Electoral Risk and Vote Buying, Introducing Prospect Theory in the Experimental Study of Clientelism

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Abstract

Most traditional theories of clientelism assert that parties in need of securing electoral support invest in vote buying. We consider this framework is limited because it assumes that losses and gains affect party's decision-making process in a comparable way, and because it assumes that the decision-making process of clientelist political parties focuses only on absolute levels of utilities while overlooking changes in outcomes respect to a reference point. We hypothesize that parties are risk averse in the domain of gains and risk-seeking in the domain of losses—i.e., losing an election hurts more than winning an election pleases. Unlike traditional theories of clientelism, we argue that vote-buying is most likely when parties are probable winners or have experienced important losses in the past. After formalizing a theory of vote buying and vote selling, we tested it in the lab by designing an economic experiment. Exploiting these novel experimental data, we show that prospect theory bridges important yet unexplained gaps in the literature.

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I. Parties With a Gambling Problem: Vote Buying as a Risky Yet Persistent Strategy

Vote buying is a very risky strategy.[1] First, it is illegal.[2] Buying votes requires extra care to avoid both reputational, electoral and legal costs. For instance, due to stigma associated with vote buying, clientelist political parties might risk electoral support from the wealthy (Weitz-Shapiro 2012) or from society in general (González-Ocantos, Kiewiet de Jonge, and Nickerson 2014). Second, vote choices are secret, thus preventing parties from effective monitoring and enforcing (Nichter 2008). Even in developing contexts such as Africa (Wantchekon 2003; Vicente 2014), the Philippines (Hicken, Leider, et al. 2018) and Latin America (Hidalgo and Nichter 2015; Oliveros 2019; Murillo, Oliveros, and Zarazaga 2021), voters might accept the private benefit but then secretly vote for another party (Stokes 2005; Nichter 2008; Szwarcberg 2013; González-Ocantos, Kiewiet de Jonge, and Nickerson 2014; Vicente 2014), making the risks taken by the clientelist party worthless.[3]

If clientelism is risky (Szwarcberg 2013, p. 43), expensive (Zarazaga 2014, p. 35) and uncertain (Rueda 2017), *How do political parties allocate scarce resources efficiently?* In this paper we address two related but more specific questions about strategic vote-buying related to the role of political contestation and sunk costs. First, *How risk-tolerant are parties when facing contested elections?* Second, *Do clientelist political parties consider "yesterday's" spending levels when buying votes "today"?* These are important questions as they speak about a party's decision-making process under risk. Unfortunately we find that the literature provides conflicting or inconclusive answers to these questions. This paper posits that these gaps in the literature originate in a wrong understanding about the party's decision-making processes under risk.[4]

Traditional theories of clientelism assert that parties in need of securing electoral support invest in vote buying regardless of the sunk costs associated with vote-buying. In other words, past research argues that clientelism is more likely when parties are probable electoral losers, while ignoring prior spending levels on vote-buying. We consider this framework is limited in a number of ways. First, it assumes that losses and gains affect party's decision-making process in a comparable way—i.e.,

[1] Vote buying is defined as the distribution of rewards during elections in contingent exchange for vote choices (Nichter 2014, p. 316).

[2] Bahamonde (2020) explains that in the United States vote buying was illegal as early as the 1700s.

[3] In fact, since clientelism may also work even with low levels of enforcement and monitoring (Hicken and Nathan 2020), investments in clientelism are always done in contexts of very high risk.

[4] For the purposes of this paper, we focus exclusively on quantitative research. Just to name a few important qualitative contributions, see Scott (1972), Auyero (2000) and Szwarcberg (2013).

winning elections feels good as losing one hurts. Second, it assumes that the decision-making process of clientelist political parties focuses only on absolute levels of utilities while overlooking changes in outcomes respect to a reference point.

By introducing prospect theory in the study of clientelism, our argument is twofold. First, clientelist political parties buy more votes when they are probable winners because decision-makers in the domain of gains usually underweight or "play down" the probability of electoral success, making risky strategies such as vote-buying more attractive (risk-aversion). Second, clientelist political parties buy more votes when their levels of sunk costs are high because decision-makers in the domain of losses usually overweight or "exaggerate" the probabilities of electoral losses, making risky strategies such as vote-buying more attractive (risk-seeking). Thus, in several respects we stand opposite to traditional explanations of vote-buying that argue that vote-buying should be higher when parties are probable losers. However, in other respects our findings complement with past research, but for different reasons: incumbents not only have more resources to spend but feel the need to "gamble" increasingly more clientelist resources to "break even."

explain this in theory sect.

Building on traditional theories of clientelism, in this paper we formalize a basic theory of vote buying and vote selling, and then we tested it in the lab by designing an economic experiment. The voting experiment was carefully designed to capture different domains of gains/losses as well as varying reference points. Exploiting these novel experimental data, we show that prospect theory (Kahneman and Tversky 1979) sheds light on several inconsistencies present in the literature. As the statistical analyses suggest, because of risk-aversion in the domain of gains and risk-seeking in the domain of losses, experimental subjects adopt a more risky alternative buying votes in a way that is unpredicted by standard expected-value calculations.

We contribute to the literature in three ways. First, while prospect theory has been influential in political science only among international relations, the theory has not received much attention among political economists nor comparative politics scholars (Mercer 2005, p. 2, Vis 2011, pp. 338–339). We believe this is a serious issue that should be corrected. We intend to bridge this gap by offering an alternative theory of the political economy of vote buying but taking prospect theory as a starting point. Second, in this paper we follow Levy (1992b, p. 297) as we carefully try to not only show that the observed behavior of political agents is consistent with prospect theory but that prospect theory provides a better explanation of vote buying than do traditional descriptions of vote buying. Third, and from a methodological standpoint, we follow Aldrich and Lupia (2011) and

McDermott (2002) in that there is a need of implementing experiments aimed to test formal models, and such, we believe that political scientists might benefit from this process to establish empirical validation of formal models (McDermott 2002, p. 45). Our paper is particularly relevant to the the study of democracy and development where experiments have been described as "a promising research tool" (De La O and Wantchekon 2011).

This paper proceeds as follows. First, we present several gaps present in the vote-buying literature. Second, we explain the basic concepts behind prospect theory, while providing more details about the direct implications for the clientelism and vote-buying literatures. Third, following the basic intuitions of traditional voting games we offer a basic formal model of vote buying. Fourth, we present our experimental design. Fifth, we analyze the experimental data. Sixth, we conclude by readdressing our results and discussing possible avenues for future research.

II. Traditional Theories of Clientelism

Neumann and Morgenstern (1947) introduced one of the first theories of decision making under risk (McDermott 1998, p. 15). Since then, a specific set of behavioral assumptions have dominated political science for the most part (McDermott 2004, p. 289, Levy 1997, p. 87), and traditional accounts of vote buying have been no exception. Just to name a few examples, Nichter (2008) used game-theoretical techniques to introduce the concept of "turnout buying," suggesting that parties deliver private benefits even when monitoring is absent. Gans-Morse, Mazzuca, and Nichter (2013) offer a formal model to explain that clientelist parties offer a mix of four clientelist strategies during elections (vote buying, turnout buying, abstention buying, and double persuasion), while Rueda (2015, p. 428) presents a model of vote buying in which a broker sustains bribed voters' compliance by conditioning future bribes. Similarly, Gallego (2014, p. 401) develops a game-theoretical model of political clientelism in which a candidate disciplines a majority of voters through the promise of a future flow of benefit.

We contest this traditional approach focused on absolute gains by shifting the attention to losses and context-dependent decision-making processes. It needs to be clarified however that the root of the problem is *not* methodological (i.e., the use of game theory) but analytical, that is, the assumed decision-making process under risk embedded in these traditional accounts of vote-buying.

We believe that a shift in focus is a valuable exercise because strategic behavior under risk

has usually been modeled according to assumptions about expected-value calculations that are "unrealistic" (Aldrich and Lupia 2011, p. 124). Since these assumptions have been installed in most traditional vote-buying theories too, our paper hopefully clarifies some "empirical deviations" present in the literature. A large body of experimental research finds that many behavioral expectations under risk do not comport with the assumptions present in game-theoretical descriptions of some political behaviors (Battalio, Kagel, and Jiranyakul 1990, p. 25, Mercer 2005, p. 1). As a matter of fact, Bernoulli—the forefather of the EUT (Fishburn 1977)—was the first to notice that people would not always behave on the basis of the expected value of a game (McDermott 1998, pp. 15–16). From a decision-making standpoint, many find that the assumptions underlying the classical theory of risky choice are "systematically violated" (Quattrone and Tversky 1988, p. 719) and that both variance and semivariance ideas of risk have been shown to be "inconsistent" with von Neumann axioms (March and Shapira 1987, p. 1405). Moreover, from an empirical perspective, there seems to be a strong consensus on that standard assumptions about strategic behavior under risk "continually failed empirically" (Vis 2011, p. 335), while others find that experiments have shown that "actual behavior and decisions frequently deviate from the neoclassical predictions" (Fatas, Neugebauer, and Tamborero 2007, p. 167). In sum, the empirical literature consistently finds that "people systematically violate the predictions of expected utility theory" (Barberis 2013, p. 173). In fact, Levy (1997, p. 87) finds "ironic" that just as rational choice has become the most influential paradigm in political science, the theory has come under heavy attacks by experimental *and* empirical evidence.

To be clear, much progress has been made in the understanding of clientelism and vote buying (see Hicken (2011) for an excellent review). Yet, there are several inconsistencies that authors tend to ignore or treat as unimportant empirical deviations. We believe these inconsistencies originate in the wrong understanding of decision-making under risk. Thus, more than neglecting traditional theories of clientelism, our paper seeks to complement such progress by bridging several gaps in the literature. In this paper we address two important inconsistencies relevant to the understanding of vote buying. We concentrate on these two aspects because both speak directly to the party's decision-making process under risk.

Political Contestation The first inconsistency that causes confusion in the clientelism literature is the role political contestation on vote-buying. As many explain, the more contested an election, the more risks of losing the election, the more incentives to resort to vote-buying (Scott 1972;

Shefter 1977; Diaz-Cayeros 2008; Keefer and Vlaicu 2017; Corstange 2018). Yet, there are recent contributions that report very large levels of vote-buying in contexts of *low* political contestation. For instance, González-Ocantos, Jonge, et al. (2012, pp. 205–206), who fielded a list experiment in Nicaragua for the 2008 elections, report that while the incumbent party enjoyed 40% of the electoral support, 24% of registered voters were offered a clientelist gift in an election that "[was] not heavily contested." Why would a party buy such a massive amount of votes in a safe and uncontested election? The literature is quite inconclusive regarding this question. In fact, Weitz-Shapiro (2012, p. 570) suggests that "there is no consensus about the relationship between high levels of political competition and the phenomenon of clientelism."

cite van de Walle 2007

Building upon the assumptions of the game-theoretical perspective, some have argued that vote buying should be higher in contexts of *low* political contestation. For instance, Medina and Stokes (2002) explain that political parties that hold an electoral monopoly tend to offer clientelist goods to deter the entry of political challengers. Similarly, Magaloni (2008) explains that hegemonic autocracies such as the PRI in Mexico have survived thank to successful deterrence strategies and clientelism. Unfortunately, these explanations seem at odds with normative theories in the risk-management and insurance-buying literatures in economics. If we think of vote-buying as an insurance against political losses, then utility-maximiser parties should "buy insurance" only in risky scenarios, that is, in cases when there is a high probability that the expected electoral outcome is a loss. As Arrow (1996, p. 111) explains, "those most at risk will buy more insurance than the others," a behavior that he describes as "adverse selection." We believe that if traditional theories of vote buying conformed with traditional expectations of utility maximization, clientelist political parties should buy votes only in cases of risking the election. Yet, they do when electoral risks are low, as found in González-Ocantos, Jonge, et al. (2012).[5]

Sunk Costs The second anomaly in the literature is the persistent assumption about incumbents: they are always thought to have huge advantages relative to challengers. While we believe the so called "incumbency advantage" definitively shapes the playing field in an uneven one, we also believe that it is not accurate to believe that incumbents are *always* in the domain of gains.

The traditional vote-buying literature is so consistent in assuming that incumbents are undoubtedly in a constant winning streak that models (empirical and formal) never consider

[5]Regarding insurance purchasing, this has also been noted by Kahneman and Tversky (1979) and Camerer (1995, pp. 620–622).

The incumbency advantage. complete

access to material benefi ts such as bags of food will always distribute goods to low-income and working-class voters in exchange for electoral support. Instead, I argue that a party operative's capacity to turn to clientelistic strategies of mobi- lization is a necessary but insuffi cient condition to explain the use of clientelism. Besides having the capacity to employ clientelistic strategies, party operatives have to prefer to build clientelistic linkages with voters" Szwarcberg2013, 33

In sum, the way in which the literature assesses clientelist targeting and political contestation seems to suggest that clientelist political parties waste valuable resources, dramatically departing from the predictions made by the EUT. We interpret this "misbehavior" (Thaler 2015) as an analytical problem, particularly, a wrong understanding of how political parties make decisions under risk. To solve this misunderstanding, next section introduces prospect theory (Kahneman and Tversky 1979) to the study of vote buying. Importantly, this section sheds light on why parties do not necessarily consider whether clients are swing/core voters, and also why they buy votes in contexts of low risk, that is when the most likely scenario is an electoral victory.

III. Prospect Theory and its Implications for Clientelism: When Losses Loom Larger than Gains

Prospect theory is a theory of decision making under conditions of risk (McDermott 1998, p. 15), and it was developed by Kahneman and Tversky (1979) as a way to incorporate empirically observed violations of expected utility (Levy 1992a, p. 179, McDermott 2004, p. 290). Since its development, prospect theory has emerged as a "leading alternative" (Levy 1992a, p. 171), "best available description" (Barberis 2013, p. 173) and "empirically correct theory" (Vis 2011, p. 334) about how people evaluate risk (Ackert et al. 2006, p. 5), particularly excelling in providing a model that offers "descriptively accurate formulations" of the human decision-making process (McDermott 2004, p. 292).

While the theory has been most influential among IR scholars, it has unfortunately had "limited" influence in political science (Mercer 2005, p. 2). Still, there are several contributions in comparative politics that take prospect theory as a framework. For instance, Weyland (2002) studies levels of loss aversion of dictatorships when they perform radical economic reforms. Vis (2009) and Vis (2010) study welfare state reform showing that political gains are the necessary condition for not-unpopular

reforms, while for unpopular reforms are deteriorating socio-economic situations, or political losses. In turn, Steinacker (2006) studies issue salience, Schumacher et al. (2015) focuses on party platform change, while Carreras (2019) argues that "citizens who were in the domain of economic losses were more likely to take a risk and vote in favor of Brexit."

Since others have already provided very good reviews of prospect theory (Levy 1992a; Levy 1992b; Levy 1997; McDermott 1998; McDermott 2004; Mercer 2005; Mercer 2005; Vis 2011; Barberis 2013; Linde and Vis 2017; Vieider and Vis 2019), we will limit this section to describe its main components. The theory is based on two mainly empirically-derived concepts (Vieider and Vis 2019, p. 334). First, utilities are defined over changes in outcomes respect to a reference point ("reference dependence"). Note the sharp contrast with EUT where the focus is on absolute levels of wealth (Ackert et al. 2006, pp. 5–6). Second, individuals distort values of possible outcomes in an asymmetrical non-linear S-shaped way when making risky decisions ("value-function dependence"). Note also another important difference with EUT where agents are assumed to treat expected utility values linearly, "even with training and effort" (McDermott 2004, p. 293). As McDermott (1998, p. 18) clearly puts it, "prospect theory predicts that individuals tend to be risk averse in a domain of gains [i.e., when things are going well], and relatively risk seeking in a domain of losses [i.e., in the midst of a crisis]." This distinction also separates prospect theory from EUT where the latter assumes that whether decision-makers are in a domain of gain or loss should not affect their attitude toward risk (Mercer 2005, p. 1).

Reference dependence is the central idea in prospect theory (Barberis 2013, p. 178, McDermott 1998, p. 40). Thus, prospect theory pays special attention to the context in which decision-making processes take place (McDermott 2004, p. 293). In simple, prospect theory "allows people's preferences to depend on the circumstances they face" (Fatas, Neugebauer, and Tamborero 2007, p. 168, March and Shapira 1987, p. 1412, McDermott 2004, p. 294), which is usually (Vis 2011, p. 335) but not always (Levy 1992a, p. 174) the *status quo*,[6] and how it shifts over time (McDermott 1998, p. 28, McDermott 2004, p. 301).[7] As Kahneman and Tversky (1979, p. 273) put it more clearly, "the carriers of value or utility are changes of wealth, rather than final asset positions." In fact, contrary

[6]The location of the reference point emerges as a critical factor in the analysis of decisions (Kahneman and Tversky 1979, p. 288). Levy (1992a, p. 174) explains that the reference point could also be an "aspiration level." In a similar way, Koszegi and Rabin (2006, p. 1135) develop the idea of a reference point which consists of "expectations rather than the status quo." I owe this point to Salomo Hirvonen.

[7]While we do not focus on the role of emotions, others have found that "sad people will take more risk when trying to avoid a certain loss" (Campos-Vazquez and Cuilty 2014, p. 6).

to the assumption of invariance (Barberis 2013, p. 186), a shift in the reference point should also lead to reversals of preferences (Quattrone and Tversky 1988, p. 719). For instance, there is strong support for the idea that prior losses (or "sunk costs") influence decisions, contrary to what normative theorists propose (Thaler and Johnson 1990, p. 643, Levy 2003, p. 218).

Value-function dependence is another central idea in prospect theory. Prospect theory pays considerable attention to losses. Levy (1992a, p. 171) in fact explains that individuals "give more weight to losses than to comparable gains," which translates into the famous statement *losses loom larger than gains*. Losses have also been the focus in other areas of political science (McDermott 2004, p. 298). For instance, Lau (1985, p. 132) explains that "negative information is more influential than comparable positive information."

Importantly, the shape of the value function is non-linear. From an analytical point of view, we consider this is *the* feature that out trumps the normative expectations contained in EUT. Formally, the asymmetrical curvature of the value function explains why individuals have risk-averse behaviors in choices among gains but risk-acceptant behaviors in choices among losses (Levy 1997, p. 87). In the domain of gains, the concavity of the value function encourages risk aversion by undervaluing the probability of success of a gamble relative to a certain outcome (underweighting). However, in the domain of losses, the convexity of the value function encourages risk-seeking behaviors by exaggerating the probabilities of rare but catastrophic losses (overweighting) (Levy 1992a, pp. 183–184). Typical examples are individuals who tend to underweight likely events such as heart attacks (not changing diet) but overweight rare events such as a plane crash (praying before landing). Unlike theories based on EUT, Kahneman (2012) explains that the process of underweighting of likely events contributes to risk aversion, while very unlikely events are overweighted "quite grossly or neglected altogether" (see also McDermott 1998, p. 32).

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In prospect theory, both reference dependence and the shape of the value function lead to a more accurate description of decision-making under risk. In fact, experimental evidence consistently finds evidence about decision-makers distorting probabilities in a non-linear way (Levy 1997, p. 87). In particular, the evidence suggests that in the domain of losses, risk-seeking decision-makers take *disproportionate risks* to avoid certain losses, while in the domain of gains, risk-averted decision-makers are *excessively eager* to secure gains (Levy 1992b, pp. 297, 299–300). This is explained because decision-makers "have difficulty with probability at extreme ranges" (McDermott 1998, p. 30). Finally, it is important to note while attitudes toward risk are usually portrait as aspects of

personality (March and Shapira 1987, p. 1406), prospect theory is *not* a personality theory, that is, it is not necessary to know about the individual personality traits of decision-makers in order to predict behavior (McDermott 2004, p. 293, Vis 2011, p. 335)

The implications for vote buying are considerable. In sharp contrast to traditional vote-buying theories based on EUT, prospect theory predicts that clientelist parties should buy votes when are probable winners or have experienced important losses in the past, irregardless of whether the voter is a core or a swing voter, or the purchasing (vote-buying) power of the party.

Clientelist parties should buy more votes when they are probable winners because decision-makers will exaggerate the small probability of losing the election. We expect vote buying to be higher in favorable electoral scenarios by making vote-buying an attractive strategy due to the absolute aversion and intolerance to the (small) probability of losing the election. The mechanics of such decision-making process should then make clear that there is no "wasting" when buying votes in the domain of gains. This expectation is consistent with prospect theory. Empirical studies confirm that "actors perceive themselves to be in the domain of losses more often than we would normally expect," even if they are not (Levy 1992b, p. 291; see also Lau 1985). This implies that loss aversion explains why decision-makers are more concerned to prevent a decline than to increase it (Levy 1992b, p. 285, see also Levy 1997, p. 89). To sum, when things are going well electorally, clientelist political parties will tend to buy more votes because "future losses hurt more than future gains gratify" (Levy 1992b, p. 285).

Clientelist parties should buy more votes when they have experienced important losses in the past, making vote buying an attractive strategy by altering the decision-makers' reference point. Altering the reference point downwards increases (1) risk-seeking behaviors and (2) the tendency of decision-makers to bet on long shots (Kahneman and Tversky 1979, pp. 286–287), that is, the tendency of clientelist political parties of incurring in more risks (i.e., vote-buying) when things are not going well, and the tendency to aspire winning hard elections even when having a history of past electoral losses. The tendency of individuals in the domain of losses to "break-even" has been confirmed by others as well (Thaler and Johnson 1990). This implies that political losers should buy more votes not necessarily because they want to win the next election but because they will try to compensate for past losses. Levy (1992b, p. 297) notes that the elasticity of the risk-seeking behavior should be quite high because "the magnitudes of the losses need not be that large in order to induce risk-seeking behavior, even small losses should induce the risk-seeking behavior." Consequently, we

expect a steeper predicted effect in the data analyses. To sum, losses should be harder to accept, and hence when things are bad, decision-makers should be more likely to make risky choices to recover their losses (McDermott 2004, p. 294).

IV. A Formal Model of Vote-Buying

Formal models can usually help experimentalists determine which theoretical settings and equilibria are most relevant to a particular causal hypothesis (McDermott (2002), Aldrich and Lupia (2011) and Barberis (2013, p. 174)). Thus, in this section we developed a vote-buying game within the Downsian-"spatial" paradigms (Downs 1957; Enelow and Hinich 1990; Plott 1991). The idea is to test the descriptive accuracy of the game-theory model in the experimental section of this paper (Lupia and McCubbins 1998, Bassi, Morton, and Williams 2011, p. 559, Dickson 2011, Tyszler and Schram 2016, p. 361, Vieider and Vis 2019, p. 1).

Following this tradition, we consider an electorate of n voters. Voters vote for a leader to implement a common policy γ from the set $\Gamma = \{1, 2, ..., 100\}$. Each citizen i has an ideal point x_i which is an *iid* draw from an uniform distribution over Γ. When policy γ is implemented, payoffs of citizen i are given by $u(D, x_i, \gamma) = D - |x_i - \gamma|$, where D represents the utility of implementing any given policy. This payoff can be incremented by transferences from both parties to voter i.

In this election, there are two candidates. One "left-wing" party and one "right-wing" party. The left-wing (right-wing) candidate represents a policy γ_L (γ_R) which is an *iid* draw from an uniform distribution over $\{1, ..., 50\}$ ($\{51, ..., 100\}$). The location of this policy give us the number of voters n_L leaning towards the left-wing candidate, while the number of voters leaning towards the right-wing party is given by $n_L + n_R = n$. While we consider that voters are attached to an ideological continuum, we do so with the sole purpose of modeling preferences—both formally and experimentally.[8]

Both parties negotiate with only one of these n voters. That voter is randomly selected from the total population n. Observe that the higher the n, the lower the representation in the election of this voter. That is, a larger n necessarily implies that every individual electoral choice matters less. However, if n is small, negotiating with this voter may be more attractive to political parties. This

[8]Ultimately, experimental subjects are not told anything about ideology. They only observe that there are a number of "points" associated with the victory of party A or party B. In this sense, voters lean ("ideologically") towards the party that gives them more points.

is because negotiating with a large number of voters is costly. We assume that each party has a budget (B) that they can use to buy votes. If a party decides not to negotiate with the voter (or the voter does no accept the offer), the party keeps this budget. The profits of party i is given by,

$$\pi_i(W, e_i, s_i) = W \cdot e_i + (1 - s_i \cdot a_j) \cdot B \tag{1}$$

where W ($W \geq B$) is a constant that represents how much each party values winning the election, $e_i = 1$ if party i wins the election, 0 otherwise, s_i is the fraction of B that the party offers to voter j who can accept the offer ($a_j = 1$) or not ($a_j = 0$). We study one version of this party-voter interaction, namely, when both parties make simultaneous offers to the voter, and voters decide whether to accept the offer or not.

The timing of the game is as follows: at the beginning of the game n voters and two political parties are randomly located on their respective ideal points: voters along Γ, the "left-wing" candidate along $\{1, ..., 50\}$, and the "right-wing" candidate on $\{51, ..., 100\}$. All locations are public information, as well as every party's budget B, the total number of voters (n) and the number of supporters of each party (n_L and n_R). In this game each party simultaneously decides whether to make a vote-buying offer to the voter. If a party decides to negotiate with the voter, privately offers the voter to buy his vote. Then the voter decides if to take the offer, or which one accept if he receives two offers. If he accepts an offer, he should vote for that candidate.[9]

Equilibrium In this case, both parties can offer certain amount in exchange for electoral support. Note that parties only have incentives to negotiate with a voter if he is the pivotal voter. That means that $|n_L - n_R| \leq 1$, and that voter i supports the ex-ante winner of the election ($i \in max\{n_L, n_R\}$). The voter prefers the party closer to her ideal point. If both parties are located at the same distance, the voter is indifferent. Denote by $i^* \in \{L, R\}$ the preferred party of the voter, and $-i^*$ the other party.

Note that, naturally, both parties want to make different offers. If the voter is pivotal, the less preferred party has incentives to offer him a certain amount m_{-i^*} such that the he perceives more utility voting for that party rather than voting for the opposite party, that is:

[9]It is important to consider that to simplify the game (and the experiment), accepting the offer necessarily implies compliance. That is, accepting the offer means voting for the party the voter accepted the offer from. We leave for future research the case where the voter may defect.

$$
\begin{aligned}
m_{-i^*} &\geq (D - |x_{i^*} - \gamma_{i^*}|) - (D - |x_{i^*} - \gamma_{-i^*}|) \\
&= |x_{i^*} - \gamma_{-i^*}| - |x_{i^*} - \gamma_{i^*}|.
\end{aligned} \tag{2}
$$

Parties expect winning the election but have limited budgets. Hence, they want to win the election at a minimum cost. If party $-i^*$ offers the voter $m_{-i^*} = |x_{i^*} - \gamma_{-i^*}| - |x_{i^*} - \gamma_{i^*}|$, he will be indifferent between voting for party i^* or party $-i^*$. Both offers $m_{i^*} = 0$ and $m_{-i^*} = |x_{i^*} - \gamma_{-i^*}| - |x_{i^*} - \gamma_{i^*}|$ are the minimum amount, but enough to make the pivotal voter indifferent between both political parties. Indifference gives the party some electoral advantage of winning of the election. Voter indifference gives two possible Nash equilibria. In one equilibrium the voter rejects the offer and votes for i^*. In the other equilibrium, the voter accepts the offer and the elected party is $-i^*$. If individuals are utility maximizers, they should be indifferent between these two equilibria.

V. Experimental Design: Buying Votes in the Lab

Building on our formal model of vote buying, a lab economic experiment was designed. The experiment was conducted in Chile by the *Centre for Experimental Social Sciences (CESS)* administered by the *University of Santiago* and *Oxford University, Nuffield College* between April 20 2021 and May 28 2021. It was programmed in `O-tree`, the online version of `Z-tree` (Fischbacher 2007). Following Harrison (2006) and others, our experimental design minimizes hypothetical bias and "cheap talk" by compensating subjects with real money according to their decisions (Morton and Williams 2010; Dickson 2011). At the beginning of each experimental session all participants were required to successfully complete two practice rounds.[10] Those data were not used in the statistical analyses. In addition, subjects received a show-up fee of $2,000 CLP (≈ 2.1€). Payoffs depended on the quality of individual decisions.[11] Figure 1 shows the distribution of payoffs expressed in actual currency by role. Table A1 shows summary statistics broken down by pre-treatment observables. These covariates were captured by a battery of socio-demographic questions delivered at the end of the study.[12] A total of 102 subjects were recruited. Each subject played the game three times.

[10] To make sure participants understood the dynamics of the game, they were shown two examples of the voting game. Participants were required to enter the correct amount of points each hypothetical participant would have received in each example. Importantly, all actual participants had to enter the exact amount of points to continue playing the game.

[11] Levy (1997, p. 95) notes that in poorer societies (like the Chilean society) conducting research with relatively smaller monetary incentives is still meaningful. However, see Morton and Williams (2010) and Bassi, Morton, and Williams (2011).

[12] The table also details the same information conveyed in Figure 1.

The total sample size is 306. For every new game, a whole new randomization process took place.[13] Formally, we follow an in between-subjects design where different groups of individuals are randomly assigned to various experimental or control conditions (McDermott 2002; Tyszler and Schram 2016; Hwang 2021). The basic experimental flow is depicted in Figure 2.

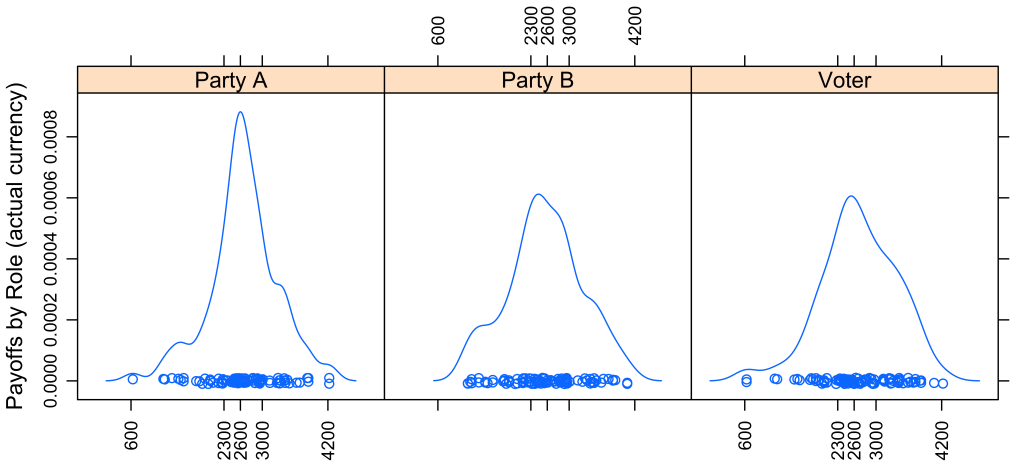

Figure 1: Distribution of Payoffs by Role (actual currency; show-up fee excluded).

Note: *Density plots show the distribution of payoffs expressed in actual currency by experimental condition. Amounts exclude the show-up fee of $2,000. 0%, 25%, 50%, 75% and 100% quantiles are shown (rounded).*

All transactions were performed exchanging experimental "points." We employed neutral terminology to maximize experimental control (Dickson 2011). Thus, throughout all three games, participants bought/sold votes (if any) and accumulated/lost wealth always expressed in experimental points. Every experimental point was equivalent to $0.42 CLP (≈ $0.00045€). Participants learned about the conversion when reading the initial instructions. Final payoffs were converted to actual currency at the end of the study.

At the beginning of every game participants received a role at random. Following Dickson (2011), roles were presented using a neutral terminology to maximize experimental control. The design

[13] That is, participants received a role, an "ideology," a party endowment and a contestability structure.

considered the following roles: *party A*, *party B*, or *voter*. Every game was played among three players (one *party A*, one *party B* and a *voter*).

Also, voters were assigned an "ideological" position at random. That is, voters received at random a certain amount of experimental points depending on whether party A or B won the election. For instance, if party A won the election, a voter would receive in that case 2,400 points, whereas if party B won the election, that voter would receive 200 points. Hence, the voter in this example should feel "ideologically" closer to party A. The idea was to model party-voter spatial distances, as considered by traditional voting theories based on the EUT (Downs 1957; Enelow and Hinich 1990). The basic intuition of this paradigm is that the set of candidates that are ideologically closer to a voter produce more utilities in the form of fiscal policies, either in terms of redistributive or free-market oriented policies (Acemoglu and Robinson 2009; Boix 2003, but importantly, see Haggard and Kaufman 2016). In short, our design mimics an electoral market where we can observe under which conditions different clientelist dynamics developed. Critically, this piece of information was not presented to participants as "ideology," but as the points either electoral outcome would give. In turn, parties also received an "ideological" position which made them "closer" or "farther way" from the voter.

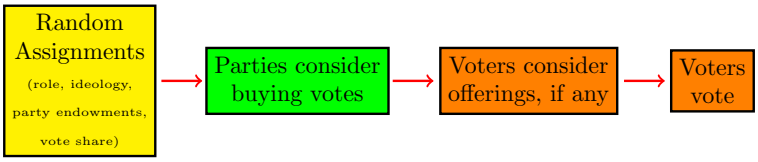

Figure 2: Experimental Flow and Timing of the Voting Game.

Note*: At the beginning of each experimental session all participants were required to successfully complete two practice rounds. A total of 102 subjects were recruited. Each subject played the game three times. The total sample size is 306. For every new game, a whole new randomization process took place. Formally, we follow an in between-subjects design where different groups of individuals are randomly assigned to various experimental or control conditions.*

Parties received as well different "endowments" at random. The idea was to reflect the fact that some parties are wealthier than others, a factor that might increase the probability of vote buying (Juan Pablo Luna 2014). Note that both parties receive the same endowment. Since our experimental design is an in between-subjects design, we should be able to observe and exploit the statistical differences (if any) across "parties" with different endowments. Participants acting the "party" role accumulated/lost wealth depending on whether they are elected/not-elected. For every time they bought votes at some amount, that amount was discounted from their wealth.

For simplicity, voters received zero endowments.[14] In turn, participants acting the "voter" role accumulated/lost wealth depending on whether their party is elected/not-elected (as per traditional EUT voting theories) and on whether they decided to sell/not-sell their vote. It is important to note that following our formal model and Tyszler and Schram (2016, p. 371), both ideology and party endowments were common knowledge.

In addition, both parties received at random an initial vote share, that is, a *certain* number of (fictional) voters that were going to cast their votes for each party. This number did *not* include the vote intention of the participant acting the "voter" role. Overall, this experimental condition mimics the degree in which an election is contested. In particular, this variable accomplishes two goals. First, it puts parties in different electoral contestation environments. In other words, it introduces the element of risk (of losing the election) in the game. Since voters win/lose points when their parties win/lose elections, this risk is also relevant for players acting the "voter" role. Second, it gives (or not) voters certain amount of electoral leverage. Since Downs (1957), traditional spatial theories of voting have considered that pivotal voters have more weight in an election, and hence, they might have incentives to sell their vote at higher prices. Given that all this information is public, this is piece of information is key in our experimental design.

During the second stage, parties decide whether to buy votes by making an offer to the voter. Experimental subjects acting the "party" role enter an amount of points, which ranges from zero to the maximum assigned budget in that round.[15] The design allows for simultaneous offers (i.e., offers from both parties), for one or zero offers. In the third stage voters evaluate offers (if any). If the party decided that it did not want to make an offer at that time, the voter is told that the party did not make an offer. Voters are told that accepting the offer necessarily implies voting for that party.[16]

VI. Statistical Analyses: Risk and Vote Buying

Since the focus of this paper is on vote buying, we discarded the *voter* data and analyze all observations i acting any of the party roles (*party A* and *party B*). In particular, we analyze one main dependent variable, namely, the amount of the vote-buying offer made by parties (if any). The

[14] This is consistent with the vote-buying literature in that both poor and rich voters are prone to receive clientelist offerings (Bahamonde 2018). See also Szwarcberg (2013).

[15] Participants acting the "party" role are told that offering zero amount means they do not want to buy votes at that time.

[16] For simplicity, we did not include the possibility of defecting. We encourage future studies to randomize certain probability of getting caught if defecting to encourage/discourage the behavior.

distribution is plotted in Figure 3.

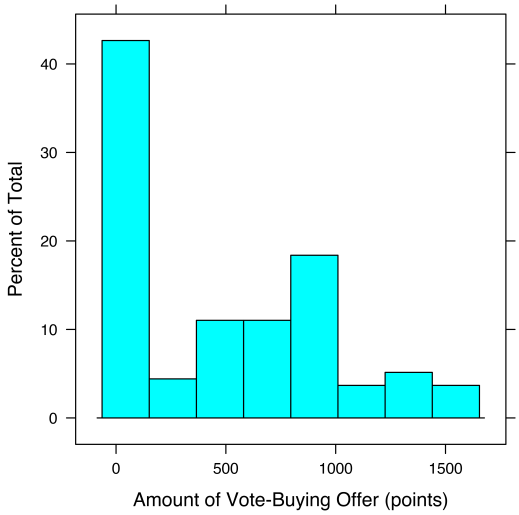

Figure 3: Distribution of the Dependent Variable.

Note: *Since the focus of this paper is on vote buying, we discarded the voter data. The new sample size consisting only in parties is N=142 (mean = 464, median = 394).*

From an internal validity standpoint, we expect this distribution to vary with the levels of risk the party is dealing with. Accordingly, if the predictions of our formal model (and the ones of the traditional vote-buying theories based on the EUT) are correct, the amount of the vote-buying offer made by parties should be higher in riskier scenarios (i.e., when facing probable electoral losses). Since vote share, ideological positions and endowments were public information (as formalized in our game), we believe these theoretical expectations should be consistent with the expectations of the traditional game-theoretical vote-buying literature.

From an external validity standpoint, we believe that voters in real elections can estimate with some degree of success actual vote shares, for instance, by looking at electoral polls. Voters can also identify parties' ideological positions. For instance, Luna and Zechmeister (2005) identify a number of conditions that are associated with higher levels of elite-mass congruence in Latin America.[17] Voters can also make inferences about a party's endowment, and how those endowments can be redistributed in a clientelist fashion (Auyero 2000). In turn, the literature is consistent in

add reference

[17] However, see Visconti (2021).

that brokers also provide necessary information about available resources and how to get access to them (Murillo, Oliveros, and Zarazaga 2021). In sum, we believe this identification strategy appropriately captures the decision-making process under risk of political parties as theorized by traditional vote-buying scholars based on the EUT.

However, based on prospect theory, we have different expectations, i.e., parties should buy votes due to risk-seeking in the domain of losses (i.e., when experienced prior losses) and due to risk-aversion in the domain of gains (i.e., when being a likely winner as the idea of losing electoral support becomes unbearable). To test these hypotheses we exploit the experimental data described above by fitting the OLS regression model specified in Equation 3,

$$\begin{aligned} \text{Offer}_i = \beta_0 + & \\ & \beta_1 \text{Vote Share}_i + \\ & \beta_2 \Delta\text{Points Accumulated}_i + \\ & \beta_3 \text{Spatial Distance}_i + \\ & \beta_4 \text{Party Budget}_i + \\ & \alpha_i + \epsilon_i \end{aligned} \tag{3}$$

where *Vote Share* is the certain number of (fictional) voters that were going to cast their votes for the party, while Δ*Points Accumulated* captures changes in the accumulated points respect to the experimental round played in $t-1$. For instance, if a player won 1,200 points in $t-1$ but then lost 500 in the next round, then $\Delta Points\ Accumulated_t = 700$. Importantly, this variable captures sunk costs. The intuition is to evaluate whether they are *not* considered when evaluating new proposals, as the EUT posits it. *Party Budget* is the party budget, and α_i is a vector of participant fixed-effects.

If traditional vote-buying theories based on the EUT are correct, then we should expect $\beta_1 < 0$, $\beta_2 = 0$, $\beta_3 = \{> 0 \veebar < 0\}$ and $\beta_4 > 0$. In simple, the larger the vote share, the less vote buying (because there are less risks of losing the election). Prior losses or "sunk costs" should not matter for vote-buying. The closer a party is to the voter is either positive for vote buying (core voter hypothesis) or negative (swing voter hypothesis). The bigger the budget of a party, the more vote buying (for instance, incumbents are usually considered to be more prone to buy votes, see

Weitz-Shapiro 2012; Szwarcberg 2013). However, if the expectations rather conform with prospect theory, we should expect $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 = 0$ and $\beta_4 = 0$.

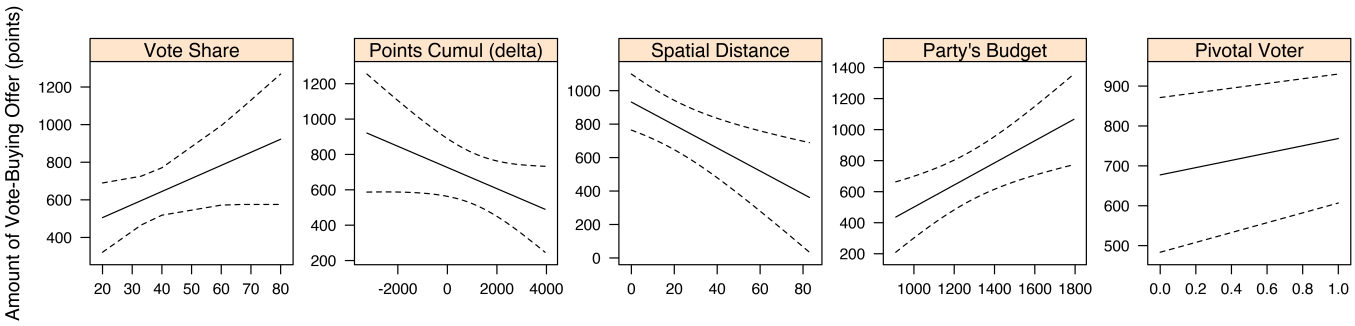

Figure 4: Predicted Values of Vote-Buying Offer.

Note: *Based on the OLS estimates in Table A2, the figure shows the predicted values of the offer made by the party expressed in experimental points. Confidence intervals were constructed using robust standard errors (as shown in Table A2). Substantively, the figure shows that experimental subjects avoid losses by over-securing electoral support even in favorable contexts (panel 1) and do consider sunk costs and try to recover losses in the short run by spending more on vote-buying (panel 2). However, parties do not consider ideological/spatial distances with respect to their constituencies when making decisions nor do their budgets, i.e., parties with more resources do not necessarily invest more in vote buying (panels 3 and 4).*

Substantive results are shown in Figure 4 (regression table is shown in Table A2). Overall, results clearly depart from the theoretical expectations of traditional vote-buying theories based on the EUT, and widely support prospect theory. Parties do not buy votes when they are losing the election but when they are winning the election (panel 1 in Figure 4). As prospect theory predicts, decision-makers in the domain of gains will exaggerate the unlikely scenario of losing the election and will become more risk-averse, making the strategy of vote-buying more attractive. Second, unlike the expectations EUT-based vote-buying theories, parties will consider sunk costs in their calculations and hence will buy votes when experiencing prior losses (panel 2 in Figure 4). That is, when parties are in the domain of losses they will be more risk-seeking, and gamble more money on vote-buying. Importantly, parties do not consider whether voters are swing or core voters (panel 3)

neither do they consider their own budgets (panel 4).

VII. Discussion

This paper began by identifying that the vote-buying literature has relied almost exclusively on the expected utility theory at the cost of overlooking several empirical inconsistencies. In particular, we have identified two, namely clientelist targeting and political contestation. To clarify these empirical departures, we have applied basic concepts of prospect theory into the study of vote-buying. After formalizing a voting game framed in the expected utility theory, we designed and implemented an economic experiment. Results widely conform with prospect theory. In particular, we concentrated our efforts on two findings. First, clientelist political parties buy more votes when they are probable winners because decision-makers in the domain of gains usually underweight ("play down") the probability of electoral success, making risky strategies such as vote-buying more attractive (risk-aversion). Second, clientelist political parties buy more votes when they have experienced prior losses (i.e., sunk costs) because decision-makers in the domain of losses usually overweight ("exaggerate") the probabilities of unlikely electoral losses, making risky strategies such as vote-buying more attractive (risk-seeking).

We encourage future research, particularly scholars in comparative politics, development, behavioral and electoral studies, to consider prospect theory as a valid alternative to explain decision-making under risk. In turn, we also encourage scholars to empirically test historical assumptions in their respective fields. In our experiment we had to sacrifice a number of important aspects, such as the probability of defection and the income distribution among voters. We intend to implement such considerations in future research.

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Word count: 7,235

VIII. Appendix

	role	variable	n	min	max	median	iqr	mean	sd	se	ci
1	Party A	left.right	66	1	10	3	4	4	2	0	1
2	Party B	left.right	66	1	10	4	3	4	2	0	1
3	Voter	left.right	68	1	10	3	3	4	2	0	1
4	Party A	male	66	0	1	0	1	0	0	0	0
5	Party B	male	66	0	1	0	1	0	0	0	0
6	Voter	male	68	0	1	0	1	0	0	0	0
7	Party A	party.id	66	2	9	9	0	8	2	0	0
8	Party B	party.id	66	1	9	9	0	9	1	0	0
9	Voter	party.id	68	1	9	9	0	8	2	0	0
10	Party A	party.like	66	0	1	0	1	0	0	0	0
11	Party B	party.like	66	0	1	0	0	0	0	0	0
12	Voter	party.like	68	0	1	0	0	0	0	0	0
13	Party A	payoff	73	633	4224	2630	674	2621	670	78	156
14	Party B	payoff	72	1148	4062	2592	710	2607	665	78	156
15	Voter	payoff	75	633	4224	2674	836	2664	697	80	160
16	Party A	salary.enough	66	1	4	2	0	2	1	0	0
17	Party B	salary.enough	66	1	4	2	1	2	1	0	0
18	Voter	salary.enough	68	1	3	2	0	2	1	0	0
19	Party A	vote.last.election	66	0	1	1	0	1	0	0	0
20	Party B	vote.last.election	66	0	1	1	0	1	0	0	0
21	Voter	vote.last.election	68	0	1	1	0	1	0	0	0
22	Party A	vote.next.election	66	0	1	1	0	1	0	0	0
23	Party B	vote.next.election	66	0	1	1	0	1	0	0	0
24	Voter	vote.next.election	68	0	1	1	0	1	0	0	0

Table A1: *Summary Statistics.*

	OLS
	Amount of Vote-Buying Offer
Intercept	−380.54
	(568.66)
Vote Share	6.95
	(5.55)
Points Accumulated (delta)	−0.06
	(0.05)
Spatial Distance	−6.87*
	(3.26)
Party Budget	0.71*
	(0.34)
Pivotal Voter	91.16
	(124.46)
R^2	0.66
Adj. R^2	−0.16
Num. obs.	142

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$; $^{cdot}p < 0.1$.
Robust standard errors in parentheses.
Fixed effects parameteres omitted in table.

Table A2: *Statistical Model (OLS): Amount of Vote-Buying Offer.*