Economic Geography, Political Inequality, and Public Goods in the Original 13 US States

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Abstract

A large and fruitful literature has focused on the impact of colonial legacies on long-term development. Yet the mechanisms through which these legacies get transmitted over time remain ambiguous. This paper analyzes the choice and effects of legislative representation as one such mechanism, driven by elites interested in maximizing jointly economic prospects and political influence over time. We focus on malapportionment in the legislatures of the original thirteen British North-American colonies. Their joint independence created a unique juncture in which postcolonial elites simultaneously chose the legislative and electoral institutions under which they would operate. We show that the initial choice of apportionment in the state legislatures is largely a function of economic geography, that such a choice generated persistent differences in representation patterns within states (political inequality), and that the latter shaped public goods provision in the long run.

"Men, who have more than a proper degree of power, are seldom known to surrender it freely."
Hugh Williamson, North Carolina politician on the persistence of the colony's malapportioned legislature

1 Introduction: The Political Transmission of Colonial Legacies

In modern democratic societies, the monopoly of violence lies mostly, if not exclusively, with the state and power is about the institutionalized allocation of political influence. By that we refer to the way in which economic and political institutions adjudicate between competing interests with different preferences over legislation, regulation, and fiscal choices. In recent years, a large body of work has focused on the historical origins of such an allocation across democracies and how they shape long-run economic and political outcomes. In this paper we contribute to these efforts by analyzing the origins and long-run consequences of legislative malapportionment in the original 13 US states. We theorize and establish empirically a link between economic geography and the initial decision to adopt different systems of representation. Using a new dataset capturing political inequality at the county level within states, we establish its persistence since the early adoption until the mid 20th Century. Finally, we show this persistence to prove highly consequential for the provision of public goods.

During the British North American colonial era (1607-1775), a system of "corporate" representation was established in each of the colonial legislatures, in which the town, parish, or county was the basis of representation. In none of the 13 colonial legislatures was representation apportioned on a 'one (white) man, one-vote' basis (Zagarri 1987). Highly restricted, corporate representation was simply imported from England, where the basis in the House of Commons was the county, borough, or university (Pole 1966). As with the House of Commons, this caused the more populated political units to be systematically underrepresented.

In the North American colonies, however, this system of representation provided an additional source of political inequality. As residents moved away from the Atlantic seaboard into the frontier interiors of each colony, these populations would only gain representation in the colony's legislature if new political units (i.e., towns, counties, parishes) were created. Since the creation of new political units would threaten coastal majorities, coastal elites strategically limited their formation (Pole 1966, Van Tyne 1922, Zagarri 1987). The policy of maintaining coastal majorities meant that as more people moved westward, the existing inequality

of representation in the various legislatures widened further. This in turn contributed to the deepening cleavage between coastal and interior residents.[1]

British colonial policy exacerbated these tensions. In an attempt to deter further settler expansion into the frontier, an English Royal Proclamation in 1765 forbid the colonial legislatures from reapportioning representation (Zagarri 1987: 43, Van Tyne 1922: 210). The inability to redress these grievances politically lead to numerous uprisings, some of which were violent, on the frontiers of a number of colonies.[2] It also contributed to large-scale out-migration, to not only other colonies, but also to lands west of the Appalachian Mountains, by residents seeking, among other things, greater political equality (Turner 1956, Van Tyne 1922).

With the May 10th Resolutions of 1776, the Continental Congress, the de-facto government of the federation of the 13 colonies, called on each colony to create new governing structures by writing their first sovereign constitutions (Adams 2001). Given this autonomy, elites in each new state had to determine, among other critical choices, whether to maintain colonial institutions that constrained the political power of the poor.[3] Despite the opportunity to institutionally entrench the colonial system of representation in their first sovereign state constitutions, elites in four states – Massachusetts, New Hampshire, New York, and Pennsylvania, implemented a system of representation based on population and regularly-scheduled reapportionment. We classify these four states as Proportional-Apportionment States (or, hereafter, PAS).

[1]In his seminal work, Turner (1956) described this cleavage as thus, "The creation of this frontier society... produced an antagonism between interior and coast...contests between the property-holding class of the coast and the debtor class of the interior, where specie was lacking, and where paper money and a readjustment of the basis of taxation were demanded; contests over defective or unjust local government in the administration of taxes, fees, lands, and the courts; contests over apportionment in the legislature, whereby the coast was able to dominate, even when its white population was in the minority; and, later, contests over slavery."

[2]See, for instance, Kars (2002) regarding the Regulator Movement in North Carolina, which was violently suppressed by the colonial militia.

[3]For instance, when a member of the Massachusetts (MA) Provisional Congress supported the expansion of suffrage with the end of the colonial era, John Adams, the primary author of this state's first (and only) constitution, wrote to this reformer in May of 1776, "...if you give to every Man, who has no Property, a Vote, will you not make a fine encouraging Provision for Corruption?....I would not advise (the MA state legislature) to make any alteration in the laws, at present, respecting the qualifications of voters."

The remaining nine continued with a corporate basis of representation, which we designate as Biased-Apportionment States (or, hereafter, BAS), in their first sovereign state legislatures.[4]

This proved to be a highly consequential choice that carried long-term effects in terms of: (1) patterns of political inequality within the states (until the US Supreme Court ruled in 1964 that unequal state-legislative representation is unconstitutional)[5]; (2) redistribution and the provision of public goods; and (3) patterns of long-term development. As we show below, the choice by 9 states to maintain the colonial basis of apportionment created a *biased system* of representation that was remarkably persistent for nearly 200 years. On the other hand, none of the 4 states that committed initially to some form of representation based on population reneged on this commitment to "one (adult white) man, one vote" during the antebellum era (1789-1860).

By explaining the origins of these institutional choices and precisely measuring their long-term implications, our analysis makes several contributions. We offer a better understanding of the role of political institutions as an important factor in the causal process linking colonial legacies and later outcomes.[6] Our focus here is on a relatively understudied aspect of this process: the role of representative institutions. We see the transmission of colonial legacies into current outcomes as a long-term process in which the design and continuity of representative institutions play a fundamental role. In contexts of democratization (however partial), incumbent elites seek to design institutional reforms to maximize the preservation of their current

[4]These nine states include three Northern and future non-slave states (Connecticut, New Jersey and Rhode Island) and six Southern slave states (Delaware, Georgia, Maryland, North Carolina, South Carolina and Virginia). See Table 1 below for further details on each state. See Appendix Figures A1 and A2 for a map of the original 13 states.

[5]See *Reynolds v. Sims*, 377 U.S. 533 (1964).

[6]On the influence of endowments and inequality on legal, financial, and educational institutions see Sokoloff and Engerman (2000); Acemoglu, Johnson and Robinson (2001); Landes (1999). On the impact of different types of extraction and the forms of social organization associated with them on future patterns of public goods provision and economic prosperity, focusing on the differential impact of different property regimes of large states, see Iyer and Banerjee (2005) and Dell (2010); on how early forms of social organization translated into persistent patterns of human capital inequality, see Bertocchi and Dimico (2014). See Nunn (2014) for a survey of the historical comparative political economy literature.

and *future* political advantage. The extent to which they are successful in doing so shapes the workings of the new democratic regime in the long run, as demonstrated by a growing literature on the implications of the varying degree to which countries are able to overcome the institutional influence of incumbent elites during periods of transition (Karl and Schmitter 1991; Mares 2015; Acemoglu and Robinson 2008; Albertus and Menaldo 2013, 2018). We argue that postcolonial elites in 1776 approached the choice on representation within each state to secure their initial political influence and, in line with previous contributions, the extent to which they managed to do so shaped the politics of public goods provisioning in the long run.

However, the maximization of political influence was not the only concern of incumbent elites. Feasible economic production and territorial control, via settlers' presence, also featured prominently. Early choices about legislative representation reflect to a large extent the labor needs of incumbent political and economic elites. As in the case of the franchise (Nikolova 2017), geography shapes the elite's choice of malapportionment through its impact on labor scarcity and the importability of slaves. The shift to population-based apportionment takes place where labor scarcity is high and climatic conditions are unsuitable for growing cash crops. These are the conditions under which incumbent elites *sacrifice* political influence and open-up representative institutions: as a way of increasing the economic base of their states by attracting new residents and deterring out-migration. Our primary theoretical contribution is to demonstrate how geography conditions the strategies regarding the *types* of institutional arrangements that elites use to maintain their influence following independence.

By linking the literature on institutional conflicts during transitions (Mares, 2015; Albertus and Menaldo, 2018) and the literature on economic geography and colonial legacies, we are able to understand why some colonial elites decided to sacrifice their status-quo political advantage in 1776. In turn, by linking the literature on the effects of malapportionment (Samuels and Snyder 2001, Dragu and Rodden 2011, Ansolabehere and Snyder 2008) with the literature on colonial legacies and economic development (Iyer and Banerjee 2005, Dell 2010), we are able to identify a new mechanism of persistence of colonial legacies. As a result, this paper corrects the tendency to overlook electoral institutions, as opposed to constraints on power, state capacity or even economic and legal institutions, as a fundamental engine linking economic geography and current outcomes.

In addition, the paper makes two empirical contributions. The first one concerns the scholarly understanding of the origins of state malapportionment in the United States. The effects of malapportioned state legislatures on the distribution of state spending in the 20th Century are well known (Ansolabehere, Gerber and Snyder 2002). Yet, surprisingly little work in political science has systematically linked the origins of this electoral institution to colonialism and slavery. Ansolabehere and Snyder (2008) attribute wide-scale state-legislative malapportionment in the mid-20th Century to the rise of urbanization in the late 19th Century. We provide an alternative explanation of the origins of malapportionment among 9 of the original 13 US states.

The second empirical contribution concerns the systematic empirical analysis of the persistence of early choices through time, a pre-condition for the transmission of the colonial legacy to actually occur. This is not the first piece linking political phenomena, such as the franchise, back to colonial legacies both comparatively (Engerman and Sokoloff, 2005; Acemoglu and Robinson, 2000; Acemoglu, Johnson and Robinson, 2001) and in the context of the United States. For instance, Berkowitz and Clay (2011) focused on legacies regarding legal traditions (common versus civil law) and their interaction with the patterns of political competitiveness at the state level, whereas Nikolova (2017), exploring a mechanism similar to the one developed below, links franchise decisions during the colonial era to labor market demand patterns.

Yet, despite these advances, however, few studies have demonstrated that these initial political institutional choices persisted, or meaningfully explain subsequent outcomes.[7] We provide one of the first efforts to theorize and empirically trace the effect of political institutions as a mechanism transmitting the impact of colonial legacies on political inequality and public good provisions. We establish how this initial choice to maintain the colonial system of representation created a systematic source of political inequality

[7]For instance, while the mechanism highlighted by Nikolova (2017) clearly contributed to institutional development during the colonial era, it is doubtful that variation in white male suffrage at the end of the colonial era had long-term effects. This is for the simple reason that most suffrage restrictions on white males did not persist and fell sharply after independence (Engerman and Sokoloff 2005: 898). Contra Nikolova's hypothesis, the pattern of persistence appears uncorrelated with slavery. For instance, all adult white males were given the right to vote in Georgia (1798), Maryland (1802) and South Carolina (1810) much earlier than in New York (1826), New Jersey (1844), and Connecticut (1845).

that persisted for nearly 200 years. To this end, this paper also makes a significant contribution by providing a consistent measure of political inequality during the colonial and post-colonial era through the 1964 Supreme Court ruling state-legislative malapportionment unconstitutional. We then demonstrate that this source of political inequality substantially shaped long-run public goods provisioning within these states.

Methodologically, we devise a plausible identification strategy that overcomes many of the flaws in the empirical literature using cross-national evidence to support the argument that historical institutional development causally affected long-term outcomes.[8] Several aspects of our empirical strategy are worth highlighting. First, focusing on the original 13 states allows us to control for many potential sources of heterogeneity as the original US state-level governments, with the exception of a few institutional features, were largely similar in their design (e.g., plurality electoral system, bicameral legislature, common law legal system (Adams 2001, Berkowitz and Clay 2011). Second, we eliminate concerns about reverse causality by exploiting the fact that the colonial system of representation was exogenously imposed on all 13 colonies though they differed in both size and economic structure (e.g., Van Tyne 1922, Zagarri 1987). Furthermore, post-independence public goods provisioning was not a concern of British rulers when creating the various colonial corporations and charters in the 17th Century that ultimately resulted in the original 13 states. The use of instruments capturing physical geographic features of the colonies further ameliorates concerns about reverse causality. Third, we present a consistent measure of political inequality at the county level for all 13 states through the period of interest, avoiding major measurement issues. Unlike the discrete variables that are common to the literature, the variable introduced here provides a continuous measure of relative representation allowing for precise estimates of the effects of this source of political inequality on subsequent public goods provisioning. Our estimation strategy leverages the consequences of these early institutional choices on within-state political inequality to measure the within-state distribution of *state-level* public education spending in the antebellum period across the counties of the original 13 states. Public education is an essential investment to foster economic development and a central focus of contention in the political development of industrializing democracies such as the United States (Ansell and Lindvall 2013,

[8]See, for instance, Pande and Udry (2005) for criticisms of the political economy empirical literature using cross-national panel data.

Lindert 2004). Importantly, the choice about representation at the core of this paper occurred well before state governments played a role in public education expansion (Goldin and Katz 2009). We are able to demonstrate significant evidence of an institutional channel through which colonialism and slavery affected the provision of public education in the 19th Century, and then evidence that this channel persisted long after the demise of both.

The rest of the paper is organized as follows. We first introduce a theoretical framework to understand the choice of representative institutions under different structural conditions. We analyze the conditions under which a potential trade-off between political influence and economic gains emerges for postcolonial elites in different states, thus shaping the choice of representative institutions. Second, we provide evidence in support of our argument on the determinants of institutional choices in the case of the 13 colonies. Third, we show empirically how these early choices translated into persistent patterns of political inequality within states. To do so, we present an original dataset covering the original 13 colonies between 1775 and the mid-20th century. On the basis of these data, we map out the persistent differences in political inequality derived from the choice at the time of independence. Finally, we provide evidence on the impact of political inequality on public goods provision in the long run.

2 The Choice of Representative Institutions at the Time of Independence: Theoretical Argument

2.1 The Initial Choice

To understand what drove some of the original 13 colonies to abandon the fixed, and highly biased, system of electing representatives that favored coastal elites during colonial times and what drove other states to keep it even in a context of major institutional innovation, we put the original 13 colonies into a broader theoretical framework, a framework focused on how political elites make decisions about political inequality and how these decisions persist over time.

We theorize *political inequality* between counties within states as the result of a strategic choice by political elites trying to maximize their current wealth and their future political influence.[9] In societies with

[9]See, for instance, Boix (2003); Acemoglu and Robinson (2006); Beramendi (2012) for work that uses a

low capital intensity, assuming the degree of technological progress to be relatively constant, the former depends almost exclusively in the stock of labor. The latter, in turn, hinges upon the specifics of the institutional arrangements that govern political exchanges in the medium run, thus shaping political and economic risks over time. By risks we refer, primarily, to potential increases in taxes to fund public goods accessible to all citizens (as opposed to captured by incumbent elites).

In an unconstrained world, when setting their preferred level of political inequality, incumbent elites will try to maximize future political influence without incurring sacrifices in terms of the factor composition of the economy. Constraints are rarely, if ever, absent though. Critical to our argument is the idea that economic geography determines whether incumbents are able to jointly achieve their desired factor composition of the economy and future political influence or whether, by contrast, they face a trade-off between them when designing representative institutions. The mechanism mediating this trade-off lies in the strategy pursued by each local economy to solve a fundamental challenge: labor scarcity, an especially pressing problem in economies characterized by low-capital intensity. In such settings, increasing output per capita occurs primarily by increasing the stock of labor. As advanced by Nikolova (2017), there is a direct link between the nature of the feasible options to this problem and the nature of political decisions by elites.

In any emerging union, labor scarcity is not a uniform concern. Our argument plays particular emphasis on two exogenous determinants of the politico-economic geography: the size of each colony and the access to coastal areas with climatic conditions suitable for growing exportable cash crops (which we term as "benign climatic conditions"). In small, highly dense units, labor scarcity does not pose a problem unless they suffer from extremely high levels of out-migration. By contrast, labor scarcity is bound to be a greater worry in large and sparsely populated units. Among the latter, there are two strategies to increase the stock of labor: to make themselves attractive to new settlers in search of better economic fortunes, or to buy and/or import labor. The key analytical issue is what drove each subnational unit to follow either path, and with what consequences for political inequality and representation.

The second exogenous factor – climate and geography of each unit – conditions the initial choice by shaping the ability of local elites to profitably meet their labor needs by importing slave labor vis-a-vis other

similar approach.

alternatives, such as servitude or the allocation of civic (property) and political rights to settlers. Nikolova (2017) shows how elites extended the suffrage during the colonial era in places where they were particularly dependent on white migrant workers (and tightened it when slave labor could profitably replace voluntary migrants); building on Congleton (2010), she argues that "representative assemblies served as a commitment device for any promises made to migrants by ruling elites (p.5)". Here we take the analysis one step forward and focus on the connection between geography, labor scarcity, and malapportionment.

Given a status quo of political advantage (biased representation), what are the conditions under which incumbent elites would have incentives to sacrifice it? We argue that the switch takes place when economic geography imposes a trade-off between political advantage on the one hand and economic gains/ territorial control on the other. As the trade-off intensifies, the calculus of elites changes, thus shaping their decision about political representation. In what follows, we analyze how the different combinations of the two factors of interest in our argument (unit size[10] and climatic conditions) condition the potential costs of keeping the institutional status quo and lead to different choices in terms of political representation.

- **Scenario 1:** *Small states with high population density* In this case, incumbent elites do not face a labor scarcity problem to begin with. As a result, their calculus is simple: the potential benefits to be derived from an increase in existing patterns of net migration would not outweigh the expected loss in consumption due to rising taxation that would occur if representation were based on population. The change to a more proportional system would also weaken their future political influence on a much broader range of policy choices, including public goods provision. Elites in small states, therefore, had a strong incentive to maintain the status quo.

- **Scenario 2** *Small states with benign coastal climatic conditions* Elites in these states face a similar set of circumstances. As in case 1, the lifetime consumption of elites in these small units would decrease if representation were based on population. For one, as a result of lower malapportionment, they would also face an increase in taxes. Moreover, and in contrast to their counterparts in case 1, the coastal climate gives these elites the ability to preserve their economic advantage through the importation of slave labor. The potential impact of outmigration by disadvantaged settlers on the stock of labor poses

[10]We assume here that unit/state size and population density to be very highly correlated

no threat to them. Accordingly, elites in these colonies have very little reason to risk future political control by allowing representation to be based on population.

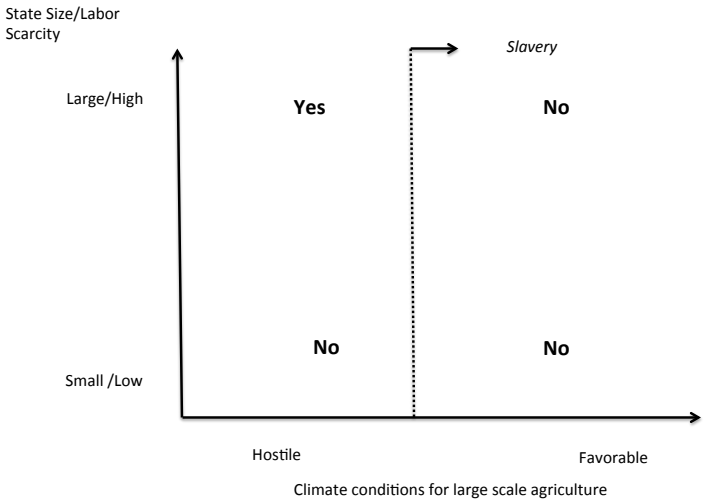
- **Scenario 3** *Large, sparsely populated states with benign coastal climatic conditions* Under these circumstances, elites have much to gain from retaining residents and attracting new migrants. Yet, as in the previous case, their dominant strategy is to resort to imported slave labor. Because they have less need to attract white migrants while already benefitting from the status quo in terms of legislative malapportionment, they have no incentive to entertain a switch to a better apportioned system and incur future political and economic (via taxation) costs.

- **Scenario 4** *Large, sparsely populated states without benign coastal climatic conditions* Finally we turn to the calculus of elites in larger states with unsuitable conditions for large-scale profitable slavery. As in Case 3, elites in these large, sparsely-populated colonies would gain significantly by attracting more labor and would be significantly harmed by large-scale emigration. Yet, in this case, geography constrains the realization of the economies of scale associated with large scale imports of slaves. Absent slavery as a feasible economic option, incumbent elites are forced to make their units attractive enough for settlers to migrate and stay. It is under these conditions that the trade-off between current political advantage and economic considerations emerges most starkly.

  For elites it is crucial to maintain a stock of labor that secures enough economic input and, especially in remote inland areas, secures enough presence to maintain territorial control. Settlers, on the other hand, also face a calculation that involves economic and political aspects. Their likelihood of staying will be smaller if they face the risk of constant extraction and, more importantly, lack the ability to protect their interests through the political process. Elites must therefore create incentives for settlers to stay by solving a commitment problem on the settlers' side. An effective way to do so is to reform the inherited system of representation from a corporate to a population-based one. Endowed with political equality, citizens are less likely to migrate to areas where their political voice is known to be muted by the system of representation. The interplay between the size of the colony and the relatively cost-free opportunities to move for settlers shapes the incentives of elites in units with unsuitable climate to abandon corporate, highly malapportioned representation.

Figure 1 summarizes the key predictions in our logic.

Figure 1: Geography and the Choice to Reapportion Representation



Our analysis approaches the decision to keep malapportionment as one among several strategies by elites to preserve their power. They only sacrifice it when labor needs, as determined by economic geography, "forces " them to. Obviously, elites have other "tools" at their disposal, ranging from limiting the franchise to employing de facto methods that prevents the right to vote from becoming effective. The goal of all these strategies is to preserve advantage and institutionalize political inequality. The choice of a specific one or any combination thereof is driven by the nature of the threat, and there is no reason to believe ex ante that different strategies like franchise restrictions or the institutionalization of malapportionment are either substitutes or complements. Theoretically, the key lies in the structure of inequality, namely whether it is primarily within or between units. The fundamental intuition that would follow from our analysis is that coastal elites use malapportionment if the greatest source of inequality is between coastal areas and interior frontiers. If, over time, local inequality is the greater threat to elite power (and/or the larger redistributive

threat), then elites should use suffrage restrictions.[11] If both types of inequality are threats, and labor needs are met, then we would expect incumbent elites to use both.

2.2 From Early Choices to Political Outcomes

The next hurdle is to explain how this initial choice translates into different outcomes in the long run. We expect elites in units retaining malapportioned representation to become the winners amidst higher levels of political inequality. The reasons behind this expectation are well understood in comparative politics: malapportioned entities enjoy a disproportionate level of political influence (relative to their population size) that allows them to bargain from a position of advantage and shape policy according to their interests. And, they fight hard to preserve such an advantage.[12] Furthermore, and unlike sources of power that require persistent mobilization and collective action, electoral institutions like malapportionment are self enforcing (Bruhn, Gallego and Onorato 2010).[13] This persistent advantage in turn should have substantial implications for the allocation of public resources.[14]

While malapportionment may be difficult to reform, our empirical analysis will focus on a period that covers the transition from a pre-industrial, mostly rural, world to a fully industrialized one. The substantial changes wrought by this process alters who benefits from a fixed system of representation. Namely, industrialization undermines the initial advantage by pre-industrial coastal elites in highly malapportioned states:

[11] Arguably, in a system without colony-wide elections, suffrage restrictions are more important when local-level inequality is greater than inter-regional inequality within colonies. Hence, an implication of this argument is that suffrage restrictions were much more important when the population was largely confined to the coast, as it was for most of the colonial period, and diminished as people moved westward.

[12] For a detailed historical analysis on the origins and consequences of legislative malapportionment in Latin America illustrating this logic see Snyder and Samuels (2004).

[13] That is, the institution persists and continues to advantage the overrepresented until reformed. Its persistence is facilitated because the majorities malapportionment engenders through its distortions can more easily block attempts to reform it.

[14] Legislative malapportionment has been shown to affect the distribution of public transfers in federations around the Western Hemisphere (Gibson, Calvo and Falleti 2004, Ansolabehere and Snyder 2008) and the inter-country transfers in the European Union (Rodden, 2002).

as urban density grows the initial advantage of coastal elites turns into an advantage for rural districts.

The natural question emerges then as to why, given the rising power of urban centers, the initial switch towards a population-based representation system did not become universal. The reason is that under conditions of disperse economic geography rising urban elites do not have an incentive to do so. As Rodden (2011) explains, industrialization leads to the concentration of labor in urban cores. Since workers are the obvious constituency for the growth of left-wing parties, a switch to a population based system would imply a broadening of the political space for new forces challenging the economic and political status quo. Rather, in contexts with a highly uneven economic geography, rising urban elites have an incentive to enter into a coalition with rural elites, the *new winners* of malapportionment in the industrial world, to keep the system of representation as is and limit the potential impact of organized labor on taxation and the allocation of public goods.[15] This is consistent with political development in the highly industrialized Northern states: as the political geography of partisan cleavages began to map onto an urban-rural divide in the North, the Republican Party became a coalition of rural elites and urban industrialists. Persistent overrepresentation of rural areas was an important source of their political power (Ansolabehere and Snyder 2008).

It is through this mechanism that we expect the initial choice on political representation to be persistent over time and condition the politics of public goods provision in the long run. We turn now to the empirical assessment of our argument.

3 Empirical Strategy: from the theory to the case

The argument above points to three clear observable implications:

1. By shaping labor needs, cross-state differences in economic geography conditioned the choice of initial post-colonial representative institutions.

2. The original levels of political inequality derived from this choice persisted through time.

[15] This is a bargain similar to the one that has been observed in many other federations around the world: small fiscal transfers to rural areas serve rising industrial elites to form a coalition in the legislature that protects against demands for redistribution or the broadening of access to public goods (Beramendi, Rogers and Díaz-Cayeros 2017, Bruhn, Gallego and Onorato 2010).

3. Political Inequality had a strong and persistent impact of the provision of public goods (public education) central to economic development.

Our empirical strategy takes on each of these three implications sequentially in the context of the original US 13 states. We first provide evidence of our theory that economic geography conditioned the need for colonies to meet labor needs through voluntary in-migration and by deterring out-migration, which drove the initial choice of (mal)apportionment among the original 13 states. This exogenous source of variation across the colonies is critical to our ability to identify the effects of this institution on subsequent public goods provision. Second, we show that if a state chose to maintain its colonial basis of representation, the resulting political inequality persisted in the long run. Finally, we establish that this source of persistent political inequality had a large effect on the provision of public goods until malapportionment was ruled unconstitutional by the Supreme Court in 1964.

Before presenting each of these three steps in detail, we discuss the connection between the theoretical premises in our argument and the empirical setting in which we assess our theoretical argument. We focus on three issues: (1) the centrality of labor scarcity and migration as a political issue in late 18th Century North America; (2) the awareness by elites on the importance of malapportionment as a tool to secure political influence; and (3) the extent to which state boundaries were fixed at the time decisions about representation were adopted.

3.1 Demand for Migrants in Colonial North America

Our theoretical argument is based on the premise that elites in each colony strongly desired more immigration to their territories. On this, historians have clearly documented the belief among colonial elites that given the abundance of land and scarcity of labor and capital, economic growth and the well-being of their colony depended on increasing the supply of labor (e.g., Pincus 2016).[16] In particular, the vast and sparsely populated interior lands could only bear economic fruits with a substantial increase in the labor supply

[16] According to Galenson (1996: 153),"The key to economic success in colonial America, for individual planters as well as entire colonies, was to obtain an adequate supply of agricultural labor to grow crops that would satisfy the demands of the large European market or of the expanding markets of the colonies."

(Abernethy 1937, Turner 1956).[17] This was a central political issue at the time.[18]

As outlined above, there were three primary options available for substantially increasing a colony's population through migration: imported African slaves, indentured servants and voluntary migrants (both international and from other colonies). It has been estimated that nearly half of the migrants who came to the Colonial America between 1700 and 1775 were slaves (Fogleman 1998). As a result, an elite planter system based largely on slave labor developed near coastal waterways from Delaware to Georgia. Yet its large-scale profitability did not extend to the Northern colonies or far from the coasts.[19] Due to the high costs of passage to Colonial America and improving economic conditions in Great Britain which slowed the rate of voluntary migration (Galenson 1996), increasing population through indentured servitude (which comprised approximately half of migrants to Colonial American in the 17th Century (Fogleman 1998)) or free migration became increasingly difficult in the 18th Century.

As a result, and despite a rapid natural rate of population increase (Gemery 2000), the 13 colonies remained sparsely populated at the time of independence.[20] These acute labor shortages meant that retention of their own residents and the ability to attract migrants from other colonies was an important source of labor. The lack of restrictions on inter-colony migration, along with the similarities across colonies in language and culture, lowered exit costs significantly among extant residents and colony-to-colony migration was very high

[17] In addition to the overall economic and security benefits of increasing their colony's population, many coastal elites also had a direct interest in population growth along the frontier given their vast landholdings of uninhabited interior lands. The profitability of these land claims was perceived to be dependent on increasing the population of the frontiers (Abernethy 1937). As a result, the attempts by the British to stem internal migration to and prevent the sale of interior lands was a major grievance against the British by both coastal elites and the frontier population.

[18] This importance is demonstrated by the fact that one of the primary grievances outlined in the Declaration of Independence (1776) was that British policy "endeavoured to prevent the population of these States."

[19] Critical to our argument, slavery was legal in each colony and economic historians attribute this variation across colonies in its use to differences in climatic, soil and disease environments (Sokoloff and Engerman 2000: 220). See Appendix C for more information and sources.

[20] In 1775, population density was only roughly 5 inhabitants per square mile with an urbanization rate of less than 5%. See Appendix C - Table C2 for sources.

(Gemery 2000, Villaflor and Sokoloff 1982). The increased difficulty of attracting in-migration from abroad was exacerbated by the large out-migration of whites from the mid-Atlantic and and New England colonies, especially to interior lands of the Southern colonies.[21] Reversing these trends were seen as critical to the post-independence economic prospects of many Northern colonies.

3.2 Malapportionment as an instrument of Preserving Elites' Power

A second assumption of our argument relates to the importance of malapportionment as an instrument for preserving elite power (Snyder and Samuels, 2004). Most scholars of comparative political development have focused on institutions, such as suffrage, as mechanisms for limiting the poor's access to political power (e.g., Engerman and Sokoloff 2005, Nikolova 2017). The question is again whether this was a fundamental political concern in our case of interest.

Historians of the colonial period have emphasized the role that malapportionment played in protecting the political power of coastal elites in the various colonial legislatures, in particular, from the expanding frontier populations (e.g.,Turner 1956; Schaper 1901; Green 1931; Zagarri 1987; Van Tyne 1922). While elites expressed a desire to populate their colonies, these coastal elites across Northern and Southern colonies expressed a fear that poorer interior populations would more heavily tax the wealthier coastal regions within their state (Green 1931, Pole 1966; Handlin 1966). The "corporate system" of representation in the colonial legislatures allowed coastal regions to retain power despite rapid westward shifts in the population.

As the population moved into the interior, representation of these populations required the creation of new administrative units. Hence, strategically limiting the creation of new units was an important

[21] For instance, Villaflor and Sokoloff (1982) estimated that roughly 50% of the whites born in the colony of Pennsylvania migrated to the Southern (slave) colonies prior to independence. At the end of the colonial era, New England also experienced large out-migration of residents to more fertile Western lands, which was widely seen as economically harmful (Klarman 2016, 60). According to one contemporary account, this emigration "enfeebles New England, since it...deprives her of industrious citizens." It was also widely believed during the Constitutional Convention of 1787 that the Southern states would soon have a majority of white citizens, as populations migrated 'south-westerly' along and over the Appalachian mountains (Farrand 1911, 605).

mechanism for maintaining coastal majorities in the legislatures. As a result, the greatest losers of this system were those settlers on the frontiers of the sparsely-populated *large* colonies (Cappon, Petchenik and Long 1976: 100).[22] This source of political inequality was significantly worsened by British policy. Following the French and Indian War (1756-1763), the British, in an attempt to stem westward migration, forbid the creation of new administrative units by colonial legislatures, effectively fixing representation in a time of rapid population movements (Zagarri 1987: 43, Van Tyne 1922: 210). This is crucial for our identification strategy outlined below.

These policies combined to leave coastal regions with control of the legislatures at the time of independence and therefore the power to perpetuate this in their initial sovereign constitutions. A large historical record leaves little doubt that maintaining this institutional arrangement was seen as critical to their ability to preserve power following the transition (e.g., Handlin 1966). In particular, coastal elites in the slave colonies came to see geographically-fixed representation as the key mechanism for protecting their interests from the rapidly-increasing yeoman populations in the upland, western regions of their own states (Green 1931).[23] The coastal slave-owners feared that whites in regions within their state where slavery was not as profitable and widespread would finance their demands for greater redistribution and public goods by specifically voting to tax a particular type of property – slaves – differently than other types of property.

[22] According to Van Tyne (1922: 210), "Perhaps the worst sufferers were the Scotch-Irish in the western part of Pennsylvania, who, deprived of proper representation in that legislature, pushed into the Piedmont region of the Carolinas, where again they were deprived of proportional representation by the seaboard planters. But, the significant fact here and in other cases is that the refusal of proportional representation was resented. As freeman and English subjects', the Scotch-Irish and Germans of the interior protested against three Quaker counties of Pennsylvania having 24 of the 36 representatives in the colonial assembly, though they had less than half the population."

[23] One must bear in mind the additional uncertainty in 1776 about whether slavery could profitably be extended beyond the coasts. Prior to the invention of the cotton gin in 1794, cotton was only profitably grown near the coasts of Georgia and South Carolina. Moreover, the ability to profitably employ slaves west of the piedmont of Virginia and North Carolina was thought to be low. Appendix-Figure A3 shows the within-state distribution of the share of the population enslaved in 1790, and that it was roughly inversely correlated with distance from the coast.

This explains why geographically-fixed apportionment of the state legislatures was the primary means of restricting political access over suffrage restrictions in the slave states after the colonial era and a central political concern.

The logic governing the calculus of elites under these circumstances is best illustrated by South Carolina's coastal (i.e., 'low country') elites: one planter wrote that up-country whites (within SC) were "strangers to our interests, our customs, and our concerns.....Though we take you into our association (state).....we can never surrender ourselves into your hands with power to dispose of us as you please" (Schaper 1901: 280). This overriding concern of coastal elites, from Maryland to Georgia, to limit the ability of western populations to gain control of their state legislatures has been documented by historians (e.g., Green 1931, Schaper 1901, Harry 1902). In response to calls from the "high country" of South Carolina to reapportion representation on a white population basis, one low-country politician succinctly described the strategy and concerns of the coastal slave-owning elites in these five states. "If representation were apportioned equally, ...the system might be built up, the tax on lands might be entirely taken off, and laid wholly on negroes.....It might be arranged that without appearing to aim at the low country, that no estate below a certain value should pay any tax at all, while the tax on estates should be raised to equal the wants of the government. The standards might be fixed to exempt the estates of the upper, and include the generality of estates in the lower" (Phocion 1795: 19).

3.3 Fixed Boundaries of Each Colony

Given the importance that the size of each colony plays in each state's demand for labor, a crucial assumption in our argument is that units' boundaries are given and exogenously determined at the time choices about the system of representation are made. While border disputes between colonies were pervasive, the size of each colony reflected to to a remarkable degree the initial boundaries established by the colonial charters in the 17th and early 18th Centuries (Stein 2008). At the time of independence, the western border of each colony that extended to the Appalachian mountains was ambiguous and British policy following the French and Indian War tried to substantially slow western expansion. Yet, given that the Western border of small states did not extend to the Appalachians, any future changes to the western borders would likely only

increase the territory of the large states and hence their need for greater in-migration.[24] Regardless, we can conclude that the size of each state at the time independence was exogenous to future elites' choices about the post-colonial system of representation.[25]

4 The Choice of Representative Institutions at the Time of Independence: Empirical Evidence

We turn now to evaluate the first empirical implication of our argument: cross-state differences in economic geography conditioned the choice of initial post-independence representative institutions. We provide preliminary evidence by matching each colony with one of the four theoretical cases as defined above. We then more thoroughly test our argument in three steps. First, we show that the systems of representation in the states that reformed their colonial system possessed the same biases in favor of coastal regions as those that retained their colonial systems. Second, we provide systematic evidence that economic geographic factors explain the shift to a population-based system of representation for only a few states. Lastly, we show that indeed this choice did cause a shift in the geographic distribution of representation in these four states, but not in the remaining nine.

4.1 Predicted Choice of Initial Representation: Preliminary Evidence

Table 1 reports the values for the core theoretical dimensions for each state around the time of independence. We place each state within one of the four cases depending on its value for each measure. Large (Small) colonies, which we measure by square miles in 1790 (column 1), are limited to either Case 3 or 4 (Cases 1 and 2). States whose climates permitted (did *not* permit) the profitable use of slave labor, which we proxy

[24] At the same time, no colony saw these western lands as under their jurisdiction at the time of independence, and they remained largely unsettled by British subjects. See Appendix Figures A1 and A2 for the geographic distribution of the population in the late colonial era. This changed quickly after independence, and migrants flooded into territories west of the Appalachian Mountains. Most of the claims to this territory was ceded by the Original 13 states in the 1780s.

[25] Changing the borders of the states was broached during the Constitution Convention of 1787; one delegate said they were "originally nothing more than colonial corporations" and did not reflect true economic, cultural or religious boundaries. These proposals went nowhere (Farrand 1911).

by slave population share in 1790 (column 2), separates high slave share states into Cases 2 and 3 (Cases 1 and 4). Using this simple framework, each of the 13 colonies, except for New Hampshire, are placed in the appropriate case.[26]

We next show our measures for variation across colonies in the need to increase in-migration of labor. Columns 3 reports the estimated population density for each colony in 1775. Column 4 indicates the share of each colony's area that remained frontier near the time of independence.[27] At first sight, and consistent with our argument, larger colonies had significantly lower population density and a much greater share of their territory remained frontier. This correlation is largely due to the fact that the colonial population was most densely concentrated along the Atlantic coast, and therefore the size of each colony was almost perfectly inversely correlated with each colony's population density.[28] Given their natural access to the coast, the smaller colonies had significantly higher population densities than the larger colonies. In fact, by the end of the colonial period, a sizable landless labor force existed in most of the smaller colonies (Galenson 1996: 169).[29] This simple descriptive evidence is consistent with our argument that it was the larger colonies whose economies would benefit the most from in-migration and suffer the most from out-migration.

Column 5 reports whether each state adopted a proportional or retained the fixed colonial system of representation in their initial constitution. Our argument suggests that only states in case 4, ones in which their size meant they benefitted from greater in-migration which they could not fill with profitably with imported slaves, would give up this source of political inequality and commit to population-based representation. For instance, colonial New York was large (column 1) and therefore very sparsely populated

[26] New Hampshire is reported as a mixed case. While it was among the smaller colonies, its geography contributed to its low population density, which could not be remedied with imported slaves.

[27] We define frontier as the share of each state in which the population density is less than 2 inhabitants per square mile in 1790, the year of the first US Census.

[28] In 1790, roughly $1/3^{rd}$ of the US population resided in a coastal county, which is the highest share on record. As we show below, a state's population density was largely a function of its size (in square miles) and miles-of-coastline-to-size ratio, and is unlikely to be endogenous to some unobserved factor. See Appendix Figures A1 and A2 for the geographic distribution of the population in the late colonial era.

[29] Unsurprisingly, the states identified by historians as possessing a sizable landless labor force were the states with no remaining frontier. Contemporary sources corroborate this (e.g. see Zagarri 1987: 38)

(column 3) and contained vast frontiers (column 4). In addition to a low and failing slave population (column 2), we know that it received far fewer foreign immigrants compared to other mid-Atlantic and the Southern slave colonies and relatively little in-migration from other colonies (Villaflor and Sokoloff 1982). Massachusetts was receiving neither much in the way of foreign or other colony in-migration, and was experiencing large net outmigration.[30] We argue that the economic need to both induce immigrants into their states and retain their own residents created a political motive to abandon the system of representation that had benefitted incumbent elites until then. Holding on to political power came at a very high cost in this particular set of colonies.

Table 1: Political-Economic Geography and Initial Political Inequality

State	Size, 1790 (sq. mi) (1)	Slave Share, 1790 (%) (2)	Pop. Density, 1775 (3)	Share Frontier, 1790 (%) (4)	Fixed Initial Representation (5)
Case 1					
CT	5,543	1	37.3	0	Y
RI	1,545	1	34.3	0	Y
NJ	8,729	6	16	0	Y
Case 2					
MD	12,407	32	20	0	Y
DE	2,490	15	18.2	0	Y
Case 3					
GA	59,425	35	1	51	Y
NC	53,865	26	5.2	0	Y
SC	32,020	43	5.6	0	Y
VA	107,438	39	5.4	38	Y
Case 4					
MA	43,969	0	7.2	63	N
NY	54,555	6	3.9	76	N
PA	46,055	1	7.1	49	N
Mixed Case					
NH	9,350	0	9.4	0	N

Note: See Appendix-Tables A1 and A2 for state abbreviations and sources. Column 4 measures the share of each state with fewer than 2 inhabitants per square mile in 1790. See Appendix C-Table C2 for more information.

4.2 The Initial Choice: Regression Analyses

To move beyond descriptions, we require a within-state measure of political inequality in representation in the various colonial (and then state legislatures). A key contribution of this paper is the construction of a

[30]See Appendix C and Table C1 for more information regarding colonial-era migration patterns.

consistent measure of political inequality during the colonial and post-colonial era through the 1964 Supreme Court ruling state-legislative malapportionment unconstitutional. We follow the approach in David and Eisenberg (1962) and Ansolabehere, Gerber and Snyder (2002) to measure county-level representation in the state legislatures, which (like the latter authors) we call the Relative Representation Index (*RRI, henceforth*). To calculate each county's *RRI*, we identify each state's electoral laws specifying the number of representatives and senators, respectively, apportioned to each county of the original 13 states for each decennial census year. We then divide each county's apportionment of representatives and senators, respectively, by each county's adult white male (hereafter, *AWM*) population. For each county, we divide this ratio by another: the state's total number of representatives and senators, separately, divided by the state's total AWM population. This results in a relative measure of representation for each county for each chamber of the (bicameral) state legislature. Any value greater than 1 indicates that the county is overrepresented relative to "fair representation" in the respective chamber of the state legislature. Any value less than 1, therefore, indicates the county is underrepresented. Our final measure of county-level political inequality is simply the average of each chamber's *RRI* for each county, and then the logarithmic value of this.[31]

Using this measure we are able to show three things: on the basis of data from 1775, (1) we first show that the status quo system had strong distortionary consequences in favor of coastal elites; (2) we then show that indeed the switch to a population-based system of representation was driven by labor needs (as proxied by economic geography variables); (3) finally, we show that as early as 1790, the reforms had powerful effects on the geographic distribution of relative representation in the 4 PAS.

First, we calculate representation in the legislature of each colony in 1775, the last year of British colonial rule. Specifically, we use apportionment in each colonial legislature provided by Cappon (1975: 100-101) combined with 1775 population estimates from Sutherland (1936) to calculate the *RRI* for each existing county of the 13 colonies in 1775.[32] If, as we contend, that British policy favored the coastal regions, then a county's distance from the Atlantic Coast should be inversely related to representation during the colonial period in *both* of the 9 BAS and 4 PAS. We test this by generating a measure of county distance from the

[31]See Online Appendix C for more details on how we calculate *RRI* and the sources we use.

[32]The values are nearly identical when using more accurate population data from the 1790 Census.

coast by combining county boundaries as they existed in 1775 with GIS software that determines the central point of each county. From this, the direct distance to the nearest point on the Atlantic coast is measured.[33] Figure 2a shows a partial regression leverage plot with the predicted colonial *RRI in 1775* (vertical axis) against the predicted value of a county's distance from the coast (x-axis). In the counties of *both* the 9 BAS (left panel) and 4 PAS (right), there is a significantly inverse correlation between underrepresentation in the colonial legislatures and county distance from the coast.[34] This indicates that colonial policy did indeed create winners of the coastal residents throughout the 13 colonies, and with it the possibility to maintain this system upon independence.

Second, our argument theorizes the choice by coastal elites to either preserve or abandon malapportionment upon independence as a function of labor needs at the end of the colonial era. As such, it hinges on the fact that the demand for greater voluntary labor, which we proxy by using population density and population slave shares, was determined by factors that did not directly influence the choice of initial representation. To predict population density, we use the size of the colony in square miles (Figure 2b, left) and its shoreline-to-size ratio (2b, right).[35] Figure 2b shows that population density in 1775 was highly correlated with colony size (r=-0.84) and shoreline-to-size ratio (r=0.67). The argument that the proportion of slaves in a colony's population is not endogenous to some unobserved factor is supported by the fact that slavery was legal in each of the colonies, and the prevalence of its use is widely attributed to geographically and climatically determined profitability (Sokoloff and Engerman 2000: 220). Empirical support for this claim is shown in Figure 2c (left), which depicts the correlation of a variable measuring a state's average

[33]More information about the county-level geographic variables can be found in the Appendix A-Table A2.

[34]Instead of splitting the sample between counties in the 9 BAS and 4 PAS, we also ran an interaction model in which county distance to the Atlantic Coast is interacted with a dummy indicating whether the county is in what would become a BAS. A Wald test of the difference in coefficients between the reference group (counties in the 4 PAS) and the comparison group (counties in the 9 BAS) yields a p-value of 0.4. This indicates that we cannot reject the null that there is no statistical difference in the relationship between county distance from the coast and *RRI* in 1775 across the soon-to-be 9 BAS and 4 PAS.

[35]Shoreline-to-size ratio is the ratio of number of miles of shoreline (on the Atlantic) in each colony to its total square miles. This captures the proportion of a colony's territory with access to the coast.

annual number of frost-free days and the share of a state's population who were slaves in 1790 (r=0.84).[36]

To assess whether the elites in the 4 PAS implemented a population-basis of representation as a means of retaining residents and attracting voluntary migrants, we model this initial choice as a binary logit in which a colony's size and average frost-free days predict the initial choice of whether to maintain the fixed colonial system of representation. Suggestively, these two variables jointly predict the initial choice of representation perfectly (Figure 2c, right).[37] Neither variable, however, provides much leverage on its own. Of the 6 largest states, 4 chose to retain their biased colonial basis. Of the 6 lowest slave-share states, only 3 chose a population basis of representation. The switch towards population-based representation took place only in large states with climatic conditions hostile to the development of slave-based agriculture.

Third, the implications associated with reforming the system of representation became apparent quickly. Figure 2d shows that the choice of 4 states to implement a population basis of representation did indeed affect the geographic distribution of representation in these states. By 1790, the year of the first post-colonial national Census, there is no relationship in the 4 PAS between a county's distance to the coast and its *RRI in 1790*. By comparison, Figure 2d (left) shows that in the 9 BAS states county distance from the coast remains significantly inversely correlated with a county's *RRI in 1790*.[38] Unlike in the 4 PAS, the initial choice in the 9 BAS preserved the colonial basis of over-representation of the coastal regions.

4.3 Competing Explanations

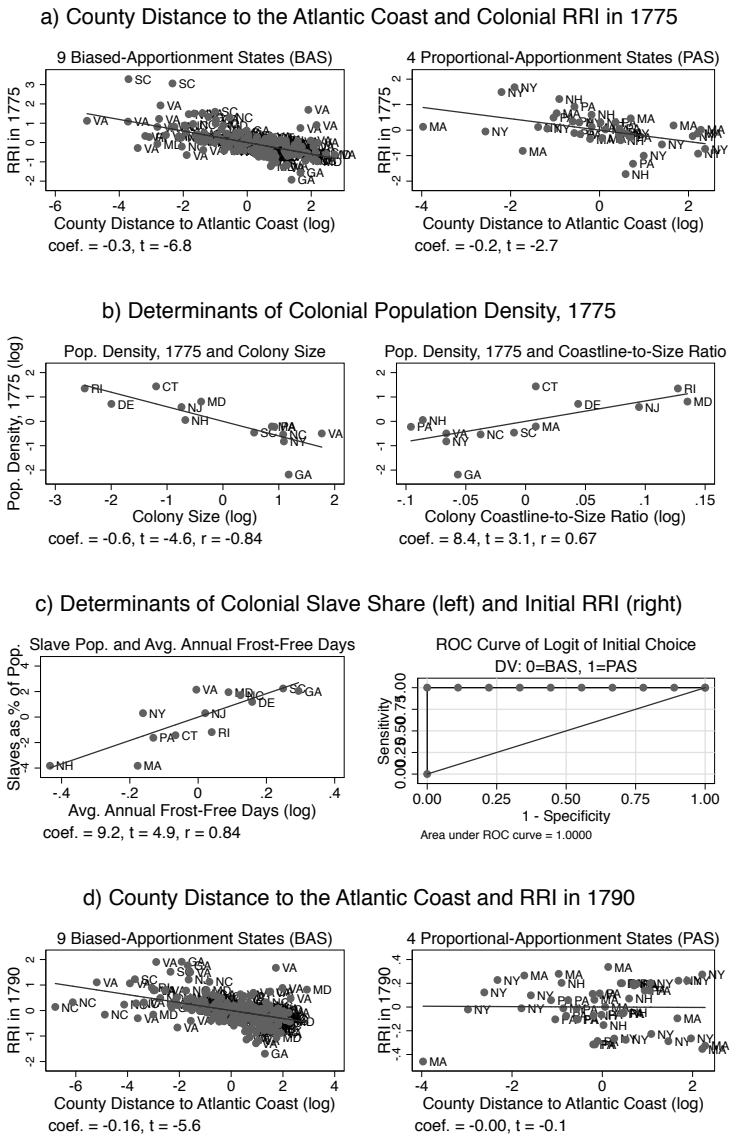
A central assumption to our identification strategy is that the choice to maintain or change the biased basis of representation did not simply reflect a colonial legacy. Put differently, for the research design to be valid it must hold that the four colonies that chose a population basis of representation upon independence were not appreciably different than the colonies that chose to maintain the colonial fixed basis other than the

[36] Cash crops, such as tobacco and rice, required long frost-free growing seasons. See Appendix Table A2 for more information on how state-level frost-free days is measured and its source.

[37] Each independent variable is continuous and the results are not due to a collinearity problem.

[38] The Wald test of the difference in coefficients between the 9 BAS and 4 PAS has a p-value of less than 0.000 indicating that we can conclude there is a significant difference between county distance from the coast and *RRI in 1790* across the 9 BAS and 4 PAS.

Figure 2: Geographic Determinants of *RRI*



Each model in a) and d) includes state fixed effects

economic-geographic factors described above. Instead, we might worry that the findings below, and the choice of each state's initial basis of apportionment, are due to variation across the 13 colonies in initial conditions at the end of the colonial era. There are a number of additional factors if present could invalidate the results presented above. Here we focus on three aspects emphasized in the comparative politics literature: inequality, ethno-religious differences, and the role of urbanization/industrialization.

Sokoloff and Engerman (2000) argue that greater economic inequality influenced the adoption of less inclusive institutions following independence in Latin America. Yet, the existing records on cross-colony inequality at the time of independence are not consistent with this account. Instead, scholars have found that wealth inequality in the Southern slave colonies was nearly identical to that in New England (Lindert and Williamson 2013, Jones 1980); and, the region estimated by Lindert and Williamson (2013) to have had the highest inequality in income, the Middle-Atlantic colonies, included two colonies that reformed their system of representation.[39] As shown in Appendix Table C1, all available evidence suggests that not only inequality, but differences across colonies in wealth, income, and human capital at the end of the colonial period *cannot* account for the representative institutions adopted upon independence.[40] For the sake of space we discuss this evidence in Online Appendix C.

A second concern is that the initial choice of representative institutions could reflect unobserved cultural and religious differences across states, in particular between non-slave and slave states, rather than economic-geographic factors. Yet this story would have to explain the *within-region* divergence in the choice of initial choice of representation (i.e., why only half the Northern, non-slave states chose to reform the colonial basis of representation). Furthermore, this within-region divergence in initial choice occurs in not only the Mid-Atlantic states, whose colonial history and demographics were quite distinct from one another, but also in the ethno-religiously-similar New England states.

[39] Nikolova (2017) also argues that differences across colonies in inequality cannot explain variation in the timing and the extent to which the franchise was extended during colonialism. Our claim is buttressed by the fact that we observe *within-region* variation in the initial choice of representation (whereas Nikolova emphasizes North-South differences).

[40] For instance, according to Galenson (1996), Virginia (a BAS) and Pennsylvania (a PAS) had similar rates of *AWM* illiteracy. Illiteracy was likely no higher in Connecticut (a BAS) than Massachusetts (a PAS).

Lastly, we need to account for a third potential confounder associated with the patterns of urbanization and industrialization. As discussed above, Ansolabehere and Snyder (2008) argue that the systematic malapportionment of state legislatures in the 20th Century was due in part to the rise of urbanization in the previous century. According to this logic, greater urbanization at the end of the colonial period should be associated with a *decrease* in the likelihood of adopting a population-based system of representation. Instead, we observe a positive, though statistically insignificant, relationship between urbanization rate in 1790 and the choice to reform the colonial basis.[41] The decision to abandon or retain malapportionment at the time of independence, when the 13 colonies were overwhelmingly rural, responded to a different logic. As we argued above, changes in the economic structure - namely, industrialization and urbanization - actually increased the incentives of rural elites to maintain the biased system of representation.

5 Persistence of Political Inequality

The second empirical implication from our theoretical argument is that the initial choice of representation created a persistent source of political inequality in the 9 BAS, but not in the 4 PAS. We investigate this contention using two different approaches. We first demonstrate that counties that were over(under)-represented during the colonial period remained over(under)-represented over the next nearly 200 years. Since the size and number of counties changed over time, we also show that the spatial distribution of representation remained biased towards the coastal counties over time. In each case, we show that this pattern only occurs in the 9 BAS.

We begin by examining whether the choice to maintain the colonial system of representation lead to persistent over(under)representation. To this end, we regress *RRI* at approximately 50-year intervals (1790, 1850, 1900 and 1950, respectively) on *RRI in 1775* by estimating the following equation on the entire sample of counties from the Original 13 states:

$$RRI1790 = B_S + B_1 RRI1775 + B_2 BAS + B_3(RRI1775 * BAS) + SFE + \varepsilon \quad (1)$$

[41] This relationship is shown in the Online Appendix Figure A4.

where B_1 measures the relationship between *RRI in 1775* and *RRI in 1790* (the first post-colonial measure of *RRI*) in the 4 PAS. The coefficient of interest is B_3, which measures the relationship of the interaction of *RRI in 1775* and a dummy variable indicating whether the county is a fixed apportion state (BAS) and *RRI in 1790*. We expect B_1 to exhibit no meaningful relationship between the colonial *RRI* (in 1775) and the first post-colonial *RRI in 1790*. And we expect B_3 to show a strong positive and large relationship between *RRI in 1775* and *RRI in 1790* in the counties of the 9 BAS. Indeed, the coefficient on B_3 is statistically significant at the 99.9% level, and indicates that a 10% increase in the *RRI in 1775* is correlated with a roughly 7% increase in *RRI in 1790* in the counties of the 9 BAS. On the other hand, B_1 shows that there is no meaningful relationship between the colonial *RRI* and the first post-colonial *RRI* in the counties of the 4 PAS.[42] *SFE* indicates that the model is estimated with state fixed effects, which gives us a within-state interpretation for each coefficient. Crucially, when the same equation is run using *RRI in 1850, 1900 and 1950*, respectively, as the dependent variable, the coefficient on B_3 remains positive and highly significant in each regression. These estimates for Equation 1 for each time interval (1790, 1850, 1900 and 1950, respectively) are shown in Appendix Table D2.

In Figure 3, we visually demonstrate this persistence over time in the 9 BAS, and the corresponding absence of any long-term relationship in the 4 PAS. Figure 3a shows the expected value of *RRI in 1850* at each value of county *RRI* in the colonial era (1775) in the 9 BAS (left panel) and 4 PAS (right), respectively.[43] Figure 3b shows a nearly identical relationship when we plot the expected values of *RRI in 1850* against *RRI in 1790*, our first post-independence measure of *RRI*. In Figure 3c, we show the relationship between

[42] The Wald test of the difference between *RRI in 1790* and *RRI in 1775* across counties in BAS and PAS produced a p-value of 0.0001.

[43] Each figure was generated using Clarify (Tomz, Wittenberg and King 2003) and includes 95% confidence intervals in which all covariates are held at their mean. Note also that all figures present a split-sample estimation strategy in which the left figure shows the estimates on only the counties of the 9 BAS, and the right for only the 4 PAS. For all split-sample models presented in this paper, the appendix includes estimates for models including an interaction between a dummy for whether a county is in a BAS and *RRI* pooling the counties across the 13 states (i.e., as with Equation 1). The split sample estimation strategy used for the figures provides a more stringent test, as it is estimated with fewer observations and allows relevant covariates (such as county slave share) to vary across the BAS and PAS.

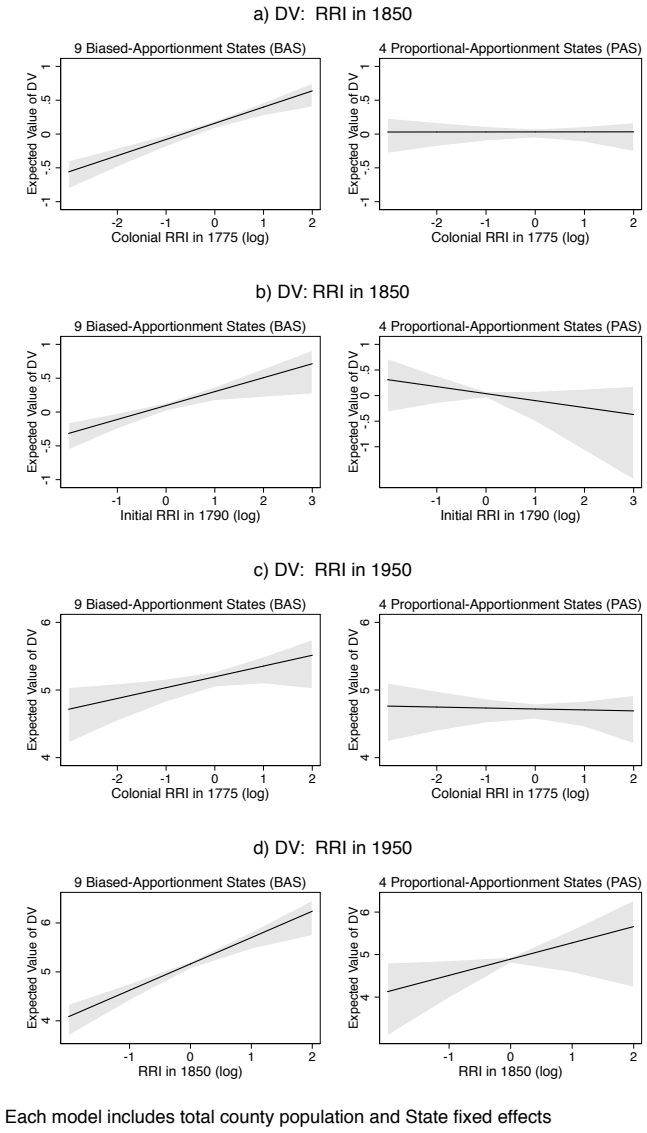
colonial *RRI* and its value nearly 200 years later, *RRI in 1950*. Remarkably, the coefficient on *RRI in 1775* in the 9 BAS is only slightly smaller for 1950 (3c, left) than for 1850 (3a, left). Lastly, in Figure 3d, we show that *RRI in 1850* strongly predicts, as expected, *RRI in 1950* in the 9 BAS (left). There is also a positive, though imprecisely estimated, relationship in 4 PAS (right), which is inconsistent with the observed patterns in Figures 3a-3c.[44]

A potential concern is that the number of counties and, therefore, the boundaries of the existing counties, changed significantly between 1775 and 1950. As a result, when correlating *RRI* for the same county over time we are in many cases comparing counties of different sizes, as well as omitting newly created counties. To account for this and to allow the sample to vary over time, we also test whether in the 9 BAS and 4 PAS a county's distance from the Atlantic Coast is correlated with its *RRI* over time. Even as new counties are introduced, we are examining whether the geographic distribution of representation continues to over-represent counties closer to the coast. In Figure 4, we present the same model as used in in Figure 2d, again using 50-year intervals. A significantly inverse relationship between a county's distance from the coast and its *RRI* remains in the 9 BAS in 1850 (Figure 4a, left), 1900 (Figure 4b, left) and 1950 (Figure 4c, left). Each specification includes total county population in the year of the model to control for the fact that most non-proportional systems of representation tend to under-represent the more populous districts. State fixed effects are included, as well. In each specification from 1790 to 1950, the coefficient is essentially unchanged in the 9 BAS. A 10% increase in the distance of a county's centroid from the nearest point on the Atlantic Coast is observed with a 1 to 2% decrease in a county's *RRI* in each specification from 1790 to 1850 (p-value=0.000 in each model). This shows that even with the enormous changes in the number of counties, the colonial bias in favor of the coastal areas remained in the 9 BAS for nearly 200 years following independence. Reassuringly, there is no observed relationship between county distance to the coast and its *RRI* in the 4 PAS.

Taken together, the evidence strongly indicates that the choice to maintain the colonial basis in the 9 BAS resulted in a highly persistent source of political inequality. The basis of representation chosen

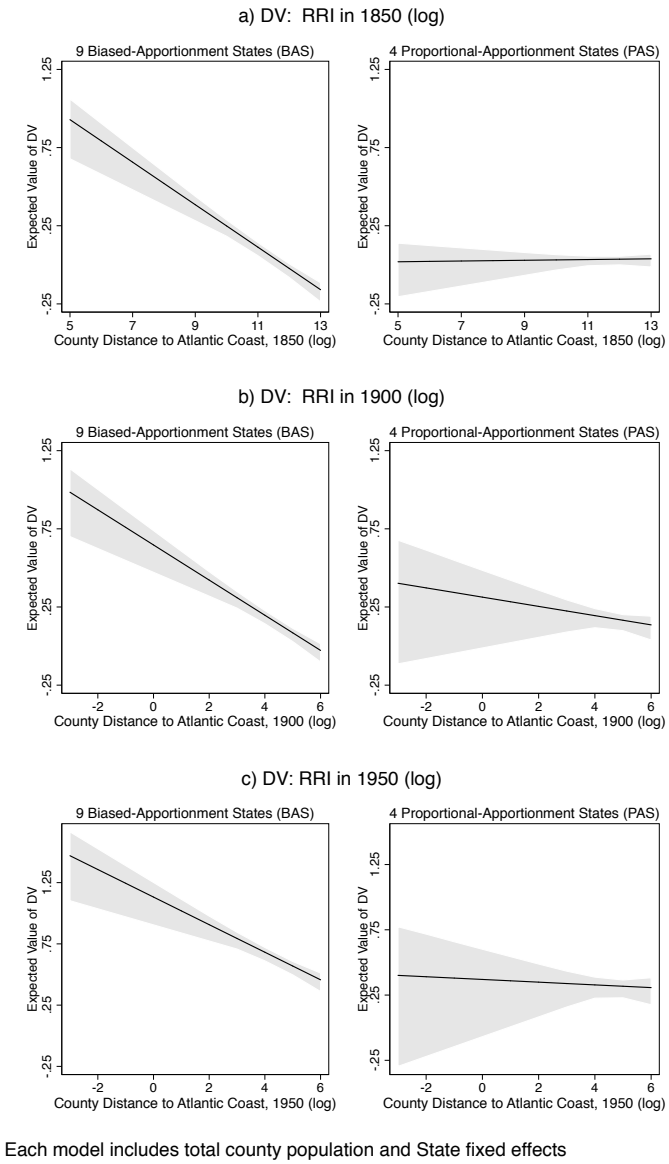
[44]This is, however, largely consistent with the argument that malapportionment in US state legislatures was associated with increasing urbanization in the 19th Century (Ansolabehere, Gerber and Snyder 2002)

Figure 3: Persistence of Initial Inequality



Note: Each figure was generated with *Clarify*, and show the expected value of each dependent variable with (shaded) 95% confidence intervals against the values of *RRI* in 1775 (a and c), 1790 (b) and 1850 (d), holding all other covariates at their mean. Each model includes state fixed effects. The sample for all figures on the left are counties in the 9 BAS; all figures on the right are counties in 4 PAS. The estimates are reported in Appendix C.

Figure 4: Geographic Persistence of Initial Inequality



Note: Each figure was generated with Clarify, and show the expected value of each dependent variable with (shaded) 95% confidence intervals against the values of a county's distance from the Atlantic Coast in 1850 (a), 1900 (b) and 1950 (c), holding all other covariates at their mean. Each model includes state fixed effects. The sample for all figures on the left are counties in the 9 BAS; all figures on the right are counties in 4 PAS. The estimates are reported in Appendix C.

at independence tended to overrepresent the same counties nearly 200 years later in the 9 BAS, and a persistent geographic bias in favor of coastal counties. By contrast, and crucial for our argument, the empirical evidence shows that the initial choice following independence to open up representation removed this previously beneficial source of political inequality in the counties of 4 PAS for approximately 100 years after independence.

6 The Long Run Consequences of Political Inequality on Public Goods

The third empirical implication of our argument is that the persistent political inequality identified in the previous section shaped public goods provision in the long run. Our primary empirical strategy for testing this implication is to measure whether over-representation in the state legislature is correlated with state transfers to the counties, with a specific emphasis on state transfers for public education, over various time periods.

Our choice to focus on state inputs to public education is for a number of reasons. As outlined above, the public provision of education is one of the primary public goods used in the historical political economy literature (Lindert, 2004), and therefore does not represent a choice of public good that simply fits our data. It is also a public good that can more easily be measured across units (in this case counties). Crucially for this study, the initial choice of representation occurred before state governments were involved in publicly supporting education (Goldin and Katz 2009: 137). This downplays concern of reverse causation from more education to more egalitarian state-level institutions. Another strategy we employ is to use state-level inputs into public education provisioning as opposed to measures of educational outcomes, such as illiteracy rates (which we use as a control). By using inputs into public goods provisioning, as opposed to outcomes which could be determined by many hard-to-observe factors, our estimates are less likely to suffer from omitted variable bias.

To show that our source of political inequality affected long-term public goods provisioning, we require consistently measured variables of state transfers for public education over time. As far as we know, this data is available in both 1850 and circa 1950 (right before the Supreme Court ruled state-legislative malapportionment to be unconstitutional). Using the data from 1850, we first test the implication that over-

represented counties in the 9 BAS should receive significantly greater per capita transfers. Furthermore, there should be no relationship *RRI* and per capita state transfers in the 4 PAS. Second, we provide several robustness tests on the relationship using alternative specifications, placebo tests, and an instrumental variable approach. Finally, we replicate the analysis using data on state transfers circa 1950. Due to data limitations, we use a proxy for state inputs into public education circa 1900.[45] Each test provides evidence consistent with our argument on the durable consequences of the choice of initial representation and its effect on long-term public goods provisioning.

6.1 The Impact of Political Inequality on Public Goods Provision in 1850

For our first test of the effects of political inequality on the distribution of public goods, we use county-level spending on education that is derived *from state sources* in 1850. This value is then divided by the county's white school-aged (5-19) population in 1850 to generate a measure of state spending per (white) capita at the county level. This data was located in the 1850 Census, and is the only systematic nation-wide measure of education spending, both public and private and by level of government (i.e., state and local), across the U.S. that provided county-level information during the antebellum era. Through this indicator we capture early investments in public education, which economic historians have found to be correlated with contemporary public goods and development (Nunn 2014, Lindert 2004). Moreover, these data tap a critical time of the development of the US public education system. Goldin and Katz (2009: 129) argue that, "the key features of US education institutions – which we term virtues – that were present in 1900.....had emerged prior to the Civil War. These virtues would determine US educational development in the 20th Century."

Estimation Framework

We compare public education investments from state sources between counties in BAS as opposed to PAS by estimating equation (2) below:

$$S_i = B_S + B_1(RRI1850) + B_2BAS + B_3(RRI1850 * BAS) + B_SX_i + SFE + \varepsilon \tag{2}$$

[45] We are unaware of a source providing complete county-level data on state transfers for public education between 1850 and 1950.

where S_i is county-level education spending from state sources per white school-aged capita, ages 5 to 19, in 1850 in county i, *RRI in 1850* is the measure of political inequality of county i in 1850, BAS is a binary measure of whether the county is in a fixed-apportioned state, X_i is a vector of county-level controls, and SFE are state fixed effects.

The choice of covariates aims to control for variation across counties in both demand for public education and the ability to supply higher levels of public subsidies. While these choices are also based on factors that have been identified in the economic history literature to have influenced education spending in this era, most seem more appropriate to understanding the determinants of *locally*-provisioned public education spending. We include a county's total population, the share of a county's population living in urban areas of 5000 people or more, and the county population density of whites, ages 5 to 19, in 1850. Each is a proxy for economic development and the demand for (and possible economies of scale of) provisioning education. We also include a variable measuring the total county value of capital invested in manufacturing per its AWM population. This is another measure of the county's demand for and ability to supply public goods. Numerous studies have shown a negative relationship between public goods and ethnic diversity (e.g., Alesina, Baqir and Easterly 1999), which justifies controlling for the share of foreign-born among each county's white population in 1850. Similarly, greater economic inequality, in particular, land inequality in largely agricultural economies, has been shown to negatively affect public goods provision (e.g., Ramcharan 2010, Galor, Moav and Vollrath 2009). We control for this by including a measure of county inequality of land ownership (Nunn 2008). To address the possibility that the importance of "good" institutions simply reflect the effects of existing human capital on development (e.g., Glaeser et al. 2004), we control for the adult illiteracy rate among native-born whites in 1850. To control for the possible unobserved harmful influences of slavery on local politics, we also include a variable measuring the share of a county's total population that was enslaved in 1850. Finally, *SFE* are state fixed effects, which are included to control for unobserved state-level heterogeneity that might affect the *levels* of state spending per white school-age child.[46]

[46] Within states, there is no reason to think errors are not independent. Furthermore, our models are cross-sectional, and state dummies are included to control for differences across states. That said, the estimates are robust to clustering the standard errors at the state level (see Appendix A-Table A6). The estimates (as shown in Appendix Table E1) are also robust to including county-level (AWM) turnout by using the

Results

Column 1 of Table 2 reports the estimates for Equation 2. The coefficient on the interaction of *RRI in 1850* and the dummy indicating whether a county was in an BAS shows that representation in the 9 BAS has a large effect on a county's allocation of state educational revenues. A 10% increase in *RRI in 1850* is correlated with a county receiving roughly 6% more in state education spending per white youth capita in the 9 BAS. The estimate of B_1 indicates that there is no appreciable relationship in the counties of the 4 PAS. We find similar results when this model is estimated separately on the counties from the 9 BAS and 4 PAS, respectively. These estimates are reported in Columns 2 and 3 of Table 2 (and in Figure 5a).[47] When estimated on only the counties of the 9 BAS, the coefficient on *RRI in 1850* is statistically significant at the 99% level with a similarly large magnitude. A one standard deviation increase in a county's value for *RRI in 1850* in the 9 BAS is associated with an increase in state-level spending per white school aged capita of 36% controlling for the covariates in Equation 2. By comparison, the coefficient of *RRI in 1850* in the 4 PAS is actually negative. As predicted, it is statistically insignificant, and the magnitude is small.

Robustness Checks

Due to the possibility that *RRI* in the 9 BAS is correlated with unobservables unaccounted for by these controls, we conduct a number of additional robustness tests to further validate the results. First, we perform a placebo test by estimating the same regressions in the 17 states that were admitted between independence and 1850. While we do not attempt to similarly explore the determinants of the system of representation initially adopted in these states, we can say that it was *not* due to the colonial legacy of British policy. In each case, the representative institutions in these states were created *de novo* after independence. Therefore, we should not observe the same patterns as with the 9 BAS. We further address concerns that these estimates are biased by omitted factors by using an instrumental variable strategy in which *RRI in 1850* is instrumented with geographic factors that are plausibly unrelated to choices on how to allocate state

average of county turnout in the 1848 and 1852 Presidential elections (Go and Lindert 2010).

[47]The bivariate relationship of each models, as well as those for all models presented in this section, are reported in Appendix A - Table A7.

Table 2: Public Education Spending and *RRI in 1850*

	Interaction Model	Split Sample		Placebo Tests	
	13 States	9 BAS	4 PAS	17 New States	New Slave
	(1)	(2)	(3)	(4)	(5)
DV: County Educ. Spending per White Cap, 5-19, from State Sources, 1850					
RRI in 1850	0.04	**0.67*** **	**0.01**	**0.01**	**-0.14**
	(0.21)	**(0.14)**	**(0.23)**	**(0.17)**	**(0.25)**
BAS	2.5***				
	(0.27)				
*(RRI in 1850)*x*(BAS)*	**0.50** **				
	(0.22)				
1850 Covariates	Y	Y	Y	Y	Y
N (Counties)	452	308	144	633	317

Notes: Column 1 reports OLS estimates using all the counties of the 13 states. Columns 2 and 3 report estimates when the sample is split into counties from the 9 BAS and 4 PAS, respectively. Columns 4 and 5 report the estimates of the placebo regressions, which is the same specification used in columns 2 and 3, but run on the 17 states admitted between independence and 1850 (column 4) and the 9 slave states created in this same period (column 5). Each model includes state fixed effects and standard errors clustered at the state level. See the text for the covariates used in each model.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

education revenues. Lastly, we estimate the same specification using a number of additional measures of public education spending. Taken together, these help mitigate concerns that the estimates from Equation 2 are being driven by omitted factors.

Placebo tests

Our first robustness test is to estimate the same regression using the sample of 17 states admitted between 1787 and 1850. Following the adoption of the Constitution, which included the *New States* Clause (Article IV, Section 3, Clause 1), the admission of new states followed a particular process. Once a territory's population reached a certain threshold, the people in the territory would petition Congress to be admitted as a state. Congress then permitted this territory to create a state constitution, which among other institutional arrangements, always included the basis of apportionment in the state's legislature. If accepted by Congress, statehood would be granted on a equal footing with the other states. While Congress occasionally rejected the proposed constitution (e.g., Kansas' proposed pro-slavery 'Lecompton' Constitution), it never rejected a state's admission due to its basis of apportionment. This indicates each new state's basis of representation

was endogenously determined.[48] In fact, almost every new state initially adopted a population basis of representation (Thorpe 1909). As with the 4 PAS, we should therefore not observe the highly significant relationship between *RRI in 1850* and the allocation of state public education resources as measured in the 9 BAS.

Our sample is the counties in the 17 states admitted following independence and 1850, the year of the dependent variable in Equation 2. As before, we use the apportionment in the legislature of each of these states to construct a measure of *RRI in 1850* for each county. The sources for the dependent variable and each control are also the same. One check on our claim is that a county's relative representation in each new state's legislature should not be correlated with the county's distance from the Atlantic Coast. As expected, there is no relationship whatsoever (p-value=0.57). We then run the same regression using the controls in Equation 2 on these states. As reported in Column 4 of Table 2, there is no relationship between and the allocation of state education resources (p-value=0.95). This null finding is consistent with the claims of Ansolabehere and Snyder (2008) that the incidence of malapportionment across state legislatures emerged in the late 19th Century with the acceleration of urbanization and industrialization. That said, we may be concerned that pooling the counties of all 17 new states obscures important regional differences. In column 5, we report the estimates on *RRI in 1850* if run only using the counties of the 9 slave states admitted after independence. Again, we can see that there is no relationship (p=0.74). If we reduce the sample further to include only states whose territory were once part of the Original 13 states (i.e., Kentucky (1792), Maine (1820), Tennessee (1796), and Vermont (1791)), we still observe no significant relationship between *RRI in 1850* and state public education spending per white capita in 1850 (p=0.19). These various placebo regressions allay concerns that the significant relationship estimated in Equation 2 are due to unobserved factors other than the choice to maintain the biased colonial basis.

Instrumental variable estimates

To allay concerns that our variable of county-level political inequality (*RRI*) is measured with error

[48]This is not to claim that the original framers in each new state were not influenced by the institutional choices made in the Original 13 states, but rather the status quo at the time of each new state's founding did not reflect a legacy of colonial policy.

or that the OLS estimates are biased by omitted factors, we estimate the effects of *RRI* using a two-stage least squares (2SLS) model separately on the counties of the 9 BAS and 4 PAS. As an exogenous source of variation in *RRI* at the county level, we use the aforementioned county distance from the Atlantic coast as an instrument for each county's *RRI*. While the F-statistic for the first stage is very large in the 9 BAS (F=68, p-value0.000), it is less than 1 in the 4 PAS.[49] We find that the IV coefficient on *RRI in 1850* in the 9 BAS is highly statistically significant, and is very similar to the OLS coefficient presented in column 2 of Table 2. The estimates and discussion of the validity of this instrument are provided in Online Appendix B.

Alternative specifications and additional tests

To provide further validation of our empirical strategy, we now ensure that the findings reported in Table 2 do not depend on the choice of a particular indicator. In particular, we also run the same specification on three additional measures of county-level public education provision, each derived from the 1850 Census: a) total public (state and *local*) education spending per white youth, b) public school teachers per white youth and c) share of public school spending from rate bills.[50] Each of these allows us to explore whether over-representation in the state legislature is correlated with better overall public education provision. As shown in Online Appendix E - Table E3, *RRI in 1850* is strongly correlated with each measure in the 9 BAS, while exhibiting no correlation in the 4 PAS.

As a further check, we ran these same three specifications replacing *RRI in 1850* with the dependent variable from equation 2: *county public education spending from state sources per white youth in 1850*. Here we are measuring whether greater state education revenues per white youth are positively correlated with greater overall county-level public education provision. If public education revenues are mostly financed locally, then we would not expect state revenues to significantly affect overall levels of public education provision. Another possibility is that poorer counties received greater per capita state education revenues (as is true now), in which case we may expect to see a negative relationship (as richer counties would provide greater overall provisioning through greater local-level provisioning). Instead, the observed strong positive

[49] This is reassuring. Representation in the state legislatures of the 4 PAS is supposed to be proportional to population, and there should not not be an exogenous source of variation that is correlated with its *RRI*.

[50] It was common in this era for public revenues to subsidize a portion of the costs of public education, and the pupil to pay the rest, which were known as rate bills (Goldin and Katz 2009).

relationship between state revenues and overall county public education spending in the 9 BAS indicates the importance of this source of political inequality on public transfers. Figure 5b shows the expected county-level values of state & local public education spending per white youth, ages 5-19, across variation in county public education spending from state sources per white youth in 1850.[51] In the 9 BAS, a 10% increase in state education spending per white youth is correlated with a nearly 9% increase in total county public education spending per white youth, respectively. By implication, the determinants of the allocation of state education revenues nearly fully explain the level of overall public education provision at the county level in the 9 BAS in 1850. Similarly, Figure 5c (left) shows a significantly positive correlation between state spending per white school-age capita and teachers per white school-age capita in the 9 BAS (p-value<0.000). By comparison, in the 4 PAS, this relationship is slightly negative and insignificant.

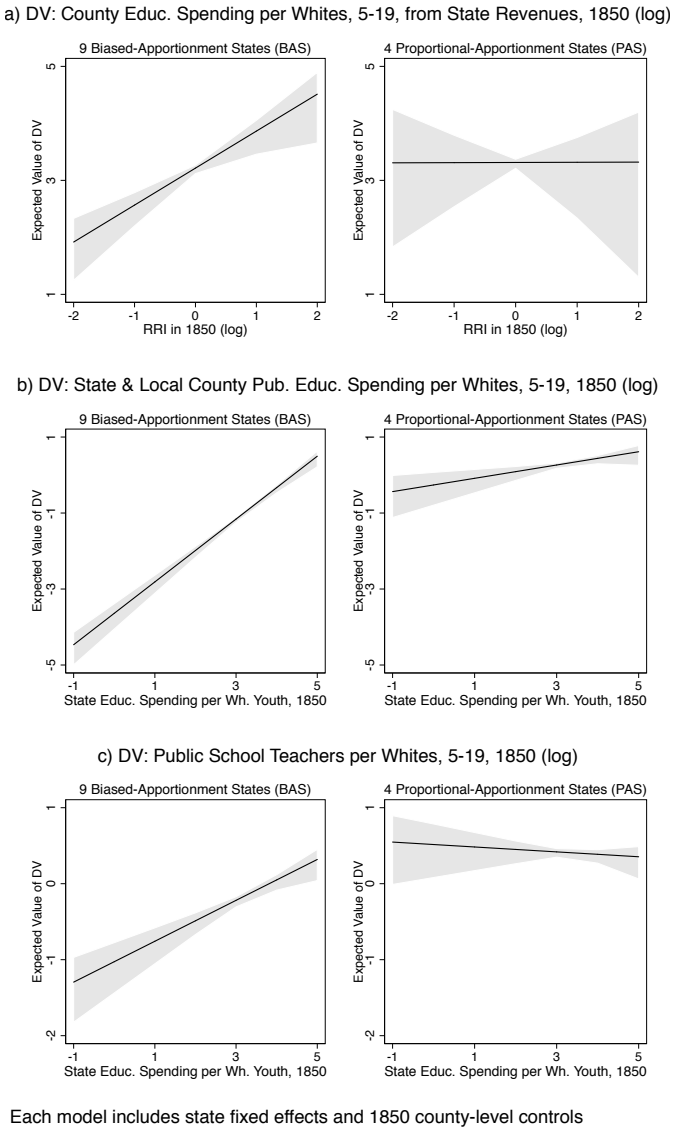
6.2 *The Persistent Effect of Initial Political Inequality and Public Goods (1850-1960)*

The findings in this paper confirm a strong and robust relationship between persistent political inequality due to an early institutional choice to preserve colonial-era malapportionment and the distribution of state-level education spending 75 years after the end of colonialism. We now show that *RRI* continued to be correlated with state transfers for public education for another 100 years. This is particularly important in the 9 BAS, as the state provided a majority of the public education funding for most of the period we are examining. In the 9 BAS, the unweighted average of public education spending in 1850 paid from state, as opposed to local, revenues was 60%. By comparison, this figure was only 17% in the 4 PAS.[52] Figure 6a indicates that the 9 BAS states continued to finance a large share of public education revenues at the state level until the US Supreme Court ended systematic malapportionment in 1964. If the over-represented areas continued to receive a disproportionate allocation of state transfers, then the consequences of this initial choice are magnified in the 9 BAS as we showed that that the distribution of representation in the 9 BAS remained systematically biased through the mid-20th Century.

[51] The remaining results are shown in Appendix E – Table E3.

[52] Then, as now, there was great variation across and within states over time in the share of public education revenues that were financed by local vs. state revenues. Online Appendix E provides more details regarding public education financing in the Original 13 states following the end of colonialism.

Figure 5: Early Effect of Initial Political Inequality on Public Goods

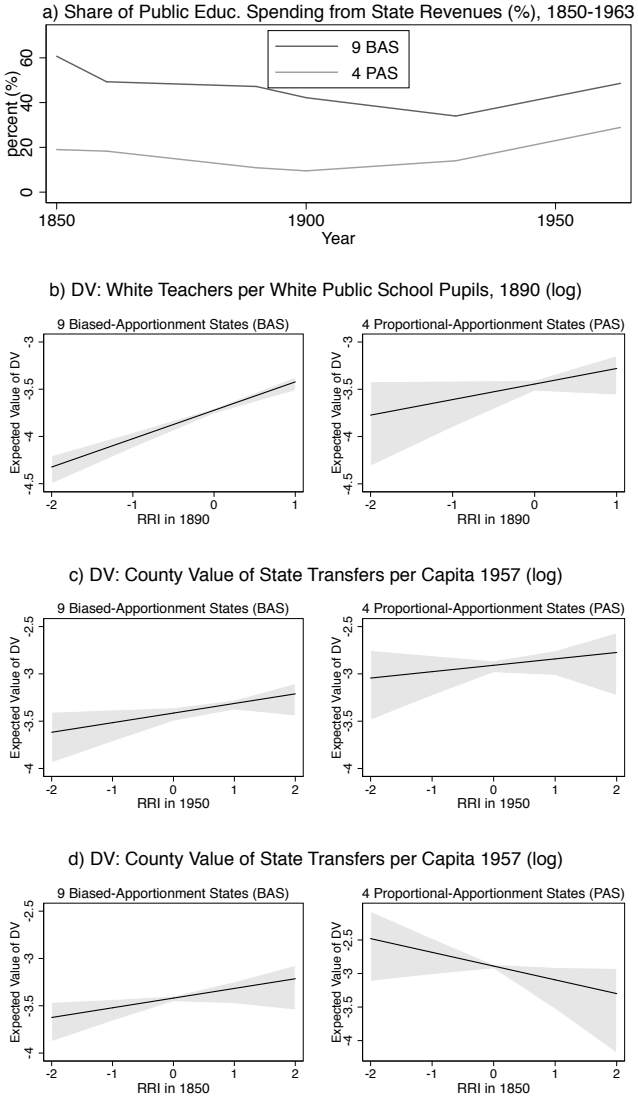


Note: Each figure was generated with Clarify, and show the expected value of each dependent variable with (shaded) 95% confidence intervals against the values of *RRI* in 1850 (a), state education spending per white youth in 1850 (b and c), holding all other covariates at their mean. Each model includes state fixed effects. The sample for all figures on the left are counties in the 9 BAS; all figures on the right are counties in 4 PAS. See the main text for the covariates included. The estimates are reported in Appendix A.

To test whether this systematic source of political inequality continued to affect the allocation of state education revenues, we regress the same specification in Equation 2 on subsequent periods between 1850 and the Supreme Court's ending of state legislative malapportionment in the 1960s. Unfortunately, the Census only provided county-level data on the amount of state transfers for public education in 1850. To the best of our knowledge, no other data sources exists that systematically collects state-level revenues specifically allocated for education at the county level. We instead use two proxies that capture the county-level allocation of state transfers for public education from 1890 and 1957, respectively, collected by the same sources. For the latter, the Census of Governments began collecting in 1957 county-level data on the amount of total state transfers to each county. According to Ansolabehere, Gerber and Snyder (2002: 769), these state transfers comprised a little more than a third of all state revenues, and approximately half of these direct transfers from the state were allocated for educational purposes. Hence, this is a good proxy of state transfers to the counties for public education. As an intermediate measure of state transfers, we use white teachers per white public school pupils in 1890. This is an appropriate proxy for state transfers to counties for public education for the simple reason that in this period salaries for teachers comprised a majority of education spending (Go and Lindert 2010). It is also the same measure that we used above for 1850. This data is provided by the 1890 Census, and is the only source that provided a comparable measure across all of the counties in the 13 states in the same time period. In this specification, we control for county-level total population, manufacturing capital per capita, share of the county's population who are black and foreign born, respectively, and include state dummies. Figure 6b shows that the expected value of white public school teachers per white pupils in 1890 is strongly positively correlated with *RRI in 1890* when holding all other 1890 county-level covariates at their mean. In the 9 BAS, a 10% increase in *RRI in 1890* is correlated with a 3% increase in county white public school teachers per white pupils. While positively correlated, there is no significant relationship in the 4 PAS.

As mentioned above, the Census of Government began reporting the amount of state transfers received by each county in their 1957 report, of which approximately half were allocated for educational purposes. Figure 6c shows that the expected value of county-level transfers from the state in 1957 is significantly positively correlated with *RRI in 1950* in both the 9 BAS and 4 PAS. This is consistent with Ansolabehere,

Figure 6: Persistent Effect of Initial Political Inequality on Public Goods



Note: Figure 6a shows the average share of total (state & local) public education revenues derived from *state* sources across the 9 BAS and 4 PAS, respectively, in 1850, 1860, 1890, 1900, 1925, and 1963. Figures 6b, c, and d were generated with Clarify, and show the expected value of each dependent variable with (shaded) 95% confidence intervals against the values of *RRI* in 1890 (b), in 1950 (c) and 1850 (d), holding all other covariates at their mean. Each model includes state fixed effects.

Gerber and Snyder (2002) findings that the malapportionment of state legislatures, which was widespread by the mid 20th Century and had originated following industrialization in the late 19th Century, strongly affected the allocation of state resources. Yet, our data shows that systematic malapportionment in the 9 BAS far predates industrialization. Figure 6d shows the the same specification as in 6c, but with *RRI in 1850* in place of *RRI in 1950*. In support of our argument, we find a strongly positively correlation between *RRI in 1850* and state transfers per capita in 1957. By contrast, the expected value of state transfers is negatively correlated with *RRI in 1850* in 4 PAS, indicating that the source of malapportionment present by 1950 in the 4 PAS was either not persistent over time or only emerged after 1850. While addressing the endogeneity of the degree of fiscal decentralization across these states is beyond the scope of this paper, we can infer that the greater state-level centralization of public goods provisioning as demonstrated in Figure 6a combined with the observed unequal allocation of state-level resources strongly suggests that the consequences of being underrepresented in the state legislature were much more significant in the 9 BAS than the 4 PAS. A key implication of our argument is that the Supreme Court's decision in 1964 to require the apportionment of state legislatures be equalized across districts according to population should have resulted in a significant reallocation of state public resources towards the previously underrepresented counties within each state. Crucially, Ansolabehere, Gerber and Snyder (2002) demonstrate that this is precisely what occurred.

CONCLUSION

This paper has shown how the preservation of legislative malapportionment after independence carried the legacy of colonialism and slavery well after their demise. Two exogenous factors – state size and climate and geography – explain whether constitution-makers in each of the original 13 states created legislatures in which representation was apportioned according to white population or whether it was fixed to preserve the interests of the coastal and rural elites. This initial choice created systematic political inequality in the nine biased-apportionment states, a variable for which we provide a new measure here, that in turn shaped public education provisioning after independence. Finally, our analysis reveals that the effects of this political institution continue to loom large to this day. This persistence is all the more striking when one considers the massive economic and social changes that have occurred within the US over the two centuries under study,

the fact that labor movement is unrestricted, and the significant increase in federal-level redistribution. The paper makes an important contribution to the vast literature on the importance of political institutions, by examining the impact of historically determined malapportionment – an understudied attribute of many legislatures – on public goods.

This study also speaks to the literature on politico-economic transitions, and, in particular, the ability of elites to design institutions that preserve their political power even after major political and economic changes (e.g., Acemoglu and Robinson 2008, Albertus and Menaldo 2018). Our findings suggest that pre-transition representative institutions work to lock in elites' power long after the initial period of change. Despite implementation occurring prior to industrialization, state-legislative malapportionment persisted through the early 1960s, when an exogenous federal-level decision of the Supreme Court ended it. Most importantly to the comparative political economy literature, we provide evidence of a politico-institutional channel through which the effects of colonialism and slavery continue to be relevant today long after the demise of each. The literature on American politics has generally failed to engage with the broader comparative politics literature on the impact of historically-determined institutions.

Finally, our paper points to additional ways in which comparative institutional development can benefit from the study of American institutional development, and vice versa. In particular, we envision additional efforts in two directions. The first one concerns the politics of taxation to fund the provision of public goods such as the ones studied in this paper, and the role biased representation played both in the allocation of the tax burden across and the scope of tax centralization in the original 13 states. These analyses will make a significant contribution to the comparative politics of the origins of effective fiscal states. The second one concerns the specific strategies elites use to preserve their relative power and the economic and political conditions under which malapportionment versus limiting franchise are complements or substitutes across space and time. This is an important question that deserves a study in its own right.

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Not For Publication

Online-Only Appendix and Supplementary Information to:

"Economic Geography, Political Inequality, and Public Goods in the Original 13 US States"

Appendix A - Supporting Figures and Tables as cited in the text of the paper

Appendix B – Instrumental Variable Estimates

Appendix C – Initial Conditions at the End of the Colonial Period

Support is provided that upon independence the choice of initial basis of legislative representation was not determined by unobserved factors

Appendix D – Measuring State level Political Inequality (*RRI*)

Information on how the variable county-level *Relative Representation Index, RRI*, was constructed

Appendix E – Public Education Spending in the Antebellum Era (1789-1860)

Information is provided regarding the development of public educational institutions in the US

Appendix A - Table A1 - Classifications of Original 13 States

State Name	State Abbreviation	Slave State	Biased (Fixed) Apportionment during Colonial Era	Biased Apportionment During Antebellum Era
Connecticut	CT	NO	YES	YES
Delaware	DE	YES	YES	YES
Georgia	GA	YES	YES	YES
Maryland	MD	YES	YES	YES
Massachusetts	MA	NO	YES	NO
New Hampshire	NH	NO	YES	NO
New Jersey	NJ	NO	YES	YES
New York	NY	NO	YES	NO
North Carolina	NC	YES	YES	YES
Pennsylvania	PA	NO	YES	NO
Rhode Island	RI	NO	YES	YES
South Carolina	SC	YES	YES	YES
Virginia	VA	YES	YES	YES

Appendix Table A2 – County-level Variables: Definitions and Sources

Variables	Variable Definitions	Source(s)
Political Inequality		
RRI	See Text and Appendix D	See Text and Appendix D
Dependent Variables		
State-level Public School (PS) Spending per White Pop., ages 5-19, 1850 ($)	log (county Public Educ. Spending ($) from State Sources per White Pop. (ages 5-19) in 1850)	1850 Census (Author Calculations). Data located at: www.icpsr.umich.edu
Private Tuition (Rate Bills) Share of Tot. Public Educ. Spending, 1850	log (county total tuition in public schools (Rate Bills) as share of total public education spending in 1850)	1850 Census (Author Calculations).
Tot. State & Local PS Spending per White Pop, 5-19, 1850 ($)	log (total county public educ. spending ($) from state and local sources per white pop. (ages 5-19) in 1850)	1850 Census (Author Calculations).
White Public School Teachers per White School-age Pop., 1850	log (county White Public School Teachers per White Pop. (ages 5-19) in 1850)	1850 Census (Author Calculations).
White Public School Teachers per White School-age Pop., 1890	log (county White Public School Teachers per White Pop. (ages 5-19) in 1890)	1890 Census (Author Calculations)
State Transfers Per Capita, 1957 (1957 $)	log (relative per capita transfers from state government to the county in 1957)	Census of Governments, 1957
Controls		
Wh. Pop. Density, Ages 5-19, 1850	log (total county white population, ages 5-19, in 1850, divided by the county square mileage size, as it existed in 1850	1850 Census. Historical county boundaries: http://publications.newberry.org/ahcbp/index.html
Urban Pop, 5000+, 1850 (%)	log (county's urban population of cities with 5000 or more people divided by the county's total population in 1850)	1850 Census (Author Calculations)
Share of Wh. Pop. Foreign-Born, 1850 (%)	log (county's white foreign-born population divided by a county's total white pop. in 1850)	1850 Census (Author Calculations)
Value of Manufacturing Capital per AWM, 1850	log (total value of manufacturing capital in a county divided by its Adult White Male (AWM) Pop. In 1850)	1850 Census (Author Calculations)
Native-born Wh. Adult Illiteracy Rate, 1850 (%)	log (county's native-Born Adult White Illiteracy Rate in 1850)	1850 Census (Author Calculations)
Gini Coeff. Land Inequality, 1860	log (Gini coefficient of the inequality of a county's land ownership distribution in 1860)	Nunn (2008). Data located at: http://scholar.harvard.edu/nunn/pages/data-0
Slave Pop. Share, 1850 (%)	log (county slave population divided by county total population in 1850)	1850 Census (Author Calculations)
Instrument		
Distance to Atlantic Coast (Meters)	log (direct distance from the center of a county to the Atlantic Coast based on county boundaries from a particular year). Years: 1775, 1790, 1850	Historical County Boundaries - http://publications.newberry.org/ahcbp/

Appendix - Table A3 - Descriptive Statistics

	Original 13 States	9 BAS	4 PAS
Dependent Variables			
State-level Public School (PS) Spending per White Pop, 5-19, 1850 ($)	***0.3 (0.3)***	***0.3 (0.34)***	***0.32 (0.19)***
Private Tuition (Rate Bills) Share of Tot. Public Educ. Spending, 1850	0.264 (0.36)	0.344 (0.392)	0.062 (0.1)
Total State & Local PS Spending per White Pop, 5-19, 1850 ($)	0.78 (0.79)	0.53 (0.69)	1.44 (0.7)
State Transfers Per Capita, 1957 (1957 $)	64.3 (28.5)	58.2 (18.5)	79.5 (40.8)
Control Variables			
Total Population, 1850	22,666 (35,399)	14,027 (14,663)	46,039 (57,700)
Wh. Pop. Density, 5-19, 1850	26.9 (234.2)	8.65 (16.1)	76.4 (447.8)
Urban Pop, 5000+, 1850 (%)	2.9 (12.6)	1.6 (9.5)	6.3 (18.2)
Share of Wh. Pop. Foreign-Born, 1850 (%)	4.5 (7.4)	2.2 (4.7)	11.0 (9.3)
Value of Manufacturing Capital per AWM, 1850	141.7 (213.1)	113.6 (225.0)	218.0 (153.4)
Native-born Wh. Adult Illiteracy Rate, 1850 (%)	17.7 (16.4)	23.2 (16.0)	3.5 (4.0)
Gini Coeff. Land Inequality, 1860	0.45 (0.06)	0.45 (0.06)	0.44 (0.05)
Slave Pop. Share, 1850 (%)	22.9 (23.6)	31.3 (22.3)	0.0 (0.0)
Instrument			
Distance to Atlantic Coast (Meters)	180718.6 (136264.2)	175768.5 (140153.4)	194296.9 (124428.3)
N (Counties)	542	396	146

Appendix Figure A4 - Full OLS Regression Estimates for Table 2 (Columns 2, 3)

DV (each Column): County Educ. Spending per White Cap, 5-19, from State Sources, 1850 (log)

VARIABLES	(1) 9 BAS	(2) 4 PAS	(3) 9 BAS	(4) 4 PAS
log_RRI_1850	**0.649*** **	**0.00378**	**0.649*** **	**0.00378**
	(0.149)	**(0.238)**	**(0.149)**	**(0.238)**
log_Urban_Share_1850	-0.0418	-0.0298	-0.0418	-0.0298
	(0.0588)	(0.0437)	(0.0588)	(0.0437)
log_Foreign_Born_Share_1850	0.0606	-0.120	0.0606	-0.120
	(0.0780)	(0.0743)	(0.0780)	(0.0743)
log_Land_Gini_1860	0.642**	-0.572	0.642**	-0.572
	(0.268)	(0.418)	(0.268)	(0.418)
log_Manuf_Adult_Wh_Males_1850	-0.0211	0.0771	-0.0211	0.0771
	(0.0279)	(0.0993)	(0.0279)	(0.0993)
log_Wh5to19_Pop_Density_1850	0.00674	-0.0770	0.00674	-0.0770
	(0.0705)	(0.150)	(0.0705)	(0.150)
log_Slave_Share_1850	0.0157		0.0157	
	(0.0740)		(0.0740)	
log_Native_Wh_Adult_Illiteracy_1850	-0.0351	-0.912	-0.0351	-0.912
	(0.279)	(0.673)	(0.279)	(0.673)
log_Total_Pop_1850	0.149	0.120	0.149	0.120
	(0.0929)	(0.137)	(0.0929)	(0.137)
N (Counties)	308	144	308	144
R-squared	0.599	0.654	0.599	0.654
State FE	YES	YES	YES	YES
State Clustered SE	NO	NO	YES	YES

Columns 1, 2: Robust standard errors in parentheses
Columns 3, 4: Robust standard errors Clustered at the State level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix A – Table A5: Interaction Model for Pooled 13 Original States of the Split-Sample Models from Figure 5

VARIABLES	(1) State	(2) Total	(3) Teachers
log_RRI_1850	0.0777	0.330	-0.0118
	(0.212)	(0.216)	(0.163)
BAS_dummy	2.499***	-0.0447	-0.119*
	(0.261)	(0.0960)	(0.0619)
log_RRI_1850xBAS	**0.516****	**0.406***	**0.146**
	(0.224)	**(0.239)**	**(0.162)**
log_Urban_Share_1850	-0.0372	0.0551	-0.0349*
	(0.0360)	(0.0367)	(0.0199)
log_Foreign_Born_Share_1850	0.0173	0.0851	-0.0844**
	(0.0519)	(0.0584)	(0.0426)
log_Land_Gini_1860	0.320	0.490**	-0.165
	(0.236)	(0.239)	(0.129)
log_Manuf_AWM_1850	-0.0101	0.0536*	-0.0102
	(0.0269)	(0.0293)	(0.0186)
log_Wh5to19_Pop_Density_1850	-0.0362	0.0232	-0.177***
	(0.0802)	(0.0469)	(0.0324)
log_Slave_Share_1850	0.0138	0.164**	0.0428
	(0.0692)	(0.0757)	(0.0562)
log_Native_Wh_Adult_Illiteracy_1850	-0.0636	0.00243	-0.258
	(0.267)	(0.276)	(0.219)
log_Total_Pop_1850	0.116*	0.0712	-0.00669
	(0.0689)	(0.0642)	(0.0527)
N (Counties)	452	485	506
R-squared	0.599	0.697	0.489
State FE	YES	YES	YES

Note: Models 1, 2, and 3 are the models from Figure 5a, 5b and 5c, respectively, but run with the entire sample of counties from the Original 13 states. Instead of a split sample from Figure 5a, we model the correlation of RRI as an interaction with the initial choice of state into apportionment status (BAS Dummy = 1 if the state chose a Biased Apportionment; PAS=0 if it chose a population-basis of apportionment).
DV in Model 1 is County Education Spending per White Cap, 5-19, from State Sources, 1850 (log)
DV in Model 2 is County Local & State Educ. Spending per White Youth, Ages 5-19, in 1850 (log)
DV in Model 2 is the Public-School (PS) Teachers per White Pop, ages 5-19 in 1850 (log)
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix A – Table A6 – Bivariate Models from 1850 to 1957

Panel A – RRI in 1850 and Public Education Spending

VARIABLES	(1) 9 BAS	(2) 4 PAS	(3) 9 BAS	(4) 4 PAS
log_RRI_1850	0.601***	0.108	0.799***	-0.268
	(0.09)	(0.21)	(0.13)	(0.21)
N (Counties)	324	144	360	146
R^2	0.585	0.625	0.472	0.349
State FE	YES	YES	YES	YES

Models 1, 2: DV = *(log) County Educ. Spending per White Cap, 5-19, from* ***State Sources*** *(only), 1850*
Models 3, 4: DV = *(log) County Educ. Spending per White Cap, 5-19, from* ***State + Local Sources****, 1850*
Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Panel B – State Education Revenues and other Education Outcomes, 1850

VARIABLES	(1) 9 BAS	(2) 4 PAS	(3) 9 BAS	(4) 4 PAS
State Educ. Revenues per White, Ages 5-19, 1850 (log)	0.874***	0.0997	0.286***	0.0693
	(0.06)	(0.17)	(0.062)	(0.067)
N (Counties)	324	144	324	143
R^2	0.716	0.353	0.306	0.234
State FE	YES	YES	YES	YES

Models 1, 2: DV = *(log) County Educ. Spending per White Cap, 5-19, from* ***State + Local Sources****, 1850*
Models 3, 4: DV = *(log) County Public School (PS) Teachers per White Cap, 5-19, 1850*
Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Panel C – RRI in 1890 & 1957 and State Education Spending

VARIABLES	(1) 9 BAS	(2) 4 PAS	(3) 9 BAS	(4) 4 PAS
log_RRI_1900	0.288***	0.533***		
	(0.0406)	(0.0798)		
log_RRI_1950			0.146***	0.530***
			(0.0231)	(0.0563)
N (Counties)	430	151	489	153
R-squared	0.289	0.462	0.613	0.838
State FE	YES	YES	YES	YES

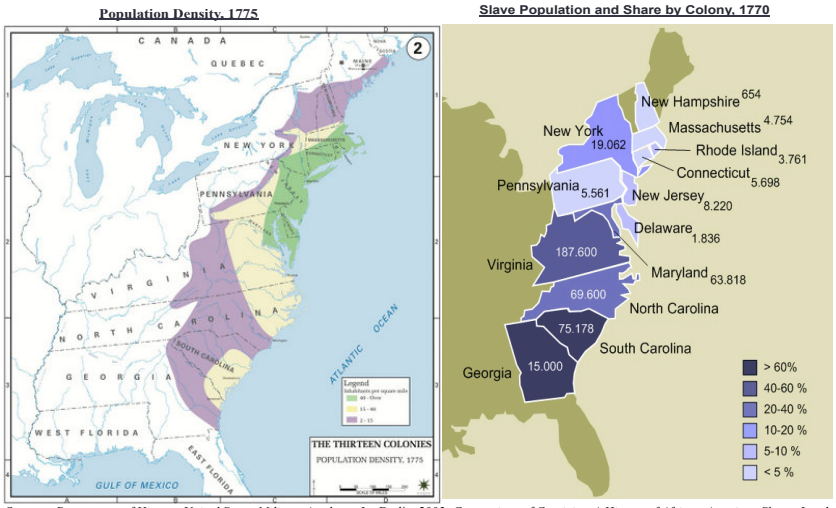
Models 1, 2: DV = *(log) County Public School (PS) Teachers per White Cap, 5-19, 1890*
Models 3, 4: DV = *(log) State Transfers per Capita, 1957*
Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix A – Table A7: Full Reg. Estimates for Post-1850 Estimates (Figure 6)

VARIABLES	(1) 9 BAS	(2) 4 PAS	(3) 9 BAS	(4) 4 PAS
log_RRI_1890	**0.301*** **	**0.165**		
	(0.0372)	**(0.104)**		
(log) Manuf. Capital p.c., 1890	0.00254	0.0612**		
	(0.0139)	(0.0285)		
(log) Total Pop., 1890	-0.0228	-0.132***		
	(0.0319)	(0.0311)		
(log) Foreign Born_Share_1890	1.335***	-1.512***		
	(0.515)	(0.497)		
log_RRI_1950			**0.102**	**0.0677**
			(0.07)	**(0.07)**
(log) Total Pop., 1950			-0.0600	-0.0803**
			(0.0470)	(0.0327)
White_Pop_Share_1950			0.254*	1.878**
			(0.152)	(0.902)
(log) Median Fam. Income, 1950			-0.0812	-0.808***
			(0.0740)	(0.166)
N (Counties)	416	151	489	153
R-squared	0.304	0.564	0.635	0.902
State FE	YES	YES	YES	YES

Models 1, 2: DV = *(log) County Public School (PS) Teachers per White Cap, 5-19, 1890*
Models 3, 4: DV = *(log) State Transfers per capita, 1957*
Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix Figure A1 – Conditions at the End of the Colonial Era (1607-1775)



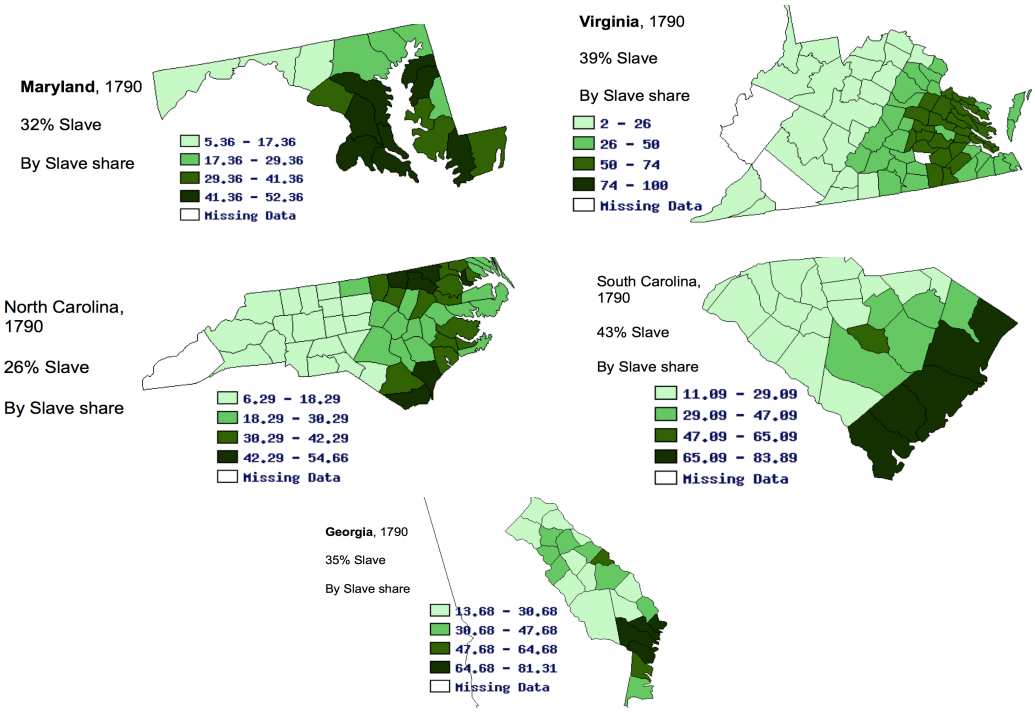
Sources: *Department of History, United States Military Academy;* Ira Berlin, 2003. *Generations of Captivity: A History of African-American Slaves*, London: The Belknap Press of Harvard University Press.

Appendix Figure A2 – Distribution of Colonial Rural Population in 1770.

Each dot represents 200 rural inhabitants. Circles represent urban areas.
Boundaries represent current state boundaries. Maine (1820) and West Virginia (1863) were part of Massachusetts and Virginia, respectively.

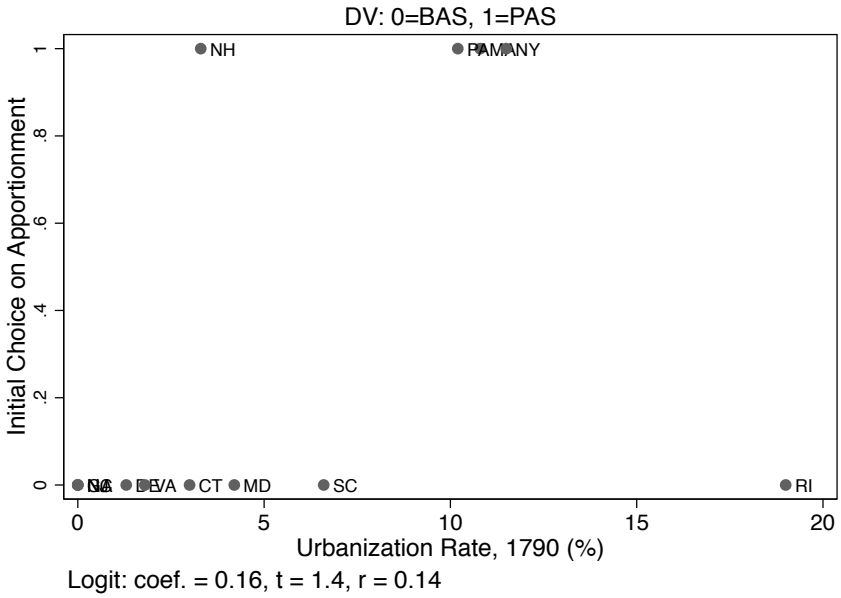
Source: Friis, Herman. 1940. "A Series of Population Maps of the Colonies and the United States" *American Geography Society: Geographical Review* 30(3): 463-470.

Appendix – Figure A3 – Within-State Distribution of Slave Share in Five Largest Slave States, 1790



Source: Historical Census Browser. Retrieved 2013 from the University of Virginia, Geospatial and Statistical Data Center: http://mapserver.lib.virginia.edu/collections/stats/histcensus/index.html

Appendix Figure A4: Urbanization Rate, 1790 and the Initial Choice of Representation



Note: The dependent variable is a binary indicator of whether a state chose a population basis of representation (PAS=1) or maintained the biased colonial system (BAS=0) upon independence. Urbanization rate is the state's share of its total population in 1790 living in cities of at least 5,000 residents.

Appendix B – Instrumental Variable (IV) Estimates

There are two primary concerns regarding the OLS estimates presented in Table 2. Measurement error in the political inequality variable, *RRI*, may be biasing the estimates. There may also be omitted factors that affect both *RRI* and public goods provision. Ideally, we would use the exogenous sources of variation for each state's initial choice of representation – state size and suitability for slavery – to instrument for *RRI*. Yet, these are state-level factors that influenced a state-level choice, but one which affects the distribution of within-state representation in the legislature. Since we cannot instrument at the county level for the state dummy, BAS, we cannot employ the same interaction model from Equation 2 of the main text. We therefore estimate the effects of *RRI* using a two-stage least squares (2SLS) model separately on the counties of the 9 BAS and 4 PAS. As an exogenous source of variation in *RRI* at the county level, we use the aforementioned county distance from the Atlantic coast as an instrument for each county's *RRI*.

The exclusion restriction requires that this instrument affects *RRI*, but does not directly influence the within-state allocation of state education revenues in 1850. County location (i.e., geography), though its effects on development, could certainly affect the level of *locally-provisioned* public goods. Yet, our dependent variable only measures what a county receives from the state government in public education expenditures as share of the county's white (5-19) population in 1850. Legislation passed in the state legislature stipulated the formulas by which state education revenues were to be allocated. The exclusion restriction would be violated if the amount each county was allocated was due, at least in part, to local-level factors that could be influenced by this instrument. Looking at the relevant legislation for each state, we found no cases of this.[1] Instead these allocation formulas, which allocated some fixed and equal amount of revenues to each county regardless of population, are consistent with the effects of malapportionment on the ability of a minority of the population to pass legislation that disproportionately allocates state resources to their districts rather than the effects of within-state differences in development on variation in state-level provisioned public goods (Ansolabehere, Gerber and Snyder 2002). As a relevant counterfactual, county distance to the coast is not correlated to the within-state allocation of state resources in the 4 PAS. State-level education revenues in the PAS were allocated to each county or town based on each district's school-age population. We also include various controls in the first stage, such slavery and economic development, to control for many possible alternative channels.

Appendix B Table B1 (Columns 4-5) reports the 2SLS estimates. In the first stage, the Kleibergen-

[1]For instance, in Maryland, the formula specified that half the state education revenues would be split equally among the counties, and that the other half would be apportioned based on population (Harry 1902). In Connecticut, the "Town Deposit Fund", half of which was specified to be spent on education, was allocated based on town, regardless of population. The statute in North Carolina that stipulated each county's share of the state education revenues was allocated according to a county's federal population (i.e., total white population and 3/5 of the non-white population; Commissioner of Education for the Year 1896-97: 1422). Since only white children were allowed to be educated publicly, white children in heavily enslaved counties received a much higher than average per capita share of state education revenues.

Paap (K-P) weak identification F-statistic of 68 in the counties of the 9 BAS states assuages any concern that the instrument is weak. As Column 4 of Table B1 shows, the IV estimates for *RRI in 1850* produces coefficients significant at the 99.9% level. While the IV coefficient is slightly larger than the OLS (Column 2), a Hausman test fails to reject the null that the OLS and IV coefficients are equal. The F-stat of less than 1 indicates that the instruments are very weakly correlated in the first stage with *RRI in 1850* in the 4 PAS (Column 5). This is reassuring, as representation in the state legislatures of the 4 PAS was determined by population, and there should not be an exogenous source of variation that is correlated with its *RRI*.

Table 1: Public Education Spending and *RRI in 1850*

	Interaction Model	Split Sample			
	OLS	OLS		2SLS	
	13 States	9 BAS	4 PAS	9 BAS	4 PAS
	(1)	(2)	(3)	(4)	(5)
DV: County Educ. Spending per White Cap, 5-19, from State Sources, 1850					
RRI in 1850	0.08	**0.65*** **	**0.01**	**0.88*** **	**-1.85**
	(0.21)	**(0.15)**	**(0.24)**	**(0.19)**	**(4.36)**
BAS	2.5***				
	(0.27)				
*(RRI in 1850)*x*(BAS)*	**0.52** **				
	(0.22)				
1850 Covariates	Y	Y	Y	Y	Y
K-P Weak Ident. F-stat.				68.0	0.8
Stock-Yogo Test				<5%	>25%
N (Counties)	452	308	144	308	142

Notes: Column 1 reports OLS estimates using all the counties of the 13 states. Columns 2-5 report estimates when the sample is split into counties from the 9 BAS and 4 PAS, respectively. The instrument in the 2SLS models (col. 4 and 5) is: the nearest distance of the center of each county to the Atlantic Ocean in 1850. K-P Weak Identification F-stat refers to the Kleibergen-Paap F-statistic of the first stage of the excluded instrument. Stock-Yogo test refers to the null hypothesis that the instrument is statistically weak, in which '5%' indicates the K-P F-stat exceeds the highest threshold of instrument weakness.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Appendix C – Initial Conditions of 13 Colonies at the Time of Independence

In line with the arguments and findings of ES (1997) and Easterly (2007), we might worry that the findings presented in this paper, and the choice of state's initial basis of apportionment, were due to the variation across 13 colonies in conditions at the end of the colonial era. The primary argument assuaging this concern is that non-slave states in both the mid-Atlantic and New England regions – states that were similar in conditions – implemented both fixed and re-apportioning systems of legislative representation. Second, it must be emphasized that original endowments of (measured) wealth, income, inequality, and human capital cannot account for the initial institutional choices of these states or their subsequent developmental paths. Appendix C – Table C1 shows that the slave colonies were wealthier, regardless of whether the value of enslaved property is included in the numerator, than the other colonies. Economic inequality is another reason often provided as a cause of the variation across countries in their initial political and economic institutions (ES 1997, Easterly 2007). While wealth inequality (among whites) was estimated to be slightly higher in the Southern states on the eve of independence, it was not significantly different than in the other regions. Income inequality in the slave states has been estimated to be lower than that in the Middle Atlantic Colonies.

This table also shows the extent to which the Southern states were attracting more white immigration than the other two regions prior to the creation of each state's first constitution. Using state militia rolls during the colonial period, Villaflor and Sokoloff (1982) estimated that roughly 50% of the whites born in the colony of Pennsylvania migrated to the Southern (slave) colonies. It was also widely believed during the Constitutional Convention of 1787 that the Southern states would soon have a majority of white citizens, as populations migrated 'south-westerly' along and over the Appalachian mountains (Farrand, Records of the Convention I: 605 1911 **?**). This belief was critical to some of the institutional protections that delegates from Northern states sought in the new federal government, and to the argument here that the findings below are not biased due to the omission of some unobserved factor existing in the relatively low slavery-intensive portions of the southern slave states. The possibility that some unobserved factor may explain why the under-represented non-coastal regions received less state-level education revenues can be ruled out, or at least these factors were not evident when institutional choices were being made at the end of the colonial era. The fact that movement into the Southern highland regions - the region that would be constitutionally underrepresented in the slave state legislatures and which was not geographically suited to the profitable use of slaves - came from the Mid-Atlantic states, and primarily from Pennsylvania, strengthens this argument. This pattern mitigates concerns that Southern colonial education policies are an unmeasured factor that were responsible for the antebellum era educational outcomes used in the empirics. It also strengthens the

argument that labor scarcity concerns were important in states such as Pennsylvania.

As for initial differences across colonies in human capital, there is evidence to suggest that the regional differences were much smaller at the end of the colonial period than that which existed 75 years later. According to Galenson (1996: 193), adult male literacy in New England was near 90%, and 70% in Pennsylvania and Virginia. By 1850, Pennsylvania's native-born adult white illiteracy rate was less than one-fourth that of Virginia's. We also cannot attribute later differences to differences in public subsidies during the colonial era. Private tuition was the primary way education was funded in the colonies and the early US until the development of local and state subsidized common schools during the antebellum era (Go and Lindert 2010). Evidence is far from systematic, and all indications are that New England was much more developed at the time of independence in terms of provisioning some publicly subsidized education (Report of the Commissioner of Education 1895-1896). Yet, recall that half of the six New England states implemented fixed apportion systems. Until 1825, roughly 75% of total school revenues in New York were funded privately, while roughly half of the remaining 25% was funded at the state level and the half at the local level (Go and Lindert 2010: 6, New York Superintendent of Common Schools, Annual Report, 1820-1855). The share of total education spending that came from public sources only climbed above 50% around 1840. Furthermore, our primary dependent variable is state-level per capita white youth *spending* in 1850 at the county level (i.e., inputs), and not educational outcomes in the antebellum era. Instead, we use antebellum era educational outcomes (e.g., illiteracy rates) as controls for the effects of educational spending in 1850 on contemporary outcomes.

Finally, Appendix C-Table C1 shows that the South, did, indeed have a lower urbanization rate than the other regions. This may be a sign of large initial differences in development, as urbanization is often used as a proxy for historical economic development (e.g., AJR 2002; De Long and Shleifer 1993). Yet, these rather small differences should not lead us to infer that the North possessed an urbanized or proto-industrialized society at the end of the colonial era. Villaflor and Sokoloff (1982) argued that during the colonial era that internal migration was strictly from port cities to the rural frontiers: "Migration between rural and urban areas in the late 18th Century seems mostly to have been a matter of dispersing the multitudes of European immigrants and their American-born offspring who collected in the port cities (p. 549-550)." The northern cities of Boston, New York, and Philadelphia did not possess significantly better natural ports than, say, Baltimore, Norfolk, or Charleston, nor were they significantly larger at the end of the colonial era. Moreover, greater urbanization was no indicator of better initial institutional quality. The only state with an urbanization rate greater than 10% in 1790 (nearly 15 years after the end of colonialism) was Rhode Island, which at independence decided to retain its colonial charter as its governing structure. This meant that the most developed of these polities at the end of the colonial era began statehood with some of the new nation's

most restrictive and unequal political institutions, both in terms of suffrage and legislative representation (Keyssar 2001: 71).

Lest one thinks that the continuation of this institution from colonialism was done naively and unknowingly, it is quite revealing that these four, large Southern states fought so vehemently at the 1787 constitutional convention for a population basis of apportionment at the federal level (e.g., Farrand 1911, Goldstone 2005). In Massachusetts, another of the large states that strongly supported a population basis at the federal level, Handlin's (1966) collection of the debates and petitions prior to the creation of Massachusetts' first state (and to this date only) constitution reveals that representation in the state legislature was a, if not the, primary issue of contention when creating the first state constitution. One such petition from an over-represented town reveals the importance to those in the over-represented areas of maintaining this political institution at the end of the colonial era, and that MA's choice to implement a population basis was not the continuation of an egalitarian colonial institution: "This state (MA) is constituted of a great number of distinct and very unequal corporations which corporations are the immediate constituent part of the state and individuals are only the remote parts." It was not just a major issue in the North. In Thomas Jefferson's famous "Notes on the States of Virginia", written in 1781, he said, "These 19,000 [electors]..living in one part of the country (Virginia's coastal tidewater section) give laws to upwards of thirty thousand living in another." This ratio would only worsen as the population shifted westward. In 1824, Jefferson wrote, "the equality of political rights is entirely prostrated by our constitution. Upon which principle of right or reason can any one justify the giving to every citizen of Warwick as much weight in the government as to twenty-two equal citizens in Loudoun, and similar inequalities among the other counties?"

A different interpretation, and one that is closer to Zagarri's (1987), is that in the small non-slave states inequality of state legislative representation was not very consequential for various reasons (e.g., greater homogeneity of economic interests due to small colony/state size, decentralization of political power and fiscal spending to the town-level). This argument can be countered with a bevy of evidence. For one, there was widespread dissatisfaction in these states regarding the effects of systematic overrepresentation of particular sectional interests. Even Zagarri outlines the great dissatisfaction in New Jersey over the effects of geographic malapportionment and the rule of the "Southern Junto" (Zagarri: 54). The Dorr Rebellion (1841), for instance, in Rhode Island was in no small part caused by anger over the extreme state-level malapportionment which gave a majority of representation to a small rural landholding elites in an increasingly urbanized and industrialized state (Keyssar: 71-76). Second, these small non-slave, malapportioned states, unlike their non-fixed New England and Middle Atlantic neighbors, raised a much higher share of their public educational revenues at the state-level (see Appendix E-Table E2, Column 2), and allocated them in an unequal manner (see Appendix E-Table E2, Column 4).

Appendix C-Table C1. Initial Conditions at the End of the Colonial Era (1607-1775)

	New England	Middle Atlantic	South
Migration			
Net Migration – 1730 – 1780			
Whites	-27,000	101,000	136,000
Slaves	-6,000	-1,000	150,000
Share of Whites Born in Region Residing in Other Two Regions	0.05	0.28	0.01
Wealth and Income, 1774			
Wealth per Capita (£)	36.6	41.9	54.7
Non-Human Wealth per capita (£)	36.4	40.2	36.4
Non-Human Wealth per free capita (£)	38	44.1	61.6
Gross Per Capita Income (in 1840 prices ($)	57.4	76.1	107.8
Inequality, 1774 (Gini Coefficient)			
Wealth Inequality	0.64	0.54	0.67
Income Inequality	0.35	0.42	0.38
Education, 1774			
White Illiteracy Rate	0.1	0.3	0.3
Urbanization Rate, 1790			
Share living in towns of 5000 or More	0.05	0.07	0.02

Notes:
New England includes: CT, MA, NH, and RI
Middle Atlantic includes: DE, NJ, NY, and PA
South includes: GA, MD, NC, SC, and VA

See Appendix A-Table A1 for state abbreviations.

Sources:
Migration (Villaflor and Sokoloff 1982, Galenson 1995, Gemery 2000); Wealth and Income (Jones 1980, Galenson 1995); Inequality (Jones 1980, Lindert and Williamson 2013); Education (Galenson 1995); Urbanization Rate (US Decennial Census, 1790).

Appendix C - Table C2. Conditions at Independence and the Apportionment Scheme Initially Adopted by Each State

State	Pop. Density, 1775 (1)	Slave Share, 1790 (%) (2)	Size, 1790 (sq. mileage) (3)	Share Frontier, 1790 (%) (4)	Miles of Shoreline / Size (5)	Initial Apportionment (6)
CT	37.3	1	5,543	0	0.11	Fixed (H); At-large (S)
RI	34.3	1	1,545	0	0.25	Fixed – Both
MD	20.0	32	12,407	0	0.26	Fixed – Both
DE	18.2	15	2,490	0	0.15	Fixed – Both
NJ	16.0	6	8,729	0	0.21	Fixed – Both
NH	9.4	0	9,350	0	0.01	White (H); Tax (S)
MA	7.2	0	43,969	63	0.11	White (H); Tax (S)
PA	7.1	1	46,055	49	0	Taxable Inhabitants
SC	5.6	43	32,020	0	0.09	Fixed – Both
VA	5.4	39	107,438	38	0.03	Fixed – Both
NC	5.2	26	53,865	0	0.06	Fixed – Both
NY	3.9	6	54,555	76	0.03	Voters (H); Freeholders (S)
GA	1.0	35	59,425	51	0.04	Federal Pop. (H); Fixed (S)

***Notes*:**
See Appendix Table A1 for state abbreviations. The size (Column 3) reported for each state reflects their territorial square mileage after the adoption of the US constitution. MA's and VA's measures include present-day Maine and West Virginia, respectively. Share Frontier (Column 4) measures the share of the state with fewer than 2 residents per square mile in 1790. *Miles of Shoreline to Size Ratio* (Column 5) is a state's miles of coastal shoreline divided by the state's square mileage.
In Column 6 (Initial Apportionment), H refers to a state's lower house, and S refers to a state's upper house. A fixed basis of apportionment refers to any representational system that does not reapportion at some prescribed period of time based on some population demographic. In the cases in which the apportionment was based on taxation, this usually referred to taxes on polls and closely resembled apportionment based on adult male population (both white and slave). The representatives to Connecticut's upper house were elected at large in a state-wide election. Apportionment to Georgia's lower house was based on federal numbers: white population plus 3/5th of non-white population.

Sources: Bureau of the Census, *A Century of Population Growth* (1909, Table 1, p. 9), 1790 US Decennial Census, Atlas of Historical County Boundaries, U.S. Congressional Districts, 1788-1841 (1978), PRISM Climate Data, Thorpe (1909).

Appendix D – Measuring Political Inequality – Relative Representation Index (*RRI*)

In Appendix D, we detail how this measure of political inequality – *Relative Representation Index* (*RRI*) – is constructed. To measure the extent of political inequality due to the initial choice of the basis of state legislative representation, county population data is combined with each state's electoral laws on the number of representatives and senators apportioned to each county. Using US Census data at the county level and each state's basis of apportionment, we are able to estimate the number of adult white males (AWM) per representative and senator in the state legislature for each county in each of the original thirteen states at ten year intervals from 1790 to 1850. These values for each county for each measure – county apportionment of members of the lower house (HOUSE) per county population of AWM of the state legislature and county apportionment of members of the upper house (SENATE) divided by the county's AWM for each state legislature – are transformed into a relative measure of representation for each county for each variable. Thus, for each original state from 1790 to 1850, a county value for HOUSERRI and SENATERRI is estimated based on the number of senators and representatives each county is apportioned per AWM in the county relative to the state mean. For each county, a variable called, *RRI*, is generated that represents the average of HOUSERRI and SENATERRI. Any value that is greater than 1 indicates that this county is over-represented, relative to the state mean, in the state legislature. A value of less than 1 indicates relative under-representation (or less representation than their AWM population deserves under equal representation). The log of this resulting variable, which we call *RRI*, is the variable used in the empirics to measure the effects of political inequality across counties in this political institution.

The sources of each state's apportionment rules, which are necessary to estimate each county's *RRI* in each state every census decade from 1790 to 1850 are three-fold. If a state had a constitutionally-based apportionment basis, such as New Jersey's one senator per county, then this was the apportionment basis used to estimate, in this case, the SENATERRI for each county in that state while this basis existed. States that periodically reapportioned due to some demographic characteristic, such as apportionment based on white population, determined their electoral districts and the apportioned representation to each on scheduled, periodic basis in the legislature. In these cases, the state law for each state over time that stipulated, for example, how many delegates each county received, was used to estimate *RRI*. Most of these legislative acts for each state were located in the State Session Laws of the Library of Congress.

Determinants of Colonial RRI in 1775

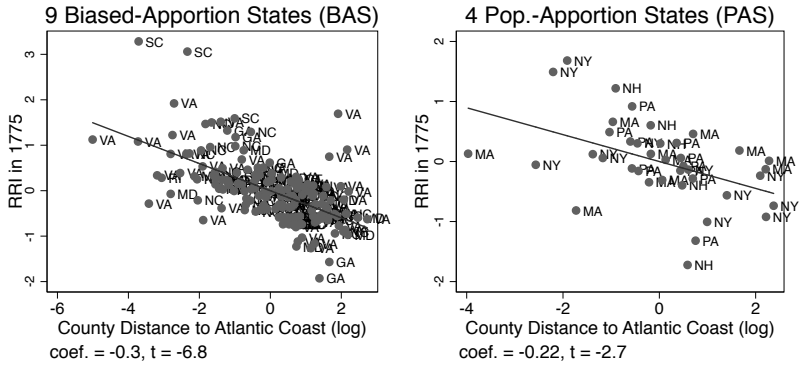
We showed in Figure 3a that colonial policy caused over-representation of the coastal areas in the colonial legislatures of each of the 13 original colonies. This was shown by measuring the direct distance of a county's

center (as it existed in 1775) from the Atlantic Coast. Colonial *RRI* in 1775 was shown to be inversely correlated with county distance from the coast. Continuing with a split sample in which the analysis was run separately on the 9 BAS and 4 PAS, we showed in Figure 3b that this relationship remained in the counties of 9 BAS but not in the 4 PAS in 1790. The basis of initial representation adopted in the post-colonial era continued to heavily favor the coastal areas in only the 9 BAS. In Figure D1, we show that this pattern persisted in the post-colonial period.

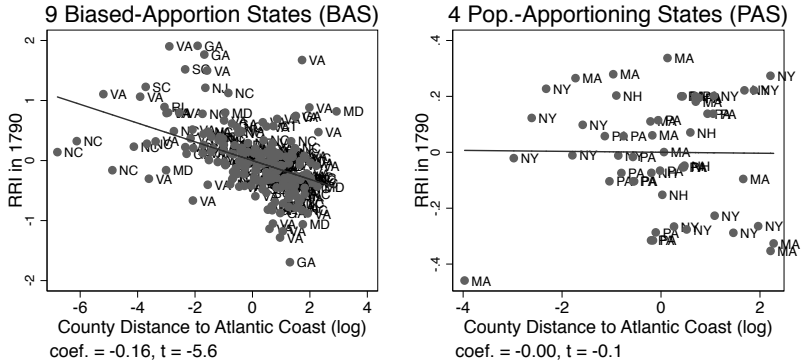
Systematically malapportioned representation was also carried over from colonialism to protect slave-owners from whites within their states who lived in areas unsuitable to large-scale profitable slavery. To capture county-level geographic suitability to profitably employing slave labor on a large scale, we measure a county's mean elevation as it existed in 1850. We do so by combining historical county boundaries with NASA's Shuttle Radar Topology Mission (SRTM) data, which measures elevation every 10 meters, to generate an extremely accurate measure of mean county elevation in each period. This geographic instrument alone is correlated with 26% of the variance across the counties of the 6 slave states in the share of their population enslaved in 1850. In Figure D2, we show that mean county elevation is strongly inversely correlated with county representation (*RRI*) in the colonial legislatures of both the 9 BAS and 4 PAS. Following independence, this pattern persists in the 9 BAS (left); but the direction of the relationship is actually positive in the 4 PAS, and is weakly correlated.

Figure D1: County Distance to the Atlantic Coast and RRI

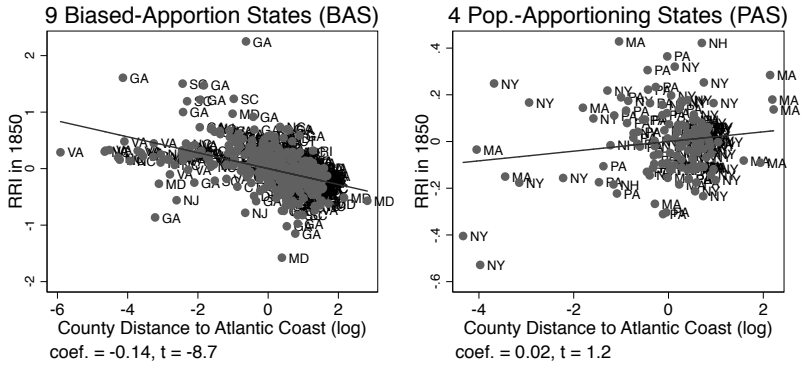
a) County Distance to the Atlantic Coast and Colonial RRI in 1775



b) County Distance to the Atlantic Coast and RRI in 1790



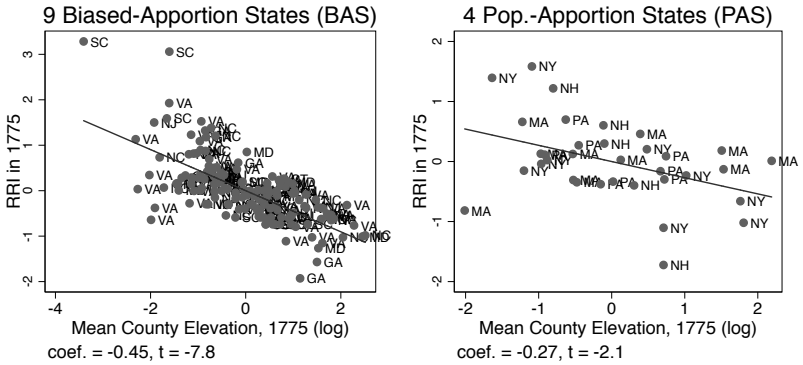
c) County Distance to the Atlantic Coast and RRI in 1850



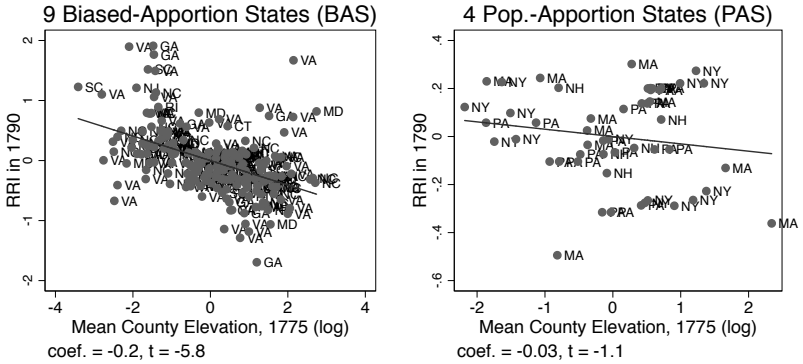
County boundaries as they existed in each year. Each model has state dummies.

Figure D2: Mean County Elevation and RRI over time

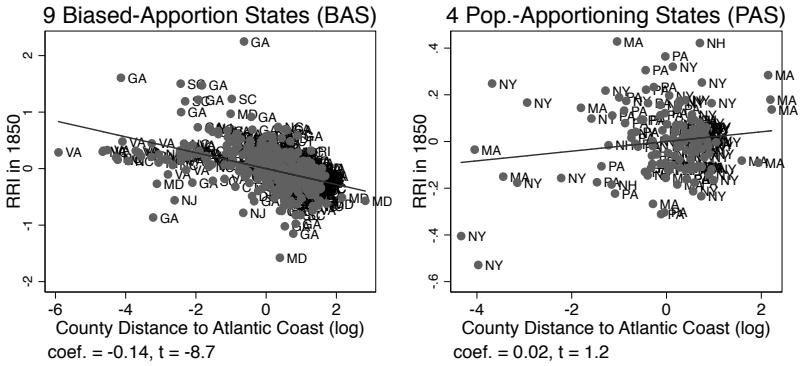
a) Mean County Elevation and Colonial RRI in 1775



b) County Distance to the Atlantic Coast and RRI in 1790



c) County Distance to the Atlantic Coast and RRI in 1850



Each model includes state fixed effects

We estimate the following interaction model, which is the previous models estimated over the entire sample of counties from the 13 states.

$$RRI1790 = B_S + B_1 DistanceCoast + B_2 BAS + B_3(DistanceCoast * BAS) + SFE$$

where B_1 measures the relationship between a county's distance to the Atlantic coast (in 1790) and its *RRI in 1790*. BAS is a dummy indicating whether the county is in one of the 9 biased-apportioned states. Our coefficient of interest is B3, which measures the difference in the relationship between the interaction of a county's distance to the Atlantic Coast if it is one of the 9 BAS and *RRI in 1790*. We expect B_1 to have no relationship and for the magnitude to be small. We expect B_3 to significantly inversely related to county distance to the coast. Table D1 shows that this is exactly what we observe.

Appendix Table D1 - Interaction Model of Pooled 13 Original States of the Split-Sample Models from Figure 3

VARIABLES	(1) RRI in 1790	(2) RRI in 1850	(3) RRI in 1850
Distance to Atlantic Coast in 1850 (log)		0.0207	
		(0.0173)	
FAS Dummy		1.684***	1.111***
		(0.278)	(0.191)
(Distance to Atlantic Coast in 1850)x(FAS)		-0.161***	
		(0.0236)	
Distance to Atlantic Coast in 1790 (log)	0.00825		
	(0.0298)		
(Distance to Atlantic Coast in 1790)x(FAS)	-0.163***		
	(0.0410)		
Mean Elevation in 1850			0.0464*
			(0.0239)
(Mean Elevation in 1850)x(FAS)			-0.222***
			(0.0292)
Counties	254	539	539
R-squared	0.391	0.270	0.329
State FE	YES	YES	YES

Notes: County distance to the Atlantic Coast is measured as the county boundaries existed in the year indicated. Mean County elevation in 1850 is measured as the county boundaries existed in 1850. See Table A2 and A3 for variable definitions and sources. Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Did the Colonial Basis Persist following Independence? Is this relationship RRI persistent in the 9 BAS? 4 PAS?

We showed in Figure 4 that the colonial basis of representation persisted in the 9 BAS and not in the 4 PAS. The evidence showed various post-colonial values for *RRI* regressed on the colonial *RRI* in 1775 run separately on the counties of the 9 BAS and 4 PAS. Here we run the following model on the entire sample of counties from the Original 13 states:

$$RRI1790 = B_S + B_1 DistanceCoast + B_2 BAS + B_3(RRI1775 * BAS) + SFE$$

where B_1 measures the relationship between *RRI* in 1775 and *RRI* in 1790 (the first post-colonial measure of *RRI*) in the 4 PAS. The coefficient of interest is B_3, which measures the relationship of the interaction of *RRI* in 1775 and the dummy variable indicating whether the county is a fixed apportion state (BAS) and *RRI* in 1790. We expect B_1 to indicate no meaningful relationship between the colonial *RRI* (in 1775) and the first post-colonial *RRI in 1790*. And, we expect B_3 to show a strong positive and large relationship between *RRI* in 1775 and *RRI* in 1790 in the counties of the 9 BAS. Table D2 reports the estimates of this model between the colonial *RRI in 1775* and the post-colonial *RRI in 1790* (Model 1), 1850 (Model 2), and 1950 (Model 3).

Appendix Table D2 - Interaction Model of 13 Original States of the Split-Sample Models from Figure 4

VARIABLES	(1) RRI in 1790	(2) RRI in 1850	(3) RRI in 1950
Colonial RRI in 1775	0.0537	-0.0111	-0.0263
	(0.0452)	(0.0588)	(0.0709)
FAS Dummy	-0.0396	0.0546	0.385**
	(0.0755)	(0.0890)	(0.186)
(RRI in 1775)x(FAS)	***0.650****	***0.294****	***0.197*****
	(0.0735)	(0.0738)	(0.0955)
Counties	209	213	202
R-squared	0.848	0.390	0.208
State FE	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Here we report the estimates that were discussed in the empircal section of the paper. To further measure persistence, we estimate the following specification to measure persistence of political inequality in county i:

$$RRI1850_i = B_S + B_1 RRI1790_i + B_2 BAS_i + B_3(RRI1775_i * BAS_i) + SFE + e_{Si}$$

The coefficient of interest is B_3, which measures the interaction of *RRI in 1790* and a dummy indicating whether the county is one of the nine biased-apportion states (BAS). We expect that the coefficient, B1, which measures the persistence of *RRI in 1850* in prior decades in the 4 PAS, to be statistically insignificant. Finally, each specification includes state fixed effects, and the standard errors are clustered at the state level. Table D3 shows the relationship when *RRI in 1850* is regressed separately on *RRI* for each decade from 1790 (Column 1) to 1840 (Column 5). As Table D3 indicates, the coefficient on the interaction of *RRI in 1850* and the dummy indicating whether county is in a BAS is statistically significant for every decade from the first census following the end of the colonial period. The coefficient on *RRI*, which measures persistence in the 4 PAS, only becomes statistically significant in 1830, and *RRI in 1790* actually has statistically significant inverse relationship with *RRI in 1850*. This is crucial, as it shows that this form of political inequality persisted throughout the antebellum era in the 9 BAS, but did not last in the 4 PAS.

Appendix D - Table D3: Persistence of *RRI* Over Time

	DV (Each Column): RRI in 1850				
	1790 (1)	1810 (2)	1820 (3)	1830 (4)	1840 (5)
RRI	-0.157** (0.054)	0.071 (0.041)	0.166 (0.124)	0.319** (0.124)	0.52** (0.172)
Fixed Apportion State (FAS)	-0.043*** (0.002)	-0.03*** (0.004)	-0.029*** (0.003)	-0.048*** (0.005)	-0.03*** (0.009)
***RRI* x FAS**	**0.481***** **(0.114)**	**0.38***** **(0.14)**	**0.41***** **(0.14)**	**0.4***** **(0.134)**	**0.4*** **(0.19)**
N (Counties)	258	375	408	452	498
R^2	0.31	0.43	0.51	0.6	0.68

Note: The DV in each model is *RRI* in 1850. The variable of interest in each model is the interaction of county *RRI* and a dummy variable measuring whether the county is in a Fixed- Apportion State (FAS), in which column 1 is *RRI in 1790*, column 2 is *RRI* in 1810, column 3 is *RRI* in 1820, column 4 is *RRI* in 1830, and column 5 is *RRI* in 1840. Each model is OLS with state fixed effects and robust standard errors clustered at the state level in parenthesis.

Why are Adult White Males (AWM) used as the only eligible voting population?

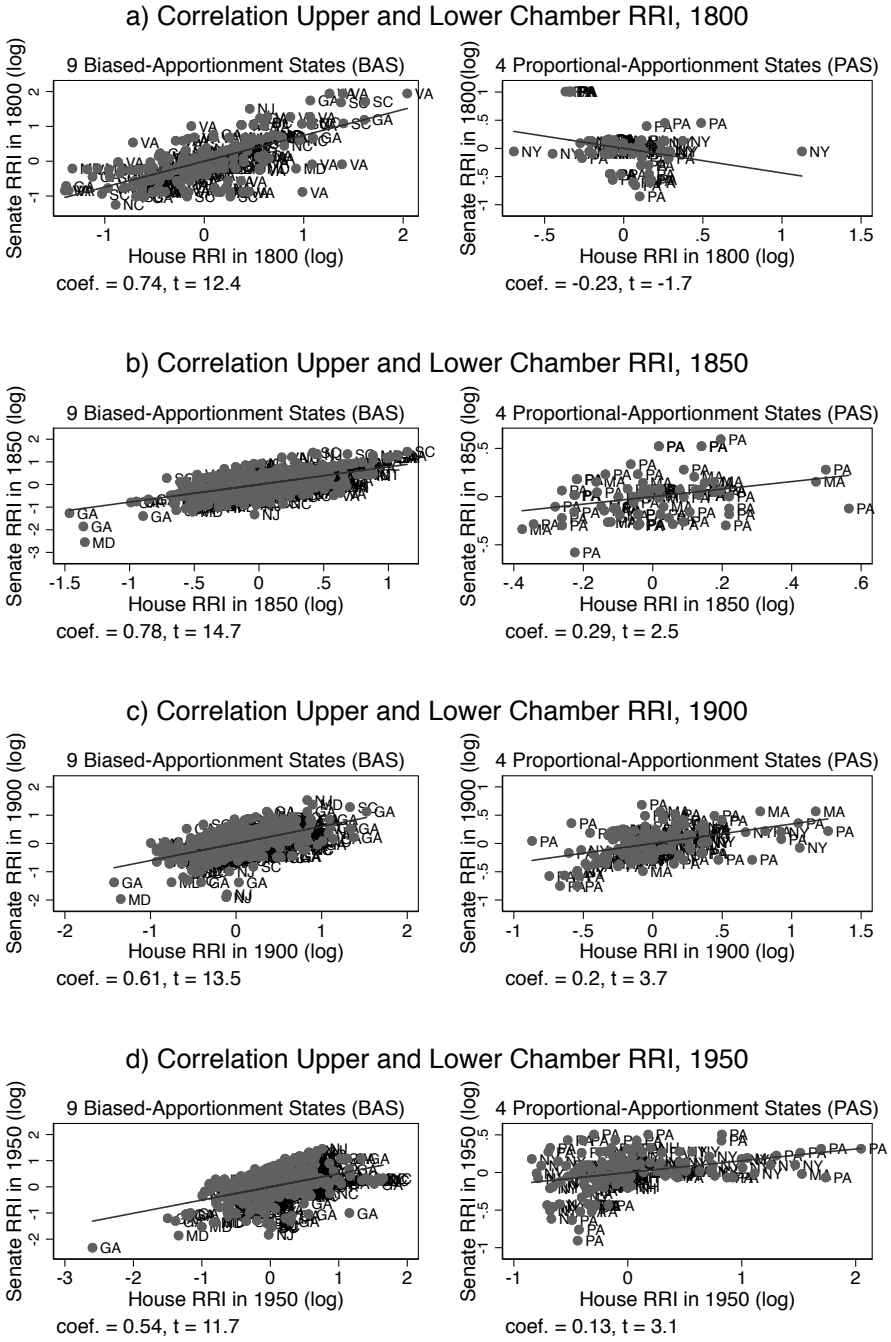
In this study, the relevant voting eligible population is assumed to be only adult white males (AWM). There are instances in which other demographics were eligible to vote to an extremely limited extent. For instance, in New Jersey from 1776 to 1807, widows of sufficient property were eligible to vote. In the few states that permitted free African-American males the right to vote, CT, MD and NJ eliminated this right by 1820. NC, PA, and NY soon followed suit in the next twenty years. Of the original 13 states, only MA, NH, and RI allowed black adult males the franchise (and RI had the highest economic requirements to voting in the US) in 1850 (Keyssar 2000: 55). No attempt is made to estimate the effect of free black males on this measure of political inequality. Doing so would not affect the results, as the total free black population of these states constituted 0.8%, 0.2%, 2.5%, respectively, of these three state's total population in 1850.

Do the upper and lower chambers represent systematically different sets of constituents?

As mentioned above, we follow Ansolabehere, Gerber and Snyder (2002) by using the average *RRI* across the upper and lower chambers for each county's value of relative representation. This approach may obscure the fact that elites may have structured representation in each chamber to represent different sets of elites (e.g., rural elites vs. urban industrialists) or constituents (e.g., lower house based on population and the upper representing some elite interests). Indeed, as reported above in column 6 of Table C2, many of the states used a different basis in each chamber. While six of the nine BAS states had a fixed basis in both chambers (Delaware, Maryland, North Carolina, Rhode Island, South Carolina and Virginia), the other three had a different basis by chamber. And, the formulas used for the fixed chamber mostly persisted for the nearly 200 years of our study. For instance, the fixed formulas in New Jersey (1 senator per county), Connecticut (1 or 2 representatives per town), Rhode Island (1 senator per town) remained unreformed until the 1964 Supreme Court ruling.

Yet, as we now show, in practice over(-under)representation in one chamber predicted to a significant degree whether a county was over(-under)represented in the other. This can be seen in Figure D3, which plots the county-level measure of *RRI* in one chamber (House RRI on the x-axis) versus its same value in the other chamber (Senate RRI on y-axis) over fifty year intervals between 1800 and 1950. The left plot for each year shows the results for the counties of 9 BAS and the right for the 4 PAS. As we are pooling counties across states, we include state fixed effects in each model. Given that we know that an over(under)represented county tended remain over(under)represented throughout the period of study, these models show that this bias largely occurred in both chambers.

Figure D3: Representation in Upper vs Lower Chambers



Each model includes state fixed effects

Appendix E: Public-Education Spending in the Antebellum Era

Appendix E provides further details regarding patterns of public spending on education in the antebellum era. This section also provides empirical support for numerous claims made in the paper. We show here that our estimates from Equation - the primary evidence that RRI affected public goods provision - are robust to including voter turnout. Go and Lindert (2010: 20) find that higher voter turnout among AWM in presidential elections at the county level is positively correlated with education spending at the county level in the North, but not in the South (while noting that Southern turnout was nearly as high as in the North). County-level variation in turnout is more likely to be correlated with variation in public education funding in the North because a much greater share of Northern funding occurred at the local level (see Table E2, Column 3). To control for the possibility that turnout affected spending, in each specification presented in this paper, a variable measuring the average share of AWMs whom turned out to vote in the 1848 and 1852 presidential elections was included. This variable does not affect the statistical significance or magnitude of the *RRI in 1850* coefficient. The inclusion of presidential voting data, however, would omit all data from SC data (as it selected its electoral college electors in the state legislature) and various other counties with missing data.

Of the total amount of public subsidies to education in the 13 Original States in 1850, as measured by the 1850 Census, roughly 70% were financed by local-level taxation. Yet, this overall figure obscures the variation across and within states in spending that existed in the share of public subsidies derived from local sources in 1850. The 18 counties (out of 541) in which there was an urban area with at least 20,000 inhabitants spent more than 40% of the total local public education spending in these 13 states in 1850. Yet, only 21% of the white school-aged population resided in these urbanized counties. The vast majority of the white school-aged population lived in rural areas in each of these states, and the more rural the county the greater the likelihood that the county's education revenues came from state sources. The average county value for the share of public spending deriving from local sources in 1850 across the counties was only 40% (compared to the overall share of 71%). Yet, only 40% of the total school-aged population lived in a county that derived a majority of its funding from the state. A clear distinction here occurs across the slave and non-slave states, and to be more precise between the fixed and non-fixed apportion states. In the six slave states, only 71 counties out of 363 had more public spending come from local sources than state sources. In the non-slave states, 140 of 179 counties did. Yet, more than half of counties in the three non-slave, fixed apportion states financed a majority of their public education spending at the state level (19 out of 33 counties). By comparison, in the four non-slave, non-fixed apportioning states, only 20 out of 146 counties received a majority of their public education funding from the state level. The exact proportion for each

Table E1 – Robustness Check with Election Turnout

DV (each Column): County Educ. Spending per White Cap, 5-19, from State Sources, 1850

VARIABLES	(1) 9 FAS	(2) 4 RAS
RRI in 1850 (log)	0.497***	-0.0449
	(0.154)	(0.232)
Urban Pop. Share, 1850 (log)	-0.0454	-0.0104
	(0.0628)	(0.0327)
Share Wh. Foreign Born Pop., 1850 (log)	0.0380	-0.118
	(0.0792)	(0.0915)
Land Inequality, 1860 (log)	0.628**	-0.512
	(0.282)	(0.369)
Manufacturing Cap. Per White Pop (log)	-0.0236	0.0718
	(0.0295)	(0.0972)
White Pop. Density, 1850 (log)	0.0559	-0.0242
	(0.0725)	(0.103)
White Adult Illiteracy Rate, 1850 (log)	0.148	-1.154
	(0.293)	(0.817)
Pop. Slave Share, 1850 (log)	0.0733	
	(0.0706)	
Avg. Presidential Turnout (1848 and 1852)	0.000749	0.000939
	(0.00419)	(0.00438)
Observations	279	144
R-squared	0.610	0.647
State FE	YES	YES

Note: Includes county-level Presidential Turnout in the 1848 and 1852 Presidential elections as a robustness check (Go and Lindert 2010). SC selected its presidential electors in the state legislature and therefore has no observations.
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

subset in which a county derived a majority of its public education revenues at the state level (in 1850) is: in the 9 FAS (311/396); in the 4 RAS (20/146). These 146 counties in the 4 RAS comprised 62% of the white school-aged population and 80% of the publicly financed education spending in 1850 in the original 13 states (Table E2, Columns 6, 7).

Appendix E-Table E2. Education Spending in the Original 13 States, 1850

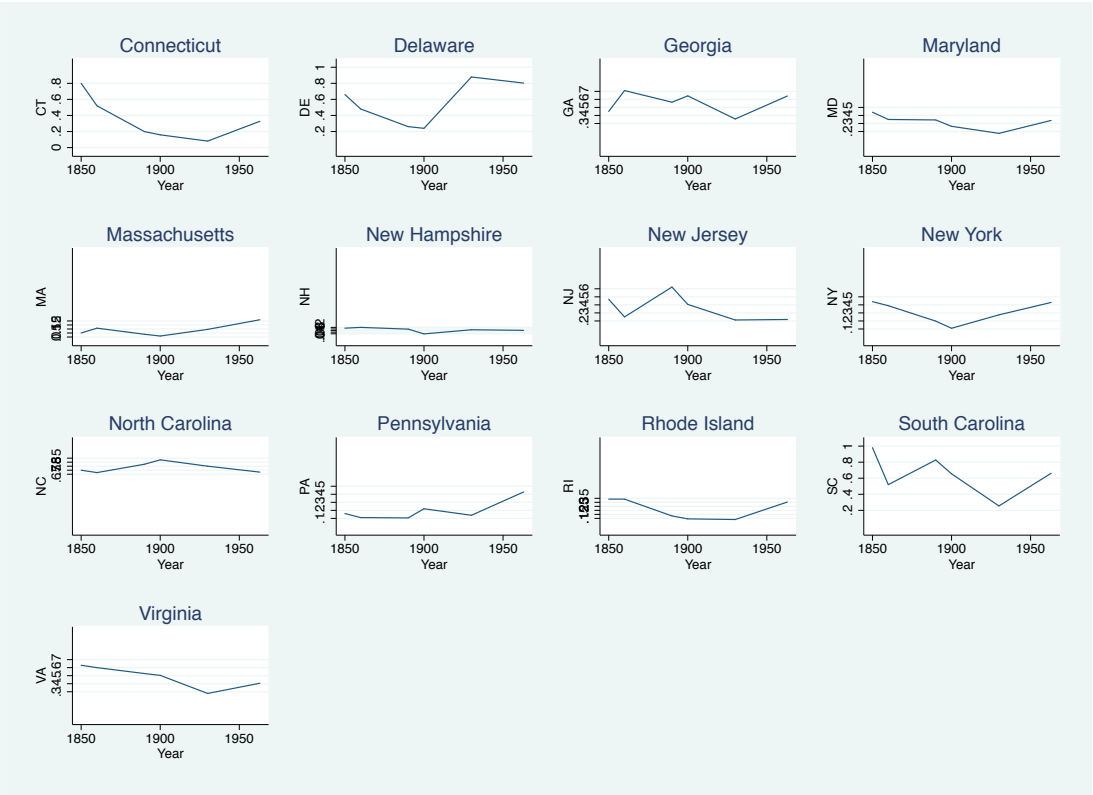
	1	2	3	4	5	6	7
	Total Education Spending per White Pop., 5-19 ($)	Public Spending Share of Total Education Spending (%)	Share of Public Education Spending at State-Level (%)	CV of Within-State Public Educ. Spending per White Pop., 5-19	Share of State White Pop, 5-19, residing in majority state-level public educ. counties (%)	State Share of Original 13 States White Pop., 5-19 (%)	State Share of Original 13 States Public Education Spending (%)
Fixed Apportion, Slave States							
DE	4.09	39	66	0.1	100	0.7	0.9
GA	1.84	10	45	2.13	77	5.9	0.8
MD	3.82	29	44	0.67	46	4	3.2
NC	1.8	37	69	1.17	92	5.9	3
SC	4.66	8	97	1.86	92	3	0.8
VA	2.05	17	58	1.93	88	9.4	2.4
AVG (1-5) / Totals (6-7)	**3.04**	**23.3**	**64.3**	**1.31**	**82.5**	**28.9**	**11.1**
Fixed Apportion, Non-Slave State							
CT	3.77	47	80	0.11	100	3.1	4.2
NJ	3.16	28	47	0.43	39	4.5	3
RI	3.48	60	34	0.38	23	1.2	1.9
AVG (1-5) / Totals (6-7)	**3.47**	**45**	**53.7**	**0.31**	**54**	**8.8**	**9.1**
Non-Fixed Apportion, Non-Slave States							
MA	4.69	69	4	0.4	0.4	8.3	20.7
NH	2.12	72	10	0.23	0	2.9	3.3
NY	2.34	57	43	0.29	38	28.4	28
PA	2.56	63	14	0.37	0.6	22.6	27.7
AVG (1-5) / Totals (6-7)	**2.93**	**65.3**	**17.8**	**0.32**	**10**	**62.2**	**79.7**
Original 13 Averages	**3.11**	**41.2**	**47**	**0.78**	**53.5**		

Source: US Decennial Census, 1850.

Notes: State abbreviations are in Appendix-Table A1. Column 1 reports the state average of total public and private education spending per white capita, age 5 to 19 in 1850. Column 2 reports the share of total education spending (Column 1) funded with public revenues. Column 3 reports the share of public education spending in each state that occurred at the state level in 1850. Column 4 reports each state's Coefficient of Variation (CV) of county public education spending per white capita, aged 5 to 19 in 1850. A higher CV, which is the standard deviation of county public spending per capita divided by the mean of county public spending per white school-age capita, indicates that this state has more within state variation in public spending per white capita across the state's counties. Column 5 measures the share of a state's white school age population living in a county in which a majority of its public education revenues were derived from state-level sources. Column 6 reports the share of the total white school-age population in the Original 13 states residing in each state in 1850. Column 7 reports the share of total public education spending of the Original 13 states in 1850 that was spent in each of each of these states.

Figure 6 of the paper showed that within 9 BAS, early development of a centralized system of public funding tended to persist. Figure E1 shows each state's share of public education revenues derived from state sources. This persistence of state-level spending in the former slave states is central to argument that state malapportionment had large long-term effect on educational and development outcomes.

Appendix E-Figure E1 – State Share of Public Education Revenues, Individual States (1850-1963)



Notes: Each plot shows the share of total public education revenues financed at the state level for each state in the years: 1850, 1860, 1890, 1900, 1925, and 1963.

Sources: Decennial Federal Census, 1850, 1860. Report of the Commissioner of Education, 1890. 1900. Biennial Survey of Education, 1924-1926. Statistics of State School Systems, 1963-1964.

Go and Lindert (2010) argued that there were differences across the regions of the US, as well as across rural versus urban areas, in the production function of education during the antebellum era. Specifically, they argued that the rural North (mostly involving states and counties that entered after the original 13) were able to provide more public school teachers per white school-age inhabitant at lower public expense, as they employed more female teachers (2010: 7). While we primarily control for this possible confounder by examining the relationship between *RRI in 1850* and state-level spending on public education within each region of the original 13 states (and by including state fixed effects), it is also instructive to look at the relationship between state-level public spending and *total* (state and local) public education spending and public school teachers per white youth. If variation across counties in state-level public education spending did not meaningfully and significantly explain variation across counties in total public education spending and the production function of provisioning education (i.e., teachers per white school-age capita), then the findings presented above would not be very important. Instead, as Table E2 shows, when state-level public education spending per white school-age youth, our previous dependent variable, is used as explanatory variable (along with same covariates in Model 2 above), the coefficient on state-level spending per white youth is statistically significant at the 99% level in the 9 FAS for both dependent variables: total public (state and local) education spending per white school-aged youth in 1850 and public school teachers per white school-age youth in 1850. The coefficient on state-level public education spending per white school-age capita in 1850 is not statistically significant for either of these two dependent variables in the 4 RAS.

Appendix E – Table E3 – 1850 Public Education Robustness Tests

Panel A

VARIABLES	(1) 9 BAS	(2) 4 PAS	(3) 9 BAS	(4) 4 PAS
log_RRI_1850	**0.748*** **	**0.175**	**0.123**	**-0.0955**
	(0.166)	**(0.193)**	**(0.117)**	**(0.172)**
N (Counties)	339	146	361	145
R-squared	0.575	0.516	0.319	0.689
Antebellum-era Controls	YES	YES	YES	YES
State FE	YES	YES	YES	YES

Models 1, 2: DV = *(log) County Educ. Spending per White Cap, 5-19, from* ***State + Local Sources****, 1850*
Models 3, 4: DV = *(log) County Public School (PS) Teachers per White Cap, 5-19, 1850*
Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Panel B

VARIABLES	(1) 9 BAS	(2) 4 PAS	(3) 9 BAS	(4) 4 PAS
(log) State Educ. Revenues per White, ages 5-19, 1850	0.827***	0.175*	0.269***	-0.0322
	(0.0642)	(0.100)	(0.0677)	(0.0724)
N (Counties)	308	144	308	143
R-squared	0.796	0.555	0.389	0.697
Antebellum-era Controls	YES	YES	YES	YES
State FE	YES	YES	YES	YES

Models 1, 2: DV = *(log) County Educ. Spending per White Cap, 5-19, from* ***State + Local Sources****, 1850*
Models 3, 4: DV = *(log) County Public School (PS) Teachers per White Cap, 5-19, 1850*
Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

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