

The Political Economy of Crony-Capitalism and Dis-investment: A Dynamic Game-Theoretic Model

Rahul Sinha*

St. Xavier's University, Kolkata

Abstract

In this paper, we demonstrate the role of cronyism in the determination of production subsidy and privatization in a three-stage mixed oligopoly game-theoretic model. The incumbent political party exploits the public sector to reap the benefits from the donations provided by the private firms in exchange for concessions provided to them in the form of production subsidies. Unlike the benevolent public sector which maximizes social welfare, we assume that the incumbent political party maximizes its aggregate political payoff, which is the weighted average of expected payoff from winning the re-election bid and social welfare. We carry out a couple of comparative statics to analyse the effects of variation in political preference of the incumbent party, an increase in the magnitude of backlash and privatization. We obtained that conflict of interest arises between the incumbent political actor and the private firm while privatizing the public sector, the private sector gains from privatization at a cost to the welfare of the economy while the political party is the net loser. We make an additional comment that democracy incentivises cronyism and prevents the corporate-political nexus to cease.

JEL Classification: D43, D45, D72, I11, I18, L32

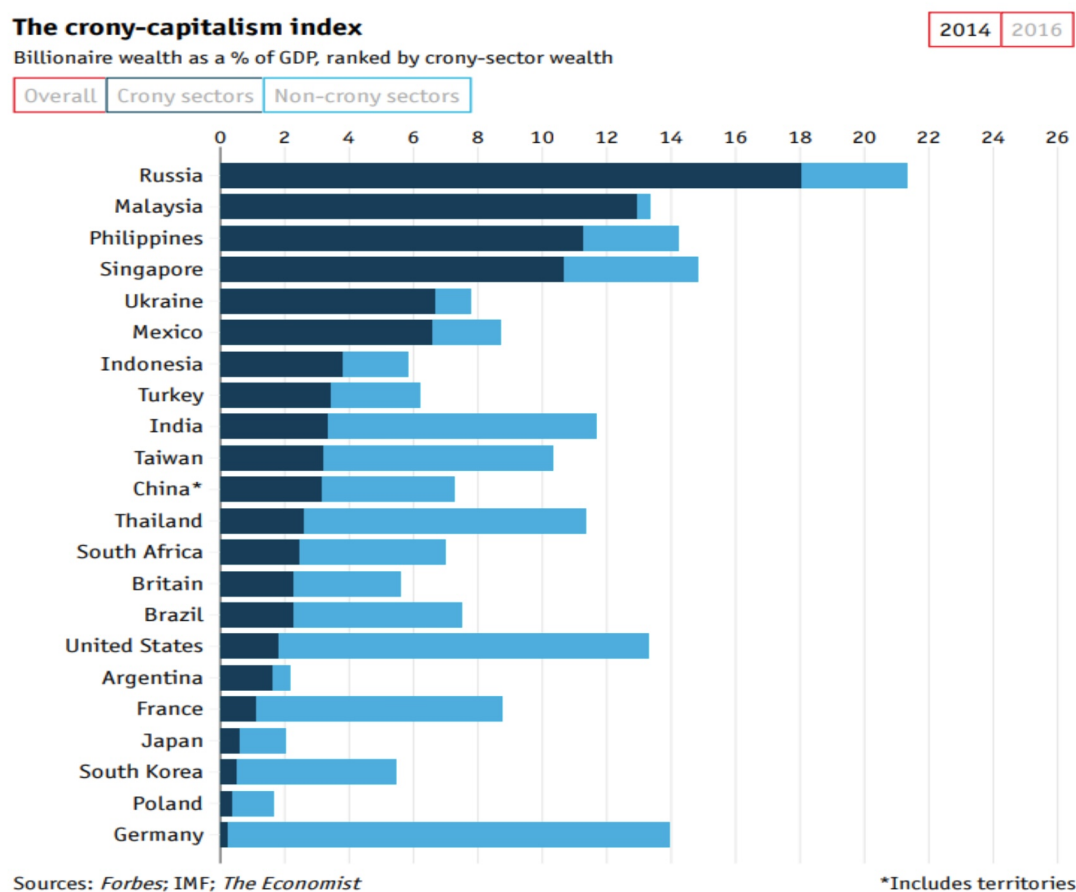
Keywords: COVID-19, Cronyism, Dis-investment, Political party, Vaccine, Healthcare, Lobbying.

*Corresponding author's email address: srahul.27501@gmail.com

1 Introduction

The phenomenon of favouritism, lobbying, and crony capitalism in India has been a key factor in shaping the private and the public sectors operating at this point of time. Crony capitalism is an economic set-up in which enterprises thrive as the return on money amassed through collusion between the influencers of the business and the political class. These manipulations lead to ease of obtaining permits, grants from the administrations, tax breaks, strategies with an aim of corporate welfare, favouritistic monetary policies and other concessions from the government. Earlier, India witnessed an incidence of favouritism in the telecom sector where certain companies were burdened with the cumulative amount of taxes whereas a specific corporate giant was favoured with strategic policies and was allowed to set low penetrative prices to capture a large proportion of the market.

Figure 1: The Crony-capitalism Index
Billionaire Wealth as a % of GDP



Source: Forbes, IMF, The Economist.

The Diagram portrays the Crony-capitalism index, which aims to indicate whether the livelihood of the people from a certain country or city with a capitalist economy is easily affected by Crony-capitalism or not.

Industries which are prone to monopoly, any form of over-powering collusion, require licensing and highly depend on the government which may be selected are considered for construction of this index. (For example: coal, timber, defence, deposit-taking banking and investment banking infrastructure, ports, airports, real estate and construction, steel and other metals, mining and commodities, utilities and telecom services.) Then, the total wealth of the world's billionaires who are vigorously involved in rent-heavy industries from the data of Forbes must be calculated. Results can be achieved from the ratio of billionaire wealth to Gross Domestic Product in their own countries, a higher ratio of billionaire wealth to GDP indicates a higher possibility of suffering from the incidence of Crony-capitalism. The aim of this paper is to capture the incidence of favouritism, lobbying, and crony capitalism in the healthcare sector of a developing nation.

We can relate this situation to the vaccine production market in India as well. There has been an evident multidimensional influence of the SARS-CoV-2 virus on several economies (both developed and developing nations), which has pushed India along with other countries into an unprecedented spiral. The global outbreak has also had a huge impact on the healthcare domain and disrupted the entire global supply chain of the industry. The pandemic has affected 150 million people and caused more than 3 lakh deaths across the world. The lack of healthcare infrastructure in developing and underdeveloped countries has acted as an instigator and made the impact of COVID-19 more effective. Shortages in oxygen concentrators, medical ventilators and most importantly anti-virus vaccines have been identified as some of the key issues which are required to be addressed urgently. As a large nation, India has a population of 996 million adults which states the requirement of 1932 million doses of vaccine. In order to meet this requirement within a year, India needs to manufacture at least 5 million vials of vaccines per day, whereas the combined production by Bharat Biotech and Serum Institute only adds up to 3.8 million vials of vaccines per day among which 15 per cent vials are moved aside as aid due to prior diplomatic commitments. These aforementioned figures are palpable.

World Health Organization suggests a 1:1000 doctor to patients' ratio and a 1:300 nurse to patients' ratio, while our nation could only manage to have a doctor for 1511 patients' and one nurse for 670 patients. As compared to the USA which has 3 hospital beds for 1000 people and China with 4 beds for 1000 people, India has only 1.4 beds available for 1000 people approximately. USA spends around 8 per cent and China spends 2 per cent of their GDP on the development of health-care, whereas India manages to spend a mere 1 per cent for expenditure on health. The figures explain the imperative need for funds which must be channelized towards public healthcare infrastructure and development.

The private healthcare sector in India caters to 70% of the healthcare demand. It was pretty evident, how the susceptibility of the Indian healthcare sector was exposed after COVID-19 bolstered the pursuit of universally affordable healthcare systems. The government spending on the healthcare sector had been quite appalling, with less than 5 per cent budgetary provisions over the previous decades. The privatization of the healthcare sector happened before 1991 with the tacit consent of the government of India itself. The private healthcare is not only trusted by the majority (due to ins and outs like corruption in public setups among

many other reasons) but the private sector also participates by contributing a distinguished amount of revenue to the government. With a predicted trend of disinvestments in the government sector enterprises and the announcement of upcoming fiscal policies to support corporate set-ups, the private healthcare sector is undoubtedly the future of the healthcare system in India. Even though the Union budget 2021 stated a 137% increase in the healthcare expenditure from 94,452 crores to 2,23,846 crores for the F.Y 2021-22. These additional allocations were mainly driven by expenditure on vaccination, Jal Jeevan Mission, grants for local bodies and grants for augmentation in the healthcare sector through the finance commission for water sanitation, hence, the vulnerable factors of the healthcare sector weren't addressed appropriately. Due to the closure of public vaccine manufacturing units over a decade ago, the government is bound to hinge on private entities like Bharat Biotech and Serum Institute. These institutes have been permitted to sell the vaccines in the open market and to charge differential prices, which is a key factor behind the instability in the vaccine market equilibrium. Due to government support and opaque pricing policies, these firms have been able to extract super-profits during these unprecedented times. Even when the government has legal powers to resolve this predicament, an absence of political willingness to do so has been observed.

Given all these, we refer to the aforementioned situations and attempt to provide an explicit political foundation to the existing theory of mixed oligopoly by demonstrating how public policies are systematically used to rig the private market at a cost to aggregate the welfare of the economy in ways that maximizes the politically connected actors in a democratic setup. We incorporate the atomistic behaviour of the incumbent political party and election arithmetic in the decision-making process for the choice of the optimal rate of subsidy under both mixed oligopolistic market structure and pure private oligopoly. Cronyism is captured in terms of the donations provided by the lobby of the private firms, in return for concessions obtained from the incumbent political party in terms of production subsidies. Unlike the existing studies that assume welfare-maximizing benevolent government, we assume that the incumbent political party that faces an election maximizes its aggregate payoff, which is a weighted average of its expected payoff from the re-election bid and the welfare of the economy. We make a two-fold comparison. First, for given values of the political variables, the results under mixed-oligopoly political equilibria and private oligopoly political equilibria are compared. Second, we compare the effect of variation in the political attitude of the incumbent party towards power away from the welfare of the economy and an increased magnitude of backlash, which weakens the tie of cronyism. In this model, we use a three-stage game to analyse the above scenario.

The results of the paper reflect a conflict of interest between the agents, viz., the political party, the private firms, the consumers, and the economy as a whole. For instance, we obtained that privatization improves the profits of the private sector while it lowers the equilibrium payoff to the incumbent political party. On the other hand, the amount of donations is high owing to the privatization of public firms. This concludes that if private firms enjoy the first mover advantage, then they can manage to improve their profit by donating more while the political party becomes the ultimate loser. The results of the paper are limited to a democratic setup in which the risk of losing office prevails. In other forms of

government, such as monarchy, autocracy etc. in which there exist no risk of losing power except for the backlash from the public protest which can be easily suppressed in such a setup. Interestingly, our paper demonstrates that democracy itself provides an incentive endogenously to the incumbent political party to indulge in cronyism even if the political party is the ultimate loser. To the best of our knowledge, no other theoretical analysis of mixed-oligopoly has taken this approach to incorporate the political dimension explicitly.

2 Review of Literature

The literature on mixed oligopoly has substantially analysed the determination of optimal subsidy assuming private firms maximize profit and public firm maximize welfare under both homogenous good simultaneous Cournot-Nash competition (White 1996; Theotoky 2001; Escrihuela-Villar and Gutiérrez-Hita 2018; Matsumura and Kanda 2005 etc.) and differentiated good Bertrand-price competition (Barcena-Ruiz 2007; Barcena-Ruiz and Sedano 2011 etc.). The commonality of these existing works includes the assumption that the government that owns the public-sector firm is a benevolent social welfare maximizer while choosing its production level and the rate of subsidy. However, in reality, we seldom find such a benevolent government in existence. With an exception to the above studies, White (2002) and Matsumura and Tomaru (2013) have considered the political biasedness in choice of subsidy and public firm's output by assuming that the public sector maximizes weighted welfare with politically biased weights assigned to consumer surplus, private profits and public profit. Although these studies have attempted to incorporate the role of politics in a mixed-oligopolistic structure, however, the political foundation of these studies do not explicitly incorporate the behaviour of the politician. No motivations are provided behind such politically biased weighted welfare function.

3 The Model

We consider an economy with ' N ' private firms and one public sector firm competing in a homogenous commodity market, respectively. There is a unit mass of homogenous consumers. The preference of the representative consumer is described by the following strictly concave utility function:

$$V(Q) = aQ - \frac{1}{2}Q^2 \quad ; V' > 0, V'' < 0 \quad (1)$$

where, $Q = q_G + \sum_{i=1}^N q_i$, and q_G, q_i are the amount of public good and each private commodity $i = \{1, 2, \dots, N\}$ consumed by the consumer, respectively facing the unit $P = V(Q) - P \left(q_G + \sum_{i=1}^N q_i \right)$ price. The representative consumer maximizes the net utility, which yields the following inverse demand function

$$P = a - q_G - \sum_{i=1}^N q_i \quad (2)$$

The firms have homogenous technologies which imply an identical increasing marginal cost, bq_i . We assume there are no fixed costs since we are not considering any entry decision of firms.

We here introduced the atomistic behaviour of the incumbent political party that faces an election. The incumbent political party offers some concession to the firms in the form of production subsidies (s) which reduces the firm's marginal cost of production. The lobby of the private firms, in return for concession obtained from the incumbent political party, donates an amount D to the political fund of the incumbent party. The party requires these funds to improve its chance of getting re-elected. In other words, the higher is the amount of D , the greater will be the probability (ρ) of getting re-elected.

The incumbent political party faces a backlash for unfair favouritism to the private firms in exchange for illegal donations by the private firms. This backlash is described by the function $\gamma\left(s \sum_{i=1}^N q_i\right)$, where, $\gamma'(\cdot) > 0$ which implies that the magnitude of backlash is strictly increasing in the amount of concession provided to the private firms. Thus, $\gamma(\cdot)$ captures the legal/public threat faced by the political party for its nexus with the private firms while in power. If the incumbent party gets re-elected, then it could suppress the backlash at least up to the next election. However, if it loses the re-election bid, then it has to face backlash.

The aggregate utility of the incumbent political party (U) is the weighted average of its expected payoff from the re-election bid and the welfare of the economy with weights α and $1 - \alpha$, respectively:

$$U = \alpha \left\{ \rho(D)\Omega - (1 - \rho(D))\gamma\left(s \sum_{i=1}^N q_i\right) \right\} + (1 - \alpha)W \quad (3)$$

The welfare of the economy (W) is given by the sum of consumer surplus (CS), producer surplus less the aggregate expenditure on subsidies ¹.

$$W = CS + \pi_G + \sum_{i=1}^N \pi_i - s \left(q_G + \sum_{i=1}^N q_i \right) \quad (4)$$

where, π_G and π_i are the profits of the public sector and the private sector firm, respectively.

Given the rate of concession (subsidy) the profits of the representative private firm and the public firm are given by the following:

$$\pi_i = q_i \left(a - q_G - \sum_{i=1}^N q_i \right) - \frac{1}{2}bq_i^2 + sq_i - D \quad (5)$$

$$\pi_G = q_G \left(a - q_G - \sum_{i=1}^N q_i \right) - \frac{1}{2}bq_G^2 + sq_G \quad (6)$$

¹In a vibrant democracy, failed policies or biased favouritism result in public outrage. Some examples include the ongoing farmer-protest in India against the incumbent National Democratic Alliance (NDA) government which resulted in complete overall defeat of the incumbent leading party of the NDA alliance in the local elections in the Punjab state of India, which is dominantly an agriculture-based state. The backlash can also be political where the new party in power throws legal cases on the former officeholders using government vigilant agencies and judiciary. The misuse of government machinery for such political vigilance is common in countries with weak legal and judiciary institutions

3.1 Mixed Oligopoly Political Equilibria

We consider the scenario of mixed oligopoly political equilibria in a three-stage game. The timing of the game is as follows.

Stage 1: the private firm chooses the amount of donation, ' D ' by maximizing its profit in equation (5).

Stage 2: the incumbent political party announces the rate of concession (subsidy) ' s ' which maximizes its payoff in equation (3).

Stage 3: the private firms and the public firm chooses the level of output which maximizes equation (5) and equation (3) simultaneously, respectively.

The model is solved using the backward induction method to obtain the subgame perfect Nash-equilibrium outcomes.

Maximizing equation (3) and (5) simultaneously and considering the symmetric private output, i.e., $q_i = q_j \forall i \neq j \in \{1, 2, \dots, N\}$ we obtain the following two reaction functions, respectively

$$q_G(b + 1) + Nq_i = a \quad (7)$$

$$q_G + (N + 1 + b)q_i = a + s \quad (8)$$

Solving equation (7) and (8) we obtain the third-stage Cournot equilibrium outputs

$$\left. \begin{aligned} q_G(s) &= \frac{a(b+1)-Ns}{b^2+(N+2)b+1} \\ q_i(s) &= \frac{ab+(b+1)s}{b^2+(N+2)b+1} \end{aligned} \right\} \quad (9)$$

We assume the following:

Assumption 1:

$$(i) N < \frac{a(b+1)}{s} \quad (ii) D < \frac{\{(a+s)b+s\}^2(b+2)}{2\{b^2+(N+2)b+1\}^2}$$

A sufficiently higher number of private firms (N) or sufficiently smaller market size (a) for a given level of ' s ' would make the public-sector firm unsustainable. Assumption 1(i) is also crucial for a positive level of the equilibrium price level. Assumption 1 (ii) is necessary for $\pi_i(s) > 0$. In other words, the nexus between the private sector and the political party in power will break down if assumption 1 (ii) is violated.

The level of output in equation (9) yields the following profit function for the public sector firm and the private firm, respectively

$$\pi_G(s) = \frac{\{a(b+1) - sN\} \{(a+2s)b^2 + ((N+4)s+a)b + 2s\}}{2 \{b^2 + (N+2)b + 1\}^2} \quad (10)$$

$$\pi_i(s, D) = \frac{\{(a+s)b + s\}^2(b+2)}{2 \{b^2 + (N+2)b + 1\}^2} - D \quad (11)$$

We now proceed to the second stage of the game. At this stage, the incumbent political party chooses the rate of concession (subsidy) provided to the firms to maximize its weighted utility in equation (3). Solving the first-order condition, we obtain the second-stage optimal value of the subsidy

$$s(D) = \frac{ab \left\{ \frac{(b+1)(1-\alpha)}{\{b^2+(N+2)b+1\}} - \alpha(1-\rho(D))\gamma'(\cdot) \right\}}{(b+1) \left\{ \frac{(1-\alpha)(N+b+1)}{b^2+(N+2)b+1} + 2\alpha(1-\rho(D))\gamma'(\cdot)(b+1) \right\}} \quad (12)$$

Assumption 2:

$$(i) \frac{(1-\alpha)(b+1)}{\alpha(1-\rho(D))\{b^2+(N+2)b+1\}} > \gamma'(\cdot) > 0 \quad (ii) \quad \rho'(D) > 0, \rho''(D) < 0$$

It has been mentioned that the magnitude of backlash is increasing in the total amount of concession provided to the private sector, however, assumption 2 (i) imposes the necessary restriction of the range of $\gamma'(\cdot)$ for which $s(D)$ will be necessarily positive. Assumption 2 (ii) is the second-order necessary condition for a private firm's profit maximization while choosing the amount of D in stage 1.

Substituting equation (12) in all the preceding equations, the profit of the private firm boils down to the following expression, termed as equation (11.1)

$$\pi_i(D) = \frac{\{(a+s(D))b + s(D)\}^2(b+2)}{2 \{b^2 + (N+2)b + 1\}^2} - D$$

Finally, in this stage, the private firm chooses the amount of donation ' D ' to maximize the equation (11.1). The first-stage optimal value of D solves the following

$$\frac{(b+2)(1-\alpha)\gamma'(\cdot)\rho'(\cdot)b(a+b+N+1)\{(a+s)b + s\}}{N \{b^2 + (N+2)b + 1\}^2 \{(N+b+1)b + 2\gamma'(\cdot)(1-\rho(\cdot))\}^2} = 1 \quad (13)$$

3.2 Private Oligopoly Political Equilibria

In this section, we consider the complete privatization of the public sector firms. This implies that the firm G chooses its output level by maximizing its profit in equation (6) simultaneously competing with other ' N ' private sector firms. The timing of the game

remains unchanged, however, in stage 1 all $(N + 1)$ private firms choose the amount of D unlike in the case of mixed-oligopoly in which the public sector firm had not to pay any donation and in stage 3 these $(N + 1)$ private firms maximize profit.

Using the backward induction method to solve the game, the third stage level of output and profit of each private firm is obtained as follows, respectively

$$q_i(s) = \frac{a + s}{2 + N + b} \quad \forall i \in \{1, 2, \dots, N + 1\} \quad (14)$$

$$\pi_i(s, D) = \frac{(a + s)^2(2 + b)}{2(2 + N + b)^2} - D \quad (15)$$

Assumption 3:

$$D < \frac{(a+s)^2(2+b)}{2(2+N+b)^2} \text{ for } \pi_i(s, D) > 0$$

The second-stage value of $s(D)$ is obtained by maximizing equation (3) solves the following:

$$\frac{(1 - \alpha)(N + 1)\{a - s(N + b + 1)\}}{(N + b + 2)} = \alpha(1 - \rho(D))\gamma'(\cdot)(a + 2s)(N + 1) \quad (16)$$

Finally, we obtain the first stage choice of D by maximizing equation (15) which leads to the following first-order condition.

$$\frac{d\pi_i}{dD} = \frac{(2 + b)(a + s)}{(N + b + 2)^2} \frac{\partial s(D)}{\partial D} - 1 = 0 \quad (17)$$

4 Comparative Statics and Numerical Results

In this section, we construct a numerical example to illustrate the effect of change in the attitude of the incumbent political party towards retaining power and compare the results of mixed-oligopolistic structure and privatization. A shift of attitude of the political party towards electoral payoff is captured by an increase in the value of α .

We define $\gamma = ks \sum_{i=1}^N q_i$ (or, $\gamma = ks \sum_{i=1}^{N+1} q_i$) for mixed (or, private) oligopolistic competition, respectively and $\rho = D/(D + 1)$ such that assumptions 1-3 are satisfied. For the given parametric values of $a = 50, N = 2, b = 1$ and $k = 1$ we obtain the following numerical results for all other variables when the value of α is increased from 0.3 to 0.5 under both mixed and private oligopoly. The arrows within the parentheses indicate the direction of change of the endogenized variables against change in the value of α for a given structure of the oligopoly (mixed or pure private).

Proposition 1: An increase in α leads to (i) decrease in equilibrium output of each private firm, q_i (ii) an increase in equilibrium output of the public sector firm, q_G (iii) fall in per-unit subsidy, s (iv) fall (rise) in the level of donation, D under mixed (private) oligopoly (v) fall (rise) in profit level of both private and public firm in a mixed (private) oligopoly (vi) a fall

Table 1: Comparative results under mixed and private oligopoly against variation in the value of α

Variables	$\alpha = 0.3$		$\alpha = 0.5$	
	Mixed Oligopoly	Private Oligopoly	Mixed Oligopoly	Private Oligopoly
q_i	10.7649	12.2298	8.6922(↓)	12.084(↓)
q_G	14.2351	–	16.3077(↑)	–
S	7.2948	11.490	1.0767(↓)	10.4239(↓)
D	2.3879	27.6687	2.3299(↓)	41.6587(↑)
π_i	171.4378	609.4089	111.0025(↓)	615.5318(↑)
π_G	205.1605	–	150.5302(↓)	–
U	655.9297	468.1498	482.2825(↓)	450.1432(↓)
W	926.7033	854.0559	903.8420(↓)	811.4895(↓)

Source: Author's calculations.

in the weighted utility of the incumbent political party and (vii) a fall in the welfare of the economy.

A higher concern for political power (higher α) in the objective of the incumbent government induces the political party to lower the rate of corporate subsidy. This is because there exists a political risk of losing the election which imposes the cost of backlash on the political party by the legal authorities in proportion to the amount of concession provided to the private firms in form of subsidy. To reduce the expected risk of backlash the incumbent political party lowers the amount of concession provided to the private firms by lowering the rate of subsidy. Given that private firms enjoy a first-mover advantage in terms of choice of the amount of donation, thus firms would reduce the donation to the political party to maximize its profit in stage 1. This produces a counterproductive outcome for the political party in terms of a fall in the level of its aggregate weighted utility, U (proposition 1 (vi)). This is because, on one hand, the level of donation falls which lowers its utility from the re-election bid. On the other hand, the aggregate welfare of the economy declines.

Corollary 1: An increase in α raises the equilibrium profit level of the private firm in a pure private oligopoly while it lowers private profit in a mixed oligopoly.

We define the nature of oligopoly by superscript ' M ' for mixed oligopoly and ' P ' for pure-private oligopoly.

Proposition 2: For any given level of α , (i) $s^M < s^P$ (ii) $D^M < D^P$ (iii) $\pi^M < \pi^P$ (iv) $U^M > U^P$ and (v) $W^M > W^P$.

Proposition 2 leads to an interesting result of a conflict of interest between the incumbent political party and the private sector firms. Privatization benefits the private firms (proposition 2-iii) while it deteriorates the aggregate weighted utility of the incumbent political party (proposition 2-iv). The welfare of the economy worsens owing to privatization. The logic behind this can be explained as follows. With the privatization of the public firm, the

Table 2: Comparative Results Under Mixed Oligopoly Against Variation in the Value of k

Variables	Mixed Oligopoly	
	$k = 0.5$	$k = 1$
q_i	9.5393	10.7649(↑)
q_G	15.4607	14.2351(↓)
S	3.6179	7.2948(↑)
D	0.4284	2.3879(↑)
π_i	172.7619	171.4378(↓)
U	696.4978	655.9297(↓)
W	992.4981	926.7033(↓)

Source: Author's calculations.

competition in the private sector increases for a share of the market power which led to a larger amount of donation to the political party to avail the concession of production subsidy, thus donation increases. The profit of each private firm improves because in the former case of mixed oligopoly market power was relatively low owing to the choice of output in the public sector by maximizing the weighted average of political payoff and social welfare, however, in the case of pure private oligopoly the market power of private improves given that the former public firm now maximizes its profit. The level of output corresponding to the weighted average of political payoff and welfare maximization in a mixed oligopoly is higher than the level of output corresponding to profit maximization in a private oligopoly. Proposition 1 and proposition 2 also proves that when optimal subsidies are used in a mixed oligopoly or pure private oligopoly in presence of political equilibrium neither outputs nor profits of the private sector and the public sector are equalized which is a direct departure from the existing theoretical results of the mixed oligopoly with the comparable underlying structure of the firms.

We now consider the effect of an increase in the intensity of backlash in terms of an increase in k for the following given values of the parameters: $\alpha = 0.3$, $a = 50$, $N = 2$ and $b = 1$.

Proposition 3: An increase in k leads to (i) an increase in the amount of donation by the private sector to the political party (ii) an increase in the rate of subsidy (iii) an increase in profits of the private firm (iv) a fall in the utility of the incumbent political party and (v) deterioration of welfare of the economy.

This implies that with a stronger vigilance on the incumbent political party, the private firm gains in terms of higher profits and enjoying a higher rate of concession (production subsidy) in exchange for a higher amount of donations, at the cost to the welfare of the economy (proposition-v) while the political party in power also loses.

5 Conclusion

While several facets of mixed oligopoly models have been analysed in the scholarship, there exists no theoretical analysis which considers the role of an atomistic political agent which becomes relevant for the determination of various policy variables. In this paper, we attempt to fill the gap in the mixed oligopolistic models by explicitly accounting for electoral arithmetic in the determination of the equilibrium rate of subsidy and the decision of privatization in a democracy.

We explore the mixed-oligopolistic political equilibria in terms of the nexus that persist between the private sectors competing simultaneously and the incumbent party, which may be explained by the situation where a specific private vaccine manufacturer may form a nexus with the incumbent political party. The private sector firms provide donations to the party in power in exchange for concession obtained from the latter in terms of production subsidy. The problem is described using a three-stage game theoretic model and solved using backward induction. We carried out comparative statics to analyse the effect of an increase in preference of the incumbent government towards power in terms of larger weight to re-election bid and lesser weight to aggregate social welfare and the effect of an increase in the magnitude of backlash facing the political party if it loses the re-election bid. We obtained that the private sector firm gains in terms of higher profit owing to privatization of the public sector firm, while the incumbent political party loses. Interestingly, the incumbent political party loses at equilibrium and lowers the rate of subsidy, however, the private firms continue to provide a higher amount of donation to the political party.

References

- [1] Bárcena-Ruiz, J. C. (2007). Endogenous timing in a mixed duopoly: price competition. *Journal of Economics* 91(3), 263–272.
- [2] Danzon, P. M. and N. Sousa Pereira (2011). Vaccine supply: effects of regulation and competition. *International Journal of the Economics of Business* 18(2), 239–271.
- [3] Deo, S. and C. J. Corbett (2009). Cournot competition under yield uncertainty: The case of the us influenza vaccine market. *Manufacturing & Service Operations Management* 11(4), 563–576.
- [4] Fjell, K. and J. S. Heywood (2004). Mixed oligopoly, subsidization and the order of firm's moves: the relevance of privatization. *Economics Letters* 83(3), 411–416.
- [5] Matsumura, T. and O. Kanda (2005). Mixed oligopoly at free entry markets. *Journal of Economics* 84(1), 27–48.
- [6] Poyago-Theotoky, J. et al. (2001). Mixed oligopoly, subsidization and the order of firms' moves: an irrelevance result. *Economics Bulletin* 12(3), 1–5.
- [7] Tomaru, Y. et al. (2006). Mixed oligopoly, partial privatization and subsidization. *Economics Bulletin* 12(5), 1–6.
- [8] White, M. D. (1996). Mixed oligopoly, privatization and subsidization. *Economics letters* 53(2), 189–195.