Do political donations buy reputation in an elite gift-exchange game?

Cameron K Murray *

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Abstract

One way to view the entrenchment of favoured elites in political processes is as a repeated gift-exchange game in which reputations sustain beneficial favour exchanges at the expense of others. Within such a game, pragmatists seeking political favours will optimally invest in costly signals, such as gifts or political donations, to improve their reputation and maximise their political returns to that reputation. This view may have merit if simulations of a reputation-signalling gift-exchange game generate patterns of donations that closely match the empirical record. This paper presents agent-based simulations of such a game amongst a heterogeneous population. The aggregate simulated outcomes show clustering of signalling strategies consistent with patterns of political donations in the UK, Germany and Australia, and also suggests a process by which entrenchment of interests occurs through exclusive access to a ‘social ladder’.

Keywords: Political donations, Lobbying, Signals, Reputation

1 Pragmatism to entrenchment

What are political donations for? While it seems intuitive that political donations are a payment for political favours, or legalised bribery, many scholars have argued against this view (Stratmann, 1991; Ayres & Bulow, 1998; Clawson *et al.*, 1998; Ansolabehere *et al.*, 2003). One reason is that the size of the donations is far too small to justify a direct economic exchange by the political actor with the donor. In light of this, a prevailing view says that there are two types of money in politics. First is ideological money, where donations are made to political actors based on long term ideological alignment of the donor and specific political actors or parties, regardless of any direct future benefits. The second type of money is pragmatic, which is “interested money”, and arises from profit-motivated business decisions. This type of money in politics is often given to more than one political party depending on the political cycle (McMenamin, 2011). Yet even within this view there remains uncertainty as to how pragmatic money leads to political favours if it is not a direct economic exchange. Other puzzles include the question of why ideological money exists in politics if it genuinely reaps no future benefits, and how pragmatically motivated individuals or organisations choose to split their money amongst competing political parties (McMenamin, 2012). For example, donations by labour unions are usually exclusively given to the Labor party in Australia. Is this ideological, because the party is aligned with the

*Henry Halloran Trust, The University of Sydney. Email: c.murray@sydney.edu.au

unions in terms of beliefs? Or is it pragmatic because the party is likely to push for new laws that provide economic benefits to union members and others in similar positions?

In this paper I offer a more micro-level view that seeks to pry into some of these uncertainties by showing how pragmatic donations can indirectly buy political favours through their effect on individual reputations. At a general level, this view frames political donations as signals of an agent’s reputation. These signals help coordinate over the long term a “network of obligation” within which an implicit gift-exchange game is played; an idea that stems from Clawson *et al.* (1998) where donating “makes you a player”, or identifies you as a participant. Without excluding the possibility of selfless ideological donors, this view more narrowly sees all political donors as pragmatic, whether they donate exclusively to one political party or many, with the choice of how to donate being determined by the donor’s current reputation level with each political party.

Reputations in this view operate as a coordination device by allowing political parties to identify who is most likely to cooperate in the gift-exchange game, and reward them by creating policy that allocates economic rents in proportion to their reputation. Reputations here are similar to the idea of social distance, which Leeson (2008) showed can be a coordinating mechanism to support indirect trade amongst a diverse population of heterogeneous agents.¹ The role of reputations in coordinating gift-exchange is also supported by the results of Engelmann & Fischbacher (2009), who found that the helping rate in a repeated donation game was proportional to an individual’s public reputation score.

Establishing a reputation requires the use of signals. Like joining the mafia, it is not sufficient to use ‘cheap talk’ promises to earn reputation. Signals must be both individually costly and have gift-like benefits for the recipient (perhaps a political party). Donations are one clear example, but others include token company appointments for politicians and their families, public declarations of support, or the sponsoring of party or government events. Since there is no obvious boundary for the way in which reputation can be signalled, many subtle signals are likely to be valuable in this game, such as attending exclusive private schools, buying membership of exclusive clubs, owning a home in the ‘right’ suburbs, driving the ‘right’ car, or even dressing the ‘right’ way. These subtle signals enhance credibility for individuals by providing a desirable image of their social status, but they also provide additional reputation information that reduces the risk of offering gifts to someone who is not part of the game. This idea was fundamental to Goffman (1959), who explained that

...many carriers (or ‘sign-vehicles’) become available for conveying this information. If unacquainted with the individual, observers can glean clues from his conduct and appearance which allow them to apply their previous experience with individuals roughly similar to the one before them, or important, to apply untested stereotypes to him. They can also assume from past experience that only individuals of a particular

¹Providing common knowledge in multi-player cooperative games through information mechanisms such as reputation is a common tool in the analysis of collection action, falling under a variety of names depending on the specific application, including *tags* (Masuda & Ohtsuki, 2007), *reputation* (Akerlof, 1980; Engelmann & Fischbacher, 2009; Ohtsuki & Iwasa, 2004; Bolton *et al.*, 2005), *image-scoring* (Nowak & Sigmund, 1998; Milinski *et al.*, 2001; Bshary & Grutter, 2006), *types* (Ones & Putterman, 2007; Ambrus & Pathak, 2011), *trust* (Luhman, 2000; Mui, 2002), *peer pressure* (Barron & Gjerde, 1997), *signals* (Lotem *et al.*, 2003; Huttegger *et al.*, 2014), *networks* (Granovetter, 1978), *social capital* (Fukuyama, 1999; Jackson *et al.*, 2012) or *social approval* (Gächter & Fehr, 1999).² These mechanisms provide both material costs and solidary incentives to maintain cooperation within a group, as cooperation improves reputation, which in turn facilitates lower cost future cooperation amongst the same group above other groups (Wilson, 1974; Leeson, 2008). Most reputation signalling mechanisms contain the idea of an ‘information threshold’ for cooperation, below which non-cooperative outcomes occur; a characteristic that is crucial in political cooperation where elites ensure that most of the population is excluded from the game.

kind will be found in a social setting.

The way any given signal is interpreted depends on the current reputation of an agent. Goffman (1959) notes that “[t]he security they justifiably feel in making inferences about the individual will vary, of course, depending on such factors as the amount of information they already possess about him...” Hence in this new view of donations as reputations-signals in a gift-exchange game, the effect of a donation signal on buying additional reputation will depend on the current level of reputation. If a low-reputation agent donates to a political party, where members of the party possess no other information about that person to verify the signal, it may have no effect at all, or even create suspicion about their intentions.

In terms of economic efficiency, while many signals involve diverting resources from productive activities, such as professional lobbying, costly luncheons and industry conferences, many are mostly economic transfers that do not reduce overall output. Donations are pure transfers, while other more subtle reputation signals, such as attending exclusive private schools, are not totally unproductive. The main economic cost in this view arises from the long run social entrenchment of high-reputation individuals with the major political parties, which greatly constrains the scope of policy-making to include only policy that benefits the high-reputation private-sector agents who support the party. Because such entrenchment is a core feature of this view, it adds to debates around Olson’s (1982) idea of *institutional sclerosis*, whereby special interest groups incur great economic cost on the community as they reallocate wealth towards themselves, along with the more general idea of stagnation in stable economies (Coates *et al.* , 2007; Horgos & Zimmermann, 2009). Because reputation is a coordinating device for participation in a gift-exchange game, there is no need for political power to be captured by small interest groups who are able to select membership to a group public good, and it may be captured by a wide array of arbitrary interests who simply had a head-start in terms of their political reputations, and who are now entrenched in the political system.

The remainder of this paper develops this view of donations as reputation-buying signals in a gift-exchange game. First, it is shown that such a game rests on long-term cooperation. It is not individually rational in the short-term and is hence prone to defection. This provides the rationale for the use of signals to identify those willing to cooperate in the game, instead of those seeking to take a short-term gains only by receiving gift without reciprocating. Then, I show how the link between signals, reputations, and payoffs from political allocations of rent can be conceptualised as an optimisation problem for any individual, where this optimal decision depends on the current reputation level of each individual. I also introduce a limit to the gift-exchange game from the monitoring and enforcement of rules on political discretion which limit the ability to favour family and friends. Because the optimal signalling decision depends on the current reputation of an individual, in order to show that this view leads to patterns of signals that match the empirical record, I use an agent-based simulation technique which determines the optimal signals of a population of agents with heterogeneous reputation levels.³ This allows me to then look at the effect of distribution of reputations on the expected patterns of donations and the resulting equality and efficiency outcomes. To complete the exposition, I look at whether the alignment of interests political donation signals in the gift-exchange game are visible in the domain of corporate directorships, which are another signal of participation and a way to exchange favours between private and political interests.

³Agent-based models are becoming more popular in political science, as they allow for the types of complex patterns we see in the data to emerge based on simple rules of interacting agents, and additionally allow for temporal changes in these patterns to be observed (Laver & Sergenti, 2011; Janssen & Ostrom, 2006; Kollman *et al.* , 2006; de Marchi & Page, 2014; Wallick, 2012).

The results of this exposition contrast with the prevailing view in a number of ways. First, donors who are loyal to one party have usually been seen as ideological. Yet they may in fact be pragmatic, but because they have a limited reputation with the opposing party so that any attempt to signal to that other party cannot be interpreted. Intuitively this makes sense. To use a mafia analogy, a potential new member cannot simply show up with a bag of cash and be taken seriously. They need to be vouched for to establish their current reputation. Second, many individuals who are playing the game with high reputations have an interest in concealing their reputation in order to gain favours, rather than signalling it. This is the logical response to the existence of any monitoring and enforcement of rules that limit the ability to provide political favours given to closely related individuals. Third, many individuals and organisations will be excluded from entry to the game because they lack sufficient reputation for any signals they provide to be interpreted. This result is consistent with the idea that money in politics buys access, and that without exclusion, this access is not valuable. Lastly, this view generates a process whereby reputations for those in the game are able to continually increase, creating a more polarised society in terms of those who have access to political power by playing the gift-exchange game, and those who do not.

2 Related literature

Various strands of the literature are related to the view presented here; first in terms of the way in which political parties are seen to operate, and hence the role of political donations, and second, in terms of the exclusivity of political access and the entrenchment of elites.

Katz & Mair (1995) classify the changing models of political parties as elite, mass, catch-all, or cartel, the last of which is newly introduced as one that is “characterized by the interpenetration of party and state, and also by a pattern of inter-party collusion.” While certainly the view of parties acting as cartels provides tangible insights, including the way there is often tacit agreement between parties on the boundaries of political debate, Enyedi (2014) argues that the view is limited in that the “the bifurcation of party systems into pragmatic and centrist cartel parties” cannot easily be reconciled. The view here is related to these ideas but is more general in terms of arguing that all types of political parties (or organisations generally) are subject to the use of reputation signals in order to establish a gift-exchange game, regardless of the size of the group participating. Also, inter-party collusion in this view necessarily requires the existence of a group of individuals with high reputations in both parties, which force the parties to cooperate when it is in the interests of these individuals and organisations.

In terms of the role of political donations, the view here is consistent with that of Franz (2008), who offers a number of hypothesis about contributions to Political Action Committees (PACs). For example, his “ideological distance hypothesis” predicts that those who are currently ideologically far from the median of the formed government are more likely to donate in order to help their preferred candidate win an election. Those close to the ideological median will instead donate to safe-seat incumbents. In addition, his “partisan hypothesis” stems from the idea that interest groups face risks in donating exclusively to one political party, leading to the prediction that partisan donations will only arise at extreme ideological points. Together these hypotheses are similar to the view presented here if ideology is instead considered to be reputation—those with high (more extreme) reputations with one political party are more likely to donate exclusively to that party, and those with high reputations to both parties will donate to both parties, being uninterested in helping any specific candidate win elections.

Much of the hypothesising about the role of political donations has arisen from the surprising

regularities of the pattern of hedging and partisan donations, whereby donations are given exclusively to one party or split at specific ratios (such as 50:50) between two main parties. Harrigan (2008) and McMenamin (2012) find such patterns of political donations in Australia, Canada and Germany. Figure 1 shows the frequency distributions of donation splits between dominant political parties in each jurisdiction, with distinctive peaks at a 50:50 splits at the federal and state level in Australia and Canada, no donation splitting in UK, and a cluster at a 65:35 split in Germany.⁴ These clusters of splitting donors are typically classified as pragmatic, and they are typically the largest donors, as shown by the donation-weighted plots in Figure 1, being on average seven times larger than single party donors in Australia and representing 61% of the value of donations made.

Figure 1: Discrete probability density function of donor frequency (by party share of donation and weighted for donation size)

Moreover, McMenamin (2008) finds evidence of *ship jumping*, or shifting donation biases, in Australian political donations data close to elections as a response to polling. He finds that political donors “direct more money to the party that is ahead in the polls, increasing the bias as an election approaches.” This clustering and bias-shifting behaviour can be reconciled through the lens of reputation signals. A temporary power gain to the elected party attracts more donations from partisan donors who could not justify it based on previous expectations of only low future political power.

Such logic is also consistent with findings on the loyalty of lobbyists, who capitalise on their

⁴Figure 1 uses data from McMenamin (2012) for Germany and Canada, UK Electoral Commission data as at July 2014 for the UK, and Australian Electoral Commission data as at July 2014 for Australian and its states.

high reputations with specific parties. Koger & Victor (2009) for example, use a large network dataset of US lobbyists and their relationships to Congress members, candidates, and political action committees to find strong patterns of overlapping service committees and voting blocs, concluding that

...lobbyists tend to concentrate their attention on political allies, avoid their ideological adversaries, and infrequently lobby fence-sitters, suggesting that they are not buying votes or persuading legislators on a case-by-case basis. More importantly, lobbyists appear to systematically switch issues as the politicians they were previously connected to switch committee assignments, hence following people they know rather than sticking to issues.

If lobbyists are selling access to their reputation with certain politicians, essentially vouching for the client as a mafia member would vouch for a cooperative intent of a new recruit by risking their own reputation, the empirical findings of loyalty are as expected. Indeed, so are the findings of entrenchment and exclusive political access, whereby certain interest groups are excluded from political favours despite their internal cohesion. Bihagen *et al.* (2013) shows that not only have class divisions, in terms of access to elite business positions, increased over recent decades in Sweden, but education as a tool for reducing equality is becoming less beneficial over time. Entrenched elites arise as a product of evolving social structures, limiting access to advantageous positions, and hence reducing payoffs to education for those in less beneficial parts of the social network. Shughart II *et al.* (2003) estimate a long-term inverse relationship between the Gini coefficient and interest group dominance in US states, suggesting that even with many interest groups involved in politics, the interests of broad swathes of the community remain excluded from political access.

A dominant theoretical view of elite entrenchment is that of Olson (1965), who viewed groups as a coordinative mechanism for self-interested individuals seeking access to non-excludable payoffs from collective action. In this view, the cost of collective action, C , is constant for each group member, while the value from a public good to a group member, V_i , shrinks in proportion to group size, meaning that as groups get larger there is less chance for individuals to gain positive profits, ($\pi_i = V_i - C$), through costly participation in collective action. Olson (1982) develops this group logic to an underlying cause of stagnation and social rigidity in politically stable environments via the accumulation of small special-interest groups, or distributional coalitions, which devote resources to protecting their financial interests at the expense of others.

While highly influential, this view has been challenged in relation to the necessary assumptions about the necessity for selective incentives to sustain larger groups, even if their interests are aligned (Wilson, 1974; Hardin, 1982; Udéhn, 1993; Cheikbossian, 2012). To be clear, selective incentives are only loosely defined by Olson as vaguely involving coercion or power to enforce group membership and cooperation, yet are the hook upon which all explanations for coordination in large groups hang. As Udéhn (1993) explains, if any selective incentive, s_i , is allowed to explain coordination in large groups, it becomes an unlimited reservoir of *ad hoc* explanations which ensure that $\pi_i = V_i - C + s_i > 0$ in any instance of large organisation.⁵ Indeed if selective incentives are available, why would groups bother investing in public goods at all and not simply ensure their public goods are limited to identifiable members of the “club”?

Even if Olson’s collective action logic is not robust, this does not automatically invalidate the empirically informed arguments for stagnation in stable economies (Coates *et al.*, 2007; Horgos

⁵Similar *ad hoc* explanations occur widely in explaining cooperation, for example the entertainment value term, E in Tullock (1971)

& Zimmermann, 2009). Indeed, a broad range of mechanisms of social organisation may be consistent with the sclerosis and stagnation view, and this paper puts forward one view that relies on the idea of individual reputations as selective incentives in repeated games; allowing for a sorting mechanism that ensures cooperative individuals are rewarded for group participation, and one that is consistent with empirical regularities in the patterns of political donations.

3 Model

3.1 Cooperative game

The underlying rationale of a gift-exchange game can be presented simply by assuming that political parties prefer costly signals and that the political system distributes economic gains as a kind of ‘payoff machine’ in proportion to an agent’s reputation with the political party currently in a position to allocate gifts. Such political gifts can come in the form of industry protection policy, favourable contracting with government agencies, land rezoning, and other monopoly protections. I first demonstrate the implicit cooperation required for an ongoing exchange of favours to be robust to potential defection. Defection in this situation arises when, following the provision of gifts to a political party by an individual, the party then refuses to provide policy favours to that individual it is now implicitly indebted to, or vice-versa.

Table 1 conceptualises the type of payoff structure available to agents and political parties in an implicit gift exchange game, where agents and parties have a repeated choice to cooperate or defect. Agents prefer political allocations of rent, b , which is given by cooperating political parties. Political parties prefer beneficial public signals (such as donations) that come at cost, c , to cooperating agents. An agent’s reputation effects are included in parentheses and represent a change in the stock, r , of political party-specific reputation.

In a one-shot game there is no unique Nash equilibrium. However, in a repeated setting a strategy of conditional cooperation, or win-stay, lose-switch (where losing involves a payoff of zero or less) renders mutual cooperation evolutionarily stable.⁶ In essence, the existence of a gift-exchange game between political parties and donors requires a high degree of cooperation in a long-term repeated game, demonstrating the necessity of reputation levels for identifying cooperators and avoid defectors. In this game, c is the cost of a signal type, s . Signal types capture the range of ways in which individual and firms can provide direct benefits to political parties, such as through donations or other means earlier discussed.

This game captures the general idea of cooperation as a repeated choice by political parties and donors. Such cooperative choices are rarely simultaneous, and we often see that gifts are exchanged with rather long lags, such as when appointing former politicians to company boards years after previous gifts were given. Because of this it may be easier to think of these payoffs as an expectation, with attached risks, and that one function of reputations is to minimise risk. It also captures the idea that the interests of particular agents and political parties may not appear aligned on the surface, but because they both participate in a gift-exchange game, their interests become aligned because providing gifts to each other sustains their mutual advantage. In terms of the relationship with the empirical record, as long as cooperative strategies are reasonably

⁶Mutual cooperation leads to ‘stay’ in the win-stay, lose-switch strategy, hence the stability of this outcome. Mutual defection leads to both players switching to mutual cooperation. Defection by the agent and cooperation by the political party leads to the political party defecting next period, creating mutual defection. The agent cooperating and political party defecting leads the agent to switch to defecting next period creating mutual defection. Even where the lose criteria is shifted from zero to strictly negative, mutual cooperation remains a ‘stay’ for any agents who start by chance at that point.

Table 1: Payoff (reputation) structure for implicit political cooperation game

		Political party	
		C	D
Agent	C	$b - c, c$ (e)	$-c, c$ (d)
	D	$b, 0$ (d)	$0, 0$ (0)

C is cooperate, D is defect.

Game payoffs are $0 < c < b$.

Reputation effects are change in reputation level r , where $0 < d < e$.

widespread in the population, the predicted behaviour should closely match data on political signals such as donations and revolving door appointments. It does not matter what proportion of the population are playing a cooperative strategy as only the cooperative strategy is observable in the data.

The main element of interest in this game is how signalling is optimised when the payoff b is the politically allocated rent, c is the cost of a signal, and the size of both depends on the current reputation level, r . These relationships open up an array of cooperative outcomes for agents with different reputation levels, some of which may have zero or negative payoffs. This means that not all people will be able to gain by attempting to cooperate on $\{C, C\}$ because their reputation level is insufficient to generate a positive profit, $b - c$.

3.2 Reputation mechanism

The reputation level performs two functions in the model. First, it determines the size of the rents allocated to each agent, i , by a political party, j , in a given time period. The underlying assumption is that economic rents are allocated by political parties on the basis of reputations, rather than any objective criteria, such as productive merit. Second, the reputation level provides a way for interpreting signals, and hence determines the relationship between the quantity of signals and the reputation gains which lead to payoffs, b .

It is first worth discussing the general concept the reputation variable is capturing. Primarily it is a selective incentive that allows cooperation to be sustained between those with sufficient reputation, and to exclude those with insufficient reputation. A simple way to understand reputation in terms of relationships networks is as a generalisation of the network distance between two individuals. Figure 2 shows how a relationship network can be mapped into a simple single variable measure of social distance, which is a reasonable proxy for the idea of reputation if each network edge is uniform in terms of trust between agents. In a single component network there is hence a minimum and maximum distance to any other node, and hence a closed range of social distance or reputation. It is also likely that well-crafted surveys could alternatively enable empirical validation of an agent's reputation level, based on the elicited expectations of reciprocation of political gifts.

Incorporating the second function of reputation level (as a means to interpret signals) into the model is achieved by allowing reputation levels, r , for agent i , with political party (or politician) j , to evolve over time as follows

Figure 2: Generalisation of relative social space from network

$$r_{i,j,t} = \gamma r_{i,j,t-1} (1 + \sum_s \alpha_{s,i,t} s_{i,j,t}^\beta) \quad (1)$$

where $r_{i,j,t-1}$ is the last period reputation level between agent i and political party j , which decays in the absence of new signals by $0 < \gamma \leq 1$, capturing the idea that if you don't use your reputation to engage in the game, you begin to lose it. Reputation gains in a period, $e_{i,j,t} = r_{i,j,t} - r_{i,j,t-1}$, arise from the total signalling effort in a period, where $s_{i,j,t}$ is the size of a signal type from i to j , $\alpha_{s,i,t}$ is a weighting factor for each signal type capturing the relative effect of different signals, such as donations or sponsoring events, and β captures the diminishing returns to each signal, since in the absence of diminishing returns only the single most efficient signal will be used. This setup captures the incentive to use a wide variety of signals to gain reputation, rather than rely on a single signal type. Equation 1 also describes a process of cumulative advantage via reputation signals, since additional reputation allows for better interpretation of signals, and hence the same gains for fewer or smaller signals. The unit costs of a signal type is assumed to be constant, which simplifies signal type costs to $c_{s,i,j,t} = s_{i,j,t}$.

3.3 Use of political power

Political parties are assumed to allocate the economic surplus based on reputation levels, relying on pre-existing institutional power of political parties to merely allocate away from a large surplus pool to their cooperative partners. The cooperative payoff b , for agent i cooperating with political party j , is therefore a function of their reputation at the time, $r_{i,j,t}$. For each j political party, their power to allocated economic rents, $\kappa_{j,t}$, reflects their relative power in the party system and hence their ability to increase the payoff to cooperative partners in the long run. This weighting parameter depends on the political environment and each party's relative ability to change policy. In a very even two-party system like Australia, the weighting of the two major political parties will be roughly equal. Whereas in Germany, for example, the political power of the Social Democrat Party of Germany (SDP) is lower than the combined power of the Christian Democrat Union (CDU) and its sister party the Christian Social Union (CSU), and hence the political power of the CDU/CSU alliance will be significantly larger than for the SDP.

Additionally, legal and institutional constraints can affect the relationship between reputation and the political gift of economic rents. At a practical level, political influence, $I_{i,j,t}$ need not be proportional to the reputation level $r_{i,j,t}$. Under a regime of political monitoring, whereby political allocations of rent to close acquaintances (e.g. nepotism and cronyism) are either strictly illegal, electorally costly to the political party or politician involved because of transparency requirements, or result in some other cost due to community expectations, the practical political

influence will not be strictly monotonic in reputation, r . Because of monitoring of close acquaintances there will be a peak in the functional relationship of political influence and the ability for gifts to be reciprocated, $I_{i,j,t}$, and reputation level, $r_{i,j,t}$, as shown in Figure 3. Here m is the degree of monitoring and determines how far from the maximum $r_{i,j,t}$ the peak of $I_{i,j,t}$ is.⁷ This implies that to gain political payoffs from the gift-exchange game it may be necessary for high-reputation close acquaintances to distance themselves from specific politicians or political parties.

Figure 3: Typical relationship between reputation and political payoff

In terms of the gift-exchange game, the payoff to an agent's political cooperation, b , is the change in influence during that period, scaled by their ability to capture economic rents, ω , and by the political party's relative power $\kappa_{j,t}$, or $b = \omega_{i,t} \kappa_{j,t} \Delta I_{i,j,t}$. The $\omega_{i,t}$ scaling factor accounts for the differential ability of firms and individuals to capture economic rents due to their 'skin in the game'. A large landowner with a high reputation might find it easy to gain rents due to rezoning and public investment decisions, but a high reputation acquaintance with no business or asset market interests might be unable to gain such valuable favours despite their identical reputation.

3.4 Agent optimisation problem

Agents cooperating in the gift-exchange game are best off if they choose to buy signals to maximise their expected profit, π , or $b - c$, over a period. This choice can be modelled by the optimisation problem in Equation 2, which is subject to the constraints outlined above in terms of i) the relationship of signal costs and signal size, ii) the relationship between the expected gift-exchange payoff, b , and reputation level, signal size, monitoring, political power, and 'skin in the game', and iii) the relationship between the change in reputation level and the current reputation and signal size.⁸

$$\max_{s_t} \pi_{i,t} = \sum_{j=1}^n b_{i,j,t} - c_{i,j,t} \quad (2)$$

⁷The qualitative model results hold for a variety of functional forms. This curve is of the form $I_{i,j,t} = r_{i,j,t}^\tau - m r_{i,j,t}^\varphi$, where $\tau = 0.5$ and $\varphi = 5$ over the reputation range $\{0, 11\}$, and is the function used in later simulations.

⁸A summary of all the variables and parameters is in Table A.1 of the Appendix.

$$\begin{aligned}
\text{subject to } c_{i,j,t} &= f(s_{i,j,t}) \\
b_{i,j,t} &= f(r_{i,j,t}, s_{i,j,t}, m, \kappa_{j,t}, \omega_{i,t}) \\
e_{i,j,t} &= f(r_{i,j,t}, s_{i,j,t})
\end{aligned}$$

The per period solution to this profit-maximising problem of an agent cooperating in the gift-exchange game arises when the marginal benefit of a signal equals its marginal cost for each signal type s , and each j th political party, or formally, when

$$\frac{\partial b_{i,j,t}}{\partial s_{i,j,t}} = \frac{\partial c_{i,j,t}}{\partial s_{i,j,t}} \quad \forall i, j, s. \quad (3)$$

In the simple case of one signal type, that of donations, where signal size corresponds ($c_{s,i,j,t} = s_{i,j,t}$), then this solution occurs when $\frac{\partial b_{i,j,t}}{\partial s_{i,j,t}} = 1$. For this simplifying case, Figure 4 shows the typical qualitative result for an agent's optimal signal size across reputation levels.

Figure 4: Optimal solution for one signal type across reputation levels

This solution contains a number of elements suggesting a close correspondence between the model and key characteristics of political favouritism. First are the two shaded reputation ranges where optimal signalling is negative. On the left is the low reputation range, a *disengagement range*, where agents have insufficient current reputation for any positive signals to be reliably interpreted as an intention to cooperate. That is, $b - c$ is negative for any signal. The vast bulk of the population is likely to reside in this range, and hence the model suggests that these individuals will be unable to participate in a repeated gift-exchange game of this nature. Because of this, over time the model will show an entrenchment of elites and a rise in inequality due to political access of the few over the many.

The shaded negative signal range near the maximum reputation is the *concealment range*, where the gains to signalling for already high reputation individuals are negative due to monitoring of political favours to close acquaintances, and potential punishment for giving favours. Instead

of signalling, it pays for these agents to reduce their known reputations by way of negative signals, or concealment efforts such as by sheltering business connections through trusts and shelf companies. Such concealment efforts may have a large economic cost as they divert resources away from productive activities.

A third feature of this optimal signalling relationship is the effect of ‘skin in the game’. In the dashed line in Figure 4 the ω parameter is proportional to the reputation level, so that higher reputation agents have more assets, or ability to be granted favours, as would typically be expected. The effect of this is to first extend the *disengagement range* further up the reputation level when ω is low, but also to shrink the *concealment range* and increase signals for individuals with higher ω at higher reputation levels.

3.5 Simulating agents in a reputation space

The above optimisation problem generates a *basin of attraction* towards each political party for agents whose current reputation lies within the positive signal range. For those agents, if they choose to participate in the cooperative gift-exchange game, they will ultimately increase their reputation through repeated signalling towards the attractor point at the high end of the range; a point where signals remain necessary only where the decay parameter $\gamma < 1$. In a two-party system an agent’s reputation level for each party leads their total signalling effort, though variation between these two reputations can lead to combinations of signals or concealment effect.

Figure 5 shows the regions in a two political party, $(r_{i,j1}, r_{i,j2})$, reputation space that contains all possible joint signalling outcomes. Above each blue line, which represents the reputation attractor point for each political party, is the ‘concealment range’ for each of the two reputation levels, where optimal concealment reduces reputations towards the attractor. Below the dashed line is the ‘no signal range’, indicating an insufficient reputation to engage in the cooperative equilibrium of the signalling game. The blue dot represents a third attractor point for agents who find themselves in the signalling range of both parties, where it is optimal to ‘hedge’ their signals, leading them from any starting point in the hedging space to the attractor point.

The relative position of this third attractor point, the hedging equilibrium, depends on the relative power of each political party. Where the relative power is roughly equal, this point will result in signals being equally split near that point. Where one party has more power, the hedging equilibrium will shift towards that more powerful party, with signal sizes to the two parties at the equilibrium point being proportional to their relative power.

Where three or more stable established parties exist, there will be additional hedging regions representing each two-party combination, and all three parties, with the shared signal size in any of these hedging regions proportional to the relative power of each party. The resulting aggregate patterns of observable signals are the result of the distribution of the agents in the political economy of these reputation spaces.

To show the aggregate patterns of signalling emerging from this type of game I simulate a simple version of the model for a two-party system⁹ for a population of individuals in a reputation space using two distributions of agents.¹⁰ Two different distributions of 2,000 agents are used for the initial period of the simulation; first, a uniform distribution across the full range of the

⁹ $\gamma = 0.8, \alpha_s = 1, \beta = 1, \tau = 0.5, \phi = 5, m = 6 \times 10^{-6}, \omega_{\forall i} = 0.5, \kappa_{\forall j} = 1$

¹⁰Unlike typical agent-based simulations I do not consider the roll of feedback in the system as agents react to the changing conditions of peers in their environment. This model merely focusses on the one-way attraction to stable political power structures, capturing the idea of *institutional sclerosis*, and not the evolutionary dynamics that allow the structure of power to evolve over time.

Figure 5: Regions arising in two-party reputation space

two-party reputation space, and second, a power law distribution, which is typically a more common pattern arising in other agent-based interactions in networks that might be operating alongside the particular gift-exchanges captured in this model (Page, 2012).¹¹ I also use two relative weights to the political parties to show the impact to the hedging region, with a equal weighting, $\kappa_{j1,j2} = 1$, reflecting very even powers of political parties in systems such as Australia and Canada, and an unbalanced weighting, $\kappa_{j1} = 1$ and $\kappa_{j2} = 2$, representing a relatively more powerful $j2$ party.

Signal patterns for each agent in the first simulation time period are in Figure 6, which closely correspond to the political donations data. Of note is that hedging signallers use larger or more costly signals on average, as the weighted frequency distributions show higher peaks near the even split between parties, and lower peaks at the partisan ends of the distribution. In the unbalanced political power setup, hedging signallers shift the balance of signals towards the more powerful party, reflecting the case of the CDU/CSU alliance in Germany. In this model the ratio of hedging signals at any point in time arises a direct result of the relative power of the political parties. This offers a story consistent with the results of McMenamin (2008) in that when relative power shifts prior to elections, political donations shares for hedging donors shift toward predicted election winners.

In a repeated setting, agents optimising their signalling are able to build reputations towards the attractor points in the reputation space. Figure 7 plots reputations over time of a sample of the 2,000 agents in the simulation as they make use of optimal signals, capturing the idea of

¹¹Pareto distribution is $r_{i,j}^{-0.2} : 0.1 < r_{i,j} < 11$ in the range $\{0,11\}$.

Figure 6: Frequency of $j2/(j1 + j2)$ signal ratio in one period of a two-party simulation

an exclusive ‘social ladder’ that can be climbed in this type of game for agents with sufficiently high starting reputation, to the exclusion of others. A full suite of intermediate summaries in the repeated simulation are in Figure A.1 of the Appendix. Over time convergence towards the three attractor points creates clusters of highly reputable and favoured agents quite separate from the many agents who are perpetually excluded from the game. The model therefore captures a process of entrenchment of elites in the political system over long periods of time.

4 Insights and applications

4.1 Concealment trade-off

Most relevant to anti-corruption public policy is the insight arising from this view that observable signals, such as political donations and lobbying, are not monotonically related to successful political favouritism. Indeed, for a large part of the positive signalling range of reputation space, higher reputations and greater political favours are related to smaller, or fewer, signals. Large political donors in this model are likely to be new to the game, such those who came from abroad and are now looking to play the political game from a relatively low reputation starting point.¹²

Thus the model points to political favouritism being a dominated over time by those close to the reputation space attractors who either i) need only minor signals to sustain their reputation,

¹²For example, Huang Changran is a wealthy Chinese property developer who arrived in Australia in 2011. With his large ‘skin in the game’ and lack of strong relationships he quickly became the largest political donor in New South Wales (Welch & Noyce, 2015).

Figure 7: Sample of agent's simulated optimal 'social ladders'

or ii) need only put in a minor concealment effort to distance oneself to escape monitoring and policing of political favours.

To better demonstrate the pattern of concealment predicted by the reputation signalling view, Figure 8 shows that under a power-law distribution of agents there is an expectation of a group of agents close to the third hedging attractor engaging in a great deal of hedged concealment. However, if reputations are more uniformly distributed, that group will be much smaller than the groups concealing reputations to only one political party.

Figure 8: Optimal concealment effort ratios from $\kappa_{j1,j2} = 1$ simulation

4.2 Distribution of power and monitoring

One assumption of the reputation-signalling model presented here is that the degree of relative power of a political party affects the potential size of the payoff from the gift-exchange game. It is therefore of interest how the size and scope of political signalling changes as political power is

shared amongst more political parties, where each one is more limited in their ability to allocate economic rents based on reputation levels. The left panel of Figure 9 shows the model results for optimal signalling across reputation levels where political power is diluted amongst one, two or three parties, holding all other parameters constant.

Figure 9: Optimal signals for combinations of relative political power, κ_j

Notice that as the power of each political party to allocate economic rents declines, the range of reputations that find it advantageous to engage in the cooperative signalling equilibrium narrows. Not only that, but the optimal signalling activity for agents in that range also declines. These results suggest that the more widely political power is shared, the less signalling activity devoted to reputation-building occurs at any reputation level. Whether this results in lower total signalling in aggregate will depend on the complete set of reputations all agents, though the general model prediction is that more dispersed power structures reduce the degree of participation in the signalling game. This result is in keeping with the view of McMenamin (2012), whereby a many-party system can see a “combination of consensual political institutions and constrained parties”, leading to a low risk of major policy change, and lower interest in either ideological or pragmatic donations.

To expand on the role of monitoring by authorities on political gifts to close acquaintances, the right panel of Figure 9 shows the effect on optimal signal size across reputation space in the two-party baseline where monitoring is increased or decreased (which is captured in the model by an increase or decrease in the m parameter). Greater monitoring leads to lower signalling for those in the positive signalling range, but greater concealment by those at high reputation levels who now must avoid greater scrutiny of gifts given. It also decreases the reputation level that maximises political influence, creating less signalling but more concealment. For policymakers, this means that policies to improve transparency of decisions which were previously used to allocate gifts will lead to greater investments by those in the gift-exchange game in concealing their reputation and relationships.

4.3 Equality and efficiency

One advantage of using an agent-based simulation of the gift-exchange game is to demonstrate the potential complexity of the relationship between equality and efficiency arising from the game. The aggregate equality and efficiency outcomes depend first on the economic cost of signals in terms of resources able to be used productively, and second, on the distribution of reputations in

the population. If all agents are near the attractor points in the reputation space, the distribution of political favours will be roughly equal, resulting in a roughly equal distribution of wealth as a result of the game. If signals required to sustain reputations are economic transfers, where resources are not diverted from more productive uses, the efficiency loss will be zero. Outside of these extremes a great deal of complexity arises.

Figure 10: Simulated total signal and concealment costs over time

Recall that the political allocation of economic rents accruing to each individual is proportional to their reputation with a party, and that party's political power. We can thus use an agent's reputation with each political party, weighted by political power, as a proxy for their individual wealth at each point in time in the model simulation. The left panel of Figure 10 shows the change in the wealth Gini coefficient of the agent population over time for the simulated baseline, with both power-law and uniformly distributed initial reputations for all agents (with a normalised starting point), and additionally with 'skin in the game', ω_i , proportional to reputation. The range of Gini coefficient paths demonstrates that increasing inequality is not a fundamental feature of the game, but is a product of the distribution of agent reputations. While in this case the power-law distribution resulted in increasing equality, as measured by the Gini coefficient, the ratio of the top 1% of wealth to the bottom 20% still increased from 32 to 36 over the 20-period simulation. Thus the net distributional effect across the whole population of agents is highly dependent on the distribution of reputations.

In terms of efficiency, while many signals involve diverting resources from productive activities, such as professional lobbying, costly luncheons and industry conferences, many are mostly transfers. Donations are pure economic transfers, while other more subtle reputation signals, such as attending exclusive private schools, or owning a home in the 'right' suburbs, are not clearly unproductive. People need to be schooled and housed even in the non-cooperative part of the game. There may also be additional 'growth costs' from the game if political allocations of economic rent constrain investment and innovation in order to protect the interest of the cooperative counterparts.

What can be shown using this model is that because signalling efforts transform the social space, they may generate a reputation distribution that can result in total signalling effort either increasing or decreasing over time. The right panel of Figure 10 shows the total size of positive signals over the simulated population under various conditions. In the two scenarios where 'skin in the game', ω_i , is fixed, signalling effort first increases before decreasing, and the signalling agents moves towards the attractor points in the reputation space where optimal signals trend towards zero. There is thus no general rule of thumb arising about the expected trends in the size of total

signalling efforts across the population. Any efficiency loss arises from the use of signal types that divert resources from more productive uses, and where a larger share of the population has reputations within the positive signal range but further from the attractor points. The aggregate economic costs of the gift-exchange game described here is therefore highly dependent the types of signals used and the distribution of agent reputations.

5 Signalling across domains

It is worth thinking about how the entrenched elites predicted by this model show clustering around the reputation attractor points in signalling domains apart from political donations. Alexander (2003) finds evidence that over the period 1976-1996 the cross-directorship network of Australian listed companies has become significantly more interconnected and clustered, suggesting that this is another possible domain in which entrenchment of elites occurs. To see whether the clustering patterns in Australian political donations data corresponds to the clustering patterns in this domain, I use the cross-directorship network of the 2,159 companies on the Australian Stock Exchange (ASX) in June 2013, of which 117 are also political donors, and 28 directors are donors in their own names. Figure 11 shows the large component of this network, highlighting the location of hedging donors (yellow), Liberal donors (dark blue) and Labor donors (red), with the size of the company node corresponding to betweenness centrality, a measure of how well-connected one's own connections are to each other,¹³ in the network.

Figure 11: Large component of ASX cross-directorship network in 2013

¹³Betweenness centrality for a node i in a connected graph is given by $\sum_{s,t \in v \wedge s \neq i \wedge t \neq i} \frac{n_{s,t}^i}{n_{s,t}}$ where $n_{s,t}$ is the number of shortest paths from s to t and $n_{s,t}^i$ is the number of shortest paths from s to t passing through i .

Table 2: ASX cross-directorship network characteristics of donor groups

	Hedgers	Labor	Liberal
Total donors	61	15	41
Within-group share of connections	0.47	0.31	0.34
Mean in-group graph distance	5.7	10.4	8.1
Out-group share of connections	0.40	0.39	0.38
Mean out-group graph distance	7.4	7.5	7.3
Share direct connections	0.43	0.00	0.05

From Table 2 we see that the hedging donors in the network are tightly connected within their own group, with 47% of firms being connected to each other by an average distance of 5.7 edges, and 43% being connected by a single edge. Labor donors are less connected amongst themselves (average distance 10.4, and no direct connections), with Liberal donors showing similar characteristics. The extensive clustering of hedging donors in the cross-directorship network offers some support for the idea that cross-directorship is an additional reputation signal that sustains cooperation within a gift-exchange game, and hence a domain in which the entrenchment of the same elites appears to occur.

6 Discussion and conclusions

The reputation-signalling gift-exchange game presented here offers an alternative micro-level view of the function of political donations, based on the following key assumptions:

1. Reputations are a coordination mechanism that helps to identify other participants in a gift-exchange game.
2. Political allocations of economic rents occur in proportion to reputations to each political party, scaled by each party's power, and augmented by monitoring and policing of favours.
3. Agents are distributed in the reputation space and optimise their use of available signals to increase their reputation level and maximise expected profits from the gift-exchange game.

From these underlying assumptions a number of key relationships arise. First, there is a finite reputation range that allows for positive signals to be interpreted. This means that many individuals will be excluded from the cooperative gift-exchange game and be unable to gain reputation and political favour. Exclusivity of elites is a commonly observed phenomena, even in democracies, and is a key element of Olson's sclerosis. The model here captures this idea through the *disengagement range*, which is a low-end reputation cut-off for participation in the cooperative game, and the entrenchment over time of agents in the positive signalling region who incrementally gain reputation as the game is repeated. Figure 7 visualises this process.

Another outcome of this view is that increasing the monitoring of political favours, through transparency policies for example, can lead to increased efforts by high-reputation agents to distance themselves (by hiding their reputation from the public) from political parties in order to be able to benefit from political gifts. In this model, an increase in monitoring will decrease positive signals, but this will come at a cost of increased concealment efforts. Moreover, the main empirical prediction is that political favours will not necessarily be well correlated with positive signals, such as political donations. Exactly this result was found in Murray & Frijters (2016), where centrality in relationship networks was used as a proxy for reputations (in line with the

network concept of reputation in Section 3.2) in a model that predicted political favouritism. In that study political donation coefficients were positive, but not significant, while the coefficients of reputation proxies were all positive, large, and significant.

In terms of observable signalling patterns between political parties, this view suggests that hedging is only a viable option for individuals who have a reputation level in the positive range for two or more political parties. Moreover, the ratio of signals between parties in this hedging region is the direct result of the relative political power of the parties. This contrasts with the view that many single-party donors are merely ideological, and opens up the possibility that most donors are using their money pragmatically.

Signalling behaviour in this model arises as a response to power. This contrasts with a widely held view that small well-connected groups can act in their collective interest more easily, and hence the signals used to coordinate such groups are what leads to the group becoming powerful. While this may be true as a general observation, the model here deals with the case of a stable power structure and the entrenchment of elites within that structure over time. Certainly there is scope for signals amongst the individuals unable to participate in this political signalling game (i.e. those with low reputations to current political parties) to use signals to coordinate their own groups and pool resources in order to tackle the political power structure through the creation of new political parties and election campaigns. The model here is consistent with this idea, with the additional implication that because of the distribution of current reputations amongst the population, new political parties are likely to arise from groups of disaffected individuals, rather than from current political elites.

Reframing political favouritism in terms of a cooperation game supported by reputations also suggests a reexamination of how of anti-rent-seeking, or anti-corruption, policy is assessed. Consider the argument of Ayres & Bulow (1998) that mandating donor anonymity would disrupt the market for political influence, since donations signal an individual's reputation. If we believe that signalling reputations through donations is only required for less connected firms, then restraints on donations will result in the market for political influence constricting to a smaller, but more reputable group, but also the use of alternative reputation signals.

It is also not clear whether caps on lobbying decrease the cost of rent-seeking in terms of signalling activity (Che & Gale, 1998; Kaplan & Wettstein, 2006; Pastine & Pastine, 2010). If professional lobbying is merely one way to signal reputation by being vouched for by someone with a higher reputation, capping or outlawing it would result in similar narrowing of field of influence to the current high reputation individuals only. Given the reliance on the reputation mechanism, regulating the way signaller's identities are concealed or revealed is likely to be disruptive to the coordination of political favours. For high reputation individuals revealing identities to the public, through disclosure of corporate records may reduce their influence, but for low reputation individuals, such disclosure could provide another means of signalling their reputation.

A related anti-corruption policy is the requirement of regular staff rotation in sensitive areas such as auditing. Such policies have been the subject of experimental study (Abbink, 2004), and were found to be successful in reducing bribery. In the language of this model a rotation policy would mean that staff are in positions of power only temporarily, greatly diminishing their individual share of power in the long term. The result that reduced power greatly reduced positive signals would mean that this policy should be expected to reduce signalling and participation in the gift-exchange game. However, it must be remembered that if the rotated staff have already high reputations with those they are regulating or supervising this will not be effective. Democracy itself is a kind of political party rotation policy, yet the long run power of political parties, even

when in opposition, ensures that reputation-building signals are optimal even in a many-party system.

The view of donations as a means to signal reputation in a gift-exchange game clearly has limitations in terms of empirical testing, particularly in the measurement of reputations, the quantification of gifts, and the interpretation of the wide array of activities that could be signals. These are certainly avenues for future research. However this view does closely match the empirical data on donation pattern, and offers a new direction in understanding the micro-level mechanics of donations and political favouritism and the likelihood of different policies to curtail it.

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Appendix

Table A.1: Variable and parameter description for political signal model

Variable	Description	Relationship
$b_{i,j,t}$	Economic rent given to individual i from political party j	$f(r_{i,j,t}, m, \omega)$
$r_{i,j,t}$	Reputation level between individual i and political party j	$f(r_{i,t-1}, s_{i,j,t})$
$s_{i,j,t}$	Signal size between individual i and political party j	Choice
$c_{s,i,t}$	Total cost of a signal type, s , for individual i at time t	$f(s_{i,j,t})$
$e_{i,j,t}$	Marginal reputation level gains from cooperative signals	$\Delta r_{i,j,t}$
m	'Strength of monitoring' for all political parties	$m \propto \text{strength}$
β_s	Parameter for diminishing returns to a signal type s	$0 < \beta \leq 1$
$\alpha_{s,t}$	Relative strength of signal type s	$\sum_{s=1}^n \alpha_{s,i,t} = 1$
γ	Decay factor for reputation $r_{i,j,t}$	$0 < \gamma \leq 1$
ω_i	'Skin in the game' for individual i	$\omega_i > 0$
$\kappa_{j,t}$	Relative power of political party j	$0 < \kappa_{j,t}$

Variables and parameters with subscript t represent values at a particular time period only.

Figure A.1: Simulated evolution of signalling and reputations