Social Networks in Policy Making*

Abstract

Recent advances in data collection, computing power and theoretical modelling have stimulated a growing literature in economics and political science studying how social networks affect policy making. We survey this literature focusing on two main aspects. First, we discuss the literature studying social connections in Congress: how (and if) they affect legislative behavior. We then discuss how social connections affect the relationship between policy makers and the outside world, focusing on lobbying, the importance of family, caste and ethnic networks, and social media and public activism. In our discussion, we highlight the key methodological challenges in this literature, how they have been addressed, and the prospects for future research.

Key words: Political Economy, Social Networks.

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I. Introduction

An often implicit assumption in political economy models is that political actors (politicians or voters) are self-interested, individualistic utility maximizers: public policies are seen as the interaction of independent individuals. There is, however, a long tradition in political science that questions this assumption, stressing the importance of social connections among political actors. In Congress, legislators' actions are deeply influenced by bonds of friendship, respect and patronage that transcend partisan or ideological divisions. Outside of Congress, political activism is also influenced by social connections, often amplified by social media; and politicians' attitudes towards their constituency depends on their social groups. Recent advances in data collection, computing power and theoretical modelling have stimulated a growing literature in economics and political science attempting to formally study these relationships. These questions have been made more salient by the increasing importance of social media in shaping political beliefs and the diffusion of "fake news" designed to spread in social networks.

In this paper, we review the literature on social networks and policy making, focusing on two keys aspects. We start by reviewing the existing literature on the role of social connections in legislatures, especially the U.S. Congress. We then expand the overview to include the role that social connections play in the relationship between policy makers (legislators as well as government officials) and society.

In Section II, we review the different metrics used to describe interpersonal relationships within legislative bodies and discuss the key theories and findings regarding how social links among legislators affect their legislative policy making. In assessing the importance of social networks in shaping politicians' decisions, there are two main issues to solve. The first issue is causality: that is, to establish that social connectivity is not just correlated with specific patterns of behavior, but indeed affects them. Causality is hard to establish because of one of three reasons: i) there may be unobserved variables affecting both the choice of social ties and the observed political activity, ii) social connections can be the result rather than the source of politicians' decisions, and iii) politicians may be exposed to the same common shocks (e.g. information) and this is what drives their correlated behavior. For example, cosponsorship networks may simply reflect common ideologies, shared geographical factors and common exposures to particularly influential interest

groups or maketing campaigns. They could also be the consequence rather than the driver of a legislator's political choices because more successful politicians can be viewed as role models and thus attract more supporters. The second issue is the observability of the true social network. Most of the research to date assumes that social connectivity can be proxied by some observable network (proximity, alumni or others), but it does not attempt to directly estimate the network. We highlight those key empirical challenges in the identification of social network effects and discuss how the most recent literature has addressed them.

In Section III, we turn to discussing how social connections affect and shape the relationship between policy makers and society. There are various ways to which society affects policy makers. We focus on three specific aspects that have been studied in recent research. First, in Section III.1, we discuss recent work on the role of social connections in lobbying. If interpersonal relationships truly play a role in legislators' behavior, then we should expect them to play a role in how interest groups allocate resources among legislators. Second, in Section III.2, we review the literature examining societies where actors are linked by powerful social connections such as family ties, as well as ethnic and religious networks. These links affect the effectiveness of policy makers in pursuing their goals and also make civic society influential through informal channels. We discuss the extent to which these links may act as a disciplining force, thereby limiting moral hazard problems, or conversely making it easier for policy makers to be captured by organized interests. Finally, in Section III.3, we discuss how social connections (and specifically social media) impact the way grass roots activism affects policy makers' activities. With the increasing importance of social media, the question of how platforms such as Facebook and Twitter affect collective movements has been asked. Never before has it been as easy to share information in social groups. How are these social innovations changing the relationship between citizens and rulers? On the one hand, there is a general sense that social platforms are making grass roots activism easier and more powerful. On the other hand, there is a sense that they are making it easier for governments to control the information flow, exert censorship and manipulate public opinion. Section IV concludes with some remarks on questions that are open for future research.

II Social Networks in Legislatures

The focus of the early literature on social networks in politics has been to document the existence of interpersonal relationships within a legislative group and to investigate their driving forces. The first approach used to measure legislators' social connections was to ask them directly. The seminal paper is Patterson (1959) who interviewed the members of the 1957 session of the Wisconsin State Assembly (Patterson (1959)). The author shows that the assembly was divided into sub-groups on a friendship basis and argues that each politician is affected by the norms of these informal groups in her/his own decision-making behavior. Using interviews of the 124 members of the Iowa State Legislator in 1965, Patterson and Caldeira (1987), Caldeira and Patterson (1988) and Clark, Caldeira, and Patterson (1993) reveal that major forces driving friendships between Iowa legislators are party, physical proximity, committee membership and attitudes towards legislative life and duties. Education and legislative experience, meanwhile, predict respect between legislators. Using the same methodology, that is an elite-level survey, on members of a different legislature, Arnold, Deen, and Patterson (2000) and People (2008) show that friendship between two members of the 1993 Ohio State House of Representatives is associated with similar voting behavior.[1] More recently, Ringe, Victor and Gross (2009) used a web-based questionnaire to construct a map of the social links between legislative offices in the E.U. Parliament. They interviewed the parliamentary assistants of members of the European Parliament's (MEP's) Committee on Environment, Public Health and Food Safety, following the idea of using the social network of staffers as a proxy for the corresponding social network of legislative offices. They suggest that social networks in legislative politics reflect information exchange. They postulate that legislative offices establish connections amongst each other that maximize the value of the information they trade. In particular, politicians are prone to elicit information from sources that are predictably biased; that is, other politicians who are very close or very far to their own preferences. Because the information provided by those sources is predictable, the legislators can use it to confirm their predispositions (if the expected information matches the actual one) or to update their beliefs (if the information deviates from their expectations). Using voting behavior as an outcome, they find evidence that the presence of social

[1] People (2008) also uses seating charts to identify social contacts. This approach is also adopted by Masket (2008) to study connections in the California Assembly (between the years 1941-1975).

ties is negatively associated with co-voting for those who are ideologically opposed. However, they do not have enough variance in their data to test whether it is also true that being socially connected is positively associated with co-voting for ideologically similar legislators.

Surveys are of limited use in eliciting social networks because they are confined to specific legislatures for which interviews are feasible. Another source of information used in the literature relies on data on memberships to informal organizations in Congress, such as caucuses, to capture social networks. Victor and Ringe (2009) analyze the caucus system in the House of Representatives as a social network, in which the ties between persons are determined on the basis of common membership in one or more of the House caucuses. They show that the same legislators that are powerful in the party and committee systems, are also powerful in the caucus system. Victor and Ringe (2014) expand the data to cover nine Congresses (1993-2010) and test a theory according to which participation in the voluntary caucus system provides opportunities for legislators to build cross-partisan relationships and profit from shared information. They hypothesize that, being exposed to more viewpoints, politicians involved in many caucuses are less likely to consistently vote with their party and are more likely to buck the party. They indeed find evidence that legislators are more likely to covote if they share more caucus connections.[2]

A completely different approach for measuring social networks among politicians in legislative bodies is based on legislators' behavior. Cosponsorships, "Dear Colleague" letters and participation in press events are the activities most widely used. Cosponsorship networks are based on the fact that, since 1967 in the House and the mid-1930s in the Senate, legislators have had an opportunity to express support for a piece of legislation by signing it as a cosponsor. Fowler (2006a,b) was the first to utilize this information to construct networks that existed from 1973 to 2004. In a cosponsorship network legislator *i* is linked to legislator *j* if *i* cosponsors one or more bills sponsored by *j*. Cho and Fowler (2010) investigate the topological properties of these networks and show that variations in topologies across time are associated with variations in the politicians' legislative activity.

[2] A related but alternative approach is proposed by Porter et. al. (2005) who represent interactions between U.S. House members in the 101st–108th Congesses (1989–2004) by using committee and subcommittee "interlocks." In their network representation, two committees are linked if they share at least one member. The analysis reveals that legislators' committee assignments contain information about their ideological preferences apart from what is indicated by standard measures of partisanship.

Following studies have further refined this approach, recognizing that the patterns of cosponsorships can be used to map different levels of social interactions between Congress members. Bernhard and Sulkin (2009) distinguished between original cosponsors, who make the decision to cosponsor prior to or coincident with the introduction of a bill, and post-introduction cosponsors, who sign on after introduction. The idea is that "original" cosponsorship is more indicative of a personal relationship between the sponsor and the cosponsor.[3]

Kirkland (2011) distinguishes between "strong" and "weak" ties using the frequency of the collaborations. This distinction is justified by Granovetter's theory of how a legislative social network may affect legislative success (see Granovetter [1973]). The underlying idea is that in the cosponsorship network legislators are linked to colleagues who commonly support the same pieces of legislations because of factors like ideology, party and demographics; and to other legistlators less similar to them, with whom they only sometimes cooperate for specific policy goals. In the repeated interaction with similar colleagues, a Congress member forms strong ties in the cosponsorship network. These strong ties represent the base of support of a legislator: those who would back the legislator's agenda even if they were not linked by a strong tie. At the same time, legislators establish weak ties with whom they have sporadic interactions. According to Kirkland, weak ties are crucial for increasing legislative success because they allow diffusing a legislator's influence beyond his or her base of support. Using cosponsorships between legislators to measure tie strength, Kirkland (2011) constructs cosponsorship networks for eight state legislatures in 2007 (North Carolina, Alabama, Minnesota, Mississippi, Alaska, Hawaii, Indiana and Delaware) and for the 102nd through 108th U.S. Houses (1991–2004). The author shows that the probability of bill survival is increasing in the number of weak ties. This evidence documents the importance of having a diverse pool of cosponsors for legislative success.[4] Following the same logic, Kirkland and Williams (2014) show that that U.S. legislators collaborate on legislation across chamber lines. Using data on cross-chamber bill sponsorship in legislatures in Texas, Colorado, Maine and Oklahoma, they show that cross-chamber collaborative partnerships exist, even across party lines. A similar idea has been used by Parigi and Sartori (2014) to study social networks in party politics. Using data from the Sixth Legislative Cycle of the Italian parliament (from 1972 to 1977), they

[3] Fowler (2006a) distinguishes between "active" (defined as those who help write or promote legislation in some way), and "passive" cosponsors (defined as those who do nothing more than add their names to the bill).

[4] Battaglini et al. (2018) find evidence in line with Kirkland's theory using data from the U.S. House of Representatives for the 109th -113th Congresses.

classify cosponsorship ties between members of Parliament as either weak (one collaboration only) or strong (more than one collaboration) ties to gauge the extent to which political parties aggregate relevant local social cleavages at the national level. The authors hypothesize that these cleaveges are then reproduced in the form of coalitions inside the party. They find that belonging to the same social cleavage, as measured by coming from the same macro region, raised the probability of cooperation between to members of parliament of the same party but did not play a role in collaboration across parties. The largest party, the Cristian Democrats (DC), appeared to be organized as a network in which there are clusters of politicians coming from the the same geographical regions linked by strong ties, and in which these clusters are linked by weak ties. In this analysis, parties, therefore, emerge as loose coalitions of local interests organized to foster cooperation between these interests and win elections against parties on the opposite side of the ideological spectrum (in the case of the DC of 1970, the Communist Party). Cintolesi (2018) documents evidence that politicians' connections are also important across party lines. Using data on the composition of local council boards in Italy from 1985 to 2014, the paper shows that members of the winning party have a greater probability of being appointed to local council boards if they are connected with a leader of the opposition party (here connected means having previously sat together on a local council board). Interestingly, the relationship disappears when a single party holds more than 50% of the seats, indicating that social networks across party lines are especially important when cooperation across party lines is necessary to secure a majority in the council.

Another avenue for inferring social connections in Congress is to use so-called "Dear Colleague" letters. "Dear Colleague" letters, named for their common salutation, are official correspondences between U.S. Congress members for the purpose of persuading or informing other politicians on a bill or issue. These letters have been commonly used since the early 20th century and signal when legislators are jointly working towards a shared goal (Peterson 2005).[5] Although the underlying networks of "Dear Colleague" letters have been recognized as potentially holding vital networking information, they have been unavailable in digital form until recently (Krutz 2005,

[5] Straus (2013) has used "Dear Colleague" letter data from the 111th Congress to explore the factors that correlate with a politician's likelihood of using this method of communication. The regression analysis identifies rank-and-file majority party members who are electorally "safe" as the politicians who are most likely to use the "Dear Colleague" system.

Kroger 2003). More recently, the letters have been moved to an electronic database, allowing them to be more readily examined. Craig (2015) recently uses this data to map networks among Congress members for the 111th Congress and shows that members from the same party are less likely to collaborate, while members from the same state or members that share collaborators are more likely to work on legislation together. Members who collaborate with their colleagues more often are more successful in gathering cosponsors for their legislation, though there is limited evidence that increasing the number of cosponsors on a bill makes it more likely to pass. Using a unique data set on "Dear Colleague" letters sent between members of Congress from 1999 to 2010, Box-Steffenmeier et al. (2018) identify which interest groups endorse which piece of legislation and at what stage of the legislative process. They show that endorsements from interest groups that are well-connected across the branches of government are associated with a larger number of cosponsors on a bill in the early stages of the process, while at the later stages the more successful bills (as measured by the bills with a higher probability to pass the House) are the ones endorsed by a larger number of interest groups.

Researchers have also used press events in order to measure social networks in Congress. These events tend to be very visible and involve high levels of coordination between members of Congress.[6] Desmarais et. al. (2015) use participation in joint press events held by U.S. Senators to draw a social network of legislators for the 97th to 105th Congress. They argue that press events can capture collaborative relationships better than co-support of legislation and co-membership in policy-focused legislative organizations (i.e. committee or caucuses). This is because joint press events feature a limited number of participating politicians, are costly to organize, require extended planning and coordination between several offices at both the member and staffer level and are subject to very few formal constraints. They show that being connected in the press event network predicts co-voting in roll calls.

A more recent approach to the study of social networks in Congress is to construct alumni networks, that is to define two politicians connected if they attended the same educational institution. There are a variety of mechanisms that support the idea that educational institutions provide a basis for social networks. For example, alumni connections may make it easier to form

[6] Specifically examining the Senate, Sellers and Schaffner (2007) argue that congressional leaders hold press conferences with rank-and-file Senators as a public display of their network.

social connections thorough common acquaintances.[7] Alumni may share similar ideologies or preferences, similar connections with lobbyists, and/or more effective communication patterns since communication is enhanced when the two parties are more alike (Bhowmik and Rogers [1971]).[8] Alumni networks have been used by Cohen and Malloy (2014) to show evidence of logrolling in the voting patterns of U.S. Senators. Their results are consistent with the theory that school ties are a preferential channel that makes vote trading easier. Interestingly, they document that the effect of alumni connections is stronger in two key situations: i) when a vote on an action before the legislature is close, thus potentially causing rational actors within the network to exploit the alumni network to whip votes for or against the measure; and ii) when a piece of legislation is inconsequential to the politician's home state, and accordingly less relevant to their constituents, thereby presumably lowering the cost of supplying a vote. When these two circumstances are combined, that is during close votes where the bill is less important to the voting senator, the alumni effect is especially pronounced.

The literature survey above has documented various effects of social connections in the U.S. Congress and provided valuable insights on the mechanisms through which these social connections affect the political activisties of the members of Congress. Summarizing, three main channels have been brought to light: information transmission, vote exchange and, finally, the workings of political parties. This literature has certainly provided suggestive evidence on the relationship between social connectedness and legislators' behavior. Moving away from a mere descriptive analysis, however, presents several empirical challenges. Finding solutions to these challenges is the subject of a recent literature in both economics and political science, which is growing at a rapid pace. Those studies are reviewed in the next section.

[7] Educational institutions explicitly encourage socialization among alumni. For example, Cornell University has a "Second Decade Program" for graduates 10 to 20 years past graduation (https://alumni.cornell.edu/connect/young-alumni/second-decade/); Yale organizes groups called BOLD or "Bulldogs of the last decade;" Harvard organizes groups called GOLD ("Graduate of the Last Decade"). At the Princeton reunions, graduation years are organized as satellites around the classes that celebrate major reunions (5th, 10th, 15th, etc. reunions). These channels for socialization are independent and plausible orthogonal to Congressional activity.

[8] There is direct evidence that school relationships are more homophilous than those formed in other settings (Flap and Kalmijn [2001])

II.2 Do social networks in legislatures matter for politicians' decisions?

II.2.1 Assessing Causality

Ideally, to determine causality of social connections we would randomly form social bonds among legislators and then observe what effects these bonds have on the legislators' behavior. While this type of intervention is typically impossible, researchers have found natural environments in which this type of random assignment occurs. Two prominent examples are Rogowski and Sinclair (2012) and Harmon, Fisman and Kamenica (2017), which measure social networks using physical proximity.[9]

Rogowski and Sinclair (2012) note that the order in which newly elected members of the U.S. Congress can choose offices is random. Since congressmen have similar rankings for office locations, their choices and therefore their office proximities are presumably driven by the random order. The random selection order, while obviously not directly relevant for voting behavior, is directly correlated with legislators' physical proximities, allowing a clean evaluation of how physical proximity affects legislative behavior. Interestingly, the authors find that "Members whose offices are located in the same building vote together about 1% more of the time than legislators whose offices are located in different buildings. The effect is even larger for cosponsorship: legislators whose offices are in the same building cosponsor together 3% more frequently than legislators whose offices are less proximate" (Rogowski and Sinclair (2012, p. 11)). Still, when the authors control for network endogeneity, no significant effect of physical proximity is found.

A similar approach, but in a different context and with different results, has been used by Harmon, Fisman and Kamenica (2017). The authors note that members of the E.U. parliament sit, with few exceptions, in alphabetical order.[10] The authors, therefore, use the Members of the European Parliament's (MEP's) alphabetical order as an instrument for physical proximity. They employ a

[9] Besides the above mentioned work by People (2008) and Mansket (2008), the early political since literature using physical proximity to draw social contacts also includes Young (1966) and Bogue and Malaire (1975). Young (1966) argues that during the Jeffersonian Congress, physical proximity, in the form of a shared boardinghouse, significantly influenced legislators' voting behavior. Bogue and Malaire (1975) questioned this interpretation by noting that legislators self-select their boardinghouse group based on shared characteristics. Thus, the observed voting behavior may be the result of mutual beliefs, rather than shared lodging.

[10] Exceptions are party leaders and members of four small parties.

dyadic regression model where MEPs' probability to agree (or disagree) on a vote depends on their similarity in a variety of characteristics (party, gender, experience, etc.), including seat proximity. Their results suggest the existence of peer effects (as measured by the effect of sitting close at random), which are stronger among women, politicians from the same country and in close votes. Since MEPs vote in different venues (Brussels and Strasbourg) which have different seating configurations, the authors also have the ability to study whether peer effects are persistent over time. The results show that MEPs who have sat together in the past are less likely to disagree on a given vote even when they are not seated adjacently at the time of the vote. Using the full randomization of the seating arrangement in the Parliament of the Republic of Iceland, Saia (2018) provides further evidence that seat proximity of politicians makes their voting behaviour closer, even if they belong to different parties.

A drawback of the approaches exploiting random physical proximity is that they have limited applicability because most seating assignments in legislatures are not random and, more, generally, it is difficult to find true natural experiments. For example, an analysis as in Harmon et al. (2017) would not be possible for the U.S. Congress, where sitting assignments are not exogenous.[11] Two other approaches with wider applicability have been suggested. The first was mentioned before and it is based on the use of alumni networks, both as a measure of social connections per se, and as an "instrument" to control for the endogeneity of cosponsorship networks. The other is structural: directly modeling network formation and its endogeneity.[12]

Alumni networks. Alumni networks are appealing because they provide a way to draw social links between legislators that are not contemporaneous to the legislative activity and therefore are not codetermined. As mentioned above, alumni networks have been used by Cohen and Malloy (2014) as a measure of social networks among of U.S. Senators. They show that the fraction of Senators in one's alumni network that vote in favor of a given bill is strongly related to a Senator's

[11] From the House Clerk's website (http://clerk.house.gov/member_info/memberfaq.aspx), we read: "Assigned seating for Members was abolished during the 63rd Congress, in 1913. Today, Members may sit where they please. Generally, Democrats occupy the east side of the Chamber to the right of the Speaker of the House, and Republicans sit across the aisle on the Speaker's left. The tables on either side of the aisle are reserved for party leaders and for committee leaders during debate on bills their committees bring to the House Floor."

[12] Observe that the reflection problem, which is an important issue in the estimation of peer effects, does not apply when network data are available. The intransitive relationships that are embedded in network topologies create nonlinearities that break the reflection problem (see e.g., Bramoullè et al. 2009, Calvò et al 2009).

own likelihood of voting in favor of that bill, even after controlling for other well-known predictors of voting behavior.

Although it is certainly true that the alumni network is by construction extraneous to the political process, a causal interpretation of these results should be considered with caution. In fact, it may be the case that some educational institutions attract students with similar characteristics; or that the type of education provided by some institutions is pivotal in forming successful politicians or politicians of a given ideology. As a result, the observed correlation between alumni network membership and similarity of behavior could simply reflect unobserved school quality or characteristics.

This problem can be tackled by moving from a small legislative body such as the U.S. Senate to a larger body such as the U.S. House of Representatives. Having a larger sample size, alumni networks from the same school can be divided into cohorts of a certain timeframe. It is then possible to exploit variations in network ties among alumni of the same school who belong to different cohorts.[13]

Battaglini, Sciabolazza and Patacchini (2018) propose a different use for the alumni networks. They study the extent to which social connections influence the legislative effectiveness of members of the U.S. Congress by proposing a new model of legislative effectiveness that formalizes the role of social connections. In the empirical test of their theory, they control for possible unobserved factors driving both network selection and outcomes by implementing a two-step procedure à la Heckman. A selection correction term derived from the network formation model is added into the model used to estimate the relationship between outcomes and social network effects. The presence of a connection in the alumni networks is employed as an exclusion restriction of the Heckman model. The identifying assumption is that attendance at a given school may predict who is in contact with whom in Congress, but it is not directly related to the politicians' legislative activity. In testing the model predictions with data for the 109th-113th Congresses, they provide new insights into how social connectedness interacts with factors such as seniority, partisanship and legislative leadership in determining legislators' effectiveness. Looking at the role of political parties in the U.S. Congress, they find that connections with those

[13] We discuss this paper in the next section.

outside one's own party are as important as connections within one's own party, supporting the hypothesis that more effective legislators are those able to find a diverse support of cosponsors (Kirkland, 2011). Their results also show that network effects increase in importance as the bill moves from the initial stage to the final vote on the Floor.

Structural approaches. A way to deal with network endogeneity is to model it directly and estimate a structural model that accounts for it. In doing so there are two complications. On one end, some theoretical models lead to sharp characterization of the equilibrium network: this is, however, obtained at the expense of making very strong assumptions and predictions that would be hardly supported by evidence. On the other end, certain models allow for more realistic assumptions but suffer from problems of multiplicity of equilibria: this is ill-suited for sharp identification of the underlying parameters. A structural analysis of network formation needs to strike a balance between these two problems.

Canen et al (2017) provide a structural estimation of a model of network formation first proposed by Cabrales et al. (2011). In this model each legislator chooses how much socializing to do but does not choose who to socialize with. The higher the "socialization level" chosen by a legislator the more likely the legislator is to form a social link with others. Links, however, are random and distinguish only between members of the same party. Socialization and legislative effort are complements and contribute to the probability of legislators' reelection. Using this model, the authors obtain predictions that link legislators' level of socialization to their legislative effort. They are able to structurally estimate this by using a proxy of the level of socialization and a proxy for legislative effort. As a proxy for a legislator's level of socialization, the authors use the log of the number of bills that the legislator has cosponsored. As a proxy for the level of legislative effort, the authors use an index based on roll call votes and the number of speeches in Congress. The authors conclude that partisanship is a significant driver of socializing in Congress, but their model suggests that social interactions are less polarized than what solely analyzing roll call evidence would suggest. While this paper makes a novel contribution to the analysis of social networks in Congress, the assumption that social links are random and non-targeted defies the popular notion that legislators strategically socialize to maximize their effectiveness and appears to oversimplify the structure of social connections. The authors manage to estimate the entire social network in Congress, using as the main inputs only the aggregate number of cosponsorships per legislator to

measure socialization, and only roll call votes and speeches to measure legislative effort. To fully harness the power of structural analysis, it seems necessary to use more granular information on the relationships between individual legislators.

Battaglini, Patacchini and Rainone (2018) provide a different attempt to estimate the social network in Congress. This paper makes two contributions: first it proposes a new model of network formation that gives, under assumptions that can be empirically tested, a unique equilibrium network; second, it estimates this network using a novel Bayesian methodology that is well suited for environments with large and complex networks. The model underlying this analysis has two stages: in the first stage, legislators choose to invest in their individual links to other legislators; in the second stage, legislators choose legislative effort given the network chosen in the first stage. The legislators aim at maximizing their effectiveness, which depends on both their legislative effort, their connections, and the effectiveness of the legislators to which they are connected. While the game is simple, the analysis is complicated by the fact that each action generates very complicated indirect effects on the other players. These complications are not dissimilar to the complications we have when studying a general equilibrium in an exchange economy: where a change in an agent's demand has an obvious direct effect on an agent's utility and an indirect effect on equilibrium prices. The solution in general equilibrium analysis is to assume that agents are "price takers": agents solve their optimization programs by taking prices as given; prices, however, must clear the market in equilibrium. Such analysis is motivated by the fact that, in many exchange economies, each agent only has a marginal impact on equilibrium prices, thus allowing researchers to ignore the indirect effects. Battaglini et al. (2018) use a similar approach by introducing the concept of a *Network Competitive Equilibrium.* As in a competitive equilibrium, legislators are "price takers" with respect to the effectiveness of other legislators. The legislators' levels of effectiveness, however, must satisfy equilibrium conditions and be consistent with an individual legislator's optimizing behavior. The authors show that this equilibrium can be characterized as a system of equations with a unique solution. While the system is typically very large (over 400 equations, one per legislator) for the U.S. Congress, it is sufficiently manageable to be estimated using large scale Bayesian methods typically used in evolutionary biology and genetics. Using simulations based on theoretical and real-world networks, Battaglini et al. (2018) show that this approach allows researchers to recover complex networks with surprising precision. They then use the approach to estimate the social network underlying the 109th-113th U.S. Congresses. Their

estimates give a significantly positive approximation for the social spillover and shows that the social structure cannot be reduced to a simple linear structure as in standard models. Furthermore, their research provides an insight into the relationship between social connectedness and individual characteristics.

II.2.2 Observability

The discussion of the structural models from the previous section suggests an additional question: Is it possible to estimate the social network in a legislature without any theoretical structure, just letting the data speak? Political scientists have dedicated considerable resources to gather data on politicians' behavior over time and in constructing time series of indexes by combining the available information. Examples include the NOMINATE score developed by Keith Poole and Horward Rosenthal and the Legislative Effectiveness Score (LES) developed by Craig Volden and Alan Wiseman.[14] Suppose we observe a time series of the legislators' effectiveness. These "outcomes" give us information regarding how a legislator's effectiveness is correlated with other members. Thus, we pose the following question: can we use these "outcomes" to reconstruct the legislators' social connections? The complication in answering such a question is that a social network with N legislators is typically described as an NxN matrix. An unknown structure of interactions would thus require inferring NxN parameters.

Battaglini, Crawford, Patacchini and Peng (2018) propose a Graphical LASSO estimator to recover the parameters of a network model of peer effects where a politician's legislative success depends on both the effectiveness of the legislators in her/his social circle and on standard determinants of legislative effectiveness. The methodology postulates the existence of a latent network among politicians and recovers its structure from the observations of the behavior of the politicians (here legislative effectiveness) over time. Importantly, they provide conditions for which the parameters of the social interaction model are consistently estimated when using the recovered network.

[14] Realtime data on politicians' ideology (NOMINATE score and related variations) are available at http://voteview.com (Lewis et al. (2017)). Data contains information on each politician from the 1st U.S. Congress through the present. Data on politicians' legislative activity (LES) are available at http://www.thelawmakers.org/ (Volden and Wiseman (2014)). Data contains information for each member of the U.S. House of Representatives from the 93rd Congress through the present.

The only other methodology that is suited for the task of estimating network influences from unknown network structures using outcome data is proposed by De Paula et al. (2018).[15] While the Battaglini et al. (2018) approach is based on parametric assumptions (in particular, normality of the error terms), De Paula et al. (2018) does not require such an assumption, but it does require observing outcomes for a number of time periods that is very large (compared to the number of units): an assumption that requires the latent network remains stable over many time periods. This is a strong assumption for applications in the political arena where political networks change rapidly over time.[16]

III Policy Makers and the Rest of Society

Politicians' social connections are important not only for explaining the internal working structure of Congress (and legislative bodies in general), but also in understanding how Congress (and more generally policy makers) interacts with the rest of society. In this section we discuss the literature that has studied the importance of social networks in the interaction between policy makers and the rest of society. We focus on three aspects of this question: lobbying, family caste and ethnic networks, and public activism.[17]

III.1 Lobbying

If interpersonal relations play a role in legislators' behavior, then we should also expect them to play a role in how interest groups allocate resources among legislators. Battaglini and Patacchini (2018) provide a theoretical framework to think about how social networks in Congress affect lobbying activities. They consider a model with two or more competing lobbyists attempting to influence a vote outcome. In the spirit of the vote buying literature, the lobbyists make monetary promises that are contingent on the way legislators vote.[18] The departure with respect to the previous literature is the assumption that legislators have a bias toward voting as members of their

[15] A different network reconstruction procedure is proposed by Breza et al. (2018). Instead of being based on outcomes, this network elicitation procedure uses aggregated relational data, that is responses to survey questions asking an agent to report, for instance, the number of social connections.

[16] They employ their method to study tax competitions across U.S. states.

[17] Another literature in behavioral political economy convincingly documents that individuals'social interactions influence voting and political participation (see, in particular, DellaVigna et al. (2016), and Perez-Truglia and Cruces (2017)). This literature is recent and still relatively small.

[18] For the vote-buying literature, see Groseclose and Snyder (1996), Banks (2000), Dekel et al. (2009).

social circle.[19] Because of this, some legislators who are more "central" in the social network are more important: by buying their vote, lobbyists can influence a larger number of legislators. In general, the allocation of the interest groups' money is generally a complex function of the voting rule, the legislators' preferences for the policy, and the topology of the social network. The authors, however, show that when legislators are office motivated or when the number of legislators is large, the relationship between network topology and allocation of resources is simple: the interest groups allocate their resources in a way that is proportional to the Katz-Bonacich measure of centrality, a well-known concept of centrality in network theory.[20] The authors find support for this prediction using the alumni network, as described in the previous sections.

The role of social networks in lobbying is also the topic of Blanes i Vidal et al. (2012) and Bertrand, Bombardini and Trebbi (2014). Blanes i Vidal et al. (2012) show that ex-staffers, who make up 34% of total revenue of lobbyists, had differing compensations depending on their connections within Congress. Former House and Senate staffers tend to have higher revenues than other lobbyists. Among former staffers, those who worked for members of the Finance and Ways and Means Committees (arguably the most important committees in the Senate and House, respectively), received a premium. Perhaps more interestingly, lobbyists connected to U.S. Senators suffer an average 24 percent drop in generated revenues when their previous employer left the Senate. The drop, moreover, is proportional to the political power of the exiting politician. These findings suggest that lobbyists who serve in the government as staffers form political capital that makes them valuable to interest groups. This point is confirmed by Bertrand et al. (2014), who look at whether lobbyists' comparative advantage lies in "what they know" or in "who the know." The authors measure lobbyist connections by using the contributions that lobbyists make to congressional election campaigns and then show that when the legislators they are connected to through previous campaign donations switch committees, they switch issues accordingly. These works suggest that understanding lobbying implies understanding the complex nexus of social connections between fellow legislators and between legislators and lobbyists.

[19] Specifically, the assumption is that legislators' utility increases with the number of other legislators in their social network who vote as they do.
[20] See, for example, Zenou (2016) for a discussion.

III.2 Family, Caste and Ethnic Networks

The discussion in the previous sections reveals how difficult and challenging it is to measure the exact topology of politicians' social connections. Exploiting the idea that ethnicity and religion are important dimensions along which social bonds form, some studies have used proximity along these dimensions to measure social networks and study their effect on policy making. This literature focuses on developing countries where bonds along those dimensions are stronger.

By exploiting the random system of reserving local council seats for caste groups introduced in India by the 73rd Amendment in 1991, Munshi and Rosenzweig (2013) document that representatives with extended caste networks (as measured by belonging to the most numerous eligible sub-caste in each ward) are associated with providing higher provision of public goods and having better competencies than representatives elected without caste discipline. Given the short-term nature of the mandate, the system does not allow citizens to hold politicians accountable for their actions through re-election. The caste system helps solve this agency issue that arises when politicians are tempted to deviate from the wishes of their constituents because the representatives are held accountable by their caste. The elected representatives, however, are only answerable to their own social group whose preferences may differ from that of the median individual of the constituency. Still using the 73rd Amendment in India but focusing on the mandated caste-based reservation for the Pradhan position (or head of the local government), Besley et al. (2004) examine how proximity to the leader in both group identity and location matter in the distribution of different forms of public goods. The study shows that caste networks seem to help for targeted household public goods but they do not matter in receiving village level public goods. [21] Those types of interventions are instead primarily targeted towards the village where the leader resides, thus making physical proximity with the leader, rather than a shared group identity, the important determinant.

The mechanism through which caste networks affect politicians' decision making is difficult to pin down. Evidence in favor of the presence of ethnic favoritism is found by Burgess et al. (2015) using data from the Kenyan national government. They document that, across the 1963–2011

[21] Household public goods include the construction of the household's house, toilet, the provision of private water or electricity connection, whereas village public goods include construction or improvement activity on roads, drains, streetlights and water sources.

period, Kenyan districts where more than 50 percent of the population is coethnic to the president in a given year receive twice as much expenditure on roads and almost five times the length of paved roads built relative to what would be predicted by their population shares. The political regime, however, is an important determinant of ethnic favoritism. Ethnic favoritism disappears during periods of democracy, suggesting that democracy limits the ability of the president to favor coethnicities.

As strong as castes and ethnic ties may be, their effect is limited by the fact that they involve only indirect and often impersonal relationships. It is natural to expect family ties to play an even more salient role due to the presumable strength and personal nature of these type of relationships. Mapping politicians' family networks is, however, as difficult as mapping their social networks. Very recently, some studies have engaged the challenge by exploiting special contexts. Naidu, Robinson and Young (2016) use genealogical data in Haiti to provide suggestive evidence that families with higher network centrality (as measured by Bonacich centrality), are more likely to support a coup. They construct family networks by building ties between families through intermarriages. Cruz, Labonne and Querubin (2017) apply a similar network construction procedure on data covering 20 million individuals in more than 15,000 villages in the Philippines. Their findings reveal that a politician's family network is a strong predictor of candidacy and electoral success, and they are in line with the idea that politicians from families that are more central (as measured by eigenvector centrality) have a greater ability to buy votes. Using biographical information of Members of the U.S. Congress from 1789 to 1996, Dal Bò et al. (2009) show that legislators who hold power for longer become more likely to have relatives entering Congress in the future. This pioneering study stimulated a strand of recent literature looking at the existence and consequences of political dynasties in different countries (see, in particular, Braganca et al. 2015, Querubin 2016). Using a novel dataset on heads of states and their background characteristics for about 200 countries, Besley and Reynal-Querol 2015 show a positive correlation between a country's growth rate and having a hereditary leader in office. The association, however, holds only if executive constraints are weak, as measured by how leaders

are bound by institutional constraints on a scale between 1 and 7, from the Polity IV database provided by the Center for Systemic Peace (CSP). [22]

Gagliarducci and Manacorda (2016) examine the potential monetary gain corresponding to having a politician as a family member using data for Italy from 1985 to 2011. They exploit the fact that in Italy the taxpayer identification number contains the first three consonants of one's last name and an identifier for the municipality of birth. They define "families" as groups of individuals sharing the same first three consonants in the tax code and born in the same municipality. Although the procedure is not free from measurement error, the fact that in Italy last names are geographically concentrated, the number of geographical divisions is high and the geographical mobility is low allows them to identify families with a reasonable degree of precision. Using data on the employment history of around 1 million private sector employees randomly sampled from social security records, their results show that the return on having a politician in the family is large—an increase in private sector earnings of about 3.5 percent relative to a baseline level. The effect increases as the resources available to the administration where the politician serves increases, in line with rent-seeking behavior. A similar analysis is performed by Fafchamps and Labonne (2017) using the main data and network construction adopted in Cruz, Labonne and Querubin (2017). Their analysis reveals that, in the Philippines, the effect is particularly noticeable at the top of the occupational distribution: individuals connected to currently serving local officials are associated with about a 20% increasein the mean probability of being a manager. Their investigation of the pathway for this effect suggests that office holders do so because they trust their relatives more, and can possibly supervise and monitor them more easily. Querubin (2011) finds that, in the Philippines, introducing a term limit does not reduce the persistency of political dynasties. Folke et al. (2017) reveal that being a child with a parent elected as mayor of a Swedish city is associated with an increase in yearly earnings of about 10 percent (of the average earnings). Their analysis of mechanisms behind this, however, does not suggest the presence of rent-seeking behavior associated with a higher probability to get a public sector job; or that the children "inherit"

[22] The Polity IV Project collects authority characteristics of all states with a total population of 500,000 or more in the most recent year, see http://www.systemicpeace.org/polityproject.html.

their parents' pre-mayoral job. The authors suggest that the boost in income is likely to be diven by the fact that children of newly elected majors are less likely to pursue higher education.[23]

III.3 Social Media and Public Opinion

It has been long argued that social media makes grass roots politics easier and more effective. Besides studying this proposition, recent work has also investigated the reverse statement: that social media provides new tools for governments to manipulate public opinion. In the next two sections we discuss these two lines of research.

III.3.1 Social Media and Public Activism

An early work emphasizing the importance of communication among citizens for the success of protests or revolutions is Chwe (2000) who studied a coordination game in which the benefit of activism increases with participation. In his model, agents have incomplete information, knowing only whether their neighbors in a network participate in the protest. The author emphasizes the importance of social links to guarantee coordination. Focusing on the case in which agents are pessimistic regarding the agents for whom they have no direct information, the author shows conditions under which strongly linked networks with larger cliques are better for coordination and thus make activism easier. The model, however, abstracts from what makes activism effective because it assumes that its success is an exogenous function of participation and it does not analyze how expectations about other agents are formed in general environments.

More recent work has extended these insights in two ways. First, maintaining the assumption that the success of activism is an exogenous function of participation, thus focusing on the determinants of participation. Second, by making the policy maker's reaction to activism endogenous, characterizing in what conditions grass roots activism has sufficient informative value to affect policy. This is important because a systematic positive effect of social media on activism can be found when the effectiveness of activism is endogenous.

[23] A related literature looks at the value of political connections for firms and banks. In this literature, a company is defined as politically connected if at least one employee (a top officer for most papers) has, had or will have a high-level government position (or is closely related to a top politician). For brevity, we do not survey this literature here (see Fisman (2001), Fisman and Wang (2015), Faccio (2006), Cingano and Pinotti (2013), Klor, Saiegh and Satyanath (2016)).

With respect to the first group of work, Shadmehr and Bernhard (2011) consider a model in which citizens are uncertain about the benefit received from a successful revolt, an event that, as in Chwe (2000), is triggered when the number of protesters passes an exogenous threshold. They show that the availability of more information or more correlated signals may increase or decrease the probability of a revolt, depending on the primitives. On the one hand, correlated or more precise signals aid coordination which makes activism easier. On the other hand, with imperfect information on the state of nature, we may have equilibria in which activism occurs even when it would not have occurred with complete information (essentially with agents being active and hoping for good signals from others).

Little (2016) distinguishes between two coordination problems that must be solved for successful activism: what the author calls a "political coordination problem," that is whether a sufficiently large number of citizens participate; and a "tactical coordination problem," that is whether activists coordinate on the same strategy (where, when, and how to protest). The author argues that social media help citizens solve the tactical coordination problem but may exacerbate the political coordination problem. Better information may reveal that a regime is unpopular, just as it can reveal that a regime is popular, thus having an ambiguous effect on participation. Tactical Coordination is unambiguously improved.

A different but complementary angle on how social media may affect public protests is provided by Jackson and Barbera (2018). They assume there is uncertainty about the potential number of protesters: the key strategic evaluation for a citizen is therefore the number of other protesters who are "out there." The authors assume that a citizen can observe some other citizens' preferences and study how this piece of information affects activism when there is homophily, that is when people are biased to meeting people with the same preferences. The authors show that by reducing the informational content of the observed signal, homophily makes protesting easier when coordination is a key factor, but, by reducing the informational content of the signal when it is important to acquire information, it makes protesting harder.

Overall, this literature, in which the policy maker's reaction function is exogenous, presents ambiguous results on the relationship between social media and activism, characterizing conditions in which the effect may be positive or negative. A systematic positive effect of social

media on protests is found when the effect of protests on policies is endogenized, as in Battaglini and Benabou (2003) and Battaglini (2017).[24] Battaglini (2017) considers a model in which some policy makers choose a policy without knowledge of a relevant state variable. As in Condorcet (1785), valuable information is dispersed among citizens, who can individually attempt to signal their private information to the policy-maker through their participation in petitions and protests. The author shows that, even in the presence of an arbitrarily large number of informed citizens, signaling is possible only if the signals available to individual citizens are sufficiently precise. To understand the reason why this is the case, it is important to examine why social media may make activism more effective. Assume a policy maker has to choose between policies *A* and *B*, and the policy maker is more prone than the citizens to choose *A* over *B*. Citizens can protest to induce the policy maker to choose *B* over *A*: they will be able to affect the policy maker's policy if their protesting convinces them that there are signals in favor of *B*. A citizen who is evaluating whether to protest a policy or not, conditions their decision on the event in which their action matters, i.e. affects the policy maker's choice at the margin. If the agent's private signal is weak, they will have a posterior close to the posterior of the policy maker when indifferent between the two decisions no matter what the value of the signal is, and no matter how many other informed activists there are. Since the policy maker is more prone to choose *A* over *B*, and in correspondence to the pivotal event the policy maker is indifferent or almost indifferent between the options, then the citizens will strictly prefer to protest independently from the observed signal, thus making an informative equilibrium impossible and making public activism irrelevant. In this context, social media allow groups of socially connected citizens to share their information, can relax the incentive compatibility constraint for information revelation and allow for the existence of informative equilibria. Groups that share information pool their information in equilibrium and act as individuals: while this reduces the number of independent signals available to the policy maker, it allows for the existence of informative equilibria in environments that would not otherwise be possible.

In light of all these theories, is it then true that social media make public protests more effective? Recent literature has found creative ways to test this conjecture and even gather some insight on

[24] Earlier signaling models of activism with an endogenous policy maker reaction function are presented by Lohmann (1993) and Banerjee and Somanathan (2001). These studies, however, do not consider the issue of social media or, more generally, communication among activists on the effectiveness of information aggregation.

the mechanisms behind it. The major complication in this research is to establish causality because the fact that social media is adopted as a form of communication by activists does not necessarily imply that it makes activism easier. This can only be established by finding sources of exogenous variation that drive the diffusion of social media.

Using details on cell phone coverage, Pierskalla and Hollenbach (2013) and Manacorda and Tesei (2016) document that the diffusion of cell phone technology in Africa has induced a significant increase in the probability of mass activism.[25] Both papers address concerns regarding potential endogeneity between cell phone coverage and mobilization events with a variety of econometric techniques and instrumental variables. The first shows that the same qualitative results are obtained when cell phone coverage is instrumented using an index of the local regulatory quality (which is correlated to phone coverage, but they assume it is unlinked to violent protests). The second shows that the same results are obtained when cell phone quality is instrumented using the number of lightning strikes during storms (which are negatively correlated with cellular phone infrastructure, but presumably not with mass protests). Within the theoretical arguments presented above, mobile phones consistently appear to both improve the information available to citizens, making them more responsive to economic conditions and make it easier for them to coordinate.

A completely different strategy to empirically study the effect of social media on public protests is proposed by Enikopolov, Makarin, and Petrova (2017). They first document that the penetration of VK, a Russian equivalent of Facebook, was correlated with protest activities in Russia during December 2011. They then use an original source of exogenous variation to show causality: information on the city of origin of the students who studied at the same educational institution where the founder of VK was studying when he started VK, Saint Petersburg State University (SPU). The idea is that students from SPU, when the company was founded in 2006, were the early adopters of the network who determined its diffusion. Enikopolov et al. (2017) found that the number of students from a given city who studied at SPU with the founder of VK is positively correlated with participation in the 2011 protests. With this analysis, the authors conclude that a 10% increase in the number of VK users in a city corresponds to a 4.6% increase in the probability

[25] Specifically, Pierskalla and Hollenbach (2013) have shown that the diffusion of cell phones is associated with an increase in the likelihood of violent collective action, while Manacorda and Tesei (2016) have shown that cell phone coverage makes mass mobilization more likely during economic downturns.

of protests and a 19% increase in protest participation.

It is useful to interpret these findings in light of the theories discussed above. All of these works see social media as a tool for information distribution and coordination, but only sometimes attempt to distinguish between these two. This tendency reflects the fact that theories of public protests have been based on information aggregation and signaling alone (as in Lohmann (1993)) or on pure coordination problems alone (as in Kuran (1991)). Recent work, however, makes it clear that it is not possible to separate these two motives. In Battaglini (2017), coordination allows citizens to act as one, thus pooling their signals. This changes the precision of independent signals and so relaxes incentive compatibility for information revelation: with no coordination, there would be no information revelation. At the same time, when the policy maker's response function is endogenous, with no information aggregation and revelation, there would be no reason to coordinate for the citizens.[26]

Protests are only one way that a citizen can be active in their nation. Another way in democratic countries is to donate to a campaign. This activism is normally seen as large donations from wealthy individuals or corporations. Social media changes this perspective as it can lower the barriers to entry. Intriguing evidence on this front is presented by Petrova, Sen and Yildirim (2016), who document that, for new politicians who have never been elected to Congress, creating a Twitter account will increase the donations to the candidate. This increase in money comes specifically from new donors and from areas with lower print newspaper circulation. Specifically, this occurs when the candidate tweets more informatively. The use of social media, therefore, can help citizens have their voices heard through donations to candidates who may not have as much financing due to their newer stature.

III.3.2 Social Media and Government Control

The dark side of the development of powerful social media is that it gives autocratic governments powerful tools to monitor and influence public opinion. For example, Qin et al. (2017), show that

[26] A direct test of Battaglini (2017) using laboratory experiments is presented in Battaglini, Morton and Patacchini (2018). The experiments show that information transmission and coordination are intimately related: as the possibilities for coordination are changed (by allowing for communication within social groups), players change their strategies and change the informativeness of their actions.

most of the real-world protests and strikes observed during the 2009-2013 time window in China can be predicted one day in advance using data from Sina Weibo, a Chinese equivalent of Twitter, thus allowing the regime to intervene even before the protests start. While theoretical understanding of how social media changes the way governments (especially of the autocratic type) interact with their citizens is still in its infancy, recent work has highlighted important facts about the strategies used by autocratic government.

King, Pan and Roberts (2014) have focused on censorship in China. In order to observe which online posts are subsequently deleted by authorities, they collected data on all published posts in Chinese social media, observing which would be censored. In order to observe which posts are not allowed to be published at all, they posted messages using fictitious social media accounts. Their analysis led to a clear picture of the strategy used by the Chines regime. They found that criticism of state and local leaders and their policies is not censored. Alternatively, authorities censor any post that may generate collective action and posts that may bring support to groups that are seen as obstacles to the Communist Party. Words such as "masses," "incident," "terror," "go to the streets," and "demonstration" are commonly found in posts that are held for further censorship review. This finding is supported by Bamman, O'Connor and Smith (2012) who identified similar expressions (such as "Tibetan independence," "democracy movement" and "Central Propaganda Section") that are also blocked on Sina Weibo.

By allowing some freedom of expression, the national party can use social media posts to monitor officials in local regions (King, Pan and Roberts (2013)). By letting local officials be criticized for corruption or inaction, the central government can be informed of the issues and see if local officials correct their conduct. If the local officials fail to meet the expectations, then the central government could intervene. Quin, Strömberg and Wu (2017) note that it is possible to predict which politicians will be charged with corruption up to one year before any legal action is started just using social media activity.

Autocratic governments, however, do not limit their activities to censorship. They are also very active in manipulating public opinion. King et al. (2017) estimate that 448 million comments each year in Chinese social media can be attributed to agents sponsored by the Chinese government; Qin et al. (2017) estimate that about 4% of all posts on Sina Weibo are generated by state agents.

King, Pan and Roberts (2017) use machine learning to identify the posts of agents sponsored by the regime (the so called "50 cents" (50c) accounts) and study their characteristics. They found that the regime-sponsored posts are not used for defending government policies or to engage in discussions on controversial issues with government critics; rather they are used to promote symbols of the regime and eulogize the revolutionary history of the Communist Party. The authors propose that the reasoning is strategic and that these posts are designed to distract the citizens from general negativity, a common grievance or events that the party would like to contain. By analyzing the timeline of these posts and when these 50c accounts spike, connections can be made with major events such as the Shoshan Riots, Urumqi Rail explosion and Martyr's Day. These are events that the party would either want to distract the public from, or bring positive attention to, for the purpose of helping the party.

Until recently, much less was known about how public opinion is manipulated in non-autocratic regimes. Recent events in which Russia attempted to interfere with the U.S. elections, however, are stimulating research in this direction. Allcott and Gentzkow (2017) have conducted a systematic study of the diffusion of so called "fake news" into the media consumed by American citizens during the 2016 election.[27] Unlike Chinese 50c, these posts tend to be focused on political discourse and supporting one presidential candidate over another. The authors focus on the fake news dispersed via Facebook[28] (specifically 156 election-related news stories determined to be false by leading fact-checkers), while also using a post-election online survey covering 1,200 individuals. They note that although media outlets may want to politicize the fact that fake news heavily favored then candidate Donald Trump over Hillary Clinton, the evidence garnered through exposure on Facebook is more inconclusive than definite. More importantly, Allcott and Gentzkow (2017) discuss the economics of fake news and how it can exist in equilibrium. Due to the high cost of determining the validity of a news source, as well as the desirability of partisan news, there is room for fake news to exist in the social media sphere.

[27] They define "fake news" to be news articles that are intentionally and verifiably false, including intentionally fabricated news.

[28] It should be noted that during the 2016 election, Facebook was not the only social media outlet that was affected by targeted fake news. Social media such as Twitter, Instagram and YouTube were also affected and received hundreds of millions of views (see Isaac and Wakabayashi (2017), Pappas and Berger (2018)).

IV. Concluding Remarks

In this paper we have reviewed recent works studying how social networks affect policy making. We have focused on two specific aspects of this question. First, we have surveyed the literature studying how social connections affect behavior in legislative bodies, especially in the U.S. Congress: how (and if) social links play a role in legislators' votes and how they determine the effectiveness and success of legislators. Second, we have surveyed the research on the role played by social networks in the interaction between policy makers and the outside world. This is obviously a broad question that we have addressed by limiting the analysis to three channels: social networks and lobbying, the role of religion, family links and ethnicity and the relationship between social media and grass roots activism.

A big push behind many of the works discussed above has been the recent advances in data collection which allow researchers to better measure social connections among policy makers and other social actors, as well as advances in theoretical modelling that provide new theories linking social connections to lobbying, public activism and other forms of political behavior. Still, important methodological challenges, such as problems concerning the observability of social networks, and the identification of casual links between policy makers' social connections and their policy choices have only started to be addressed. Progress along those lines requires not only advanced theoretical frameworks to help interpret data, but also outright creativity in finding new data and identification strategies.

More work is needed to understand how networks operate and affect policy making. The existing literature suggests that social connections may affect policy outcomes by helping legislators to establish vote-trading networks and share information. Which of these two activities is prevalent and under what conditions? In addition, social links play more than a supporting role in the interior functioning of political parties, especially in parlimentary democracies where they have such an important role. This seems to be an important aspect that is not emphasized enough in a literature that has been mostly focused on the U.S. system. For all these issues, we have only a limited theortical understanding and not enough empirical evidence. It is clear that more research is needed on all these fronts.

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