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## Conference Paper

# Disentangling economic and political goals in the net neutrality debate

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**Disentangling Economic and Political Goals  
in the Net Neutrality Debate**

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## 1. Background

Discussions of fundamental directions of communications policy are rare. More typically, incremental problems are addressed as they arise, although the accumulation of such small changes may have big consequences. The network neutrality debate is one of these rare opportunities to reflect on the bigger issues of information and communications policy. Because of its overarching nature, it touches a broad range of economic and non-economic policy concerns. It addresses a fundamental issue in advanced communications: how to structure the rights and obligations of different stakeholders in the ICT system, particularly among the operators of physical network platforms and providers of content and applications. However, in this context, it also addresses the rights of users and possibly vertical relations between providers of logical platforms (e.g., operating systems, development platforms, and search) and other stakeholders. From an economic vantage point, this raises questions related to the dynamics and performance of vertically related network markets, in which market power is present at least in some segments. Should the rules of interaction between players be allowed to evolve in repeated market interactions or is there a need for a collective agent to define boundaries or even mandatory rules? From a broader social policy perspective, additional issues become important, including the implications of different governance arrangements for the freedom of speech, democracy and civic participation, and possibly human rights in general.

This diversity of objectives complicates the discussion greatly. Proponents and opponents of network neutrality often construct their arguments from different, even disconnected, normative frameworks. Some analyses are based on broad, and widely shared, aims of communications policy, such as the protection of free speech or support for democratic goals. Others focus narrowly on the economic efficiency implications of policy choices. Rarely are there any attempts to reconcile these different angles and to explore the relation between different goals and the instruments proposed to implement them. Analyses of the diversity of vantage points common to communications policy debates have been addressed before. Wildman and Entman (1992) analyzed the analytical and policy debates around the notion of a marketplace of ideas. They pointed to major inconsistencies and misunderstandings between experts sympathetic to a liberal economic perspective and those arguing from a broader social welfare position. We similarly posit that a lack of clarification of the various dimensions of a policy debate can muddy the water, confusing the design and implementation of policy principles and instruments. Our paper attempts to contribute to a clarification of political and economic goals and the potential instruments that can be used to pursue them.

To this end, we review economic and political reasons that are used as rationales to argue for or against network neutrality. This discussion also helps differentiate alternative specifications of network neutrality and examine overlaps, tensions, and contradictions among stakeholders. We then proceed with an analysis of the relations between different instruments proposed to address

the governance problem and how different policy options serve these aims. We are interested in the logical relations between instruments and objectives. Are certain instruments sufficient, necessary, or neither to achieve an outcome? Do different instruments have to be used in combination? Do trade-offs exist between goals or is it possible to achieve a balanced combination?

## **2. Network neutrality as a governance problem**

At its core, the network neutrality debate is about the governance of advanced communication systems. Governance refers to voluntary and mandated forms of coordination in social and socio-technical systems with the goal to bring them closer to a preferred state or avoid that they degenerate to an undesirable state (Dixit 2009; Hollingsworth and Lindberg 1985; Jordana and Levi-Faur 2004; Rhodes 1996; Scharpf 1993; Williamson 1996, 2005). Hence, government regulation is one form of governance, as are voluntary agreements between stakeholders (“self”-regulation) or hybrid arrangements that include both government action and voluntary measures (“co-regulation”) (Latzer et al. 2003). The notion of governance recognizes that actors other than the state are involved in coordinating social systems. In contrast to the prior view of government as “steering the economy,” the notion recognizes that in increasingly complex social systems effective full “control” may be difficult or impossible to achieve (Mayntz 2003). In reality, it may only be possible to partially influence and move the system toward a more desirable state.

Effective governance requires a workable consensus on the goals to be pursued and a shared understanding of the working of the system to be governed and how it will respond to different forms of governance. This does not necessarily mean that all stakeholders must agree on one single view of the world, but positions have to be sufficiently coherent to allow adoption of a course of action (Denzau and North 1994). If stakeholders’ positions are too fragmented, it may not be possible to meet majority voting requirements in government and voluntary organizations. Likewise, any resulting course of action may be contested in the courts by stakeholders that oppose the action. Thus, when an issue is recognized as a policy problem, a first stage in the discussion is frequently dedicated to clarifying the exact nature of the problem and to forming a sufficiently coherent and workable view of the social system and its responses to specific forms of policy intervention. An important first step in this analysis is a clear understanding of direct effects of governance instruments. Given the complexity of the ICT system, it is also important to examine indirect effects, cumulative effects, and emergent effects at higher levels of the system. Although this will not be possible with a high level of accuracy, the design of governance mechanisms can often be improved if these potential effects are at least considered.

Network neutrality is a rather broad term that gained momentum in the public policy debate because it was seen as addressing a concern shared by many stakeholders. At least three issues can be identified that were perceived as a possible problem, although only two of them are currently at the center of the discussion. One key problem is *network management*, the rights and obligations of network operators to manage traffic flows over their infrastructure. In contrast to content and applications, the network platform market is more highly concentrated. In the U.S., the pattern of competition is spatially diverse. While many local markets are served by several providers, a large number of them are served by only one or two providers, with DSL and cable operators jointly serving the bulk of subscribers. Moreover, the FCC since 2005 had reclassified broadband access markets as information services, relieving service providers from the non-discrimination provisions of common carriage. These issues have raised concerns about the ability of network operators to discriminate against content providers and users. The situation was further aggravated by the expectation that network operators would seek to expand into vertically related content and application markets. Many pundits were concerned that this would increase their incentive to sabotage competitors dependent on their network platform. Such scenarios were contrasted with the ideal type of end-to-end connectivity, which was widely seen as one driving force behind the innovative prowess of the internet (Blumenthal and Clark 2001; Lemley and Lessig 2001).

A second set of concerns was related to the potential role of *network operators as gatekeepers* of information flows. Several instances of discrimination against certain types of content have emerged (although most of them were quickly remedied). The elimination of common carriage obligations was seen as a strengthening of the free speech rights of service providers but possibly at the expense of weakening the free speech rights of users. Related to this set of issues is the concern that the internet might lose its potential role in supporting a vibrant public sphere and civic life.

A third potential issue is *access to logical platforms*, such as development tools and search. Although discussions on “search neutrality” have flickered here and there, this discussion is currently mute. This is not to say that all stakeholders agreed that these were serious problems. Many representatives of industry argued that these were exaggerated concerns, “solutions in search of a problem.” Nonetheless, combined with a few very visible instances of seeming abuse, such as the Comcast-Bit Torrent case, the theme of net neutrality made it from the institutional to the actual policy agenda, not only in the U.S. but also in other countries.

In the course of this discussion, alternative meanings of a “neutral” net were also clarified and with it the possible set of policy options. In broad terms, the discussion moved from a rather simple and broad view to more specific proposals. Moreover, this aspect of the discussion also addressed the vertical, layered architecture of the internet and raised the question of where neutrality policies should be positioned in this stack (Jordan and Ghosh 2009; Jordan 2009;

Frieden 2010). Whereas stakeholders continue to hold widely divergent positions, this process has at least brought clarity to the discussion and has revealed the broad range of options that are available to address the main economic and political concerns. The set of alternatives spans a continuum from rather strict forms of regulation through a range of non-discrimination policies to sole reliance on competition law and antitrust enforcement. Very few authors envision full-fledged regulation of interconnection, interoperability, and pricing as a desirable alternative. The class of non-discrimination options addresses the relation between network operators and content providers as well as those between network operators and users. With regard to the former, it encompasses (1) rather strict provisions such as “a-bit-is-a-bit” models, (2) mandating a zero price constraint on network operators vis-à-vis content and application providers but allowing differentiation on the user side, and (3) less restrictive option of allowing tiered network services as long as they are made available to all content and application providers in a non-discriminatory fashion. With regard to users, non-discrimination options similarly range from the prohibition of differentiation to forms of differentiation (e.g., of prices for different access speeds) as long as they do not result in blocking access to applications and content.

[Figure 1 about here]

Whereas this aspect of the net neutrality debate helped clarify the principal options, additional information is needed to assess which instrument or which combinations of instruments are suited to meet the agreed goals. Although in political practice, goals and instruments often are determined simultaneously, it is justifiable to ask this question from an analytical vantage point. Answering it requires a detailed understanding of the causal nature of the relations between instruments and outcomes. Given the complexity of the modern ICT system, this is not an easy task. Whereas recent research has contributed interesting results to this discussion, much remains to be done. From a logical point of view, the challenge is to determine whether an instrument is a necessary or a sufficient condition to achieve an outcome. Necessity implies that a condition is present whenever an outcome is observed but other factors need to be present as well to generate the outcome. Sufficiency is a stronger condition and implies that whenever a factor is in place, the outcome follows. For policy makers, finding necessary and sufficient conditions is critical. If sufficient conditions can be found, policy implementation is relatively straightforward. In complex social systems, this is often not the case. Several factors jointly may constitute a sufficient or a necessary condition. In this case, policy-makers would have to control all the relevant conditions. Moreover, it is possible that some factors are necessary or sufficient dependent on the overall state of the system. For example, a zero price rule may support investment under certain constellations of consumer demand and network costs but not always. Lastly, it is possible that instruments are not logically related to outcomes but nonetheless perceived as legitimate means. We will come back to these issues in sections four through six.

### **3. Normative foundations of network neutrality**

Good public policy requires a clarification of the overarching visions of society. Although such arguments can benefit from knowledge on the working of society, a large part of policy development is necessarily normative. Where this discussion is not brought into the open, the normative aspects are often tacit; they are nonetheless present.

#### *3.1 Political arguments in favor of network neutrality*

The network neutrality discussion is not different. It draws from several normative traditions, most importantly arguments about political freedoms and human rights, fairness and justice, and more narrowly construed but also normative arguments in favor of efficiency. The former are often emphasized by legal experts, communication scholars, and political scientists, whereas the latter are often invoked by economists and engineers. Part of the tensions in the ongoing network neutrality discussion rests in the very different foundations of these discourses. Although a fair number of authors simply assume that net neutrality serves these goals, several contributors have sought to deconstruct these issues. Important perspectives originate in Habermas' notion of a public sphere, Rawls' theory of justice, and related theories on the freedom of speech particularly as it relates to vibrant democratic institutions.

Habermas (2006) describes that the institutional design of modern democracies is generally comprised of three central components: (1) the private autonomy of citizens "each of whom pursues a life of his or her own" (p. 412), (2) democratic citizenship, specifically "the inclusion of free and equal citizens in the political community" (Ibid), and (3) "the independence of a public sphere that operates as an intermediary system between state and society" (Ibid). He goes on to say that the institutional design should guarantee "the political participation of as many interested citizens as possible through equal communication and participation rights" (Ibid). These ideas are at the heart of many of the normative arguments presented by those that support network neutrality. Those that advocate for an "open-internet" through network neutrality, suggest a distinct connection to Habermas' normative bedrock that promotes and maintains access to the public sphere.

In the online world, to maintain a public sphere as described by Habermas, proponents of network neutrality have called for the normative objective of "openness," which coincides with Habermas' connection between access to the public sphere and democracy. Cooper (2003) presents an early argument for openness at the physical layer of the Internet. He notes,

The physical layer of the communications platform is too critical a choke point to risk a closed layer. The physical layer is controlled by too few owners of dominant technology, which makes it too easy to manipulate the platform as a whole. These owners employ singular, narrow motives and leverage market power in order to protect

existing monopoly rents to achieve domination over neighboring products. Thus, these players are in a unique position to affect the entire communications platform. If this is allowed to continue, the inevitable economic result will be a lessening of competition and a denial of consumer choice leading to slowing of innovative activity. The result in the polity will be to confer excessive influence to platform owners and, more importantly, undermine an opportunity to enrich civic discourse through more active involvement of the citizenry.

Another argument for openness can be found in Schejter & Yemini (2007) who identify a difference between access to traditional media and the potential for access via the Internet. They assert that traditionally, access to the radio spectrum had to be limited through regulation because it was a scarce resource. For this reason, only certain entities were allowed licenses for the purpose of broadcasting. This was a tremendous access limitation that was placed on the general public, as only some individuals were allowed to operate broadcast outlets. To contrast, part of the beauty of the Internet has been its abundance, providing novel opportunities for innovators, consumers and individuals that just want to have their voices heard. Schejter and Yemini assert that regulators addressing the future of the Internet, need to shift their thinking; moving away from approaches that have traditionally been designed to address problems of scarcity and towards the opportunities that this technology of abundance. The authors note that [t]he promise of the internet does not lie in its support of large businesses, but in the opportunities it provides for those who could not have had a say in technologies of content scarcity. (p. 171) and that “[n]etwork neutrality is about creating a potential voice for the many over the first true technology of abundance: broadband internet” (p. 173). Creating a potential “voice for the many” thought a “technology of abundance” emphasizes the objective of openness, and links directly with Habermas’ notion of liberal democracy.

Closely related to the openness objective is the Freedom of Speech objective. Again, tied to Habermas’ notions of a liberal democracy, this objective emphasizes the ability for users to access the Internet, not simply in general, but through their ability to communicate their thoughts and viewpoints online. This objective takes access a step beyond and focuses specifically on the ability for individuals to contribute to the marketplace of ideas.

Nunziato (2009) begins her book by noting “the Internet provides the greatest forum for communication and expression that the world has ever seen” (xiii). She goes on to argue that control of the Internet by a handful of corporations with the ability to censor speech threatens the normative objectives of this forum for freedom of speech.

Blevins and Barrow (2009) present a similar assertion, noting “we conclude that the Internet has such unique qualities and a momentous democratic nature that it merits its own First Amendment framework informed by participatory-democratic theory.” (46) In their article they reference the federal court for the Eastern District of Pennsylvania which described the internet as the “most participatory form of mass speech yet developed,” noting further that the Internet thus “deserves the highest protection from government intrusion.” Blevins and Barrow take this statement a step

further and claim that because “it is the most participatory form of mass speech yet developed” (46-47) they posit that the Internet deserves the highest protection from “*any* instruction, government *or private*.” (47) Furthermore, the authors note that “the human speech rights of Internet users should outweigh the property rights of ISPs.” (47)

Travis (2007) identifies the Internet’s “superior capacity to fulfill First Amendment values” (1522) and argues that a hearkening back to traditional conceptions and objectives of free speech is necessary in order to protect the opportunities provided by the Internet. Travis notes,

By hearkening back to the common law and articulating originalist principles of constitutional, intellectual property, and antitrust law, Internet freedom can be founded upon a surer footing than the ad hoc balancing that characterizes contemporary cyberlaw scholarship and judicial decisions. Specifically, demanding freedom of speech at least equal to that exercised in Britain and North America in 1791 can preserve Internet users’ access to voices and digital technologies threatened by overbroad assertions of copyright, trademark, or telecommunications licensing interests. Moreover, returning antitrust law to its original foundations in the liberty of the subject, suspicion of concentrated public or private power, and insistence on vigorous price and quality competition promises to roll back recent Supreme Court decisions celebrating monopoly power in a variety of contexts critical to digital media, most notably telecommunications and Internet infrastructure. A First Amendment that accounts for the freedom guaranteed by the common law would mandate the breakup of private tyrannies over information, and the liberation of audiences from monopoly control over the instrumentalities of free speech (1579-1580).

Several authors and public policy-making institutions have, also, referred to fundamental human rights and freedoms as foundations for net neutrality. The FCC’s declaration of four principles of an open internet, promulgated in 2005 and based on Michael Powell’s earlier support for these goals, repeatedly refers to net freedoms. Likewise, the declaration of the Council of Europe of 2009 envisions Internet access as a fundamental human right.

## *2.2 Opposing Arguments and the Challenges of Normative Argumentation*

In assessing the contributions of normative argumentation to the network neutrality debate we must address the challenges of this form of argumentation in general as well as the subjective differences inherent in any normative debate. Fashioning pragmatic strategies and outcomes from normative arguments in general can be a challenge, due to the inherent subjectivity of normative argumentation, as well as the difficulties with empirical providing empirical support. The problems can be linked to the central element of normative ethics, morality. Including perceptions of how one “ought” to live and how society “ought” in decision-making processes can be very complicated. If morality is the factor that directs action, whose conceptualization of morality should be followed? If one camp argues that the promotion of Habermas’ liberal democracy through network neutrality rules is the normative stance to take, and another asserts

that network discrimination practices that protect children from harmful content should take priority, whose moral hierarchy is followed?

What about a normative argument in favor of the rights of ISPs? Sidak notes (2006) that “The cost and demand characteristics of the telecommunications industry, along with fundamental principles of welfare economics and the common law, imply at least six rights that the owner of a broadband network may be recognized to possess.” The first of these rights he identifies is the right to innovate on your own network, which would involve network management and pricing strategies. For Sidak, these actions would increase the value of the network, and contribute to a general economic welfare, making this right normative in nature. The second right would be to “unilaterally price the use of one’s network in any way that does not violate antitrust law.” Sidak sees this strategy as another they would promote development and expansion of the network and promote broadband deployment. He sees this benefit as contributing to economic as well as social welfare, making the right normative in nature. A third is the right to “refuse to carry content or applications that present a legitimate risk to the security or performance of one’s network or of the devices that the network operator’s subscribers attach to the network.” He notes, “As a normative matter, a network operator should have the right to refuse to carry content or applications that present legitimate threats to the stability, security, or performance of its network.” The fourth involves the right to prioritize the delivery of data packets.

Sidak sees the connection here to economic welfare and to the importance of a strong and innovative network. Some organizations require that packets arrive faster, and thus, to maximize the efficiency and innovative nature of the network, this right must be recognized. Sidak notes, “the welfare gain of prioritized delivery is greater for a real-time application like VoIP than it is for a less time-sensitive application like email. To achieve a Pareto-efficient usage of the network, a network operator must have the right to prioritize content to maximize economic welfare and minimize the aggregate welfare losses associated with best-efforts delivery.” Rights five and six are similar, and they are: the right to reserve capacity on one’s own network, and the right to use network capacity to vertically integrate into the provisions of content or applications. Sidak notes, “Like the right to reserve capacity on one’s network, this right helps ensure that end-users benefit from a competitive supply of content and applications.”

### *3.3 Economic arguments*

In comparison to these debates, economic arguments in favor of efficiency are much less contested, as efficiency is widely regarded as an important objective, even in an environment where some factors are abundant. Some disagreement exists with regard to the relevant notion of efficiency (static, dynamic) and how one relates to the other. One could argue that efficiency, as a relation between goals and means is agnostic to broader policy issues. Once a level of freedom of speech is determined, it makes sense to search for the most efficient way to achieve it. Nonetheless, many authors disagree, mostly on the count of whether unfettered markets also will

protect and facilitate the goal of free speech. The next section will look at the instruments proposed to achieve these goals and their logical relation to outcomes.

#### **4. Instruments and objectives of the net neutrality debate**

Several specific proposals how network neutrality could be achieved have crystallized from the discussion. In this section, we will examine how contributors to the political and normative debates have assessed five of these instruments: (1) prohibition of blocking (of content, applications, and devices), (2) a zero price constraint on network operators vis-à-vis content and application providers, (3) quality of service tiering between network operators and application providers without discrimination, (4) quality of service tiering between network operators and application providers with discrimination as long as it does not violate antitrust regulations, and (5) the provision of a mandated minimum quality service tier.

Whereas scholars steeped in law and communications have contributed more in-depth analyses and discussions of the broad normative goals that might warrant network neutrality, these contributions rarely examine specific instruments and the causal links between instruments and desired outcomes. If they are discussed at all, instruments and outcomes are juxtaposed suggesting that the presence of an instrument constitutes a sufficient condition to reach an outcome. As our paper intends to examine this connection more closely, we sought to detect the logical relation implied in the arguments whenever it was not discussed explicitly in a contribution.

Perhaps the most common instrument championed by those advocating for an “open” Internet is the “non-discrimination provision.” This provision would ideally take the form of a policy that would be put in place to ensure that governments and private organizations could not affect the traditional “end-to-end” principle. Organizations would have no legal right to censor content being communicated over the Internet, or to affect the transmission of packets from one user to another.

Nunziato (2009) posits, “my argument focuses specifically on regulation prohibiting broadband providers from discriminating on the basis of content.” As noted earlier, Blevins and Barrow (2009) assert the same point by noting that because the Internet is the “most participatory form of mass speech yet developed,” “it deserves the highest protection from *any* intrusion, government or private.” (46-7) The ACLU (2010) notes that the First Amendment requires “that the government create strong policies against incursion by companies that are, at root, profit-seeking rather than civic-minded.” (5) Cooper (2004) argued that “allowing network owners to discriminate against communications, content, equipment or applications represents a dramatic change that would render the information environment much less conducive to innovation. “The

mere threat of discrimination dramatically affects incentives and imposes a burden on innovation today.” (96)

A non-discrimination provision presents an instrument that would involve limiting the actions of ISPs for the purpose of fulfilling the normative goal of providing an “open” Internet. A call for a somewhat different government policy that aims to achieve the same goal, namely, the maintenance of an “open” Internet, is the “equal access provision” suggested by Blevins and Barrow (2009). Instead of the focus of the policy being limitations placed on ISPs, a provision of this type would focus on the promotion of equal access, which on its face appears to be a more ambiguous nob to Jaberamas’ notion of liberal democracy. That being said, the equal access provision, by focusing on ends rather than means seems more pragmatic to a certain degree as it allows for the potential of different solutions to the problem. This notion seemingly parallels calls by individuals like Tim Wu (2004) who have advocated for network neutrality, but have also identified the potential benefits of allowing ISPs to control the network in specific situations. This control would ideally be under the watchful eye of the government and the public. Wu notes, “Operators should have the freedom to “police what they own,” or act reasonably to control the local broadband network. On the other hand, it suggests that the Internet community (and, at some point, regulators) should view with suspicion restrictions premised on inter-network criteria” (235).

The early literature dedicated to an examination of the economics of net neutrality also proceeded largely by juxtaposing instruments and outcomes. However, an increasing number of more recent papers examine the performance implications of specific instruments more carefully. In part, this is facilitated by the stronger reliance on formal models, which makes these relations more explicit. In most of these cases, the logical relation between an instrument and a stated goal could be deducted easily from the papers. It is also striking that papers focusing on the broader political goals often touch upon economic issues but that the primarily economic papers rarely address the political aspects of the discussion.

For the purposes of this paper, it suffices to highlight a small number of recent economic papers that represent the broader body of literature (see Schuett 2010 for a brief survey). The six papers synthesized in Table 1 all take a zero price rule imposed on network operators as the baseline scenario and then investigate the effects of deviations from this strict form of network neutrality, most often, quality-of-service-tiering (QoS-tiering), on short-term and long-term outcomes. The models differ in their assumptions regarding the allocation of network capacity, the structure of network and content/application provider markets, and whether they examine investment and innovation decisions explicitly. Three papers use M/M/1 queuing models to address the allocation of network capacity. Only one model considers competitive ISPs whereas five papers assume that network provision is a monopoly. Half of the papers model competition in content and application markets.

[Table 1 about here]

The majority of the papers explore the effects of different regulatory regimes on short-term resource allocation and long-term decisions. Outcomes are, to a certain degree, contingent on the specific model assumptions. This is particularly true for short-term effects, where several papers find that network neutrality is welfare enhancing (e.g., Economides and Hermalin 2010) or welfare reducing (e.g., Krämer and Wiewiorra 2010). Findings are more consistent with regard to investment and innovation implications, where a recurrent finding is that network differentiation facilitates innovation and investment. With the exception of Shrimali (2008) all other authors find that this outcome is likely but nonetheless contingent on specific conditions. For example, Choi & Kim (2010) identify conditions under which strict network neutrality increases network investment.

[Table 2 about here]

The results of our qualitative assessment are captured in Table 2. An interesting pattern emerges from this first level of analysis: instruments are better suited to pursue economic objectives or political objectives but none of the five instruments is capable of contributing across the range of accepted goals. In most likelt scenarios, prohibition of blocking does not have any plausible strong effect on the allocation of scarce network capacity. Such a provision may reduce the range of options of network operators to address extreme forms congestion, it may increase the incentives of network operators to expand capacity, and it may enhance the incentives of content and application providers to innovate. But these effects are most likely small. However, a prohibition of blocking is instrumental in safeguarding freedom of speech issues and goals related to vibrant democracy processes.

A zero-price constraint on network operators takes away one effective instrument to manage network capacity on the downstream side of the market. Under most circumstances, it will reduce the incentives of network operators to invest in network upgrades compared to a situation in which price differentiation is allowed. However, as Choi and Kim (2010) show, if the network operator holds a monopoly position, it might, under certain market conditions, actually increase the incentives of network operators. A Zero price constraint most likely facilitates innovation at the services and application layer, as it reduces the direct costs of gaining access to a network for players at the application and services layer. This will expand the range of economically feasible services and applications (Bauer 2011). In as far as such lower costs increase the diversity of content and applications they also might support freedom of speech and democratic ideals. However, this is not as clear-cut and straightforward as many pundits seem to believe. As research on complex adaptive systems has demonstrated, increased diversity is not always positive; too much diversity may lead to chaos and disorganization (Page 2010). A similar phenomenon has been observed online, where a proliferation of blogs, social networks, and

information sources seems to have generated fragmentation into relatively isolated, homogenous echo chambers of like opinions rather than vibrant dialogue. However, this paper is not the place to pursue this interesting issue further. All we want to note is that the link between zero price regulation and political diversity may be less robust than many seem to think.

One of the concerns with allowing differentiation of the network platform is that applications and services whose backers do not have the funds to pay for priority lanes on the network will be relegated to slow best-effort lanes. The incentives of network operators are mixed. They do have incentives to make content available if there is demand among their customers. However, small political interest groups or themes that are highly specialized may not be sufficiently important and hence suffer from the slow-lane problem, even if a no blocking condition is introduced. Brennan (2011) therefore suggested a minimum quality approach, where a regulatory agency would set a minimum service quality that needs to be provided to users and service providers. Similar to a zero-price constraint, this approach would probably enhance the incentives for innovation at the application and services layer. As well, it probably would safeguard free speech and civic engagement. However, it is less clear that such a regulation would strongly contribute to efficient capacity management or network investment. Moreover, defining such minimum quality levels is not straightforward, although precedents exist in telecommunications.

Quality of service tiering with non-discrimination requirements are another policy option that is widely considered. In a more stringent form, such a model would permit quality of service tiering but oblige network operators to make any such tiers available to any requesting party. This would allow differentiation of service classes while avoiding sabotage and anti-competitive discrimination, which is a relevant concern with regard to services that compete with a network operator's own offerings. At the same time it would allow premium service providers and service providers with specific technical requirements to agree on specific quality of service tiers with network operators. In a more libertarian approach, the ability to discriminate would only be bounded by antitrust principles. Both these options have desirable efficiency properties and will help better capacity utilization and, other things being equal, network investment. However, these policies may reduce the incentives for certain types of modular applications and service investment. Moreover, there is a tension between them and free speech and other political goals. Quality of service tiering vis-à-vis content and application providers may also increase the incentive to enhance user revenues by new business models. If certain types of content are only available for premium subscribers, the Internet may start to resemble today's cable industry. To avoid this development, quality of service tiering may have to be coupled with other instruments such as no blocking or minimum service quality provisions.

## 5. Discussion

Our analysis has re-examined several aspects of the network neutrality debate. Whereas political and economic arguments are drawn from different normative foundations, they are not necessarily in conflict with each other. However, there are no single instruments that could achieve both sets of goals simultaneously. Of the five instruments discussed in more detail (no blocking, zero price, minimum service quality, QoS-tiering with non-discrimination constraints and QoS-tiering with antitrust constraints, some affect predominantly political goals and others predominantly economic goals.

[Figure 2 about here]

An analysis of the causal relations between these instruments and the goals of the network neutrality debate shows that none of the instruments are sufficient to achieve the goals (figure 2). No blocking is a necessary condition for political goals and certain types of innovation. QoS-tiering are necessary conditions that allow ISPs to adopt better short-term capacity utilization methods and also are necessary conditions for network investment in a market environment. This suggests that in order to pursue both economic and political goals, these instruments have to be combined. Fortunately, as table 2 shows, combining instruments will not harm the pursuit of the other goals. For example, no blocking does not have strong negative consequences for economic efficiency goals (although there may be some minor ones). A policy of allowing QoS-tiering, safeguarded by no blocking, could meet both political and economic goals.

## 6. Conclusions

We believe that the analysis presented in this paper can show a potential way forward in disentangling economic and political arguments in the network neutrality debate. Other instruments are feasible and need to be subjected to more in-depth analysis. However, the examination of the direction of effects and of causality relations can help clarify the ability of single instruments and of combinations of instruments to achieve consented objectives.

Figure 1: The logical structure of policy-making

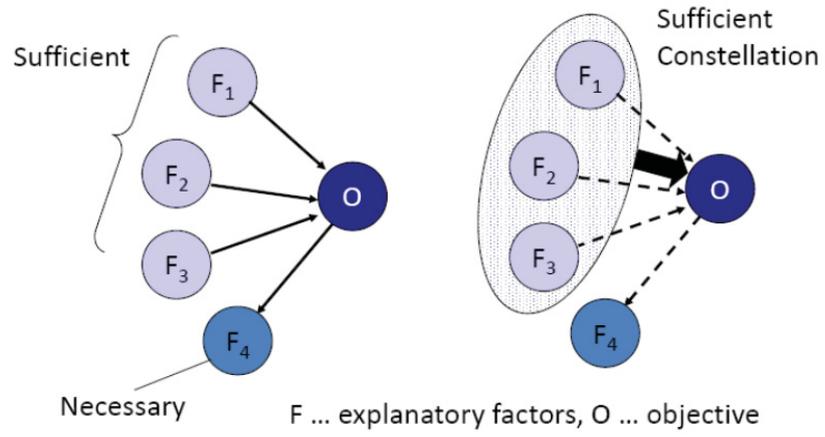


Figure 2: Causal relations between instruments and objectives

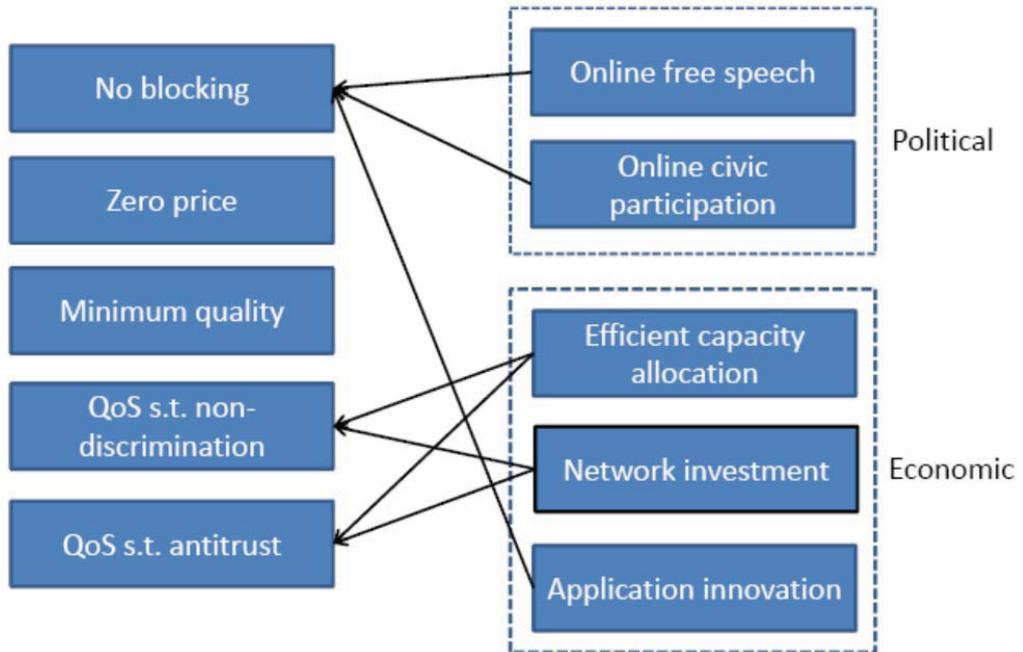


Table 1: Recent research on the effects of network neutrality instruments

	Hermalin & Katz (2007)	Shrimali (2008)	Cheng, Bandyopadhyay, & Guo (2010)	Choi & Kim (2010)	Economides & Hermalin (2010)	Krämer & Wiewiorra (2010)
Vertical regulation regimes	Zero price versus quality of service tiering (QoS-T)	Zero price versus price differentiation for network services	Zero price versus quality of service tiering (QoS-T)	Zero price versus quality of service tiering (QoS-T)	Zero price versus quality of service tiering (QoS-T)	Zero price versus quality of service tiering (QoS-T)
Allocation of network capacity	Independent	Independent	M/M/1 queueing	M/M/1 queueing	ISPs allowed to subdivide bandwidth and sell priority service	M/M/1 queueing
ISP market structure	Competition	Monopoly	Monopoly	Monopoly	Monopoly	Monopoly
Content provider market structure	Monopoly	Monopoly or duopoly	Competition	Competition	Monopoly	Competition
Investment by ISPs	No	Yes	Yes	Yes	Yes	Yes
Innovation by content providers	Yes	Yes	No	No	Yes	Yes
Selected findings	Restricting a platform to a single product constrains application providers seeking lower and higher-than-average quality platform services; allows those in middle to use higher quality; likely negative welfare effects	Zero price rule maximizes social surplus in the short-run; in the long-run, ability of network operators to price differentiate facilitates innovation	In the short-run, network operators gain, and content providers lose, if QoS-T is permitted. Incentives for ISPs to expand network capacity are generally higher if QoS-T is prohibited (i.e., zero price rule is enforced)	It cannot be excluded that zero price rule results in higher network investment	In the short-run, network neutrality superior to subdivision but investment incentives are highest if price discrimination is permitted. Net effect a priori unclear	In the short-run, QoS-T is welfare superior if the same number of content providers (CPs) are active; QoS-T creates stronger incentives for broadband investment if and only if competition between CPs for ad revenue is not too strong

Table 2 Stylized relations between network neutrality instruments and overarching goals

Instrument	Economic goals			Political goals	
	Efficiency of network capacity allocation	Network investment, innovation incentives	Applications and services innovation	Freedom of speech	Civic participation and democracy
Prohibition of blocking	~	~	~	+	+
Zero price constraint on network operator	~	Could be + under certain conditions	+	+	+
Minimum quality of service tier	~	~	+	+	+
Quality of service tiering without discrimination	+	+	+ for coupled innovations	~	!
Quality of service tiering with discrimination	+	+	+ for some coupled innovations	-	-

Notes: ~ ... no strong relation; + ... positive relation; - ... negative relation

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