Designing for Robustness: Overcoming Systemic Risk in the Political Branches

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In October 2013, the President and Congress failed to agree on an appropriations bill or continuing resolution to fund government services. That inciting incident prompted a sixteen-day government shutdown. The effects of this shutdown created a chain reaction emanating from Independence Avenue to Wall Street to Main Street, crippling government services, and costing the country billions. Historically, the separation of powers has helped the U.S. political system to thrive. However, the 2013 crisis shows that sometimes the checks and balances written into the Constitution exacerbate, and are insufficient to manage, breakdowns that can grind the government to a halt and cast a shadow over the entire country.

This Comment applies the concept of systemic risk, borrowed from the study of financial institutions and the sciences, to analyze these sorts of catastrophic political breakdowns. It models the political branches of the federal government as a system of nodes (the agencies and branches of the federal government) and links (the instruments by which they exert influence over each other). Through modeling, this Comment argues that the federal government shutdown is similar in form and consequence to systemic breakdowns in mechanical and institutional designs. The modeling also makes it possible to identify ways to increase the robustness, or resilience to systemic risk, of the political system. This Comment offers and examines three robust design features in the federal government context that have been gleaned from institutional design research in financial, political, and industrial fields: redundancy, feedback, and quality. These design features serve a dual role. First, they permit a careful scrutiny of the systemic risks inherent in our legislative
process. Second, they are a lodestar by which a more robust federal government system can be plotted. Considering the dire consequences of the most recent federal government shutdown of 2013, academics, politicians, and jurists can and should consider the threats posed by systemic risks and the value of designing for robustness to mitigate future breakdowns in the political process.

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INTRODUCTION

When Paul Baran began developing an improved national communications infrastructure for the RAND Corporation in the late 1950s, he sought to design a system that was robust enough to survive a Soviet nuclear attack.1 To achieve his goals, Baran developed a distributed system of access points, which guaranteed sustained communication even if breakdowns arose across numerous points of connection.2 Baran’s theorizing led to the development of the ARPANET,3 which informed essential features of the modern Internet. Baran’s work also holds lessons for the political sphere.

2. See id. at 1.
In 2013, Congress flirted with employing its own “nuclear-tipped leverage point” by refusing to fund federal government operations in order to pressure the President to stay the implementation of the Affordable Care Act. This Congress-Executive standoff resulted in a sixteen-day shutdown of nonessential government operations and cost the U.S. government and its citizens billions. Throughout the crisis, the executive and legislative branches struggled to reach compromise through the formalized law-making process.

The study of systems’ structure has become an integral tool in academia, including in political science and law. One lesson from Baran’s research and the school of thought that deals with designing and maintaining complex systems is that a system can be organized to be more robust in response to systemic risks—that is, better able to survive events that could cause catastrophic failure—such as nuclear attack or crippling political gridlock. Legal scholars have also used the terms “robustness” and “fragility” to describe the U.S. system of government, but rarely do they employ these concepts—beyond their facial definitions—as part of a systematic theory. In addition,

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5. 42 U.S.C. § 18001 et seq. (2012); see also Welna, supra note 4.


7. The President called special meetings with Congressional representatives on October 2nd and October 9th, but neither meeting broke the impasse. For a discussion of the October 2nd meeting see Jeff Mason and Thomas Ferraro, Obama, Congressional Leaders Still Deadlocked on Shutdown, REUTERS (Oct. 3, 2013), available at http://uk.reuters.com/article/2013/10/02/uk-usa-fiscal -idUKBRE98T0Q220131002; for the October 9th meeting see Lori Montgomery et al., Obama to Meet with Lawmakers on Shutdown: Pentagon Scrambles to Ensure Death Benefits, WASH. POST (Oct. 9, 2013), http://www.washingtonpost.com/politics/as-financial-markets-show-signs-of-worry -white-house-plans-meetings-with-lawmakers/2013/10/09/1413368c-30e2-11e3-8627- c5d7de0a046b_story.html.


10. See J.B. Ruhl, Managing Systemic Risk in Legal Systems, 89 IND. L.J. 559, 561 (cataloguing uses of the words “robust” and “fragile” to describe political systems).
research into the federal government as a system has, until very recently,11 failed to consider the importance of robustness to the effectiveness of the federal government. Even now, the scholarship has yet to explore the effects of systemic risk on the very foundation of our national political system: divided government and the separation of powers.12

This Comment argues that political systems and the separation of powers that dictates the structure of the federal government exhibit network phenomena similar to mechanical and social systems. Consequently, these political systems are susceptible to systemic breakdown and can exhibit both robustness and its converse, fragility. Systemic risk and robustness will be analyzed through a consideration of the government shutdown of 2013. That inciting event is the closest analogue to systemic breakdown in other systems because the shutdown had sweeping consequences within the government and broader society. This Comment argues that, fortunately, systemic risks can be mitigated by thoughtful design considerations. Therefore, policy makers should consider systemic risk and robust design when responding to internal or external threats to effective governance. This Comment does not go as far as those advocating for a complete reconsideration of the separation of powers.13 Rather, this Comment proposes modest examples of reform to ameliorate the systemic risk of government shutdown.14 Of note, this Comment defines the political branches as those involved in law making—the executive, the legislature, and the administrative state—and steers clear of addressing the balance of power between states and the federal government.

Part I will familiarize readers with the concept of systemic risk: accidents that create a domino effect leading to significant system-wide losses. The Section will consider the research of Paul Baran to illuminate the design challenges in managing systemic risk and to introduce the vocabulary that will be used throughout this Comment. It will also consider modern research into systemic risks in the financial system to show the application of systemic risk theory to modern policy.

Part I will continue by applying Baran’s language of links and nodes to the relationships between the branches and agencies of the political system, arguing that the federal government exhibits systemic risk in ways similar to

11. See generally id. (considering the role of robustness in effective government response to stimuli).

12. In principle, Ruhl’s work and the author’s work share a great deal in common. Nevertheless, Ruhl focuses on exogenous issues (such as the Deepwater Horizon spill and Financial Crisis) that were affected by government (specifically administrative agency) fragility. This Comment focuses on an endogenous issue, the budgeting process, which has consequences within the political system and beyond.


14. See infra Part IV.
the financial industry (a social system) and Baran’s decentralized communication network (mechanical). Furthermore, the Section will characterize the government shutdown of 2013 as an instance of systemic breakdown in our policy-making system caused in part by the design constraints of the separation of powers. Finally, Part I will challenge the notion that extreme government wrangling that leads to government shutdown is a sign of healthy checking of ambitions in the separation of powers.

Part II will develop a working definition of robustness as a means to reduce systemic risk. First, the Section will consider the goal of robustness: to achieve global system stability. The Section will then argue that despite increased transaction costs, greater stability will reduce the chance of systemic risk while increasing efficiency. Part II will also grapple with the “Robust Yet Fragile” dilemma, which postulates that as a system is made more robust through safety measures, it becomes more complex and necessarily more fragile. Though this dilemma is a concern for all systems, the Section will show that the U.S. political system is well suited to weather localized disputes as long as those disputes cannot obstruct system-wide decisions.

Part III of this Comment will identify three means of designing for robustness, gleaned from research across a spectrum of systems theory applications. Subsequently, the Section will apply these design features to the federal government and argue for the importance of these features in government design.

Using the government shutdown in 2013 as an example, Part IV will encourage further discussion about how institutional design changes could increase robustness against shutdown. The Section will also suggest modest institutional design changes that will increase the robustness of the federal budgeting process to exemplify how institutional design can yield positive changes in the political structure.

Stated plainly, the goals of this Comment are threefold. First, this Comment will introduce the concept of systemic risk to the discussion of political systems. Second, this Comment will show that systemic risks exist in the separation of powers’ framework and are distinguishable from the routine countervailing ambitions that drive the American system. Third, this Comment will argue that orienting the separation of powers to be more robust through specific design efforts can reduce the likelihood of systemic breakdowns caused by government shutdowns.

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15. The author acknowledges that there are fundamental differences between mechanical systems and those composed of independent-minded people. However, mechanical systems can exhibit tremendous complexity even if they are ultimately made of nonthinking parts, and research into human behavior has increased the ability for scientists to predict behavior in increasingly complex decision-making scenarios. The result is that the difference in the types of systems is less significant than one’s (predictable) aversion to being likened to a machine indicate.
I. DEFINING SYSTEMIC RISK

A brief spin through the cable news networks on any given day would lead one to believe that the entire U.S. system of government is perilously dangling at the precipice above disaster or perhaps already rushing headlong into collapse. Despite these dramatic commentaries, the U.S. political system has proven largely resilient over the last 250 years. Nevertheless, problems arise, and it is the purpose of this Comment to focus on a particular set of problems called “systemic risks,” which can bring down the entire political system.

This Section will familiarize the reader with the vocabulary surrounding the concept of systemic risk. Part A will demonstrate that the principle of systemic risk, commonly analyzed in financial regulation, is deeply correlated with the study of systems of all types. The Section will analogize the language of financial systemic risk to the domains of science and management, and will rely in large part on the scholarship of Paul Baran. Part B will extend the analogy to map the study of systemic risks on to the study of political systems. Part C will center systemic risk analysis on the U.S. political system and explore why the government shutdown of 2013 is an example of a systemic risk. Part D will conclude this Section by arguing that features of the separation of powers are a root cause of the political system’s fragility to the systemic risk of government shutdown.

A. What Are Systemic Risks and Systemic Breakdowns?

Within the legal community, systemic risk is often associated with the management of the global financial system.16 The management of systemic risk is an effort to avoid systemic breakdowns: singular events that can have cascading consequences that jeopardize an entire system.17 Some scholars have identified that in complex systems, risks—however seemingly minor—often jeopardize the entire system because of complex interrelationships between parts.18 For example, Edward Lorenz theorized in 1963 that very-long-range

17. See id. at 196–98 (describing various definitions of systemic risk).
18. Some issues of systemic risk are particularly pernicious because the links between different nodes are unclear. See LAWRENCE GONZALES, DEEP SURVIVAL: WHO LIVES, WHO DIES, AND WHY 109 (2003) (“One of the characteristics of such a system is that a small change in the initial conditions, often too difficult to measure, can lead to radically different behavior.”); see also PER BAK, HOW NATURE WORKS: THE SCIENCE OF SELF-ORGANIZED CRITICALITY 51 (1996). In the most extreme formulation, a butterfly flaps its wings and changes the course of history. See RAY BRADBURY, A SOUND OF THUNDER AND OTHER STORIES 203 (2005). More commonly, as in the case of the financial crisis of 2008, the chain of causation is muddled, the initial “wing flap” is hard to identify, and the effects on far-reaching organizations are hard to predict. See Andrew W. Lo, Reading About the Financial Crisis: A Twenty-One-Book Review, 50 J. ECON. LITERATURE 151, 154 (2012). Despite intense study of the 2008 financial crisis, there is limited agreement between scholars as to the actual inciting causes of the systemic breakdown. See id. at 154–155.
weather prediction is hampered because predictive models are unstable with respect to small modifications. Therefore, slightly different initial inputs can lead to significantly different outcomes. To be considered a systemic breakdown, the result need not be the entire collapse of the system. On the contrary, a systemic breakdown is merely one that has produced significant externalities beyond the scope of the involved actors.

The 2008 financial crash is routinely cited as an example of a systemic breakdown in the financial system because the actions of a few sophisticated economic drivers led to cascading failures that affected parties who were seemingly uninvolved or even insulated from the original cause of the crash. Particular incidents in the housing market set off a domino effect, crippling international markets, bankrupting numerous financial institutions, and wiping out the savings of ordinary investors.

Though the phrase “systemic risk” is routinely applied in financial analysis, it need not be limited to that field of study. In fact, regulation of the financial industry’s systemic risk shares a common rootstock with studies of physical and interpersonal man-made systems.

Paul Baran’s design emphasizes the prevention of systemic breakdown in the communications network, and his approach affords a useful model for this Comment. The national communication system contemplated by Paul Baran was a direct attempt to minimize complete breakdown of communications in response to a targeted attack. He faced a significant design challenge: how should the network be organized so that a sufficient number of “links”—instruments like physical telephone wires transmitting digital information—would remain capable of sending information, so that any two “nodes” of the network could maintain communication.

20. Id.
21. That the financial system is still functioning does not negate the argument that the effects of past financial shocks could have been better contained to prevent widespread suffering or that future market collapses will not have even more significant consequences. The same reasoning applies to political issues like the government shutdown. This Comment argues for reform on the basis of these two principles.
22. Ruhl similarly defines systemic risk as “the risk of very large local or even system-wide failures—in other social systems.” Ruhl, supra note 10, at 562.
24. For a detailed list of books written about the 2008 financial crisis and their explanations, see Lo, supra note 18, at 154–55.
25. See Shwarcz, supra note 16, at 196 (“‘systemic’—the term meaning ‘[o]f or pertaining to a system’) (quoting OXFORD ENGLISH DICTIONARY 500 (2d ed. 1989)); see also Haldane, supra note 23 (comparing systemic risk in financial systems to the outbreak of SARS).
26. See GONZALES, supra note 18 (analyzing systemic breakdown in a mountain climbing incident caused by a combination of a complex network of support ropes connecting the climbers and the instability of the mountain itself).
institutions such as people or facilities seeking to share information—could reach each other following a targeted nuclear attack on the system?27

The systemic breakdown contemplated by Baran could occur in three ways: (1) through the failure of so many links that connections between the nodes could not be maintained, (2) through the failure of so many nodes that no appropriate message recipient remained, or (3) through a combination of these two factors.28 Baran studied three different possible systems and considered the likelihood that each could survive systemic breakdown. In a centralized system (see Table 1, Image A), communication links radiate outward from a central node so that the end nodes are all linked through the center. As Baran succinctly described it, “[t]he centralized network is obviously vulnerable as destruction of a single central node destroys communication between the end stations.”29

**FIGURE 1: Paul Baran’s Three Proposed Systems**30

If the central communication node were destroyed in a nuclear attack, it would no longer be able to provide instruction to secondary nodes. This effect would cascade down to the lowest level, cutting off communication at each

27. See Baran, supra note 1, at 1. The author also credits J.B. Ruhl with the use of the terms “instruments” and “institutions” to make more concrete what Baran had otherwise described as “links” and “nodes” respectively. See Ruhl, supra note 10, at 567. The terms will be used interchangeably hereafter.
28. See Baran, supra note 1, at 1.
29. See id.
30. See id. at 2.
step and preventing any one node from transmitting information to the central node or through it to any other branch.

The systemic risk of link and node loss is reduced, but not eliminated, in what Baran diagrammed as a decentralized network (see Figure 1, Image B). This system “shows the hierarchical structure of a set of stars connected in the form of a larger star with an additional link forming a loop.” The national power grid is an apt example of this decentralized system. A significant amount of energy is transmitted through a few, critical high transmission cables that connect the nation’s primary power production areas with regional power centers, which in turn distribute power to highly populated areas. Some redundancies in lower voltage transmission lines can compensate for link or node loss from accidental failure or intentional sabotage, but the system is still susceptible to systemic breakdown. The loss of power in one home because of a damaged transformer or a blown house fuse is an inconvenience, and damage to a regional station can cripple a city and cost millions in lost productivity. Of greater consequence, damage to the high transmission line could lead to a systemic breakdown cutting off power services to millions and causing incalculable cascading consequences for citizens and industry. The holiday traveler who has suffered excruciating delays because of major airport closures, but still has been able to make it to her destination by rerouting, has interacted with a similarly decentralized network.

Baran determined that a distributed “mesh” system of links and nodes (see Figure 1, Image C) was the most robust against a systematic breakdown. In the distributed system, individual nodes and links are mostly fungible. The preferred route of communication is the one with the fewest number of links between two nodes, but any route is acceptable to communicate a message between two nodes. Because the parts are mostly fungible, they need not be high performing because failure by any one would not have system-wide consequences. Baran’s research in the 1960s presaged work by modern complex system theorists. Alderson and Doyle, studying the technical nature of

31. See id. at 1.
33. Id.
35. See Charles Perrow, Organizing to Reduce the Vulnerabilities of Complexity, 7 J. CONTINGENCIES & CRISIS MGMT. 150, 150 (1999); see also NAT’L RESEARCH COUNCIL, supra note 32.
37. See Baran, supra note 1, at 1.
38. See Baran, supra note 1, at 3.
39. See id.
40. See id. at 4.
system robustness, describe minimal systemic risk systems as modular systems using diverse and imperfect components via distributed (versus centralized) control.41

Designing in a distributed manner is not without trade-offs, which will be discussed in greater detail in Part II. At present, it is important to recognize that systemic risk is least likely when systems are distributed and no link or node is essential to the system. Systemic risk increases in centralized systems and where communication is forced through a few inflexible channels.

B. Political Systems as Linked Systems of Nodes

In order to understand how political crisis can be understood as systemic breakdown, it is helpful to extend Baran’s language of links and nodes (applied above to the financial system and the power grid) to political systems.

One type of political system, a dictatorship, lends itself well to link and node mapping. The structure of the government is a mostly centralized system with one dictator (central node),42 who hierarchically issues orders (links) to subordinates (less-centralized nodes), who subsequently impose rules on citizens (least-centralized nodes). The dictator is characterized as a “central node” not only because the dictator occupies a central position of authority, but also because the number of other nodes that the dictator has influence over (directly and indirectly) is greater than any other node in the system. This type of political system, like Baran’s centralized communications system, is highly susceptible to systemic breakdown because of the high level of influence exerted by the central node. The loss of the dictator (central node) through unexpected death, disappearance, or assassination severs the issuing of orders (links), casting the subordinate officers (nodes) into disarray and straining the stability of the entire system.43

Mapping the connections in the federal government’s separation of powers through the language of links and nodes is more complex, though achievable. As a threshold matter, one must define the scope of the government to be mapped. This Comment concerns the interaction between the law producing branches of government—the executive, the legislature, and the interstitial “fourth branch” of administrative agencies.44 The executive and

42. This simplification of a despotic system of government is intended to demonstrate the relative importance of specific institutions within the system—not to accurately describe an operational political system with any specificity.
43. See, e.g., CHRISTOPHER S. CHIVVIS & JEFFREY MARTINI, RAND, LIBYA AFTER QADDAFI: LESSONS AND IMPLICATIONS FOR THE FUTURE ix (2014).
44. This framework excludes the effects of partisanship dynamics and citizen interaction with the government. These two topics are excluded to simplify the modeling, but their influences are identified where appropriate. For a rich discussion of Congress as a system within the constitutional
legislature are the central nodes through which the political government functions. Through direct and indirect influence (links), they each exert control over the entire menagerie of administrative agencies (less-centralized nodes) and over each other in particular ways.

Take Figure 2 as an example.

**Figure 2: Government Operations as a Series of Links and Nodes**

Imagine the Environmental Protection Agency (EPA) as representing any administrative agency attempting to conduct its regulatory responsibilities. The EPA (less-centralized node) develops new environmental regulations on greenhouse gas emissions in conjunction (link) with the executive (central node). (Figure 2, Link 1.) In response, the legislature (central node) passes a law constraining the power for the EPA (less-centralized node) to amend emission limits (link). (Figure 2, Link 2.) They send it to the President (central node) who vetoes it (link) (Figure 2, Link 3), whereby Congress repasses it over the veto (link). (Figure 2, Link 4.) Subsequently, the Supreme Court (central node) invalidates the law (link). (Figure 2, Link 5.)

This model demonstrates how the separation of powers functions similarly to Baran’s decentralized system. There are overlapping connections between nodes, such that some nodes can communicate with others without passing through any particular center. In the same way, administrative agencies can communicate with each other or with one branch without engaging with all of them. However, in the U.S. system, just as in Baran’s decentralized system, it is clear that certain nodes and links are of greater importance. Systemic

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45. The EPA is a less-centralized node in the separation of powers framework because its authority is dependent on and a reduction of authority otherwise possessed by the legislature, executive, and judiciary. Put simply, the authority bestowed on the central nodes is derived from the Constitution, whereas the authority of administrative agencies is conditional. *See infra* Part I.C.

46. *See supra* Table 1B.
breakdown is most likely to occur when risks enter these narrow, most-important channels.

Through the above examples, this Comment conceives of the federal political government as one typified by nodes (institutions) that are connected by links (the instruments of exerting influence). With the political system conceived in this language, it is possible to identify instances of systemic risk and means of reducing those risks through robust design. Though the links and nodes that Baran discussed and those involved in the financial crisis of 2008 are different from those between the branches of government, the types of breakdowns and their effects are similar.

C. Government Shutdown as Systemic Breakdown

Having shown that political systems are systems composed of an array of more and less centralized nodes with varying numbers of links between them, this Section argues that this system carries a systemic risk of breakdown. This Section will explain why government shutdowns are an example of systemic breakdowns rather than the systematic or routine interactions between the branches. It will also rebut the argument that government shutdowns are a healthy feature of the separation of powers by showing how current government shutdowns have had increasingly deleterious effects within the political process and beyond. Importantly, this Comment does not argue for an evisceration of the separation of powers or even for a significant realignment of responsibilities among the branches. In general, the separation of powers achieves Madison’s goal that “[a]mbition must be made to counteract ambition.” However, this Comment argues that one ought to distinguish those systematic, routine political interactions that cannot jeopardize the entire system with systemic risks that can. As discussed below, the passage of a budget is a principal example of this systemic risk.

Systematic breakdowns, which consist of routine shocks that the system is designed to internalize, are distinct from systemic breakdowns, which jeopardize the entire system. While many decisions of the federal government have sweeping effects on the public, wrangling over those decisions does not jeopardize the entire economic or political system and thus represents only a systematic breakdown. This systematic breakdown—that is, routine back and

47. See supra note 13.
48. For an example of a scholar’s argument for realignment of responsibilities among the branches, see Gersen, supra note 4.
50. See Schwartz, supra note 16, at 196 (“[i]t is generally agreed that systemic risk represents a propensity for some sort of financial system disruption[,] one observer might use the term ‘market failure’ to describe what another would deem to have been a market outcome that was natural and healthy, even if harsh.”) (quoting Alan Greenspan).
forth in the separation of powers—can be distinguished in two ways from systemic breakdowns.

First, a risk is systematic if failure to reach a compromise on an issue does not jeopardize the government’s ability to provide other services. In the financial services sector, people and businesses invest and lose every day. These transactions are localized and do not jeopardize the industry at large, which goes on trading unaffected. However, when certain entities fail, their losses can have a cascading effect, eroding confidence in assets across the entire industry and freezing up the entire trading process.\textsuperscript{51} Consider these two scenarios in light of Table 2,\textsuperscript{52} which describes the general operations of the government as a series of links and nodes. A failure to come to an agreement on emissions levels may have long-term consequences for the environment, but if the status quo is maintained (because no new regulations are made), the political and economic systems will not grind to a halt. In contrast, failure to pass an appropriations bill or continuing resolution before October 1 of each year incapacitates administrative agencies\textsuperscript{53} and sends shockwaves through the markets.\textsuperscript{54}

Second, a risk is systematic if it concerns an ancillary rather than a core function of the government, in this case measured by the historical source of the authority and the rights vindicated by the government action. In these respects, the EPA functions described in Table 2 are markedly different from the government’s responsibility to pass a budget. The federal power to regulate emissions is modern and arose out of an executive order.\textsuperscript{55} On the other hand, the power to pass a budget has existed since the founding and is a necessary condition to government operations.\textsuperscript{56} Similarly, the rights vindicated by the EPA cannot be greater than those that are jeopardized by a government-wide shutdown. It is unnecessary to consider the relative importance of the rights protected by the EPA or any other administrative agency as almost all agencies are dependent on the passage of the budget in order to effectuate their objectives. Therefore, failure at the critical juncture of budget passage impinges the fundamental rights of citizens insofar as those rights are guaranteed by agencies that would be mothballed during a government shutdown.\textsuperscript{57}

\textsuperscript{51} See P. Sieczka et al., The Lehman Brothers Effect and Bankruptcy Cascades, 82 EUR. PHYSICAL J. B 257 (2011).

\textsuperscript{52} See supra Table 2.


\textsuperscript{56} See U.S. CONST. art. I, § 9, cl. 7.

\textsuperscript{57} A number of federal agencies that were constrained to a significant degree by the government shutdown protect rights that might be described as fundamental, including the Department of Justice (Civil Division), the Department of Homeland Security, the Occupational Health and Safety
The financial consequences of the most recent government shutdowns further reveal the systemic nature of these political breakdowns. These shutdowns have had sweeping financial consequences for the government and beyond: “Congress did experience shutdowns prior to 1995 but, none of any real consequence. There were a total of seven brief shutdowns from 1985-1995 . . . none involved layoffs for more than a single weekday.”

58. On the other hand, the government shutdown in 2013 had far-reaching consequences for every part of the country. 59 In 2013, federal employees were furloughed for a combined total of 6.6 million days, and $2.5 billion in wages and benefits were owed to furloughed employees. 60 Model predictions of the cascading consequences for the entire economy predicted at least $2–6 billion dollars in lost output. 61 In 1981, the Government Accountability Office modeled a hypothetical thirty-day shutdown and described the consequences as “unthinkable.” 62 Since then, the size of the federal government and its agencies has expanded and as a result, subsequent shutdowns could lead to ever more catastrophic outcomes. 63

The most recent government shutdown in 2013, like many of those preceding it, arose because a divided Congress and President were unable to agree to a continuing resolution or full appropriations law. This specific problem precipitated a system-wide failure in the political system. To argue that the 2013 government shutdown is part of the normal checking of authority is to confuse systematic with systemic risks. The problem is systemic because, as the evidence above demonstrates, the failure to pass a budget has sweeping effects beyond the political arena. Furthermore, the passage of a budget, enumerated in the Constitution and antecedent to all other government operations, is central to the responsibilities of the government. In a limited case


61. See IMPACTS, supra note 6, at 8.


63. See id.; see also IMPACTS, supra note 6, at 8.
like this, steps should be taken to reduce the chance of systemic breakdown by reviewing the system itself.

D. Systemic Risk in the Political Branches

Before embarking on a discussion of systemic risk in the political branches, it is important to understand what types of problems will be characterized as political branch problems in this Comment. Disagreements over the passage of appropriations bills happen within the legislature and between the legislature and the executive. One could argue then that what this Comment calls problems with the political structure is really problems with party ideology. Alternatively, one could argue that government shutdown is only a serious problem because of the size of the federal government. To firmly establish that certain political problems, such as government shutdowns, are structural issues between the branches rather than ideological issues or issues of government bloat, these two counterarguments will be discussed in turn.

The difference between structural dynamics in the American federal government compared to parliamentary systems illustrates why the systemic breakdowns discussed in this Comment are structural as much as they may be ideological. First, parliamentary countries can have robust political parties. However, because they do not have a separation of powers for the passage of laws, the ideological differences between parties almost never create obstructions to the passage of laws by a majority party in control of the government. Therefore, while it is true that political differences are the cause of disagreement between the branches, it is the requirement that laws pass through the legislature and the executive—which may be ideologically opposed—that gives rise to obstructions. Consequently, when one party controls both the presidency and both houses of Congress, the structural barriers to bill passage are significantly reduced. This circumstance is unlikely in our political system, but control of both houses is much more common. In this case, the disagreement between the branches is the critical barrier to lawmaking.


65. The 89th Congress and the 111th Congress, both controlled by Democratic Party supermajorities, with a Democratic Party President in office, are regarded as some of the most productive for their ability to pass landmark legislation. See Adam Sorensen, The 111th Congress, TIME (Dec. 20, 2010), http://swampland.time.com/2010/12/20/the-111th-congress.

66. Since 1945, both houses of Congress and the Presidency have been held by the same party only 13 out of 33 times. In the same period, both houses of Congress have been controlled by the same
Critics may be justified in arguing that the complex challenges of the federal government are exacerbated by the sheer size of the bureaucracy. Systems theory recognizes the axiom that size increases complexity. While it may be possible to “calculate” an optimal size of government on the basis of certain data, it is unnecessary for this Comment to descend into that quagmire. A better question for systemic risk analysis is: “which activities should be the responsibility of the federal government?” All but the most hardened libertarians would likely prefer that certain responsibilities of the administrative state remain intact. The specter of government shutdown will loom large over the provision of those services. Therefore, while it may be debatable, or even desirable, to roll back some of the extensive bureaucratic machinery of the federal government, interdependencies will remain and their effects will, to some extent, result in cascading consequences.

Turning from these two counterarguments, this Section analyzes how limits on the separation of powers are justified in this narrow context. The founders decided to enshrine in the Constitution a separation of power between three branches of government to prevent the centralization of power. Though the founding fathers were not steeped in the language of systems theory, their decision to decentralize through the separation of powers (as well as through federalism and divided government) is largely consistent with the values encouraged by system theorists. However, certain modern political problems within the lawmaking process—such as the decrease in the number of laws passed, the comprehensive nature of proposed bills (especially for
appropriations bills), and the legal framework that binds the fate of much of the administrative state together—have led to complicated interdependencies in (sometimes) disparate policy issues. These interdependencies reduce the decentralization that makes a compromise-driven government effective and increases systemic risk for failure to pass critical legislation (such as the appropriations bill to end the shutdown). In addition, it is not clear that the framers intended the separation of powers to obfuscate the political process in times of crisis. Therefore, limits on the separation of powers are justified in the narrow context of high systemic risk.

Recent years have seen a significant decline in the number of bills proposed and passed by Congress. As the 113th Congress approaches its completion in January 2015, it will go down as one of the least productive in recent history. The 9,723 bills proposed thus far in the 113th Congress are the third fewest since 1973. The 2 percent of those bills which have become law is the lowest such figure since 1973. According to the Pew Research Center, as of July 29, 2014, only 108 of the laws were more than ceremonial. From a system level analysis, the decline in bill proposals and low bill passage mean fewer links between the executive and legislative branches and consequently greater importance on those links that remain. One could argue that the decrease in bills is valuable insofar as it indicates that government is getting less complex. But the decrease in passed laws belies the increasing complexity of the laws that are actually passed.

Compounding the issue of low bill proposal rates is an increase in the complexity of those bills advanced by Congress, as measured by length. Table 3 from The Economist compares the increasing length of bills against the declining rate of bill passage.

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72. See, e.g., Steven G. Calabresi, Some Normative Arguments for the Unitary Executive, 48 ARK. L. REV. 23, 37–47 (1994) (arguing that the framers intended a strong executive for its energy, accountability, and ability to check the legislature because such power was vital to the health of the republic).


74. Id.


76. In the same time frame, the number of vetoes decreased rather than increased. See Gerhard Peters, Presidential Vetoes, AM. PRESIDENCY PROJECT (Dec. 20, 2014), http://www.presidency.ucsb.edu/data/vetoes.php. Divisions within the legislative branch may have caused the decline in bill proposals. Nevertheless, the effect on relations between the branches is the same.

77. As John Boehner argued on “Face the Nation,” “[W]e should not be judged on how many new laws we create. We ought to be judged on how many laws that we repeal. We’ve got more laws than the administration could ever enforce.” Face the Nation Transcripts July 21, 2013: Boehner and Snyder, CBS NEWS (July 21, 2013, 2:37 PM), http://www.cbsnews.com/news/face-the-nation-transcripts-july-21-2013-boehner-and-snyder/.
As The Economist noted in 2013, “[i]n 1948 the average length of bills that made it through Congress was two and a half pages. Now it is 20.” The problem is especially pernicious for appropriations bills. Of the ten largest bills proposed between 1999 and 2009, three were general appropriations bills and one was a defense authorization bill governing military spending. The increasing complexity of bills exacerbates systemic risk tied to the bill’s underlying purpose. If a bill addressing comprehensive immigration or environmental reform fails because it is too complex, this breakdown

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79. Id.


81. Rep. John Boehner, describing the 2013 Senate immigration bill: “The idea that we’re going to take up a 1,300-page bill that no one had ever read, which is what the Senate did, is not going to happen in the House.” Aaron Blake, Boehner Closes Door on House-Senate Immigration Panel,
between the branches does not subject the system of government and society at large to immediate catastrophic losses. On the other hand, the failure to pass appropriations bills does have this effect. Unfortunately, the problem of fewer, but larger, bills acutely affects the appropriations process. Because the stakes are so high, appropriation bills become ill-suited conduits for the passage of pet legislation. In 2013, it was the inclusion of language defunding the Affordable Care Act that prevented compromise and led to the government shutdown that year.

The government’s narrow interpretation of the Antideficiency Act also exacerbates systemic risk between the branches. “The Antideficiency Act [...] states that no Federal official or officer may authorize Government obligations or expenditures in advance of or in excess of an appropriation, unless otherwise authorized by law.” The history of the Antideficiency Act goes all the way back to the 1870s, and Congress codified the Act in the 1960s. In 1980, then U.S. Attorney General Benjamin Civiletti issued two opinions strictly interpreting the Act, thereby enhancing its potential to cause systemic breakdown. The opinions required agencies to entirely suspend operations except under limited circumstances. From a systems theory standpoint, the Antideficiency Act entangles nearly the entire menagerie of administrative agencies with a single link—the appropriations bill. It is precisely these sorts of complex entanglements that generate systemic risk.

One could argue that, independently, each of the changes to legislative practice cited above is beneficial to the political system. It might be more efficient for legislators to debate fewer bills, even if they are longer. In addition, the Antideficiency Act may discourage unsustainable agency spending and apply salutary pressure on lawmakers to come to an agreement.

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82. Nonetheless, there is still the possibility of significant later harms for failure to act on these issues.
83. See Philip Bump, The 113th Congress is Historically Good at Not Passing Bills, WASH. POST (July 9, 2014), http://www.washingtonpost.com/blogs/the-fix/wp/2014/07/09/the-113th-congress-is-historically-good-at-not-passing-bills/ (charting data from Govtrack.us of the increasing length of appropriations bills relative to the number of such bills passed).
85. See supra note 4.
86. See GEN. ACCOUNTING OFFICE, supra note 622, at 2.
88. See BRASS, supra note 59, at 3–5.
89. Id.
However, when analyzing these circumstances for systemic risk, it is insufficient to look at the issues in isolation because systemic risk is also concerned with emergent properties of systems, which manifest through a confluence of factors. In this case, the decrease in the number of laws passed, in conjunction with the increasing stakes (as measured by the size and comprehensiveness) within the law itself—and in the case of appropriations bills, stakes for all nonessential agency functions—increases the risk of failure across the system rather than limited, contained failures. Because of this emergent systemic risk, the separation of powers can, in some circumstances, pose a risk of systemic breakdown within the government and in society at large.

II. DEFINING ROBUSTNESS

Whereas Part I of this Comment introduced a problem, Part II turns toward a solution. While legal theorists have proposed novel reconsideration of the separation of powers to achieve particular ends, none have done so with an explicit focus on robustness. A robust system is designed to reduce systemic risk and the likelihood of systemic breakdown. Part A of this Section will explain the goals of a robust system and how they conform to the goals of effective government. Part B will explore the “Robust Yet Fragile” dilemma, which stipulates that attempts to increase the robustness of a system paradoxically increase the fragility of a system. Ultimately, this Section will show that while the dilemma is a real concern for all systems, the localized fragility caused by the reforms suggested here can be easily mitigated by the otherwise effective separation of powers system.

90. See Ruhl, supra note 10, at 567–68 (“The core idea of the emergence property is that the system exhibits macroscopic behavior that could not be predicted by examining the system . . . at microscopic scales.”); see also Vermeule, supra note 9, at 69–71 (describing system properties that emerge directly as well as those which develop through an “invisible-hand” process of unintended byproducts of member actions).

91. See Ruhl, supra note 10, at 561–62 (describing how a system can be both robust and fragile).

92. See, e.g., Gersen, supra note 4, at 303–04 (“structuring government authority in this way [blended authority in topically limited domains] would arguably produce government behavior more in keeping with underlying constitutional aspirations”); Schwarz, supra note 16, at 205–08 (describing purposes of financial regulation).

93. However, the word robustness is popular in describing risk reduction in other policy areas. For robustness in finance, see generally Lars Peter Hansen & Thomas J. Sargent, Robustness (2008); for robustness in organizational theory and infrastructure policy, see generally Perrow, supra note 35.
A. Goals of Robustness

This Section will define the primary goal of robust design—to achieve as much stability as possible in the face of systemic risk. Robust design envisions stability as the minimization of the frequency and scale of cascading breakdowns, though an entire elimination of cascading breakdowns is not possible. While attempts to increase robustness through fail-safe measures—such as redundancies, increased monitoring and feedback systems, and higher quality components—impose transaction costs on the system, efficiency is achieved as a by-product of robust systems over the long term because systemic breakdowns are less likely to occur.

Ruhl defines robustness in legal systems succinctly:

[A] system or any of its properties is more robust the more invariant it is with respect to a set of shocks or perturbations . . . a legal system could be described as robust if it remains relatively intact endogenously, notwithstanding disruptions from exogenous forces and endogenous failures.

However, Ruhl’s definition captures only one side of the coin. While a political system may be valued for its own preservation, the U.S. federal government is measured by its ability to protect the rights of its citizens. Therefore, for the U.S. political system to be considered robust, it must be able to preserve itself endogenously while also maintaining the exogenous status quo. In essence, the federal government must be able to protect American society, which depends on the government, notwithstanding disruptions from inside or outside the system. On this definition, the 2013 government shutdown is an example of a lack of robustness—which we will call fragility—in the political system. The shutdown was an endogenous failure: the inability to pass legislation. This failure led to the shutdown of a wide range of other government institutions, leaving the government significantly crippled for a time. The government

95. For simplicity’s sake, the support for this proposition can be found in the fable of the “Tortoise and the Hare.” Despite the Hare’s tremendous efficiency, a measure of how much distance he could cover in a limited amount of time compared to the other animals, catastrophic breakdown that was inflicted by a hubris-induced nap caused him to cover less distance than the Tortoise over the entire duration of the race. See AESOP’S FABLES 117 (Laura Gibbs trans., Oxford Univ. Press 2002). For a more academic analysis, see Mark Buchanan, Sand in Machine Makes a Stable Market: Market Buchanan (Correct), BLOOMBERGVIEW (Aug. 26, 2011, 9:46 AM), http://www.bloombergview.com/articles/2011-08-25/sand-in-the-machine-the-key-to-stable-markets-mark-buchanan.
96. Ruhl, supra note 10, at 570.
97. Ruhl’s analysis captures this flipside of robust legal systems better than his definition. See id. at 595–96 (describing “the contribution of legal systemic risk to social or economic catastrophe” in the context of the Deepwater Horizon oil spill).
shutdown, in turn, caused significant exogenous harm outside of the
government to business and individual citizens alike.

Robust system design emphasizes stability rather than efficiency. Therefore, it would be incorrect to say that designing a system, such as a government, for robustness will lead to greater efficiency in routine, systematic interactions. Rather, a robust political system increases costs in the short term by adding fail-safe devices to identify and counteract systemic risks before they trigger and cause system-wide collapse. By comparison, a government that carries significant systemic risk provides less stability for its citizenry. This type of instability lowers the value one can derive from relying on or investing in the government. Therefore, the trade-off between greater robustness and less efficiency is worthwhile when the costs of creating new nodes (agencies) or permitting new links (influences) between nodes is less than the magnitude and likelihood of systemic breakdown. That cost-benefit analysis ought to be adjusted for potential biases that could affect decision making about risk under uncertainty. Though the complete removal of systemic risk may be illusory, if the government can take significant steps to make itself more stable with regards to a particularly significant threat like a government shutdown, it should consider them.

B. The Robust Yet Fragile Dilemma

The previous section described how robust system design entails greater near-term transactional costs in favor of long-term stability and lower risk. In addition to higher transaction costs, systems theorists have argued that the robustness contemplated by this Comment (“decreased likelihood of systemic breakdown”) comes at the expense of increased fragility throughout the system. These theorists are right that designing for robustness can increase the complexity of the system and the likelihood of breakdowns. However, the goal of designing for robustness is to decrease the likelihood and magnitude of

98. See Perrow, supra note 35, at 150.
99. See id. at 151.
100. Markets may correct for this volatility through lower stock valuations, but the same is not possible for governments, which are monopolistic and noncompetitive; when governments do compete, reliability can dictate migration patterns. See Paige Williams, Drop Dead, Detroit!, NEW YORKER, Jan. 27, 2014, at 32 (analyzing the effects of migration from Detroit into Oakland County, Michigan). In the context of sovereign debt, the market is better able to penalize unreliable political systems. See Daniel Bases, U.S. Credit Rating Again in Danger of Downgrade, REUTERS (Oct. 7, 2013, 3:40 PM), http://www.reuters.com/article/2013/10/07/us-usa-fiscal-ratings-idUSBRE960SI20131007.
102. See Sunstein, supra note 101, at 870–71 (exploring the applicability of cognitive biases to catastrophic situations).
103. See infra Part II.B.
104. See Alderson & Doyle, supra note 41, at 840.
cascading breakdowns—not to eliminate them entirely. Therefore, a robust political system is not devoid of vigorous partisan debate or a healthy separation of powers. On the contrary, a healthy system can, and our system—at its best—does subsume political skirmishes.

Alderson and Doyle argue that the mechanisms we create to manage complex systems themselves produce greater complexity in the system, which increases the "number of components in the system as well as making it more difficult to predict the consequences of a break down. The result is that attempts to increase robustness in one area can increase fragility in the same or other areas of the system. Alderson and Doyle call this phenomenon the "Robust Yet Fragile" dilemma. Ruhl describes a number of reasons for this paradoxical phenomenon. First, attempts to increase robustness are usually reactions to known phenomena. Second, where complexity increases interconnections between nodes, slight disturbances could cause an unexpected chain reaction of consequences. Additionally, the same interconnectedness could mean that salutary changes in one domain could have negative consequences elsewhere in the system.

C. A Working Definition of Robustness

This Comment defines robustness in a government system as structural resilience and the mitigation of harmful public externalities as a result of endogenous failures or exogenous threats. This definition anticipates the challenges of the Robust Yet Fragile dilemma, which postulates that attempts to prevent breakdown along a particular paradigm will inevitably lead to greater fragility at other levels of the system. The dilemma is problematic only insofar as all fragility is treated as equal. But not all fragility is created equal, for the federal government benefits from fragility at the component levels where individual politicians and bureaucrats challenge the status quo. "The cardinal virtue of the Madisonian separation of powers is supposed to be that, by raising the transaction costs of governance, it preserves liberty and prevents tyranny."

105. The difference is tantamount to the contrast between systemic and systematic risks discussed above.
106. See Alderson & Doyle, supra note 41, at 842 (discussing the imposition of system sensors, the authors note that "the same system that provide robustness under normal operating conditions can yield extreme fragilities if they fail or are hijacked").
107. Id. at 839.
108. Ruhl, supra note 10, at 587.
109. Ruhl calls this the "failure cascade problem," see id. at 588, but this Comment has included this scenario within the definition of systemic risk.
110. Ruhl calls this the "spillover effect," but it is also seems indistinguishable from his "shifted risks" concern. See id.
Therefore, fail-safe mechanisms are only important for a small set of issues, like government shutdowns that threaten the robustness defined above. Even if reforms to reduce this risk induce fragility into the political system, if such fragility is at the “component level” of individual politicians and bureaucrats, then breakdowns can be identified and resolved before they affect essential government functions. As a result, the U.S. system of government can adopt specific design reform at the system level without suffering from the fragility imposed by the Robust Yet Fragile dilemma. Consequently, Part III will identify general design considerations that can increase robustness in systems of all types, including in the political arena.

III. DESIGNING FOR ROBUSTNESS: WHAT DESIGN FEATURES MAKE A SYSTEM ROBUST?

This Section focuses on three design features that can increase system robustness: redundancy, feedback, and quality. These three were chosen because they have been previously applied in the study of mechanical systems, sociopolitical systems, and legal systems. This Section will show how these design features enhance the robustness of systems and how they can be applied directly to the separation of powers as a system.

A. Redundancy

Redundancy, the incorporation of alternative links or nodes through which an objective can be attained, is an important means to achieve robustness in systems of all types. Baran devoted a great deal of his technical analysis of a distributed communication system to identifying the amount of redundancy necessary to survive a major attack on the system. Similarly, Perrow emphasized that effective administrative agency networks “should be a ‘web’, where the redundancy is fortuitous and substitutions inventive” so that breakdowns are not simply passed on to the next level of the system, but are dealt with through alternative links within the network.

Baran favored a high redundancy system, in part, because it enabled the system to be designed with low quality components. In the political context, this means that systems with redundancies in policy makers and policy

112. See Perrow, supra note 35, at 151 (arguing that the robust design of systems should include signals for component failures rather than just the larger sub-system failures).
113. See, e.g., Baran, supra note 1.
114. See, e.g., Gersen, supra note 4, at 324–51 (listing other examples of robustness criteria under the label of “design principles”).
115. See, e.g., Ruhl, supra note 10.
116. See, e.g., Baran, supra note 1, at 1.
117. See id. at 3.
118. Perrow, supra note 35, at 154.
119. See Baran, supra note 1, at 4–5.
proposals can minimize the ill effects of low quality in either case. Redundant policy making promotes policy innovations even if recalcitrance exists in some of the links and nodes.120

Ruhl thus summarizes research into redundant policy making as follows:

While it may appear inefficient and cumbersome to have several agencies at different scales working away on some mutual policy problem, the built-in redundancy can provide significant benefits including broadened policy space and promoting synergy between the scales and the formation of informal networks among institutions.121

The same emphasis on redundancy which Baran adopted in physical systems provides benefits in the context of policy formation, including at the level of inter-branch decision-making.

In the law-making context, the informal links between the executive and legislative branches can be as important as the formal law-making avenues. When parties repeatedly interact, it encourages a level of courtesy that may not arise when actors rarely interact or are complete strangers.122 The lack of repeat interactions seems to influence the current relationship between branches of the federal government and vice-versa.123 As the New Yorker reports:

Joe Manchin, a Democrat from West Virginia who was elected to the Senate three years ago, said recently that Obama’s distance from members of Congress has hurt his ability to pass legislation. “When you don’t build those personal relationships,” Manchin told CNN, “it’s pretty easy for a person to say, ‘Well, let me think about it.’”124

Indeed, systems theory suggests that “[r]epeated personal contacts across organizational boundaries support some minimum level of courtesy and consideration between the parties [and] discourage[s] efforts to seek a narrow

120. See David E. Adelman & Kirsten H. Engel, Adaptive Federalism: The Case Against Reallocation Environmental Regulatory Authority, 92 MINN. L. REV. 1796, 1809–10 (2008) (emphasizing that policy regulation at one level of government can prompt regulation at another level where the environment is more favorable). But see Michael Grunwald & Susan B. Glasser, Brown’s Turf Wars Sapped FEMA’s Strength, WASH. POST, Dec. 23, 2005, http://www.washingtonpost.com/wp-dyn/content/article/2005/12/22/AR2005122202213_pf.html (arguing that agencies that work in turf wars sap creativity and productivity); Editorial, 88, Count ‘Em, N.Y. TIMES, Jan. 8, 2010, http://www.nytimes.com/2010/01/09/opinion/09sat4.html?_r=0&pagewanted=print (arguing that redundancy was determined by the 9/11 commission to have been a “hydra-headed system that hobble[d] Congress” and prevented the intelligence community from foreseeing and preventing the terrorist attacks).

121. See Ruhl, supra note 10, at 580.


123. Rigid partisanship is another obstacle to amicable interactions between members of the government. However, partisanship is evidence of tightly networked systems that are prone to systemic risk. Rather than permitting legislators to create redundant collaboration channels with many parties across the aisle, the legislative agenda is narrowly channeled through a few cross-party interactions.

advantage in any particular transaction." 125 The courtesy and respect between legislators, at least in the Senate, is a historical hallmark of the federal government. 126 These types of interactions can be fostered through institutional and informal links. In either case, analyzing political gridlock through system theory reveals the importance of the web of interlocking and redundant relationships. 127

Redundancy also reduces the importance of each individual link or node to the overall health of the system. 128 When too much power is centralized, damage to the central nodes or links creates greater risk of systemic breakdown. 129 Diffusion of assets is a strategy promoted not only for personal financial planning to limit risk, but also to increase the robustness of financial systems. 130 In the context of the federal government, diffusion of power can lower risk and increase robustness. As the responsibilities of the federal government have grown, the government has shifted increasing amounts of federal legislative, executive, and judicial authority to administrative agencies. However, this type of power distribution provides limited value in mitigating the systemic risk of government shutdown because the Antideficiency Act binds together agency funding, and because appropriations bills are exceedingly complex and forced through narrow, inflexible decision-making channels. 131 In a robust political structure, decision making that implicates systemic risk, like the design of appropriation bills, can be broken into parts and developed through collaboration among administrative agencies, the executive, and the legislature. 132 Furthermore, if a systemic breakdown does occur, rather than using the Antideficiency Act to close agencies that might contribute to breaking the deadlock 133 and force conflict back into paralyzed nodes and links, agency participation should be seen as a tool to encourage problem solving to stem the immediate crisis and to avoid future breakdowns.

125. Jones et al., supra note 122, at 922 (quoting EVAN WILLIAMSON, MARKETS AND HIERARCHIES: ANALYSIS AND ANTITRUST IMPLICATIONS 107 (1975)).
127. Porter et al., supra note 9.
128. See Gersen, supra note 4, at 328–31 (on tyranny); Perrow, supra note 35, at 154.
129. See supra Table 1.
131. See supra Part I.D.
132. See infra Part IV.B.
B. Feedback

Robustness also requires effective monitoring of and feedback from the links between the branches, as well as transparency within the institutions (nodes) themselves. This Comment synthesizes monitoring of node and link performance with feedback—the information generated through monitoring. As Ruhl acknowledges, “[t]he point of building sensor protocols into a system is to provide relevant information about system failure potentials to system [decision makers].” Monitoring and feedback requirements are a critical feature of financial regulation for systemic risk. Similarly, they are a common component of physical system and organizational design.

Systems that resist monitoring are particularly likely to employ centralized command structures, which increase systemic risk. Centralized command structures in mechanical systems, like Baran’s communication network, and in political systems, like the dictatorship example above, are highly susceptible to systemic breakdown for similar reasons. The centralized systems tend to be efficient, with few links between nodes and high dependency on specific links and nodes. Therefore, the systems are more likely to break down when nodes and links fail. In addition, when organizations are not required or do not have the proper incentives to be transparent, they exhibit confirmation bias by ignoring or concealing defects that increase systemic risk and lead to breakdown. Hedge funds are regarded as acutely systemically risky, in part because they are not required to disclose their leverage or trading practices.

Feedback increases robustness because it promotes a more decentralized communication system and helps decision makers pinpoint when a node or link is failing. As Perrow notes, “[a] rich organizational environment . . . allows inputs that reduce the self-indulgent fiction of unrealistic ‘emergency plans’ and meaningless drills.” In essence, effective feedback systems help decision makers understand the actual problem and prevent someone from concealing the problem such that it might magnify and cause systemic breakdown.

Monitoring and feedback systems exist in some policy domains. Ruhl highlights two examples of effective monitoring: the National Environmental

134. Ruhl, supra note 10, at 582.
135. See Schwarcz, supra note 16, at 228.
136. See NAT’L RESEARCH COUNCIL, supra note 32, at 34, 41 (describing the importance of system control centers in the electrical grid to respond to and report disturbances to the grid, and the protective relays which report failures at the local level); Perrow, supra note 35, at 150 (describing the importance of monitoring in organizations).
137. See Perrow, supra note 35, at 152–53 (citing examples from NASA and from the FBI).
138. See supra Part I.A.
139. See supra Part I.B.
140. See Perrow, supra note 35, at 152.
Policy Act, which requires careful environmental impact analysis on certain legislation, and the Regulatory Flexibility Act, which requires “flexibility analysis” of administrative actions affecting small businesses. In both cases, the law requires monitoring of policy impacts and then provides that information to policy makers who can reform the actions based on the feedback. However, an increase in the availability of new information does not necessarily translate into a more informed and involved legislature or public. On the contrary, because elected officials have discretion across a wide range of policy areas, voters may elect a candidate strong in one area but flawed in many others. Additionally, feedback may be ineffective because citizens may not know, or they may disregard or fail to consider additional information. Fortunately, economic factors are a high motivator for voting. Therefore, monitoring and feedback mechanisms may be most effective in highly visible contexts like appropriations, where the practical economic effects are relayed to the public before a shutdown.

C. Quality

In mechanical systems, it is easy to understand how improvements in quality can lead to a decrease in systemic risk. A finely tuned engine made with exacting parts will perform more consistently than one produced with a hodgepodge of inferior and ill-fitting materials. As Baran put it, “[t]here is a strong relationship between element cost and element reliability.” But the connection to a political system is less clear. How can one improve the quality of either the institutions or the instruments through which policy is formed? There is no obvious way to improve the quality of the links between the branches. In a country where it is difficult for representatives to assemble to make decisions, one could improve the quality of the links by improving the facilities or tools needed to interact. For example, in a country that lacks an effective assembly hall or means of communication, instrumental improvements would be possible. However, the U.S. political system is far removed from these issues. Within the language of the laws themselves, there is no clear standard for what makes a law higher or lower in quality.

143. See Ruhl, supra note 10, at 581–82.
144. See Gersen, supra note 4, at 313–14.
146. See Gersen, supra note 4, at 341 (asserting that “many voters historically vote their pocketbooks in presidential elections . . . voters think that if the executive is good at managing the economy, the executive is probably good at lots of other things”).
147. This may potentially be achieved through anticipatory spending cuts. See infra Part IV.A.
148. See Baran, supra note 1, at 4.
Similarly, the institutions of policy making are the politicians themselves. Therefore, to improve the quality of the political institutions, one must improve the quality of the elected officials. Ruhl suggests that quality controls are possible in legal systems through educational qualifications and certifications. This is troublesome in two related respects. First, handpicking more technocratic officials for office—that is, officials who are of higher quality because of certifications—will sacrifice democratic values and jeopardize the quality of feedback through the ballot box, effectively sacrificing one robust design feature for another. Second, in a democratic system, the only way to guarantee quality in the political system is to elect quality officials. Unfortunately, there is likely no consensus on what makes a quality elected official. The United States is a country of competing values, and any decisions about quality would cleave based on the values favored within each jurisdiction. Even if there was a consensus on quality, for voters to make good decisions about elected officials, they are dependent on another robust design feature—effective feedback on politician performance.

But quality may be the least important of the robust design considerations. Baran argued for a communication system that assumed that nodes and links would fail and that used the least expensive parts to increase redundancy. Similarly, Perrow emphasized the employment of inelegant, off-the-shelf components that were easy to maintain. Because an assessment of the quality of hypothetical political institutions or instruments is “speculative,” it is easier to focus on redundancy and feedback both as design improvements themselves and as a means to better distinguish the quality of elected officials.

This Section considered three common design features of robust systems: redundancy, feedback, and quality. Each feature can be applied in similar ways to technical, financial, and political systems. Though these design features implicate trade-offs in other values, they promote stability in the face of systemic breakdown. Furthermore, these features provide a standard for assessing novel attempts to design for robustness.

IV.
PREVENTING CATASTROPHIC SHUTDOWN

Chiefly, this Comment attempts to illustrate how robust design principles from the physical and social sciences can be applied to political systems. But for this application to be meaningful beyond merely an academic exercise, this

149. See Ruhl, supra note 10, at 579.
150. See supra Part III.B.
151. See supra Part III.B.
152. See Baran, supra note 1, at 4.
153. See Perrow, supra note 35, at 151.
154. Gersen, supra note 4, at 349 (“Any comparison of the quality of public policy produced by different hypothetical institutional structures is inherently speculative.”).
Comment must show that robust design principles can be applied to a real systemic risk problem in our political system. This Comment has focused on the risks inherent in the budget-making process, and has defined government shutdown as a systemic breakdown. Therefore, this Section will apply the principles discussed above to understand ways to make the budget process more robust and reduce the likelihood of a catastrophic shutdown—though not necessarily all shutdowns.

A. Antideficiency Act

One important lesson from the research into systemic risk is that reducing the number of links, or alternatively increasing the number of nodes served by a single link, increases the risk of system-wide failure caused by link loss. In the context of the government shutdown, the essential link that failed in 2013 was the inability for the executive and legislature to agree on a budget. The Antideficiency Act essentially reduced the complex web of administrative agency interactions with the legislature and executive into a single tenuous link, the budget passage, such that failure in that single link shut down almost all agency functions. As the 2013 shutdown showed, the failure in one overly important link can cripple functionality across the political system and impose sweeping consequences beyond the political system.

One solution to this problem is to repeal or reform the Antideficiency Act. As discussed above, the Antideficiency Act binds the operation of the administrative state to the passage of an appropriations bill, thereby constraining the web of interactive administrative actions into a single channel and defeating any salutary benefits of redundancy. Furthermore, the single channel effect means that “low quality” in the budget-making process—the link between the legislative, executive, and administrative branches—can break the entire system. In the language of system theory, this is exactly the predicate to the most recent government shutdown. However, repeal does not completely sever the administrative state’s dependency on a successful resolution of the budget process. After all, if the agencies keep spending, someone has to pay the bills. In addition, repealing this Act may reduce pressure on lawmakers to reach an agreement on an appropriations bill, and the delay may cast a shadow over the long-term solvency of administrative programs. While the Antideficiency Act functions harshly, it unequivocally dictates the status of agencies.

Nevertheless, the application of robust design principles can mollify the harshness of the Antideficiency Act. Rather than flatly prohibiting spending without an appropriations bill, the law could provide for a systematic winding down of spending as the deadline for passing an appropriations measure approaches. Each instance of decreased spending will lead to small cuts to government services, which will enable policy makers and voters alike to

155. See supra Part I.A.
monitor the effects of a failure to resolve the budget impasse and adjust their positions. The cuts could be applied across all agencies, as occurred during the 2013 budget sequestration, or through cuts to nonessential agencies first, consistent with the steps already required under the Antideficiency Act. Critically, the small cuts to agencies diffuse harms across the system instead of centralizing them, which reduces the likelihood of a system-wide collapse while also increasing feedback to lawmakers and voters about the effects of further budget intransigence.

B. Budgetary Process

Repealing or amending the Antideficiency Act may reduce the consequences from a government shutdown, but neither step addresses the underlying problem that caused the shutdown—namely, the centralization of budget decisions in omnibus spending bills that are decided through narrow decision-making links. Even without the Antideficiency Act, failure to pass a budget would significantly hamper the operations of administrative agencies and could still have substantial ramifications beyond the political realm.

Systems theory presents at least two options to address the underlying separation of powers issue at stake in passing the budget. First, increase the number of links by providing alternative means to pass a budget or finance the government. Second, break up the omnibus bills into smaller bills so that failure to pass a single bill is less consequential and so that stakeholders can more precisely monitor and provide feedback on the process.

One could argue that the U.S. political system has already embraced the solution of adding more instruments through which to fund the government instead of relying solely on the timely passage of a general appropriations bill. Between fiscal years 1977 and 2011, the federal government has passed all of its regular appropriations actions on time in only four of those years. Rather than relying on the omnibus appropriations process, the government has typically relied on the use of continuing resolutions of varying lengths to sustain current levels of government spending. While the use of continuing resolutions is facially consistent with systems theory, it carries important consequences for the health of the system. The widespread use of continuing

156. The revision of probabilities in light of changed circumstances known as “Bayesian probability” is an effective technique for accurately calculating the likelihood or severity of an incident, and can be effectively applied in deciding policy outcomes. See, e.g., RJ Lilford & D Braunholtz, The Statistical Basis of Public Policy: A Paradigm Shift is Overdue, 313 Brit. Med. J. 603, 604 (1996) (discussing the use of Bayesian probability in the context of a public policy decision). In this case, incremental cuts facilitate predictions about the scope of harms caused by a total government shutdown.


158. Jessica Tollestrup, Cong. Research Serv., RL32614, Duration of Continuing Resolutions in Recent Years 3 (2011).
resolutions prevents the enactment of new policy initiatives.\textsuperscript{159} Usually, funding is limited to activities from the previous year.\textsuperscript{160} Therefore, the stopgap and continuing resolution instruments are essential tools to avoid systemic breakdown.\textsuperscript{161} However, neither is an ideal solution for long-term policy development because such short-term measures force the legislature to spend more time debating funding measures and less time developing substantive policy.

Systems theory also points away from the use of omnibus appropriations bills. While omnibus appropriations bills are a useful means to settle all appropriations issues with a single vote, the proliferation of continuing resolutions because of ongoing debates in the appropriations process—each requiring a new vote—reveals that they are no more efficient than the passage of separate appropriation bills. Therefore, the consolidation value of omnibus appropriations is negligible. As discussed in the previous paragraph, continuing resolutions also stifle the development of substantive policy.\textsuperscript{162}

Therefore, a return to piecemeal appropriations process may increase robustness. The decentralization achieved through piecemeal appropriations can be made even more robust by building inelegancies and overlaps into the budget process. Appropriations deemed essential could be appended to each of the piecemeal budgets. In this way, critical issues are prioritized and available for a vote at every stage of the appropriations process. Once the relevant appropriation is passed, it can be stripped from all subsequent appropriations measures in that year. If the critical appropriation is not passed, there would remain numerous opportunities for stakeholders to monitor the progress of the issue and provide feedback on the policy-making process.

Though not applying systems theory to his analysis, Berry and Gersen advance a similar argument for disaggregation in “The Unbundled Executive.”\textsuperscript{163} They suggest that monitoring by voters is facilitated by unbundling executive responsibilities to a number of executives serving over specific policy domains.\textsuperscript{164} In addition, unbundling makes it easier to choose

\begin{itemize}
  \item \textsuperscript{159} See id.
  \item \textsuperscript{160} See id.
  \item \textsuperscript{161} In fact, it was a continuing resolution that brought the 2013 shutdown to an end. Continuing Appropriations Act of 2014, Pub. L. No. 113–46, 127 Stat. 558 (2013) (allocating funds for operations).
  \item \textsuperscript{162} As legislative logjams over appropriations can hinder new policies that were intended to limit the size or scope of the federal government, the development of new substantive policy may produce new bureaucracy and add to the complexity of government. See, e.g., Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010) (increasing regulation of the financial services industry and creating the Consumer Financial Protection bureau).
  \item \textsuperscript{163} Christopher R. Berry & Jacob E. Gersen, The Unbundled Executive, 75 U. Chi. L. Rev. 1385, 1385–434 (2008).
  \item \textsuperscript{164} See id. at 1393–94.
\end{itemize}
quality representatives in each policy domain. The observations can be analogized to the budget context. By dividing the budget process along policy dimensions, as it has been historically, stakeholders can better review the bill and give feedback. Consequently, better-informed representatives and voters, especially those with a particular interest in the subject matter, can improve the quality of debate on the budget process. By contrast, the omnibus appropriation bill lumps all of the policy dimensions together, making it harder to disaggregate the sound and supported budget initiatives from those that are a wrench in the appropriations works.

Designing for robustness imposes trade-offs in the system. Reforms to the Antideficiency Act and appropriations process impose additional monitoring costs and complexity on the system. However, the reforms can also reduce the possibility of systemic breakdown in the budget process by providing redundancy, increasing opportunities for monitoring and feedback, and making it easier for stakeholders to identify, evaluate, and promote quality policy initiatives.

**CONCLUSION**

The U.S. system of government has proven mostly stable over the course of the last 225 years. That stability, however, is jeopardized by the systemic risk of government shutdown. The most recent government shutdown in 2013 sent shockwaves through political and economic systems, imposing heavy costs on citizens and institutions alike. While it is tempting to view these events as a necessary consequence of a strict separation of powers, the problem of government shutdown extends beyond the limits of the constitutional framework because it has the potential to bring down the entire system. When the risks are that catastrophic, measures to provide stability deserve attention.

Therefore, this Comment has argued that the law-making branches should be made more robust—that is, less susceptible to systemic risk. This Comment

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165. See id. at 1394 (“The unbundled executive allows voters to better match expertise, ability, and other characteristics that make for government performance to the underlying jurisdiction of government offices.”).


167. Lawmakers may oppose smaller appropriations bills for ideological reasons (e.g. religious objection to Planned Parenthood funding), though they might support that smaller bill as part of a larger omnibus package in the interests of achieving passage of their own ideological interests. However, smaller appropriations measures allow for new coalitions to form that would otherwise be hindered by partisan omnibus measures. Therefore, the Republican who is ambivalent about Planned Parenthood funding may support such a budget measure (perhaps in exchange for support from his colleague across the aisle), but such compromises are impossible when the stakes are highest and partisan loyalty is emphasized in the fight over omnibus bills.

168. See BRASS, supra note 59, at 14 n.64 (describing the Government Accountability Office’s characterization of the results of a hypothetical thirty-day shutdown they postulated in 1981 as “unthinkable”).
proposed three design features of robust systems—redundancy, feedback, and quality—which proliferate in robust systems across a range of fields. These features are sufficient, but not exhaustive of the possible ways to measure robustness.

Notwithstanding the adoption of the particular initiatives proposed here, the study of systemic risk and designing for robustness present a novel remedy not only for surviving nuclear attack, but also political gridlock. Considering the high costs of failure, research into systemic risk and the theory of robust design ought to be considered where the separation of powers has obstructed the passage of system-essential legislation.