

# Managing Social and Economic Externalities: Industrialization and the Rise of the Bureaucratic State

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## Abstract

Which role did externalities play in the emergence of modern bureaucracies? Many scholars argue that general increases in socioeconomic complexity caused by industrialization were a key reason for the rise of the modern bureaucratic state. I build upon this established perspective by examining the critical role of externalities. Industrialization led to an exponential increase in externalities because (1) it meant the intensification, amplification, and spatial concentration of economic exchange and social interaction, and (2) it was accompanied by forceful processes of “creative destruction.” Resulting externalities—such as widespread health issues, crime, social conflicts, and the recurring mass socioeconomic dislocation of workers—could become so severe that they often threatened the stability of political systems. Moreover, the economic frictions associated with externalities had a significant potential to reduce rulers’ tax revenues, which gave them further incentives to address their fallout. I argue that the combination of these circumstances with contemporary technological constraints made bureaucratization an effective political response. Accordingly, governments created modern administrative organizations because they were capable of implementing policies aimed at addressing externalities in a comprehensive and standardized fashion. I illustrate the suggested dynamics through comparative case studies of Germany and the United States in the nineteenth century.

**Keywords:** Externalities, bureaucracies, industrialization, bureaucratization, creative destruction, public administration

**JEL Codes:** D62, D73, H83, N11, N13, N41, N43, O14

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# 1 Introduction

How did externalities shape the emergence of modern bureaucracies? In this paper, I examine the role that social and economic externalities<sup>1</sup> played in the rise of the modern administrative state. Scholars have already provided various explanations for this process of “bureaucratization,” arguing that increases in socioeconomic complexity caused by industrialization and urbanization (and a subsequent surge in the demand for public services) were key (Ansell and Lindvall, 2020; Higgs, 1987, chap. 1; Mann, 1993, chaps. 11–14; Skowronek, 1982; Potter and Vogler, 2021; Raadschelders and Rutgers, 1996, 86; Saylor, 2014; Vogler, 2023). Thus, it is not surprising that the nineteenth and early twentieth centuries—a period during which several major powers experienced rapid industrialization and urbanization—are considered critical (Carpenter, 2001; Silberman, 1993; Vogler, 2019b).

Building upon these previous insights that connect industrialization to the emergence of bureaucracies, I provide a more detailed perspective on the specific mechanism of externalities. In economic theory, externalities are understood as the results of market transactions that are not priced into these transactions (Pigou, 1929). For instance, when a factory generates pollution that has a detrimental impact on its vicinity and that is not subject to taxation, then it is not part of the manager’s price calculation. Because it is “external” to the transactions of producing and selling the good, it is understood as an “externality.”

I often rely on this traditional understanding of externalities, which is grounded in conventional economic theory. Accordingly, in my framework, I describe how we may think of pollution and work-related injuries as forms of standard “Pigouvian” externalities. However, this traditional view has been further developed and expanded by many authors, including Buchanan and Stubblebine (2000) and Worcester (1969), who introduce a number of conceptual differentiations. Most important to my work is Buchanan and Stubblebine’s notion of

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<sup>1</sup>As I elaborate below, building on numerous studies in the social sciences, I rely on a more extensive definition of “externalities” that connects to other contributions to the field of institutional economics (e.g., Paniagua and Rayamajhee, 2023) and to Ostromian perspectives on political economy (e.g., Ostrom, 2010).

“potentially relevant externalities,” which create a desire in affected third parties to change the behavior of the actors responsible for the externality.

Furthermore, the Pigouvian understanding of externality is challenged by [Paniagua and Rayamajhee \(2022\)](#) who criticize its simple, dichotomous character. In line with this notion and building on more extensive conceptualizations of externalities from across the social sciences ([Baumol, 2010](#); [Biagi and Detotto, 2014](#); [Claassen, 2016](#); [Komlos, 2016](#); [Rueda and Stegmüller, 2016](#); [Witt, 1996](#)), for the purpose of explaining the rise of the bureaucratic state, I also rely on a broader view of the phenomenon. Indeed, many kinds of social interactions—including such that are not strictly economic in character—have the potential to generate “externality-like” byproducts (on this point, see also [Paniagua and Rayamajhee, 2022](#)) that are (1) unintended, (2) unaccounted for by the parties engaged in the original action/interaction, and (3) have an effect on third parties. Given these substantive similarities to Pigouvian externalities, if the research question and theory warrant it, we may go beyond the traditional concept by including the unintended byproducts of social interaction as well as of economic actions other than the simple exchange of goods/services. In line with [Buchanan and Stubblebine \(2000\)](#), it is sensible to limit this broader understanding in one important way, however: only externalities that induce a desire on the part of the third party to change the behavior of the original parties may be considered analytically relevant.<sup>2</sup>

This definition of externalities is broader than the traditional perspective because it is not limited to voluntary economic exchange,<sup>3</sup> but also applies to many other forms of social interaction.<sup>4</sup> A broadening of the concept of externalities is not entirely novel, but it represents a practical analytical tool that can be used to explain certain real-world phenomena,

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<sup>2</sup>The conceptual distinction by [Buchanan and Stubblebine \(2000\)](#) can also be seen as related to the differentiation by [Daou and Marciano \(2023\)](#) who suggest that we need to consider both an objective and a subjective dimension of externalities. Specifically, not every objectively existing externality may be subjectively perceived as a loss of utility on the part of affected actors.

<sup>3</sup>I define “economic exchange” as all market transactions of labor, goods, services, and currencies that two or more parties voluntarily engage in and that are associated with prices.

<sup>4</sup>I define “social interaction” as voluntary and involuntary encounters of two or more people in a narrow space that involve oral communication or physical contact or both.

such as the factors that contribute to economic growth (see [Aghion, Antonin and Bunel, 2021](#); [Baumol, 2010](#)) or the rise of bureaucracies. This is not to say that more limited, conventional conceptualizations lose their value or validity. Rather, specific research questions and theories should guide researchers to either perspective.

A broader understanding of externalities is also compatible with Ostromian political economy for two reasons. First, Ostromian theory moves away from a simple state vs. market dichotomy by emphasizing the relevance of social interactions that are not exclusively transactional. Second, Elinor Ostrom also championed an encompassing perspective on social dilemma situations, including the many different ways in which two-party exchanges can lead to third-party costs ([Ostrom, 2003](#); [Ostrom, 2010](#); [Ostrom, 2012](#)).

In addition to demonstrating the utility of a more extensive understanding of externalities, this paper connects to a broader theme in the institutional economics literature, namely the governance of complex externalities, by showing how a specific set of historical technological restrictions in combination with significant negative externalities resulted in (public) bureaucratic response mechanisms as opposed to private or community-managed solutions. However, as I discuss in the conclusion, private (and fully polycentric) solutions may be superior under different (contemporary) technological conditions (cf. [Leeson and Thompson, 2021](#); [Paniagua and Rayamajhee, 2023](#)).

I build my theory in multiple steps. First, I argue that industrialization was associated with the intensification, amplification, and spatial concentration of economic exchange and social interaction. Intensification is reflected in the occurrence of more economic exchange (larger absolute amounts of transactions and greater relative income shares spent on tradeable goods) and more comprehensive social interaction (more activities that involve larger groups of people). Second, I argue that these circumstances resulted in an exponential increase in the number and severity of negative externalities.

Additionally, industrial societies also regularly experience “creative destruction,” which

refers to the displacement of old firms by ones that use more recent technologies (Caballero, 2010; Schumpeter, 2010). While creative destruction generates overall wealth increases, it is typically also associated with the mass social and economic dislocation of employees in affected industries (cf. Polanyi, 1944). Such dislocation may be viewed as an externality, too, as it represents the unintended negative byproduct of decisions to innovate and to comprehensively restructure or close older firms (see also Komlos, 2016; Witt, 1996).

In short, industrialization generates a multitude of severe, spatially concentrated externalities. If those externalities remain unaddressed, affected populations are likely to lose trust in the political system, which negatively affects its legitimacy and stability (cf. Chanley, Rudolph and Rahn, 2000; Foster and Frieden, 2017). Political radicalization could materialize as a result.<sup>5</sup> Moreover, an exponential rise in negative externalities also implies economic frictions that lower overall output. As political ruler's ability to extract tax revenue is decreased through these frictions, they have an additional motivation to address them (cf. Levi, 1988; McGuire and Olson, 1996; Olson, 1993; Piano, 2019). For these reasons, incumbent governments have strong incentives to provide an effective institutional reaction.

Given (1) these specific challenges of industrializing polities and (2) contemporary technological constraints, the creation of large-scale bureaucratic apparatuses—capable of the standardized implementation of policies to address negative externalities (among others by providing social insurance and public goods/services)—was an effective response. In this respect, the avoidance of idiosyncrasies and arbitrariness (that would have occurred through non-standardized responses) was key to preventing further losses of legitimacy.

Importantly, my argument is not that externalities were the only cause of bureaucratization. Many additional factors also contributed to the rise of the administrative state and prominent authors, including Weber (1978), Skowronek (1982), and Mann (1993), have already connected industrialization to bureaucratization. At the same time, given the sub-

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<sup>5</sup>For instance, Chanley, Rudolph and Rahn (2000) find that crime and negative perceptions of economic performance decrease trust in government.

stantive relevance of externalities, it is clear that the degree of conceptualization, theorizing, and empirical examination to date is insufficient. For instance, the term “externality” is entirely absent from the three aforementioned contributions. Moreover, although [Fukuyama \(2014, chap. 3\)](#) briefly mentions the benefit of bureaucracies in addressing externalities, he does not provide a rigorous conceptualization and exploration of the term. Finally, although they add significant substantive knowledge on the process of bureaucratization, the concept is also absent from well-known accounts of the emergence of the welfare state and social services, including those of [Hayek \(2011\)](#) and [Steinmetz \(1993\)](#).

## 2 Literature Review

### 2.1 Rise of Modern Bureaucracies

Modern public bureaucracies are administrative organizations that are subordinated to governments and responsible for policy implementation and the provision of public goods. [Vogler \(2023\)](#) identifies five features that jointly distinguish them from other types of public administration: (1) a strict separation of offices and officeholders; (2) recruitment procedures that ensure minimal competence; (3) clear expectations for official conduct; (4) stable salaries; and (5) limited discretion in bureaucrats’ daily routines and an orientation toward meeting politically defined goals.<sup>6</sup>

The literature has provided three broad explanations for these systems’ emergence:<sup>7</sup> (1) pressures from military conflict that induce state rationalization ([Besley and Persson, 2009](#); [Kennedy, 1989](#), esp. 70–72, 75–86; [Mann, 1993](#), chaps. 11–12; [Tilly, 1990](#)), (2) increases in socioeconomic complexity caused by socioeconomic development ([Ansell and Lindvall, 2020](#); [Higgs, 1987](#), chap. 1; [Mann, 1993](#), chaps. 11–14; [Potter and Vogler, 2021](#); [Raadschelders](#)

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<sup>6</sup>This definition differs from Weber’s classical perspective in several ways (see [Vogler, 2023](#)). On the limits of Weber’s concept of bureaucracy, see also [Ang \(2017\)](#).

<sup>7</sup>This part of the literature review section is directly based on arguments and analysis from [Vogler \(2023\)](#).

and Rutgers, 1996, 86; Saylor, 2014; Skowronek, 1982), and (3) imperialism and the imposition of institutions (Buzan and Lawson, 2015; Matsuzaki, 2019; Mattingly, 2017; Paik and Vechbanyongratana, 2019; Vogler, 2019*a*).

Because most of the world's leading powers bureaucratized in the relative absence of war, accounts that focus on increases in socioeconomic complexity are substantially more powerful explanations. The relevance of industrialization is also visible in the fact that it typically directly preceded bureaucratization.<sup>8</sup>

Existing works point to a variety of mechanisms that link industrialization and bureaucratization. Skowronek (1982, esp. 11–12) emphasizes that increases in social complexity require more capable administrations, especially to manage societal conflicts that arise from uneven development in industrializing economies. Hayek (2011, chap. 19) argues that social insurance mechanisms managed by the government (but based on individuals' contributions) developed because otherwise the public would have paid in full for all sorts of contingencies faced by industrial workers, which would not have been economically or politically feasible. These circumstances were part of the reason why bureaucratic, unitary government organizations tasked with managing social insurance were created. Moreover, as Hayek highlights, these insurance systems eventually transformed into mechanisms of economic redistribution (which meant a perpetuation of bureaucracies).<sup>9</sup> Similarly, Ansell and Lindvall (2020) suggest that industrialization led to political conflicts, increased the state's infrastructural power, and heightened social risks. These dynamics constituted the basis of both the demand for and the supply of public services through the state. However, Ansell and Lindvall's account is more strongly focused on how different forms of public service provision were established, rather than the general background dynamics responsible for their emergence.

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<sup>8</sup>For a detailed account of bureaucratization, see Fischer and Lundgreen (1975). On the case of France, see also Zhang and Lee (2020). Similarly, Allen (2011) suggests that new technologies that resulted from industrialization allowed for institutional innovation.

<sup>9</sup>Importantly, Hayek then proceeds to criticize the notion that insurance/redistribution has to be (perpetually) provided by a unitary government organization and advocates a move away from the compulsory and unitary government-controlled model.

Alternatively, [Potter and Vogler \(2021\)](#) highlight the diversification of economic elites and the associated desire to create a neutral, professional, and competent (modern) administrative state. Specifically, they suggest that, when multiple economic elite factions with heterogeneous interests are present in a more diverse economy, the only stable equilibrium is a neutral/professionalized state apparatus that is not captured by a single faction. Moreover, [Weber \(1978, chap. 9\)](#) famously argued that money-based economies (that ultimately become fully capitalist) require modern bureaucracies because capitalism needs more predictable and rational types of public administration than premodern administrations.

While all these contributions focus on different aspects of increased socioeconomic complexity caused by capitalist development or industrialization, the existing frameworks do not put externalities (or conceptual equivalents) at the center of their analyses. Indeed, in none of the cited works do we even find the term. Thus, the concept has not been thoroughly explored in key existing works, indicating that this study can make a major contribution.

Additionally, two more accounts are noteworthy. First, with a focus on the German Empire, [Steinmetz \(1993\)](#) puts “social fear” at the center of the emergence of the bureaucratic welfare state at the federal level. Specifically, the ruling elites in Germany feared social disorder from mass poverty as well as the revolutionary power of worker movements, which provided a key incentive to establish a national public welfare system managed by modern bureaucracies. This line of reasoning will be reflected by one aspect of my theoretical framework, namely one of the mechanisms that link externalities to bureaucratization.<sup>10</sup>

Moreover, [Higgs \(1987\)](#) examines how historical crises affected the American administrative state. His account differs from mine in that I emphasize the structural components of industrialization, while he highlights episodes of severe crisis. Interestingly, although [Higgs’s](#) main account focuses on crises, he also briefly introduces (and rejects) an explanation based on externalities that he considers a part of “Modernization Theory.” In this brief account he

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<sup>10</sup>With respect to the local level, [Steinmetz](#) puts particular emphasis on the political strength of Social Democrats and the presence of trained experts in the municipal public administration. Neither one of these explanatory factors rests on externalities.

suggests that the pollution that resulted from urbanization (an externality) required government regulation, which contributed to the rise of modern bureaucracies. While this very brief line of (auxiliary) arguments introduced by [Higgs](#) is in accordance with my own perspective, it does not represent a fully developed theory. In this paper, I provide a more rigorous and comprehensive step-by-step framework of how industrialization results in various kinds of externalities (not just pollution) and how this shapes bureaucratization.<sup>11</sup>

## 2.2 Industrialization

The phenomenon of industrialization has been of interest as both a dependent and an independent variable. For instance, some prominent theories suggest that industrialization is an essential contributor to democratization and/or democratic stability ([Lipset, 1959](#); [Przeworski and Limongi, 1997](#)).

Additionally, scholars also seek to identify the major historical roots of industrialization. For instance, [North and Weingast \(1989\)](#) suggest that decentralization of political power created the political-economic conditions that ultimately gave rise to industrialization. Similarly, [Acemoglu and Robinson \(2012\)](#) posit that inclusive political and economic institutions unleash industrial progress. Moreover, [Gingerich and Vogler \(2021\)](#) argue that the abolishment of serfdom in the wake of the Black Death led to the socioeconomic conditions that ultimately spurred capitalist development; and [Blaydes and Chaney \(2013\)](#) suggest that tensions between kings and nobility in Europe prevented an ultimate power center,<sup>12</sup> which benefited decentralized economic decision-making. Finally, the role of culture and ideas in shaping economic development has been examined by [Mokyr \(2016\)](#) and [McCloskey \(2016\)](#).

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<sup>11</sup>It is also noteworthy that [Higgs \(1987\)](#) does not provide any references that explicitly develop the perspective of bureaucratic modernization theory, but instead suggests that his brief summary account is merely based on “[r]eading between the lines of many historical works” ([Higgs, 1987, 6](#)).

<sup>12</sup>On the general relevance of constraints on rulers, see also [Ahmed and Stasavage \(2020\)](#), [Stasavage \(2020\)](#), and [Vogler \(2022b, 195–199\)](#).

## 3 Theory: How Externalities Contributed to Bureaucratization

### 3.1 The Intensification, Amplification, and Spatial Concentration of Economic Exchange and Social Interaction

The two facets of industrialization that are most relevant to my theory are the creation of large-scale production complexes (factories and industrial parks) and the process of urbanization (cf. [Ansell and Lindvall, 2020](#), 30). These processes are closely related because, as factories grew in size, an increasingly large workforce was needed. Due to the limits on transportation technology and the long working hours associated with early industrialization (cf. [Klein, 1963](#), 30), workers typically settled in factories' vicinity. In addition, a secondary group of laborers that provided goods and services (such as clothing, food, etc.) often began to settle there, too ([Köllmann, 1969](#), 60; [Scott, 1986](#), 32).

The spatial concentration of production was primarily related to the exploitation of economies of scale, that is the decreasing per-unit production costs ([Haldi and Whitcomb, 1967](#)). It was also economically beneficial to build factories close to relevant resources, especially coal, which further incentivized spatial clustering ([Gutberlet, 2014](#); [Reulecke, 1977](#), 25; [Zimmermann, 2015](#)). Moreover, as manufacturing processes became more complex and required a range of intermediary products, industrial production expanded vertically ([Scott, 1986](#)). Similarly, the spatial concentration of labor supply made horizontal industrial expansion attractive ([Rosenbloom, 2002](#), esp. 10; [Scott, 1986](#), esp. 28, 32). In general, the specialization of labor contributed to the intensification of exchange (cf. [Scott, 1986](#)), because trading increasingly became necessary for economic survival (cf. [Reulecke, 1977](#), 28).

An example of how industrialization led to the spatial concentration of workers is Manchester, which was one of the key sites of British industrialization. Its population rose from 20,000 people in 1750 to more than 250,000 in 1850 ([Davenport, Boulton and Black, 2022](#)).<sup>13</sup>

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<sup>13</sup>Another historical example is the Japanese city Toyota. Beginning in the 1930s, the Toyota Motor

Another process that amplified urbanization was internal migration from rural to urban areas (Reulecke, 1977, 25). Due to unprecedented urbanization, social interaction also became more intense and frequent. Workers and their families—who lived in confined spaces—began to engage in a multitude of social activities and gatherings.<sup>14</sup>

In short, industrialization leads to the intensification, amplification, and spatial concentration of both economic exchange and social interaction.

### 3.2 The Resulting Externalities

A direct consequence of the processes described above was an exponential rise in negative externalities (cf. Mashaw, 2012, 229). Spatial concentration is of prime importance in this respect: in densely populated areas with significant economic production, the diminishment of externalities in both time and space is limited, making them more severe and impactful. Possibly the most visible externality during early industrialization was pollution (which occurred in various forms, including environmental and noise pollution). Similarly, overcrowded cities with poor sanitary infrastructure experienced recurring disease outbreaks (Brown, 1989; Melosi, 2008). These circumstances likely contributed to high infant mortality (cf. Federman and Levine, 2010; Steckel, Floud and Vanderlinden, 1997). Furthermore, the occurrence of (sometimes deadly) work-related injuries was also common during early industrialization, because production complexes typically did not have sufficient safety standards. Thus, many workers became unemployable or died due to severe injuries.

Importantly, one could argue that work-related injuries do not represent an externality because firms anticipate that they may need to compensate workers for them, which reduces the wage that they are willing to pay. However, a “number of surveys taken about 1900 showed that only about half of all workers fatally injured recovered anything and their average compensation only amounted to about half a year’s pay.” For this reason, “industrial methods [at this time] developed with little reference to their safety” (Aldrich, 2023).

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Corporation created a massive industrial production center, which led to a significant population increase.

<sup>14</sup>On the (over-)crowded living situation of workers in cities at this time, see Reulecke (1977, 28).

Additionally, if the injuries had been partly caused by fellow workers, employers often had another argument to avoid financial liability (Aldrich, 2023). Sometimes when the worker had died from the accident, factory managers were able to completely escape responsibility (Self Insurance Market, 2023). Accordingly, there is no reason to believe that the risk of work-related injuries significantly influenced the wages that employers were willing to offer. Therefore, even with a strict conventional view, we may conceptualize them as externalities.

Another type of externality that became more concentrated in space was criminal activity. Crime has been conceptualized as an externality in a range of academic studies. Closely in line with the argument presented here, James and Smith (2017) view crime as an externality of economic resource booms and subsequent migration patterns. Similarly, Hemley and McPheters (1975) consider crime as an externality of economic growth and urban concentration. Finally, Biagi and Detotto (2014), Rueda and Stegmüller (2016), and Farrell and Roman (2006) also view crime as an externality of various other social phenomena.

The availability of more economic wealth coupled with a high density of transactions within limited spaces (that resulted from industrialization and urbanization) attracted criminals (see Ansell and Lindvall, 2020, chaps. 3–4), which then had negative consequences for third parties in the same area (who could become subject to theft or robbery) (cf. Hemley and McPheters, 1975). Even if some of the many actors involved in the original transactions accounted for this possibility through the negotiated price, it is likely that not all of them did so. Moreover, criminals subsequently often spatially expanded their activities, affecting more third parties. Accordingly, in the nineteenth century, “across Europe, crime was rife in the cities” (Ansell and Lindvall, 2020, 68).

Moreover, creative destruction was generally associated with mass layoffs in affected industries, which we may conceptualize as an externality of innovation and the subsequent decisions to close or restructure firms. Such destructive effects of “creative destruction” have previously been conceptualized as externalities by both Witt (1996) and Komlos (2016).

Moreover, Baumol (2010) and Aghion, Antonin and Bunel (2021) also discuss the multifaceted externalities of creative destruction, but they emphasize positive byproducts.

Already during periods of steady economic growth, inefficient labor market institutions at the time could make it difficult for workers to quickly find new employment when they were out of work (Rosenbloom, 2002). During mass layoffs the problem was likely exacerbated because if many workers search for new employment simultaneously, this creates an imbalance in labor markets that—in light of inefficient labor market institutions at the time (Rosenbloom, 2002)—cannot be expected to be resolved immediately.<sup>15</sup>

Finally, rapid economic development coupled with the dislocation of certain social groups can lead to significant conflicts with unaffected groups. If extreme socioeconomic imbalances are sustained, it is likely that those who are disadvantaged lose trust in the political system. Given the ease and speed of social interaction (that also result from industrialization and urbanization), dissatisfied groups can more easily organize themselves. In this sense, industrialization does not only provide the incentives but also the means for mass political organization. Ultimately, these dissatisfied groups have the potential to further radicalize themselves, which may (*in extremis*) result in violent action against the political system.

In sum, several types of severe negative externalities resulted from industrialization, including pollution, work-related injuries, crime, mass economic and social dislocation, and pronounced socioeconomic conflicts. If sustained, the combination of these externalities can lead to a significant loss of trust in the political system by affected populations.

The key theoretical claims discussed so far are summarized in [Figure 1](#).

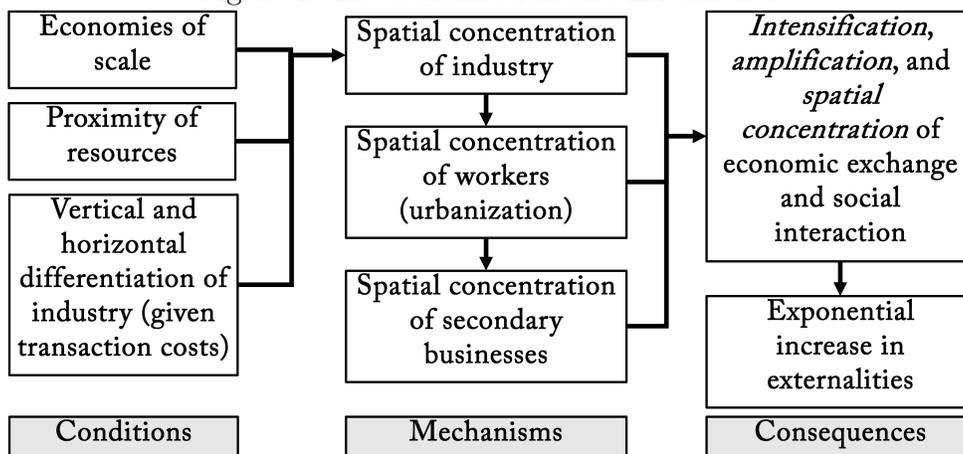
### 3.3 Bureaucratization as a Response

Two primary mechanisms link the exponential rise in externalities to bureaucratization: (1) the potential of radicalization that results from a loss of trust in the political system’s ability

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<sup>15</sup>Similar dynamics are also observed in other periods. For instance, Detroit experienced a significant economic decline due to creative destruction in the twentieth century.

Figure 1: Industrialization and Externalities



to address major challenges and (2) the creation of economic frictions that reduce rulers’ overall shares of tax revenue. Below, I detail these two mechanisms.

The described rise in severe negative externalities poses a grave threat to the stability of affected polities for a variety of reasons. For instance, if crime is not sufficiently combated, then this will have two major detrimental effects. First, criminal activity will be seen as even more attractive because it leads to material gains with little risk. Second, regular economic activity will be disincentivized and inhibited. Thus, there will be both direct and escalating indirect effects that threaten the political-economic system’s stability.

Similarly, if the impact of mass layoffs through creative destruction is not contained—for instance, through some form of short- or medium-term assistance to affected workers—this could lead to escalating negative dynamics. Specifically, affected people might experience loss of housing, which could then make it impossible to find new employment. In addition to incentivizing criminal activity, lasting economic misery can also increase social conflict and amplify processes of political radicalization (Doerr, Gissler, Peydro and Voth, 2021).

While work-related injuries are not as significant a threat to a social system’s stability as widespread crime or mass layoffs, they can still be economically devastating to affected individuals. In combination with health-related issues stemming from pollution, the issue becomes significant in scope. Pollution often increases infant mortality rates in particular.

In short, the common consequence of these externalities—if they remain unaddressed—is that they can affect citizens so negatively that they can result in a loss of trust in the government’s ability to effectively respond to problems, which may severely hurt its legitimacy. These circumstances generate incentives for the government to address externalities. Importantly, this first mechanism is particularly strong in democratic political systems where elections are an institutionalized—and highly effective—sanctioning tool for the population to penalize incumbent governments that do not address their needs. Although the related incentives may be weaker in authoritarian systems, autocratic rulers are also concerned about potential radicalization and instability that—especially in the absence of peaceful institutionalized sanctioning mechanisms—could ultimately lead to violent resistance/rebellion against them, including by other elite groups (see [Andersson, 2023](#); [Kim, 2007](#); [Steinmetz, 1993](#)).

As indicated above, there is a second mechanism that incentivizes governments to address externalities: the ruler’s overall tax revenue is likely lowered by the associated economic frictions. For instance, especially at an aggregate level, the adverse health consequences from pollution have the potential to lower economic output as they lead to higher mortality rates among the productive population. In general, there is an empirically established link between health outcomes and long-term economic growth ([Baum and Lake, 2003](#)). Similarly, as detailed above, widespread crime disincentivizes legal economic activity, which is an essential source of government tax revenue. In this respect it is noteworthy that an extensive literature in institutional economics as well as political economy shows that governments (and elite groups that control the government) have a keen interest in increasing their tax revenue as a source of their wealth, power, and societal position (e.g., [Andersson, 2023](#); [Levi, 1988](#); [Olson, 1993](#); [Piano, 2019](#)). In line with this perspective, we would also expect governments to have an incentive to address externalities for self-interested reasons ([McGuire and Olson, 1996](#)). This second mechanism fully applies to both authoritarian and democratic governments.

Because of collective action problems (see [Olson, 1965](#)),<sup>16</sup> market actors themselves typ-

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<sup>16</sup>[Ostrom \(2003\)](#) also examines related issues in detail.

ically do not respond to these aggregate externalities effectively. Individual responses are generally insufficient to combat widespread externalities at their root. For example, market actors could avoid areas that exhibit high crime rates, but criminals are mobile, too, and can adjust through relocation.

Because no single actor has the incentives—or the means—to individually combat aggregate externalities, a more centralized response is often necessary. Governments must be considered the essential party in this respect because they have responsibility for and an interest in the stability of the social system as a whole. In fact, they have strong incentives to meet public demands by addressing severe externalities because both their tax revenue as well as their position as leaders of the system are at stake otherwise (cf. [Buchanan, 1968](#); [McGuire and Olson, 1996](#)).

For example, in response to the problem of increased criminal activity during early industrialization, states created bureaucracies in charge of police and prisons ([Ansell and Lindvall, 2020](#)). Moreover, infant mortality stemming from pollution and malnutrition was a major concern that could be addressed through building competent bureaucracies and effective administrative capacity ([Bustikova and Corduneanu-Huci, 2017](#), 286–288). If governments do not address negative externalities, they leave a major public demand completely unaddressed (on this issue, see [Buchanan, 1968](#)) and thus face a threat of social revolution (cf. [Kim, 2007](#); [Steinmetz, 1993](#)).

As we deal with the historical stage of early industrialization, we have to assume that most political systems initially rely on premodern administrations.<sup>17</sup> These systems differ from modern bureaucracies in all of the aforementioned dimensions.<sup>18</sup> Most importantly, premodern systems are often incapable of effective large-scale policy implementation because, first, they do not ensure officeholders’ minimal competence, and, second, they also do not have standardized expectations for official conduct or routinized training.

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<sup>17</sup>For an overview of premodern states (prior to the Industrial Revolution), see [Fukuyama \(2011\)](#).

<sup>18</sup>For further discussion, see [Vogler \(2023\)](#).

Yet a consistent policy response is essential for two reasons. First, the described negative externalities often occur in similar form and with comparable consequences (in part due to the standardization of work through industrialization), making relatively standardized solutions both feasible and efficient.<sup>19</sup> Second, the unequal treatment of people in comparable situations could further reduce trust in the system. Therefore, as a response to externalities, governments have strong incentives create modern bureaucracies that are capable of implementing policies (relatively) competently, reliably, and in a standardized fashion.

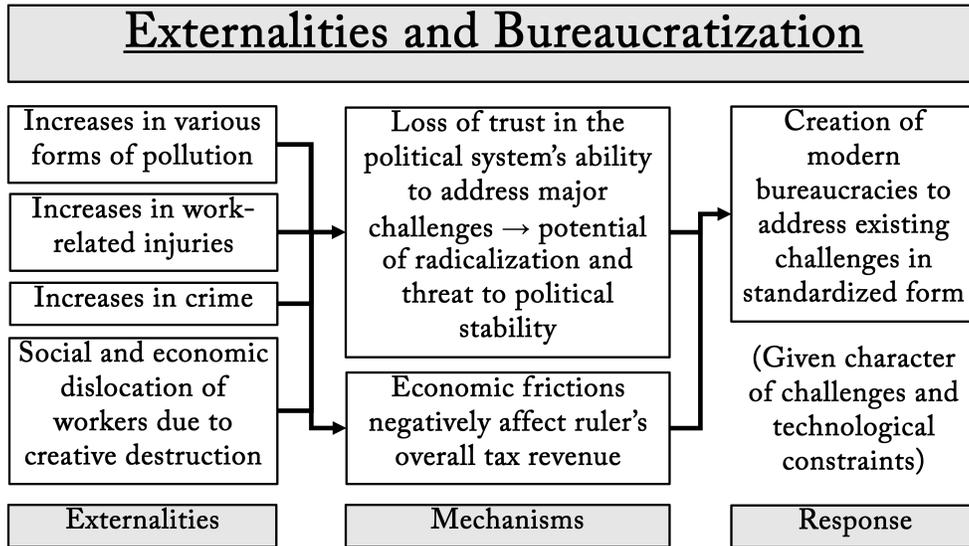
There is one more reason why bureaucracies are a highly effective organization when responding to the concrete challenges of early industrialization. In part because of the rapidity of socioeconomic changes, administrations needed to be able to *swiftly* implement standardized policies at a large scale. This goal is most easily achieved with a hierarchical decision-making process, which is common to modern bureaucratic systems. In addition, standardized training and clear expectations (which are also hallmarks of modern bureaucracies) in combination with effective monitoring technologies (cf. [Allen, 2011](#)) allow for the relative autonomy of lower offices in mundane tasks. At the same time, given restrictions on available data processing technologies, hierarchical organization allows for those lower-level administrative offices to condense and pass on only relevant information to the top. Without these features, any administrative system based on the data aggregation technologies of early industrialization would be overwhelmed by unmanageable information flows (cf. [Vogler, 2022a](#)). A final—but closely related—argument is made by [Kiser and Schneider \(1994\)](#) who argue that technological changes in communication and monitoring that occurred in the late eighteenth and early nineteenth centuries made hierarchical and centralized bureaucratic structures more effective forms of public administrative organization.

In short, modern public bureaucracies represent an effective response to the externality challenges associated with rapid industrialization. Among others, externalities led to the

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<sup>19</sup>However, the same is not necessarily true for societies that are significantly more socially and economically complex, especially post-industrial societies.

Figure 2: Externalities and Bureaucratization



creation of police departments to provide public safety (Ansell and Lindvall, 2020), public organizations to provide social insurance mechanisms, and regulative agencies to manage waste removal, pollution, and other health hazards. By doing so, bureaucracies serve two purposes: (1) they help maintain or reestablish a government's legitimacy and (2) they help reduce economic frictions (which otherwise negatively affect rulers' tax revenue levels).

The theoretical claims from this theory section are summarized in Figure 2.

## 4 Case Studies: Industrialization, Externalities, and Bureaucratization

### 4.1 Case Selection

It is important to first distinguish between politically autonomous countries and those that were subject to foreign rule. As administrative institutions in the latter category were influenced by external powers (Matsuzaki, 2019; Mattingly, 2017; Vogler, 2019a), I need to pick cases from the former category, where bureaucratization is likely shaped by domestic factors (Vogler, 2019b, chap. 2).

I use a most-different comparative case study design. Specifically, I chose two countries in the nineteenth century that differ substantially in a wide number of theoretically relevant dimensions, but that have in common that industrialization caused a range of severe externalities: Imperial Germany and the US. Despite crucial differences between them, I expect that, in both cases, externalities represent strong pressures to induce bureaucratization.

In which relevant categories do the US and Germany differ during the considered time period? The first dimension is the overall geopolitical situation. As discussed previously, military competition spurs administrative reform (Tilly, 1990). In this respect, the US and Germany heavily differed. Germany was at the center of Europe, a major military force in great power politics, and a key part of geopolitical competition at the time (Kissinger, 1994; Simms, 2013; Vogler, 2022b).<sup>20</sup> On the contrary, the US was geographically isolated, had only limited military capacities, and was not a key part of geopolitical competition (Kissinger, 1994; Mann, 1993, 459).

Another relevant category is dominant (popular) ideologies, which could also affect state building and the design of public institutions (e.g., Gorski, 2003). In this respect, Bustikova and Corduneanu-Huci (2017) show that trust in the state and its institutions has direct effects on the quality of public goods. The two cases differ substantially in this dimension, too. Specifically, in nineteenth-century Germany, the state was perceived as a relatively neutral, legitimate, and enduring institution, the existence of which was usually not contested (cf. Steinmetz, 1993, 106). To the contrary, in the US there was much stronger contestation of the state. This was in part related to significant historical opposition to the British state and the fact that many who migrated to the US had previously been suppressed by public authorities. As a result, the early American state was much more decentralized and did not have strong executive/administrative institutions. Instead, it heavily relied on the court system to solve social conflicts (Tocqueville, 2003). Until the early twentieth century, this

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<sup>20</sup>For this reason, Prussia—a core state of Imperial Germany—had already developed bureaucratic structures earlier, meaning that there were also differences in preexisting administrative systems. This further underscores the appropriateness of a most-different case design.

state's administrative weakness was especially pronounced at the central level.<sup>21</sup>

In addition, ethnic heterogeneity also potentially affects the institutional strength of bureaucracies and public goods provision (for a critical discussion, see [Pardelli and Kustov, 2022](#)). In this respect, too, the two cases differ substantially. Germany was much more ethnically homogeneous, with Germans representing the vast majority of its citizens (though there were substantial Slavic minorities). The US, on the other hand, was significantly more ethnically diverse.

The final relevant dimension is the form of government and the dominant social groups, which are two closely related factors. In Imperial Germany, which had a semi-authoritarian political system, the landed elites were the dominant social and political force. This was in part because serfdom had previously persisted in Germany's east for centuries ([Gingerich and Vogler, 2021](#)). In general, the political system represented a compromise between a dominant aristocracy and the middle classes ([Eley, 1984](#); [Mooers, 1991](#), 144; [Paniagua and Vogler, 2022](#), 35 (appendix); [Rogowski, 1987](#), esp. 1125; [Rosenhaft and Lee, 1994](#), 16; [Vogler, 2019b](#), chap. 2). In comparison, while the US also had landed elites in the South, after the Civil War, the North economically dominated the Union. The northern landed elites were substantially weaker and other social groups noticeably stronger. As a result, political power was more clearly dispersed among different groups (cf. [Vogler, 2019b](#), 61–65).

## 4.2 Case I: Germany

While Britain had already begun industrialization in the late eighteenth century ([Hartwell, 2017](#); [Vries, 2015](#); [Wrigley, 2018](#)), it took a few more decades for “Germany”<sup>22</sup> to fully begin this process. Importantly, German industrialization was uneven across space, with some parts of the country, especially the western parts, industrializing significantly more quickly ([Gutberlet, 2014](#); [Reulecke, 1977](#)). Industrialization gained momentum in the four decades

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<sup>21</sup>On this broader issue, see also [Skowronek \(1982\)](#).

<sup>22</sup>The German-speaking lands of Central Europe were only formally unified in 1871.

from the 1830s to the 1860s; and it was further amplified by national unification in the 1870s. Especially the Rhein Ruhr region became a center of economic development, with extremely high spatial concentrations of workers (Reulecke, 1977, 26–27).<sup>23</sup> In Germany, industrialization thus directly led to urbanization (Köllmann, 1969; Reulecke, 1977, esp. 25; Zimmermann, 2015). The percentage of the population that lived in towns of 5,000 or more people grew from 9 percent in 1800 to 15 percent in 1850 and then increased steeply to 49 percent in 1910 (Zimmermann, 2015).

Moreover, the late 1870s and 1880s are particularly relevant because this was the “Second Industrial Revolution,” with extreme growth in the chemical and electrical industries. In addition, due to parallel increases in the heavy and machine industries, the spatial concentration of production intensified even further. At this time, both natural growth of the population and internal migration from rural areas were key factors behind the rapid growth of cities (Zimmermann, 2015).

Germany is an excellent case to discuss the role that externalities played in bureaucratization. While the country gained massive wealth through the rise of industries, there were also many downsides to these rapid changes. For instance, in western Germany, giant industrial complexes polluted their environment. Economic development also led to creative destruction, which was associated with the recurring dislocation of workers. This was one of the factors that contributed to tensions among social groups, especially those between industrialists and their employees (Reulecke, 1977, 28; Steinmetz, 1993, esp. chap. 3). Furthermore, as a result of poor industrial working conditions, including in transportation industries, there were many work-related injuries (see Lee and Marschalck, 2000, 379–380).

Moreover, one significant problem associated with early industrialization in Germany was high death rates among infants in urban areas. This was due to a combination of factors that included quick transmission of diseases due to overcrowded living arrangements, poor

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<sup>23</sup>Similar to industrialization, population development throughout these decades was uneven across space and a significant emigration wave after 1848 also meant a setback in terms of population growth in some German regions (Reulecke, 1977, esp. 22–23).

access to health care, insufficient nutrition, and high levels of pollution (Vögele, 1991).

The combination of all these circumstances led to decreasing trust by the residents of urban areas (mostly workers) in the ability of the political system to protect their interests. Thus, political parties that represented workers' interest were formed, some with the goal to radically change (and replace) existing socioeconomic and political structures. Yet these parties also had some more modest goals, such as the introduction of social insurance mechanisms or public works that would prevent the most negative effects of sudden job loss, illness, or forced retirement (see, for instance, Steinmetz, 1993).

Despite the emergence of new parties, Imperial Germany's political system remained dominated by the aristocracy who effectively controlled both the executive and the upper chamber of parliament. Further, the middle classes enjoyed strong representation in the lower chamber, turning the process of governing into a compromise between these groups by excluding workers (Eley, 1984; Mooers, 1991, 144; Paniagua and Vogler, 2022, 35 (app.); Rogowski, 1987, esp. 1125; Rosenhaft and Lee, 1994, 16; Vogler, 2019b, chap. 2). Thus, the case of Germany shows that, even in the absence of worker parties with direct political influence, the threats to social stability created by externalities can lead to bureaucratization.

Specifically, German Chancellor Otto von Bismarck who was a political ally of the monarchy (and the aristocracy in a broad sense) was concerned about the possibility of social unrest by workers who had been experiencing severe social, economic, and health problems related to externalities. As he was worried about the state's legitimacy, he initiated the introduction of a comprehensive social insurance system to address these challenges (Steinmetz, 1993, chap. 5; Ullmann, 1979).<sup>24</sup> In this respect, Bismarck made the following statement:

My thought was to win over the working classes, or shall I say to bribe them, to see the state as a social institution that exists because of them and that wants to ensure their welfare (quoted in Paulus, 2018, 57).<sup>25</sup>

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<sup>24</sup>Similarly, Kim (2007) suggests that other European countries also introduced social insurance as a response to threats to political stability.

<sup>25</sup>Translated by the author.

As a result, in 1883, Germany introduced health insurance, which significantly benefited workers and residents of urban areas who fell ill because of exposure to pollution and other work-related hazards. Then, in 1884, accident insurance was introduced, which strongly benefited those who were injured at work, and in 1889 invalidity and old-age insurance systems were created, which helped prevent the impoverishment of workers who had lost their job or were forced to retire (Kocka, 2016; Steinmetz, 1993, 125–131). As theoretically expected, each of these reforms led to the emergence of associated giant bureaucratic apparatuses that administered and distributed these public insurance services to ever growing masses of citizens in need. Because public institutions had to supervise and steer these activities, the number of civil servants in Germany rose dramatically in the second half of the nineteenth century (Vogler, 2019b, 237; Wunder, 1986, 72–73).<sup>26</sup> The German parliament had already previously laid the groundwork for significant bureaucratic expansion by passing the *Reich Civil Service Law* that created and regulated professionalized bureaucratic structures at the federal level (Vogler, 2019b, 52–55).

The fact that there were nearly unstoppable political pressures to introduce these new social insurance systems is also highlighted by the circumstance that they were institutionalized despite significant resistance from major employer organizations (Mares, 2003, 246–247).

Also, as a response to high infant death rates, many German cities created municipal milk supplies and instituted welfare centers for infants, among other measures.<sup>27</sup> As of the mid-nineteenth century, these strategies were successful in that they led to a significant decline in infant mortality rates (Vögele, 2000, 1994). Similarly, in addition to the essential government-provided goods of schools and water supply, municipalities effectively dealt with growing amounts of waste by creating sewerage systems (Brown, 1989; Reulecke, 1977, 28).

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<sup>26</sup>In addition, multiple forms of workplace regulations were introduced in the second half of the nineteenth century. Their enforcement remained imperfect, however (Steinmetz, 1993, 136–137).

<sup>27</sup>Milk is a key source of nutrients for children. If children are well nourished, their chance of surviving disease outbreaks and coping with the adverse health consequences of pollution (both externalities of concentrated industry and high population densities in urban areas) are increased (Vögele, 2000, 1994; Walson and Berkley, 2018).

As a result, “[b]y 1910, 92 per cent of the population in German cities of a population greater than 100,000 was connected to sewers” (Brown, 1989, 2). Finally, another local/regional-level policy that was significantly expanded to deal with externalities of socioeconomic dislocation was public works (Steinmetz, 1993, 131, 178–179). As administrative structures had to be built to organize and implement all these programs, bureaucratization further intensified.<sup>28</sup>

In short, Germany is an excellent case to demonstrate that pressures arising from externalities and affecting the political system’s legitimacy contributed to bureaucratization.

### 4.3 Case II: The United States

Similar to Germany, the US also industrialized only a few decades after Britain. Industrialization began in the 1830s and took off in the 1850s. Although the US was “late” compared to Britain, the highly decentralized character of its political-economic system meant that development happened at an unprecedented speed. Within just a few decades, the US became one of the most important global producers of industrial goods; and, already by 1885, it had become the world’s leading economic power (Kissinger, 1994, 37).

In the case of the US, too, the historical developments of industrialization and urbanization went hand in hand, especially in the second half of the nineteenth century. As industries developed, they attracted workers who settled in the vicinity. The rise of major urban-industrial centers was especially pronounced in the Northeast and Midwest (Mashaw, 2012, 148; Rees, 2016).

The consequence was extremely fast urbanization, implying the intensification, amplification, and spatial concentration of social interaction and economic exchange (Rees, 2016). A key parallel to Germany is that in the US, too, this process was associated with many negative externalities, including crime, population overcrowding, masses of waste, and widespread

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<sup>28</sup>It should be briefly acknowledged here that externalities were clearly not the only reason for bureaucratization in Germany. Prussia as the most important member state had already bureaucratized much earlier due to military pressures (Fischer and Lundgreen, 1975, esp. 516–517; Kiser and Schneider, 1994; Mann, 1993, chap. 12; Wunder, 1986, 21–22). But externalities were an essential contributor to bureaucratization.

pollution (Boustan, Bunten and Hearey, 2013; Robertson, 2015). Significant increases in health problems resulted from these phenomena as well as from poor sanitary conditions. They required extensive investments into public health administrative capacities, which we observe toward the end of the nineteenth century (Boustan, Bunten and Hearey, 2013).

In part due to the absence of barriers to trade across states, market exchange and social interaction did not remain localized. Instead, a national economy emerged. Significant economic activity regularly crossed state lines and populations migrated between regions (Fishback, 2007; Robertson, 2015). Thus, the steep rise in associated externalities became a matter of national concern. In addition, growing discrepancies between socioeconomic groups (that led to intergroup conflicts) and, at times, the mass dislocation of workers put additional pressures on the state to create bureaucracies capable of intervening when purely local administrative institutions were no longer effective (Robertson, 2015; Skowronek, 1982).

In the mid-nineteenth century, however, the US still had a federal administrative system that was not a “modern bureaucracy” as defined by Vogler (2023). First, incumbent political parties awarded administrative positions to loyal supporters. Second, there were no entry screenings that ensured even minimal competence. Third, standards for official conduct were not rigorously defined and systematic punishment absent, which allowed for significant idiosyncrasies in agents’ behaviors. For these reasons, this (premodern) administrative system was understood to be a “spoils system” (Ingraham, 1995, 20–25; Shefter, 1994, chap. 3; Silberman, 1993, 243–249; Van Riper, 1958, chap. 3).

In light of the theoretical claims made here, it is no surprise that this state was incapable of delivering the public services necessary to address the aforementioned externalities. To the contrary, the administrative apparatus increasingly became a burden to the political system. Its inefficiency and the costs associated with the recurring complete replacement of bureaucrats were simply too high (Johnson and Libecap, 1994; Mashaw, 2012, esp. 238–239). Processes of creative destruction, interstate travel/commerce, and environmental problems

associated with externalities needed to be addressed through effective policy implementation (see [Mashaw, 2012](#)).

Thus, public pressure mounted to replace this inefficient patronage system with one that would be able to address the steep rise in externalities. Such pressure to create a more capable system came from a number of different socioeconomic groups. [Skowronek \(1982, esp. 46\)](#) argues that politically relevant groups and their interests were crucial to new state programs that required capacity expansion. Similarly, [Theriault \(2003\)](#) suggests that public pressure contributed to administrative reform, which is in line with the perspective that political stability requires the expansion of bureaucracy aimed at addressing severe externalities.

As a result, Congress passed the 1884 Pendleton Administrative Reform Act, which introduced merit recruitment at the national level. Although it did not immediately turn the entire administrative apparatus into a fully modern bureaucracy (as a large number of positions initially remained exempt from merit recruitment), it meant a significant step toward meeting the criteria for modern bureaucracy set out earlier and making the administrative apparatus more capable of intervening in crucial social matters. In this respect, [Gailmard and Patty \(2012\)](#) argue that merit recruitment and protection from arbitrary dismissal allowed bureaucrats to become experts within their respective fields, which significantly increased their effectiveness. Similarly, [Carpenter \(2001\)](#) highlights the importance of mid-level bureaucrats in the late nineteenth century as the key agents behind policy implementation. By guaranteeing these bureaucrats' long-term employment, the state had given them the ability to develop administrative agendas to address key needs of the population.

Once the bureaucracy had been comprehensively reformed, several new, more specialized agencies were created to address problems associated with externalities, including the US Children's Bureau in 1912 and the US Department of Labor in 1913. Similar to the case of Germany, the United States also experienced high child mortality rates amid rising pollution and disease outbreaks, especially in urban centers. The creation of the Children's Bureau

was in part a response to the challenges associated with these externalities (Bradbury, 1956). Moreover, one of the key responsibilities of the Department of Labor was (and is) to ensure better working conditions, including workplace safety, which—at the period of its founding—was a reaction to widespread work-related injuries and their adverse consequences on workers and their families, among others (Aldrich, 2023; Casil, 2005, 8–9; MacLaury, 1998).

Nevertheless, given the decentralized character of the American system of government, it is important to note that different regions of the country bureaucratized at diverging speeds. While states in the Northeast and the Midwest developed significant administrative capacities to deal with externalities early on, the South retained more limited administrations (Robertson, 2015). This is also reflected in the diverging adoption speed of merit reforms across states (Ruhil and Camões, 2003), which is a key aspect of moving toward a modern bureaucracy (Vogler, 2023). A key insight from these observations is that the enormous heterogeneity in industrialization across the US resulted in differential exposure to externalities, which partly explains the diverging speed of bureaucratization.

Despite the need to comprehensively reform certain aspects of the American administrative state, it should be noted that, in some other regards, it had a remarkably high level of development early on. For instance, it was highly effective at demarcating land (Libecap and Lueck, 2011). This specific public system was so simple and potent that it was implementable by squatters who developed private associations to allocate land in the first half of the nineteenth century (Allen, 1991; Murtazashvili, 2013). In addition, the American state installed extractive administrative institutions in Indian country, which it used to dominate the Indians (Dippel, Frye and Leonard, 2022; McChesney, 1990). This included the replacement of traditional tribal policing with federal policing (a process that started before the Civil War) (Crepelle, Fegley and Murtazashvili, 2022) and the imposition of property rights, especially after the Dawes Act of 1877 (Alston, Crepelle, Law and Murtazashvili, 2021).<sup>29</sup>

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<sup>29</sup>On the issue of property rights and their relationship to organizational capacity, see also Murtazashvili and Murtazashvili (2016).

After the Pendleton Act, the reformed American bureaucracy was used for purposes similar to those of the new German bureaucracy. For instance, political reformers helped achieve financial support for widows (which partly addressed the externality of death from work-related injuries). At the same time, there were also slight differences in both the forms and the consequences of bureaucratization between America and Germany. Specifically, the ambition to create nation-wide public health and unemployment insurances failed in the US. This was likely related to differences in political culture and the lower strength of the central state (Robertson, 2015). Additionally (and likely for similar reasons), other than in the German case, many regulations and laws were not uniformly applied across the US; instead America retained a more fragmented public administration (Robertson, 2015). This more fragmented system also meant that some areas of the country had less comprehensive basic public infrastructure—such as sanitary infrastructure—than in the German case (Brown, 1989; Melosi, 2008). Despite these noticeable divergence, both countries experienced rapid bureaucratization (Mashaw, 2012, 231–233; Vogler, 2019b, 237; Wunder, 1986, 72–73).<sup>30</sup>

As American society continued the processes of economic modernization throughout the remainder of the nineteenth and the early twentieth centuries, merit recruitment of bureaucrats was continuously expanded (Ingraham, 1995, chap. 3). This was because the unprecedented growth of externalities required an increasingly competent state apparatus.

## 4.4 Summary

As the case studies show, in both Imperial Germany and the US, industrialization and urbanization were associated with an unprecedented increase in negative externalities. This led to the introduction and expansion of modern bureaucracies aimed at combating their fallout. Thus, externalities were an essential factor that contributed to bureaucratization.<sup>31</sup>

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<sup>30</sup>It should be noted that, similar to Germany, externalities were not the only cause of state development. For instance, the Civil War also played a role in shaping the prospects for centralization (Bensel, 1990).

<sup>31</sup>The specific configuration of socioeconomic interests diverged between cases, though, and led to different institutional design of the emerging administrative apparatus (Vogler, 2019b).

## 5 Conclusion

I argue that negative externalities severe enough to threaten political stability and rulers' tax revenues were a key factor behind bureaucratization. Specifically, I suggest that (1) industrialization and urbanization led to an exponential increase in externalities; and (2) governments created modern bureaucracies to address the associated socioeconomic problems. The pressure for reform was particularly high because premodern administrations were not able to effectively implement policies in a standardized fashion due to administrators' lack of competence/training, which led to manifold idiosyncrasies. Vice versa, modern bureaucracies with their high level of capability to implement standardized policy responses to widespread social problems represented the most effective available solution to externalities.

Although the bureaucratic systems that emerged had strong hierarchical organizational elements, they were not entirely monocentric. In other words, there was typically not a single (superordinated) administrative entity making all relevant decisions for the entire national territory. Instead, as the German case and (in particular) the American case reveal, (1) there was significant cross-sectional variation in the bureaucratic structures and (2) there were often complex interdependencies between local, regional, and federal institutions. Therefore, even early bureaucratic systems clearly had aspects that resembled polycentrism, including some degree of adjustment to regional peculiarities and demands (see, among others, [Paniagua and Rayamajhee, 2022](#); [Rayamajhee and Paniagua, 2021](#); [Schaefer, 2023](#)).

Beyond these key points, two further general insights can be gained from this analysis. First, the sheer size of bureaucracies may be explained by the magnitude of the (externality) challenge they face.<sup>32</sup> This is reflected in bureaucracies' "explosive" growth throughout the nineteenth century (e.g., [Fischer and Lundgreen, 1975](#); [Mann, 1993](#)). Second, when considering what the most effective institutional response to a social challenge is, one should take contemporary technological constraints into account (see also [Allen, 2011](#)).

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<sup>32</sup>On the related issue of how the magnitude/complexity of social challenges affects institutional responses, see also [Paniagua and Rayamajhee \(2022\)](#), [Paniagua and Rayamajhee \(2023\)](#), and [Paniagua \(2022\)](#).

I have demonstrated the suggested dynamics through case studies of Germany and the US, which differ in a variety of key relevant dimensions. Yet the commonality of both cases is that industrialization and urbanization resulted in significant externalities that ultimately necessitated the expansion of modern bureaucracies.

Finally, this paper makes two additional contributions. First, connecting to a number of previous studies, I have confirmed the (situation-specific) utility of a more extensive definition of externalities. Second, I have theorized that the intensification, amplification, and spatial concentration of economic exchange and social interaction is generally associated with an exponential increase in externalities.

Vice versa, a reduction, deceleration, and spatial dispersion in these dimensions is likely to result in a noticeable decrease in externalities, which may lower the needs for bureaucratic response mechanisms. This potential implication could be tested in the future. Similarly, if we consider present-day contexts, it would be interesting to explore if modern communication and data processing technologies have changed the possible range of institutional responses, including non-bureaucratic and fully polycentric governance mechanisms (Paniagua and Rayamajhee, 2022; Paniagua and Rayamajhee, 2023). In this respect, an overview by Leeson and Thompson (2021) of how aspects of public health could be regulated through non-bureaucratic mechanisms shows a number of potential empirical examples.<sup>33</sup>

While this paper has left much space for future contributions to explore these additional issues, it has provided a novel theory and comprehensive case studies regarding the critical role of externalities in the historical emergence of modern bureaucracies.

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<sup>33</sup>On potential weaknesses of centralized bureaucratic response mechanisms under contemporary technological restrictions, see also Ang (2020).

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