A social network perspective on the interaction between policy bubbles*

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Abstract

The socio-psychological phenomenon of the policy bubble occurs when policy overinvestment or overproduction, itself the result of distorted policy valuation, is sustained by positive feedback processes and contagion over an extended period of time. Studies of policy bubbles have so far focused on the policy domain as the unit of analysis, thus allowing scholars to analyze the inflation or deflation of standalone bubbles following changes in self-reinforcing processes and contagion within the policy domain at hand. Little attention has been devoted to the fact that while the phenomenon of policy bubbles captures the efficiency of policymakers in matching the intensity of the policy tool to the intensity of the policy problem in the long run, policy efficiency itself can only be defined relative to an information set. Scholars have therefore ignored the possibility that a policy bubble in a given policy domain or jurisdiction may constitute an information event for another policy bubble which has inflated elsewhere. Given that diffusion processes are closely related to the basic architecture of a population's network, and that social networks are primarily carriers of information and shapers of policy beliefs, opinions, and choices, this paper imposes multiple policy domains on bubbly policy processes. Drawing on the distinction between technical/factual information and experience-based (e.g., expert) judgement, as well as on the consequences of social-network structure for information diffusion, the paper develops a theoretical framework and methodological toolbox for explaining the potential impact of interbubble dynamics on the sustainment of policy bubbles. The main contribution of the paper lies in expanding political scientists' analytical toolkit for elucidating policy overproduction in the long term. This is achieved by unpacking the potential causal mechanisms through which a policy bubble can be sustained, even if positive feedback processes and contagion in the jurisdiction within which it developed no longer bolster its support bases.

Keywords: Interbubble dynamics, bubble connectivity information, social networks, network segregation, 'alternative facts,' policy overinvestment

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In recent years there has been growing interest in the difficulties which policymakers encounter in matching policy solutions to problems over an extended period. In this regard, one of the most intriguing complex public policy phenomena is that of policy bubbles. Jones, Herschel, and Wolfe (2014) as well as Maor (2014) defined and conceptualized this phenomenon as a policy overinvestment or overproduction which is sustained by positive feedback processes and contagion over a relatively long time period. To facilitate the distinction between the phenomenon and its explanation, Maor (forthcoming) recently defined the term as "a socio-psychological phenomenon which occurs when policy overinvestment or overproduction due to distorted policy valuation is sustained by positive feedback processes and contagion over an extended period of time".

Jones et al. (2014) furthermore demonstrated that policy bubbles are a real phenomenon through an examination of crime policy, school reforms, and privatization in the United States. They found that following a period of underinvestment relative to indicators of policy problem severity, the US government vastly overinvested in the areas of crime and privatization relative to these indicators and was slow to reduce policy investments to match the declining indicators. Moving beyond this basic finding has proven difficult and, in fact, no empirical study to date has systematically identified and examined policy bubbles.[1] Recently, the notion of policy bubbles was conceptually extended by focusing on the role of emotions in processes of sustained policy underreaction, termed negative policy bubbles (Maor 2016).

Studies of policy bubbles have so far focused on the policy domain as the unit of analysis, thereby allowing scholars to analyze how standalone bubbles inflate or deflate following changes in self-reinforcing processes and contagion within the policy domain at hand. Little attention has been devoted to the potential connecting tissue between policy bubbles, namely the shared information set, and to social networks as an enduring meso-level component of policy systems through which 'infected' information (i.e., distorted policy valuation) may be diffused from one bubble to the other across policy sectors, levels of government, states, and other jurisdictions.

This neglect is rather surprising. Indeed, although the phenomenon of policy bubbles captures the efficiency of policymakers in matching the intensity of the policy tool to the intensity of the policy problem in the long term, policy efficiency itself can only be defined relative to an information set (Sohn and Sornette 2017). Further, in this information set, the causes of policy problems are "matters of interpretation and social definition" (Cobb and Elder 1983, 172). Scholars have therefore ignored the possibility that a policy bubble in a given policy domain or jurisdiction may constitute an information event for another policy bubble which has inflated elsewhere. An information event in a policy system which shares an information set with another policy system refers to the diffusion of new information through a social context with the potential to change people's sensitivities regarding policy-related aspects at the receiving end. Diffusion indicates the "process through which political [or policy] phenomena spread from one jurisdiction [or domain] to another" (Karch, Nicholson-Crotty, Woods, and Bowman 2016, 83). A policy bubble in a given domain could potentially cause a gradual or, alternatively, a large and sudden

inflation or deflation of a policy bubble in the same domain elsewhere (i.e., in another jurisdiction) or in another policy domain in the same jurisdiction or elsewhere.

A salient example is the broader view of management as the key to better government: this reached a peak, becoming a dominant ideology, in the UK and the US in the late 1980s and early 1990s (Pollitt 1990, vi). Public management reform thus became "an ideological and visceral issue" (Hood and Dixon 2015, 196). Although it did not produce "a government that costs less and works better" — rather, quite the opposite — it diffused to numerous OECD countries as the reforms were continually marketed as science-based "best practices" with universal validity (Heady 2001, 391). To capture such a possible dynamic, in the ensuing pages I will carefully attempt to lay a theoretical foundation for the study of interbubble dynamics.

Drawing on the distinction between technical/factual information (e.g., official statistics, evidence-based knowledge, and other verifiable facts) and experience-based judgment (e.g., evaluation by experts and self-perceived experts, 'alternative facts,' and other unsubstantiated opinions), as well as the consequences of social-network structure for information diffusion, this paper develops an analytical framework and methodological toolbox for explaining the potential role that interaction between policy bubbles may play in the sustainment of these bubbles. It conceptualizes how the aforementioned types of information, transmitted from a source bubble through social-network structures which vary in terms of segregation patterns, allow us to anticipate changes in the forces that sustain policy bubbles elsewhere, in addition to the self-reinforcing processes and contagion in the jurisdiction within which they developed. Rather than focusing on social structure, this paper evaluates the independent role of social networks as agents of change and, at times, as protectors of inefficient policy investment. Structural patterns identified here are relevant in cases of diffusion of new information through both elite- and non-elite networks at the local, state, federal, and global government levels. Thus, the analytical framework advanced here encompasses information diffusion at these levels. Overall, the paper contributes to general policy process theory by unpacking the potential causal mechanisms through which such bubbles can be sustained, even if self-reinforcing processes and contagion in the jurisdiction wherein they developed no longer bolster their support bases.

Relevant Literature

Underlying this conceptual paper is the premise that by abstracting from a policy system in order to explain a standalone policy bubble we risk severely misunderstanding the full spectrum of factors which may determine the sustainment of policy bubbles. To counteract this tendency, we require a deep understanding of how ideas, information, and behaviors spread, which aspects of a policy enhance or impede diffusion, and which aspects of the network's topology enhance or impede diffusion. At the outset, one of the major results emerging from empirical and theoretical analyses of how social structure relates to behavior is that social-network structure affects how information flows, what access individuals have to various types of information, how policy choices are made, and how actions are diffused. Notable examples have been recorded in sociology (e.g., Granovetter

1985; Smelser and Swedberg 2005), economics (see the review in Goyal 2016; Jackson 2016), and in politics, public policy, public administration, and international relations (see the review in Victor, Montgomery, and Lubell 2018). Likewise, fruitful investigations concerning the effects of social networks on policy outcomes have been published during the last two decades (for a review, see Boucher and Fortin 2016, 280-3).

We therefore focus on social networks because of their unique potential for explaining policy change. This is due to their "capacity to exist outside, within, and across formal organizations, groups, and hierarchies [thereby coordinating] the actions of individuals excluded from institutionalized bases of collective power—and therefore facilitat[ing] cooperation between those who may be interested in transforming or, even, razing existing structures" (Erikson and Occhiuto 2017, 230). In addition, when formal institutions do not work efficiently, social networks with mutually observing individuals generally play a central role (Breza 2016). Further, the importance of networks is well-established empirically (Bramoullé, Galeotti, and Rogers 2016, 8), as is the finding that highly connected 'hub' players can hinder learning and the diffusion of desirable practices (Bala and Goyal 2001). The ubiquity of networked interactions in policy systems means that, if anything, social networks should be integrated in any analytical framework which attempts to explain policy investment, let alone over- or underinvestment.

Specifically, scholars agree that insights from epidemiology regarding how contagious disease spreads through a population can be constructively applied to the study of policy diffusion (Boushey 2010). In addition, several scholars who focus on learning as a diffusion mechanism leading to policy adoption have recognized the role played by the communication of information as a trigger of diffusion. Learning is "a process where policies in one unit are influenced by the consequences of similar policies in other units" (Gilardi 2016, 9). Two types of information have been studied: policy effectiveness (Meseguer 2006; Mooney and Lee 1995; Simmons, Dobbin, and Garrett 2006, Walker 1969) as well as the policy's political viability and public attractiveness or popularity (e.g., Graham, Shipan, and Volden 2013; Berry and Berry 1990). Gilardi (2010) identified the independent effect which each of these types of information has on policy adoption, as did Seljan and Weller (2011), although the latter cover the entire policy process. Other streams of research have focused on the role of information, concentrating on how the ease of policy implementation affects the speed of policy diffusion (Boushey 2010; Makse and Volden 2011; Nicholson-Crotty, Sean, Peterson, and Ramirez 2009), as well as on the fact that complex policy information is often distilled into simple policy image (Baumgartner and Jones 1993) and "embedded in policy as messages that are absorbed by citizens and affect their orientations and participation patterns" (Schneider and Ingram 1993, 993). In this regard, Boushey (2016) determined that a criminal justice policy which reinforces popular stereotypes diffuses more readily than policies that challenge biases regarding the target populations, and that state governments are more likely to adopt congruent policy innovations when crime is a nationally salient public problem. Relatedly, Gilardi, Shipan, and Wueest (2017) applied a structural topic model to demonstrate the diffusion of policy perceptions. In addition, Mallinson (2016) found that policy characteristics and their perceptions can be manipulated by policy entrepreneurs.

Scholars have also explored policy diffusion networks based on the adoption of many policies over time (Desmarais, Harden, and Boehmke, 2015). Using network inference methodology developed in machine learning, they have inferred diffusion networks connecting US states that adopt policies in the wake of their use in other states, by applying an algorithm which analyzes persistent diffusion patterns. Drawing on this study, among others, Boehmke, Rury, Desmarais, and Harden (2017) suggested a dynamic, latent diffusion network through which various strategies for seeding a policy in the American states spread from 1960 to 2009. These studies highlight the importance of the nature of the diffusion process arising from characteristics of network structure, such as patterns of segregation, network density, the distribution of links within the network, and the potential changes in the network resulting from people's reaction to contagion.

Characteristics of social network structure shape behavior—as economic literature has demonstrated extensively (for a review, see: Bramoullé, Galeotti, and Rogers 2016; Jackson, Rogers, and Zenou 2017). In parallel to this literature, the narrative advanced here treats prominent properties of 'infected' information, transmitted from a source (policy) bubble and macro properties of network structure through which information flows, as factors that enhance or impede diffusion, thereby influencing the sustainment of policy bubbles.

The analytical framework advanced in the next section seeks to account for the complexities of interbubble dynamics in the context of large and massive networks, rather than small and medium-sized ones. How do patterns of social contacts affect the flow of information amongst policy bubbles? For which policy bubbles are networks important and when are they less so? What are the relevant aspects of networks for interbubble dynamics? How should policy actors use social networks to promote or discourage over/under production of policy or to mediate messages which promote distorted policy valuations? If a policy entrepreneur wants a specific causal story to spread as widely as possible, which nodes should he or she infect first? Which network structures perform better in diffusing 'correct' policy valuations? Which network structures are less effective than others from a social perspective? To what degree should a government be willing to act in order to acquire information about social networks, and how should it promote the 'correct' policy valuation on social networks? To what extent can companies and governments operate as "switches" between social networks? Empirical tests of the framework advanced here can answer these questions in a way which provides policy-oriented conclusions. The framework offers increased precision in distinguishing the various social processes that sustain policy bubbles, because forces such as diffusion of information, contagion, and peer pressure depend on network structure and can have substantial policy implications.

The Analytical Framework

At its core, the aim of the framework is to discern different causal mechanisms involved in the sustainment of policy bubbles. We do so by conceptually identifying the potential conditions under which distorted policy valuation, transmitted from one bubble to another through different network structures, is likely to lead to a persistent level of 'infection' at

the receiving end. One example is information contagion that spreads fears from one bubble-generating network to another. Another is contagion through interlinked or related public goods and strategies (e.g., when some governments are forced either to reduce/stop or begin/accelerate the production of certain public goods, leading to cascades of losses/gains which spread, through exposure, to common factors). The framework developed here therefore focuses on information diffusion and macro (e.g., social) network characteristics. Information diffusion is a causal process involving internally- and/or externally-generated policy-related information, or the perceptions thereof. Macro network characteristics may be internally- and/or externally-determined characteristics which direct attention to macro, global, and aggregated network patterns.

A particularly important question is how network structure interacts with the type of information transmitted—via common people interacting through diverse relationships—from one bubble to the other. Network connections can have a positive effect by undermining the 'infected' policy valuation, but they can also have a negative (or distortive) effect by creating channels through which 'infected' policy valuations may spread. The key issue here is therefore whether the network structure serves to amplify or dampen 'infected' policy valuations. This issue directs attention to both the dynamics of the diffusion process itself—which, through a temporal dimension, leads from an initial piece of information at the source bubble to an endemic 'infection' at the receiving end—and to the outcomes of information diffusion.

Underlying this framework is the premise that dynamic social networks are interconnected rather than isolated. A given social network depends on the dynamic processes that occur in some other social networks. This is because different bubbles may share an information set, and this, in turn, provides a connecting tissue between bubbles. To understand such processes, we must consider how information is produced, how it is introduced, how it is spreads or decays, how the various information sources interact within networks and with the audience, and, most importantly for our framework, how information diffusion and contagion via common exposure to an information set depend on network characteristics, such as segregation/fragmentation patterns.

Specifically, two policy systems with slightly different degrees of network segregation may experience highly divergent responses to the diffusion of a particular type of information. It is therefore necessary to ascertain the structural conditions under which the network at the receiving end will become more susceptible to a contagion process that remains endemic in the long run as a result of its segregation patterns and the type of information transmitted. Which type of information, through which patterns of network segregation, can continually 'infect' the hubs, thereby spreading the infection to others? In which receiving network are we more likely to record hubs that tend to be connected to other highly connected nodes, consequently amplifying endemic 'infection'? In sum, some basic aspects of overall network structure and variations in the kinds of information may have important consequences for interbubble dynamics and its outcomes.[2]

The framework advanced here incorporates independent variables on two different levels: (1) interbubble connectivity information, and (2) the social-network structure. For the

former, the framework distinguishes between two kinds of information regarding the policy instrument: *technical/factual information* which largely advances a single interpretation of the value of a policy instrument, and *experience-based judgment* which, by its nature, allows for diversified interpretations.

Bubble connectivity information is 'infected' by its nature. It may be biased, light, or at least based on highly selective data or on no verifiable data whatsoever. It may include deceptive misrepresentation or, in the era of post-truth politics (Hopkin and Rosamond 2017; Lockie 2017), even utter lies and bullshit (Frankfurt 2005). When incorporated in politicians' rhetoric, it can shape people's perceptions of policy problems and solutions in addition to defining the parameters of what is politically possible and normatively appropriate (Hay 2004). It can also be used as an instrument in policy entrepreneurs' construction of consensus narrative aimed at legitimizing and objectifying claims for the production of more/less policy (Abolafia 2014). Policy actors can use bubble connectivity information to influence audience attention and to generate ambiguities and uncertainties in order to thwart the prevailing policy valuation.

Specifically, technical/factual information includes facts that help us determine whether something is true or false. "When applied to programs designed to increase human well-being, evidence allows us to decide whether the program produces its intended impact" (Haskins 2018, 8). Thus, technical/factual information encompasses, among others, official statistics, cost-benefit analyses, quantified impact assessments, measurement of performance,[3] random assignment experiments, routine procedures and techniques, and other types of evidence-based knowledge. Although verifiable, such information can still be 'infected' by policy entrepreneurs who emphasize some facts over others, or advance factual claims with emotional significance and/or identity and ideological bias. Yet, because objective facts are verifiable, they require no (or very little) gap-filling by policy actors and individuals. Consequently, their behaviors may remain passive or be understood as exogenous. Technical/factual information also leaves relatively little leeway for individuals (e.g., highly connected nodes — the hubs) to manipulate information in order to shift the opinions and actions of others deliberately. Social networks which are exposed to technical/factual information may therefore lack the additional layer of strategic interactions (Jackson 2008; see also Jackson and Zenou 2015; Bramoullé and Kranton 2016).

By contrast, experience-based judgment may include expert-based judgment as well as narrative-grounded evaluations and 'alternative facts' which are generated by self-perceived experts and other commentators who manifest imperviousness and sometimes even animosity to facts. For example, performance indicators could be used strategically ─ especially in post-truth political environments ─ to mislead the public and construct 'objective facts' where none existed (e.g., Irvine, Miles and Evans 1979). When bubble connectivity information is based on experience, people must interpret the information they receive from others and decide with whom to conform. Network members may ask two questions: Is the policy instrument used properly? Is this the right policy instrument? The

answers to these questions—one relating to the intensity or scale of use, the other to the type of policy instrument used—may change policy dynamics. This may be the case especially when changes are recorded in salience assessment of a policy by policymakers, citizens, interest groups, and the media. Such a change in public opinion may lead to an alteration in the level of mobilization (e.g., due to a change in the inclination to test new ideas) and in the cognitive commitment of citizens, social groups, and public officials to the policy at hand. Further, a change in the dominant 'image' of the policy instrument can lead to a shift in the venue of decision making, and this may bring about an ideational change, undermining the bases of support for the prevailing policy valuation. Such a change will depend, among other factors, on policy image resilience (Mondou, Skogstad, and Houle, 2014). New interpretations may also divert public attention to what (influential) network members who supported, or chose not to oppose, the policy's initial overproduction consider unanticipated adverse outcomes. They can likewise expand electoral opportunities for politicians, as well as the political coalition for policy change, or undermine those opposing it by producing alternative cost-benefit calculations or leveraging more popular mechanisms (e.g., market or non-market mechanisms). However, to what extent and in what direction is policy dynamics likely to change?

Experienced-based judgments provide a great deal of leeway for strategic interaction and information manipulation, in ways that are rapidly changing according to technological developments. Further, those social networks exposed to experience-based information may manifest multiple layers of strategic interactions. Highly connected nodes may withhold or distort the information that will prove useful in understanding the objective value of the policy instrument. They may also attempt to change how people think about what is true and important, thus exerting a profound impact on the diffusion of information and social learning (Golub and Sadler 2016). They may interact with the media and utilize word of mouth, with important implications for social learning. In some contexts, external actors (e.g., enemy states) may find it easy to enter into the fray, attempting to influence networks and the processes operating on them.

With regard to social network structure, the analytical framework advanced herein focuses on *network segregation* occurring in a social network: "[…] when all the members of one class of persons are cut off from all relationships with all members of other classes" (Freeman 1978, 414). This term developed in order to grasp agents' tendency to associate with other agents who share similar characteristics, such as race, nationality, gender, cognitive and behavioral traits—including personal tastes and the propensity to cooperate with others—as well as genetic traits. One example is separation in geographical space following a slight ethnic preference in friendships and social interactions (Schelling 1971; Cutler, Glaeser, and Vigdor 1999; Patacchini and Zenou 2016). Scholars have discussed network segregation in generic terms and in policy theory (Henry 2018). There are a few related facets to this phenomenon, such as *homophily* (i.e., processes that determine tie formation) and *community structure* (i.e., concentration of linkages among certain groups of nodes). For the purpose of analytical sharpness, it is important to note that segregation refers to observed characteristics of social networks—rather than homophily—and to a situation in which the existence of links correlates with the similarity of nodal attributes—

rather than a community structure (Henry 2018, 566-7). In sum, network segregation is recorded in policy systems, "[w]hen the diversity of [a policy entrepreneur's] local network is lower than the diversity of the network as a whole […]" (Henry 2018, 565).

The variations amongst bubble connectivity information and patterns of social network segregation generate numerous hypotheses, as follows (for a summary, see Table 1).

H1. *Technical/factual information transmitted from one bubble to another is likely to lead to "mechanical" types of diffusion processes, thereby resulting in a stronger and more sustainable inflated valuation of the policy instrument at the receiving end and, thus, a relatively stable and self-sustaining policy bubble at the receiving end.*

When bubble connectivity information is technical/factual, people do not need to interpret the information they hear from others or decide whether they intend to conform to others' views and behaviors. The source bubble therefore operates as an exogenous factor facilitating the diffusion of 'infected' information. This, in turn, solidifies the already distorted policy valuation at the receiving end, thereby contributing to bubble sustainment. Even when technical/factual information is introduced via a new medium and/or at a level of intensity that crosses a tipping-point (e.g., a relatively high visual-emotional degree), the weak ties which are activated and/or the new ties which are created among network members do not interfere with the diffusion and social learning processes. Rather, they create more channels for contagion and amplification of the bubble connectivity information transmitted from the source bubble.

Technical/factual information may also help people from a similar background predict others' behavior with more accuracy, as the rationale of the prevailing distorted policy valuation at the receiving end solidifies. Subsequently, this introduces another common dimension shared by supporters of the (overproduction of) policy at hand (i.e., becoming common knowledge or the 'new normal'), and reduces the potential for loss of confidence as well as coordination failure, which occurs when people are unsure of others' actions or beliefs.

By contrast, experience-based judgment transmitted from one bubble to another is likely to lead to complex diffusion processes, the net impact of which can be either corrective or distortive insofar as the prevailing policy valuation at the receiving end is concerned. This outcome depends on the relative importance of the decreasing contact rates among network members due to the complexity of bubble connectivity information versus the increasing attempts by highly-connected nodes to interfere with the transmission of bubble connectivity information that undermine the prevailing policy valuation at the receiving end, and/or inhibit the spread of certain corrective interpretations via several mechanisms, such as regulating populations which are at risk of becoming 'corrected.'

This rationale brings to the fore a general hypothesis: *Increasing network heterogeneity can reduce the opportunity of experience-based judgment to correct the prevailing policy valuation at the receiving end, thereby resulting in a stronger and more sustainable inflated valuation of the policy instrument at the receiving end and, thus, a relatively stable*

and self-sustaining policy bubble at the receiving end. This hypothesis may be divided into two.

H2. *In segregated social networks, experienced-based judgment transmitted from one bubble to another is likely to lead to somewhat complex types of diffusion processes, the net impact of which can be either corrective or distortive insofar as the prevailing policy valuation at the receiving end is concerned.*

In segregated social networks, agents can inhibit the spread of certain interpretations deriving from experience-based judgment—that is, limit the expansion of imaginable, workable, and plausible policy alternatives—via several mechanisms, such as counter-framing the status quo as the safer option, distorting scientific facts, regulating populations who are at risk of becoming 'corrected' (e.g., concerning closure in small social networks, see Coleman 1988), and interfering with the transmission of particular policy valuation**.** An abundance of 'infected' hubs implies more interference with judgment that carries 'corrected' policy valuation. Put differently, increasing network heterogeneity can reduce the opportunity to correct the prevailing policy valuation at the receiving end.

H3. *In less segregated social networks, experienced-based judgment transmitted from one bubble to another is likely to lead to highly complex types of diffusion processes, the net impact of which can be either corrective or distortive insofar as the prevailing policy valuation at the receiving end is concerned.*

In less segregated networks, experience-based judgment may trigger controversy within the professional community. Senior civil servants, attuned to controversy in the professional community, may act to correct the prevailing policy valuation or deflate the policy bubble unilaterally, rather than rubber-stamping inflated levels of policy production. By the same token, experience-based judgment may be interpreted differently by ordinary or regular hosts, potentially decreasing the number of 'infected' hosts. This, in turn, may signal to network members that correction of policy valuation is in order, thereby deflating the policy bubble. In addition, certain interpretations of experience-based information can cause a negative change in peoples' perceptions regarding the worthiness of given policy-related actors or institutions, and this, in turn, can have a knock-on effect on the worthiness of other actors, thus creating a form of information contagion which undermines the prevailing policy valuation. When investigating the aforementioned processes, it is important to distinguish between the level of connectivity and segregation patterns within a policy system, on the one hand, and the level of connectivity and segregation patterns among decision makers on the other. Both may be of vast significance in amplifying or dissipating information shocks to the system yet, at the same time, such shocks can be triggered at one level.

As noted earlier, the net effect of these patterns can be either distortive or corrective. Gauging the net effect requires recognition of the conditions under which experience-based judgment will spread across the entire interacting network system, as compared to a spread to only one type of network, with minimal isolated 'infections' on other network types. It also requires consideration of a situation wherein two or more distorted policy valuations

spread within the same social network or different networks and interact dynamically with one another. Depending on the characteristics of social-network structure, network type can have a profound or minor effect on the spread of information from one policy bubble to another. Identifying the conditions in which these cases occur is vital to our understanding of interbubble dynamics. Needless to say, the effects of these patterns may vary according to policy contexts.

A careful examination of network interaction patterns should help us to disentangle information originating in one policy domain (e.g., wherein the bubble originally developed) from that which is the product of another policy bubble — both fuel the original bubble, together or separately. It also allows us to develop a structural approach to interbubble dynamics, thereby minimizing the empirical difficulties in gauging deliberate choices made by members of networks when forming links and their policy implications. I refer here specifically to the difficulties in executing empirical tests of the framework due to the possibility that network behaviors correlate with behavior and unobserved factors which influence behavior, that is, due to the possible endogeneity of the network (Jackson, Rogers, and Zenou 2017, 74). I also refer to the difficulties which derive from the fact that the nodes in a network may be political, social, and economic institutions whose behavior may be highly strategic, affecting policy investment and production but also the evolution of the network and the resulting transmission of shocks and crises (e.g., Jackson 2016, 75). We now turn our attention to the relevant methodological toolbox.

Methodology

Identifying causal associations between social networks and outcomes of interest presents empirical challenges. These concerns may be addressed by pursuing multiple research strategies. I elaborate three options: big data analysis, agent-based modeling, and experimentation.

Analyzing the information spreading patterns in multiple social networks can take advantage of the modern advances in data science. Important in this regard are the models developed so far to analyze the adaptive process in information diffusion which are used to characterize the dynamic of opinion formation, such as models concerning social segregation (Gross and Blasius, 2008; Nardini, Kozma, and Barrat 2008). Complex network structures could be uncovered, for example, by analyzing records of mobile communication calls and SMS (text) messages. It is possible to construct a measure of network segregation for each jurisdiction under study, which can then be paired with geo-coded census data on jurisdiction composition in terms of gender, ethnicity, and so on. Complex network structures can also be uncovered by analyzing the online social networks which constitute the most important information spreading platforms. Complex patterns of information spreading can likewise be gauged by analyzing instant messengers, Twitter, blogs, Facebook, as well as other systems that embed rich information spreading phenomenon, such as Instagram, Flickr, YouTube, and so on. It is possible to analyze information spreading by focusing on information broadcasting, sharing, and so on.

Opinions also compete on social networks. Different opinions are distributed in the networks and interact with one another. This calls for the use of agent-based models (ABM) for understanding opinion competition dynamics and competitive diffusion processes on multiplex networks, where the networks are made up of different layers that comprise the same nodes and a given type of edges in each layer. As hypothesis- generating method, ABM is an efficient way to formally examine theoretical explanations, to construct new expectations and gauge potentially surprising findings, to concreticize theoretical puzzles by transforming hypotheses to mechanisms, and to enrich networked experiments. There is abundant research on opinion dynamics over multiplex networks wherein agents interact with bounded confidence. A number of scholars have provided comprehensive surveys of this stream (Lorenz 2007; Castellano, Fortunato, and Loreto 2009; see also Myers and Leskovec 2012; Antonopoulos and Shang 2018). This method may be relevant for understanding social contagion processes during which two adjacent individuals who hold opinions regarding a policy instrument exchange views and compromise, if their opinions do not differ by more than a given threshold. It can also infuse meaning to empirical analysis of deductive- and ABM-derived expectations by using massive date sets which represent large-scale social systems.

Networked experiments provide another possible methodology which can help us explore the implications of interdependencies for policy investment and production. Social settings may be randomized and engineered to enable exploration of the outcomes of social interaction and the unpacking of nuanced behavioral mechanisms that explain social effects. The ability to test complex dynamic hypotheses concerning social behavior has radically increased with the growth of digital tools such as Facebook applications, Amazon Mechanical Turk, as well as increasing collaboration with platform developers and website administrators (for a review, see Aral 2016). Notable examples include digital experiments concerning information sharing and diffusion (Bakshy, Rosenn, Marlow, and Adamic 2012). The design of networked experiments (i.e., setting, sampling, randomization, and treatment assignment), as well as the analysis of such experiments, are discussed elsewhere (Aral 2016). Lab experiments provide a further avenue for testing the analytical framework advanced here (for a review of lab experiments in information flows through varying network structures, see Choi, Gallo, and Kariv 2016, 465–7). Researchers can also gauge causal estimations of network effects by implementing exogenous network structures in the lab (Choi, Gallo, and Kariv 2016).

Conclusions

Over the past few years, political scientists established the plausibility of policy bubbles, principally claiming that such bubbles are fueled by self-reinforcing processes and contagion yet ignoring the possible impact of interdependence between complex policy systems on the sustainment of policy bubbles. To improve our understanding of such a complex phenomenon, we relied here on the fact that policy bubbles are sociological and psychological, down to the core elements of their emergence, sustainment, and collapse. As such, they are not exempt from symbolic, emotional, and other influences occurring in the policy systems with which they share an information set. We can therefore regard one policy bubble as a site for producing information which may fuel another policy bubble.

The hitherto neglected shared information set amongst policy bubbles constitutes a connecting tissue between them. Thus, the question of bubble sustainment cannot be answered until we consider all the potential sources fueling policy bubbles and analyze the information set shared by separate policy bubbles. Regardless of the dynamics at play, the mere act of locating shared information sets across policy sectors, levels of government, states, and other jurisdictions brings the problem of bubble sustainment into sharper focus than ever before.

Considering that diffusion processes "tie in very closely to the basic architecture of a population's network" (Jackson, Rogers, and Zenou 2017, 66), we decided to develop a social network perspective for the study of policy bubbles. At the heart of this perspective is the premise that when the source bubble (i.e., that from which 'infected' information is transmitted) emerges across multiple networks throughout different policy domains and jurisdictions, these same networks may facilitate and/or inhibit the sustainment of policy bubbles at the receiving end. A social network perspective provides powerful tools for analyzing information diffusion processes as well as the extent of contagion, which depends on network structure. It captures the effects of large-scale network structure on aggregate behaviors and outcomes, in addition directing attention to variations between societies with regard to the sustainment of policy bubbles (e.g., fragmented societies may exhibit more fragmented networks). Further, such a perspective allows us to develop conceptual insights of a realistic nature. One reason for this lies in the network concept which "does not imply equilibrium orientation, and involves much lower integration" (Schneider and Bauer 2016, 74). Another relates to the fact that, even when people are not familiar with the details of networks, they instinctively impart information to others who share their demographics. As complicated objects, we thought it useful to simplify networks by focusing on one property, namely network segregation. This conceptual strategy enabled us to demonstrate the importance of network segregation in transmitting bubble connectivity information.

Taken together, the added value of a social network perspective on interbubble dynamics can potentially explain empirical regularities manifesting in policy bubble processes. Specifically, by applying a multi-network logic and imposing multiple policy domains on bubbly policy processes, a social network perspective has the capacity to widen the number of mechanisms for policy bubble sustainment. An empirical examination guided by this perspective can demonstrate the role played by interbubble dynamics (or the lack thereof) alongside self-reinforcing processes and contagion. I view this as the main contribution of this paper.

References

Abolafia, Mitchel Y. 2014. "Central Banking and the Triumph of Technical Rationality." In: Karin Knorr Centina and Alex Preda (Eds.), *The Oxford Handbook of the Sociology of Finance*. Oxford: Oxford University Press, pp. 94–114.

Antonopoulos, Chris G. and Yilun Shang. 2018. "Opinion Formation in Multiplex Networks with General Initial Distribution." *Scientific Reports – Nature* 8: 2852–2864.

Aral, Sinan. 2016. "Networked Experiments." In: Yann Bramoullé, Andrea Galeotti, and Brian W. Rogers (Eds.), *The Oxford Handbook of the Economics of Networks*. Oxford and New York: Oxford University Press, pp. 376–411.

Bakshy, Eytan, Itamar Rosenn, Cameron Marlow, and Lada Adamic. 2012. "The Role of Social Networks in Information Diffusion." *Proceedings of 21st International Conference on World Wide Web*, 519–528. ACM, New York.

Bala, Venkatesh and Sanjeev Goyal. 2001. "Conformism and Diversity under Social Learning." *Economic Theory* 17(1): 101–120.

Baumgartner, Frank and Bryan Jones. 1993. *Agendas and Instability in American Politics*. Chicago: University of Chicago Press.

Behn, D., O. Kristian Fauchald, and M. Langford. 2015. "Bursting Policy Bubbles: The International Investment Treaty Regime." PluriCourts Research Paper, No. 15-15.

Berry, Frances Stokes and William D. Berry. 1990. "State Lottery Adoptions as Policy Innovation: An Event History Analysis." *American Political Science Review* 84(2): 395–415.

Boehmke, Frederick J., Abigail Matthews Rury, Bruce A. Desmarais, and Jeffrey J. Harden. 2017. "The Seeds of Policy Change: Leveraging Diffusion to Disseminate Policy Innovations." *Journal of Health Politics, Policy and Law*, 42(2): 285–307. DOI 10.1215/03616878-3766728

Boushey, Graeme. 2010. *Policy Diffusion Dynamics in America*. New York: Cambridge University Press.

Boushey, Graeme. 2016. "Targeted for Diffusion? How the Use and Acceptance of Stereotypes Shape the Diffusion of Criminal Justice Policy Innovations in the American States." *American Political Science Review* 110(1): 198–214.

Bramoullé, Yann, Andrea Galeotti, and Brian W. Rogers (Eds.). 2016. *The Oxford Handbook of the Economics of Networks*. Oxford and New York: Oxford University Press.

Bramoullé, Yann and Rachel Kranton. 2016. “Games Played on Networks.” In Yann Bramoullé, Andrea Galeotti, and Brian W. Rogers (Eds.), *The Oxford Handbook of the Economics of Networks*. Oxford and New York: Oxford University Press, pp. 83–112.

Breza, Emily. 2016. “Field Experiments, Social Networks, and Development.” In Yann Bramoullé, Andrea Galeotti, and Brian W. Rogers (Eds.), *The Oxford Handbook of the Economics of Networks*. Oxford: Oxford University Press, pp. 412–439.

Boucher, Vincent and Bernard Fortin. 2016. “Some Challenges in the Empirics of the Effects of Networks.” In Yann Bramoullé, Andrea Galeotti, and Brian W. Rogers (Eds.), *The Oxford Handbook of the Economics of Networks*. Oxford and New York: Oxford University Press, pp. 277–302.

Castellano, Claudio, Santo Fortunato, and Vittorio Loreto. 2009. “Statistical Physics of Social Dynamics.” *Reviews of Modern Physics* 81: 591–646.

Choi, Syngjoo, Edoardro Gallo, and Shachar Kariv. 2016. “Networks in the Laboratory.” In Yann Bramoullé, Andrea Galeotti, and Brian W. Rogers (Eds.), *The Oxford Handbook of the Economics of Networks*. Oxford and New York: Oxford University Press, pp. 440–478.

Cobb, Roger W. and Charles D. Elder. 1983. *Participation in American Politics*. Baltimore: John Hopkins University Press.

Coleman, James S. 1988. “Social Capital in the Creation of Human Capital.” *American Journal of Sociology* 94 (Supplement): S95–120.

Cutler, David M., Edward L. Glaeser, and Jacob L. Vigdor. 1999. “The Rise and Decline of the American Ghetto.” *Journal of Political Economy* 107(3): 455–506.

Desmarais, Bruce A., Jeffrey J. Harden, and Frederick J. Boehmke. 2015. “Persistent Policy Pathways: Inferring Diffusion Networks in the American States.” *American Political Science Review* 109(2): 392–406.

Erikson, Emily and Nicholas Occhiuto. 2017. “Social Networks and Macrosocial Change.” *Annual Review of Sociology* 43: 229–248.

Espeland, Wendy Nelson and Michael Sauder. 2016. *Engines of Anxiety: Academic Rankings, Reputation, and Accountability*. New York: Russell Sage Foundation.

Frankfurt, Harry G. 2005. *On Bullshit*. Princeton: Princeton University Press.

Freeman, Linton C. 1978. “Segregation in Social Networks.” *Sociological Methods & Research* 6(4): 411–429.

Gilardi, Fabrizio. 2010. “Who Learns from What in Policy Diffusion Processes?” *American Journal of Political Science* 54: 650–66.

Gilardi, Fabrizio. 2016. “Four Ways We Can Improve Policy Diffusion Research.” *State Politics & Policy Quarterly* 16(1): 8–21.

Gilardi, Fabrizio, Charles R. Shipan, and Bruno Wueest. 2017. “Policy Diffusion: The Issue-Definition Stage.” Working Paper. Available on-line at: https://www.fabriziogilardi.org/resources/papers/policy-diffusion-issue-definition.pdf

Gillard, Rose and Kathryn Lock. 2017. “Blowing Policy Bubbles: Rethinking Emissions Targets and Low-Carbon Energy Policies in the U.K.” *Journal of Environmental Policy & Planning* 19(6): 638–653.

Golub, Benjamin and Evan Sadler. 2016. “Learning in Social Networks.” In Yann Bramoullé, Andrea Galeotti, and Brian W. Rogers (Eds.), *The Oxford Handbook of the Economics of Networks*. Oxford and New York: Oxford University Press, pp. 504–542.

Goyal, Sanjeev. 2016. “Networks in Economics: A Perspective on the Literature.” In Yann Bramoullé, Andrea Galeotti, and Brian W. Rogers (Eds.), *The Oxford Handbook of the Economics of Networks*. Oxford and New York: Oxford University Press, pp. 47–70.

Graham, Erin R., Charles R. Shipan, and Craig Volden. 2013. “The Diffusion of Policy Diffusion Research in Political Science.” *British Journal of Political Science* 43(3): 673–701.

Granovetter, Mark. 1985. “Economic Action and Social Structure: The Problem of Embeddedness.” *American Journal of Sociology* 3: 481–510.

Gross, Thilo and Bernd Blasius. 2008. “Adaptive Coevolutionary Networks: A Review.” *Journal of the Royal Society -- Interface* 5(20): 259–271.

Haskins, Ron. 2018. “Evidence-Based Policy: The Movement, the Goals, the Issues, the Promise.” *The Annals of the American Academy of Political and Social Science*, 678: 8-37.

Hay, Colin. 2004. “The Normalizing Role of Rationalist Assumptions in the Institutional Embedding of Neoliberalism.” *Economy and Society* 33(4): 500–527.

Heady, Ferrel. 2001. “Principles for 2001 and Beyond.” *Public Administration Review* 69 (4): 392–393.

Henry, Adam Douglas. 2018. “Network Segregation and Policy Learning.” In Jennifer N. Victor, Alexander H. Montgomery, and Mark Lubell (Eds.), *The Oxford Handbook of Political Networks*. Oxford and New York: Oxford University Press, pp. 559–588.

Hood, Christopher and Ruth Dixon. 2015. *A Government that Worked Better and Cost Less? Evaluating Three Decades of Reform and Change in UK Central Government*. New York: Oxford University Press

Hopkins, Jonathan, and Ben Rosamond. 2017. "Post-Truth Politics, Bullshit and Bad Ideas: 'Deficit Fetishism' in the UK." *New Political Economy*. DOI: 10.1080/13563467.2017.1373757

Irvine, John, Ian Miles and Jeff Evans. 1979. *Demystifying Social Statistics*. London: Pluto Press.

Jackson, Matthew. 2008. *Social and Economic Networks*. Princeton and Oxford: Princeton University Press.

Jackson, Matthew O. 2016. "The Past and Future of Network Analysis in Economics." In Yann Bramoullé, Andrea Galeotti, and Brian W. Rogers (Eds.), *The Oxford Handbook of the Economics of Networks*. Oxford and New York: Oxford University Press, pp. 71–82.

Jackson, Matthew O., Brian W. Rogers, and Yves Zenou (2017). "The Economic Consequences of Social-Network Structure." *Journal of Economic Literature* 55(1): 49–95.

Jackson, Matthew O. and Yves Zenou. 2015. "Games on Networks." In H. Peyton Young and Shmuel Zamir (Eds.), *Handbook of Game Theory. Volume 4*. Amsterdam and Boston: Elsevier, pp. 95–164.

Jones, Bryan D., Herschel F. Thomas III, and Michelle Wolfe. 2014. "Policy Bubbles." *Policy Studies Journal* 42(1):146–171.

Hood, Christopher, and Ruth Dixon. 2015. *A Government that Worked Better and Cost Less?* Oxford: Oxford University.

Karch Andrew, Sean C. Nicholson-Crotty, Neal D. Woods, and Ann O'M. Bowman. 2016. "Policy Diffusion and the Pro-innovation Bias." *Political Research Quarterly* 69(1): 83–95.

Lockie, Stewart. 2017. "Post-Truth Politics and the Social Sciences." *Environmental Sociology* 3(1): 1–5.

Lorenz, Jan. 2007. "Continuous Opinion Dynamics under Bounded Confidence: A Survey." *International Journal of Modern Physics* C 18(12): 1819–1838.

Mallinson, Daniel, J. 2016. "Building a Better Speed Trap: Measuring Policy Adoption Speed in the American States." *State Politics & Policy Quarterly* 16(1): 98–120.

Makse, Todd and Craig Volden. 2011. "The Role of Policy Attributes in the Diffusion of Innovations." *Journal of Politics*. 73(1): 108–24.

Maor, Moshe. 2014. "Policy Bubbles: Policy Overreaction and Positive Feedback." *Governance* 27(3): 469–487.

Maor, Moshe. 2016. "Emotion-Driven Negative Policy Bubbles." *Policy Sciences*, 49(2): 191–210.

Maor, Moshe. Forthcoming. "Overreaction in Politics and Policy." In: Alex Mintz and Lesley Terris (Eds.). *Oxford Handbook on Behavioral Political Science*, Oxford: Oxford University Press.

Meseguer, Covadonga. 2006. "Rational Learning and Bounded Learning in the Diffusion of Policy Innovations." *Rationality and Society* 18: 35–66.

Mondou, Matthieu, Grace Skogstad, and David Houle. 2014. "Policy Image Resilience, Multidimensionality, and Policy Image Management: A Study of Biofuel Policy." *Journal of Public Policy* 34(1): 155–180.

Mooney, Christopher Z. and Mei-Hsien Lee. 1995. "Legislating Morality in the American States: The Case of Pre-Roe Abortion Regulation Reform." *American Journal of Political Science* 39: 599–627.

Muller, Jerry Z. (2018). *The Tyranny of Metrics*. Princeton University Press.

Myers, Seth A. and Jure Leskovec. 2012. "Clash of the Contagions: Cooperation and Competition in Information Diffusion." *IEEE 12th Int. Conf. on Data Mining* (ICDM): 539–548.

Nardini, Cecilia, Balazs Kozma, and Alain Barrat. 2008. "Who's Talking First? Consensus or Lack Thereof in Coevolving Opinion Formation Models." *Physical Review Letters* 100 (15): 158701–158705.

Nicholson-Crotty, Sean, David A. M. Peterson, and Mark D. Ramirez. 2009. "Dynamic Representation(s): Federal Criminal Justice Policy and an Alternative Dimension of Public Mood." *Political Behavior* 31(4): 629–55.

Patacchini, Eleonora and Yves Zenou. 2016. "Racial Identity and Education in Social Networks." *Social Networks* 44: 85–94.

Pollitt, Christopher. 1990. *Managerialism and the Public Services: The Anglo-American Experience*. Oxford: Blackwell.

Schelling, Thomas C. 1971. "Dynamic Models of Segregation." *Journal of Mathematical Sociology* 1(2): 143–86.

Schneider, Anne L. and Helen Ingram. 1993. “The Social Construction of Target Populations: Implications for Politics and Policy,” *American Political Science Review* 87(2): 334–47.

Seljan, Ellen C. and Nicholas Weller. 2011. “Diffusion in Direct Democracy: The Effect of Political Information on Proposals for Tax and Expenditure Limits in the U.S. States.” *State Politics & Policy Quarterly* 11(3): 348–368.

Schneider, Volker and Johannes M. Bauer. 2016. A Network Science Approach to the Internet. In: Johannes M. Bauer and Michael Latzer (Eds.) *Handbook on the Economics of the Internet*. Cheltenham: Edward Elgar, pp. 72-90.

Simmons, Beth, Frank Dobbin, and Geoffrey Garrett. 2006. “The Diffusion of Liberalism.” *International Organization* 60: 781–810.

Smelser, Neil J. and Richard Swedberg. 2005. *The Handbook of Economic Sociology*, 2nd edition, New York: Russell Sage Foundation.

Sohn, H. and Didier Sornette. 2017. Bubbles as violations of efficient time-scales. Institute for New Economic Thinking Working Paper Series No. 65. Available at SSRN: https://ssrn.com/abstract=3081563.

Supiot, Alain. (2017). *Governance by Numbers: The Making of a Legal Model of Allegiance*. Bloomsbury, Hart Publishing.

Victor, Jennifer N., Alexander H. Montgomery, and Mark Lubell. 2018. *The Oxford Handbook of Political Networks*. Oxford and New York: Oxford University Press.

Walker, Jack L. 1969. “The Diffusion of Innovations among the States.” *American Political Science Review* 63: 880–99.

[1] Notable examples of studies that have touched on this phenomenon include Behn, Fauchald, and Langford (2015) and Gillard and Lock (2017).

[2] If this claim is supported by empirical examinations, then policymakers may have at their disposal informational and structural features which are relevant for setting government policy in response to potential policy bubbles.

[3] For the impact of quantification on our understanding of the nature of public services, administrative capacity, the nature of citizenship, democracy, and the state, see, for example, Espeland and Sauder (2016), Muller (2018) and Supiot (2017).

Table 1: Interbubble Dynamics, Information Type, and the Structure of Social Network – Hypotheses Generation

Policy Bubbles	*Policy domain [A,B] & jurisdiction [X,Y]*	*Bubble connectivity information*	*Type of network structure*	*Layers of strategic interaction*	*Type of diffusion*	*Net impact on target bubble*
H1						
Source	A_x A_x	Technical/factual	Highly segregated or less segregated	None	Mechanical	
Target	A_y B_X					Bubble sustainment
H2						
Source	A_x A_x	Experienced-based judgment	Highly segregated	A few	Somewhat complex	
Target	A_y B_x					Bubble sustainment or deflation
H3						
Source	A_x A_x	Experienced-based judgment	Less segregated	Numerous	Highly complex	
Target	A_y B_X					Bubble sustainment or deflation