. *Journal of International Economics*, 54(2), 383-409. [http://dx.doi.org/10.1016/0022-1996\(93\)90025-S](http://dx.doi.org/10.1016/0022-1996(93)90025-S)
- Krugman, P. (1987). Is free trade passé? *Journal of Economic Perspectives*, 1, 131-144.
- Maskin, E., & Tirole, J. (1987). A theory of dynamic oligopoly, III: Cournot competition. *European Economic Review*, 31(4), 947-968.
- Michaelis, P. (1994). Regulate Us, Please! On Strategic Lobbying in Cournot-Nash Oligopoly. *Journal of Institutional and Theoretical Economics*, 150(4), 693-709.
- Moore, M. O., & Suranovic, S. M. (1993). Lobbying and Cournot-Nash competition:



Implications for strategic trade policy. *Journal of International Economics*, 35(3-4), 367-376. [http://dx.doi.org/10.1016/0022-1996\(93\)90025-S](http://dx.doi.org/10.1016/0022-1996(93)90025-S)

OpenSecrets. (2016). *Lobbying Database*. Retrieved from <https://www.opensecrets.org/lobby/>.

Raff, H. (2001). Preferential Trade Liberalization under Cournot Competition. *Review of International Economics*, 9(3), 455-461. <http://dx.doi.org/10.1111/1467-9396.00292>

Selten, R. (1975). Reexamination of the perfectness concept for equilibrium points in extensive games. *International Journal of Game Theory*, 4(1), 25-55.

Wachsman, Y., & Zhou, J. (2013). A Model of Cournot Competition with Lobbying. *Journal of Business and Economic Research*, 11(6).

## **Appendix**

### **Social Welfare Function**

The social welfare function mentioned in this paper is of a general form, with some basic assumptions about its behaviour. The social welfare function is an increasing function that is mapped along all real numbers and has a resource constraint implying a local maximum exists. The function satisfies rationality and is an ordering of individual's welfare under different circumstances as originally described by Kenneth Arrow (1950).

### **Copyright Disclaimer**

Copyright for this article is retained by the author(s), with first publication rights granted to the journal. This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/3.0/>).