The Great Revenue Divergence

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Abstract

This paper describes and explains a previously unnoticed empirical pattern in state revenue collection. As late as 1913, central governments in Western Europe and East Asia collected similar levels of per capita revenue as the rest of the world, despite ruling richer societies and having a long history of fiscal innovation. Only over the next sixty years did Western revenue levels permanently diverge. We argue that fiscally strong states require both a pressing demand for revenue and an existing supply of high-quality bureaucratic and political institutions. Neither factor in isolation will lead to sustained high levels of fiscal extraction. We formalize this insight in a simple model in which governments can respond to demand shocks by "building up" or "building down." This can explain low taxation and reliance on indirect taxes in both the nineteenth-century West and twentieth-century former colonies.

Keywords: Government revenues, Fiscal capacity, State capacity, War, Bureaucracy

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1 Introduction

On the eve of World War I, many political and economic advantages distinguished Western Europe from the rest of the world. Western European countries (along with the United States and Japan) were the world's leading military powers, controlled huge colonial empires, and had high per capita income relative to the rest of the world (Pomeranz, 2009). However, per capita *government* income tells a different story. Despite being poorer on average than the West, South American countries and some colonies collected per capita revenue levels similar to those in the West—and, frequently, their intake was higher as a percentage of GDP. For example, Denmark collected 44% less nominal central government revenue than Argentina, and only 20% more than Egypt and 24% more than Jamaica. Britain, noted for its long history of intensive taxation, extracted roughly the same level of per capita revenues as colonial Cuba. Many Asian and African countries lagged Europe, but even these differences were small by twentieth-century standards.

Large and sustained differences in government revenues between OECD countries and the rest of the world emerged only later in the twentieth century. Between 1913 and 1950, nominal per capita revenue in Britain increased by 560%—compared to increases of 42% in India and 62% in Jamaica. In France, nominal per capita revenue increased by 212%, compared to 53% in Madagascar and 64% in Tunisia. Neither divergent economic growth rates nor changes in price levels can explain these large differences. Given existing research on the importance of fiscal capacity for statebuilding and governance quality (Levi, 1989; Tilly, 1992; Besley and Persson, 2011), understanding why this divergence emerged and why it occurred so late is crucial for explaining broader political and economic differences across the world.

We identify this *great revenue divergence* using a new panel dataset of central government revenue, which includes data going back to the mid-nineteenth century with broad coverage across global regions—including numerous non-Western countries and colonies. To construct this measure, we combined largely unused data on central government revenue from Mitchell (1998) with historical exchange rates, gold prices, and population. The main contribution of our dataset is its spatial and temporal breadth: at least one year for 19 Western countries (including 16 with at least one data point in the nineteenth century) and 68 non-Western countries (28 in the nineteenth century). This contrasts with existing fiscal capacity datasets that include only or mainly European countries (Beramendi, Dincecco and Rogers, 2019; Dincecco, 2011, 2015; Karaman and Pamuk, 2013; Scheve and Stasavage, 2016), only the late twentieth century (International Monetary Fund,

2017), or only a cross-section for a particular year (Queralt, 2019). This combination of depth and breadth makes our dataset uniquely suitable for analyzing global historical trends in revenue levels.

Can the extensive literature on fiscal extraction explain the great revenue divergence? Some scholars propose what we call "demand-side" explanations that emphasize how some states have greater revenue extraction needs than others. Many analyze the effects of wars or international rivalries (Herbst, 2000; Centeno, 2002; Thies, 2004; Scheve and Stasavage, 2016), which increase the cost of proving security and create political conditions needed for increasing taxation. A related line of research argues that fiscal extraction stems from the greater demands placed on the state in countries with inclusive political institutions or ruling coalitions that favor higher spending (Beramendi, Dincecco and Rogers, 2019; Mares and Queralt, 2015; Andersson, 2018; Saylor and Wheeler, 2017). By contrast, what we call "supply-side" explanations emphasize the historical contingency of constructing effective extractive and information-gathering institutions (Brambor et al., 2020; Lee and Zhang, 2017), the difficulty of producing educated bureaucrats, and the necessity of strong political institutions that constrain the executive (Acemoglu, Johnson and Robinson, 2005; Dincecco, 2011, 2015). According to these authors, high levels of fiscal extraction require sustained investments in fiscal capacity that take time to be realized, and are highly persistent.

These families of explanations cannot answer two questions about the twentieth-century revenue divergence. First, why did it not occur earlier? After all, prior to 1914, Western countries had industrialized, colonized most of the world, enacted fiscal innovations (such as income taxes) based on rationalized bureaucratic structures, and instituted some democratic reforms. Reflecting this, many accounts of fiscal capacity expansion in Europe focus on institutional changes that occurred prior to the twentieth century (Tilly, 1992; Brewer, 1990; Dincecco, 2011). Second, why did taxation in non-Western countries continue to lag even after gaining independence? Many experienced international warfare or full democracy, which scholars propose as the main explanations for Europe's high levels of taxation.

Our main theoretical claim is that sustained high levels of central government revenue, in particular of modern fiscal sources such as income taxes, require the confluence of supply and demand factors. If demand is low, then there will be insufficient will for an active government regardless of the latent ability to raise revenues. The onset of war or franchise expansion changes this calculus, but states facing such a demand shock cannot develop an effective bureaucracy overnight. Absent information about citizens, meritocratic recruitment procedures for bureaucrats, and norms of compliance with state demands, rulers are unlikely to

be able to effectively collect income taxes, and will instead pursue predatory strategies to raise revenue in the short-term, such as promoting state-run monopolies.[1] We formalize this intuition using a simple formal model in which the government can make a fiscal capacity investment to either "build up" or "build down." If bureaucratic quality is low, then the government will respond to demand shocks by purposely *undermining* economic activity because this strategy improves its ability to collect revenue.

Several pieces of evidence support the empirical relevance of the supply/demand interaction. Despite vast differences in latent fiscal capacity, the relative dearth of intra-European wars between 1815 and 1914—a period that also predated modern welfare states—limited the demand for revenues. After 1914, this pattern was reshaped by the pressures of two world wars and a global depression. Europeans restructured their economies to fight total war and faced increased demands for social spending due to franchise expansion, the rise of labor and socialist parties, and the creation of welfare states. Their existing stock of political and fiscal institutions enabled them to meet these challenges and raise high levels of direct taxes.

The converse situation existed in most ex-colonies in the twentieth century. Despite high levels of war and democracy in some of these countries, the lack of precolonial fiscal infrastructure and the extractive institutions that Europeans created during colonial rule meant that these states had only a limited ability to collect direct taxes. This prevented most non-European countries from capitalizing on demand pressures, as European states had done several decades earlier. The inability of ex-colonies to tax effectively generated the large and sustained differences in revenue intake between Western Europe (and offshoots) and the rest of the world that we observe today. Japan and some other states in East Asia were able to meet this challenge because they had both high levels of demand for revenue and long histories of bureaucratic government. To further demonstrate that Europe's fiscal advantage arose from its combination of preexisting institutions and twentieth-century political crises, we also document changes over time in the proportion of revenue from customs and income taxes as well as present associational statistical evidence.

[1]Other working papers also contribute to understanding the interaction of supply and demand factors, albeit focusing on distinct theoretical mechanisms and empirical settings (Gottlieb and Hollenbach, 2019; Suryanarayan, 2019).

2 The Great Revenue Divergence: Trends Over Time

After briefly introducing our new data, this section provides graphical evidence of a great revenue divergence between Western Europe/East Asia and the rest of the world starting around 1914. It then compares the late onset of this revenue divergence with the earlier economic gap that had emerged between the West and the rest of the world, and with existing evidence on statebuilding in Europe. More details on the dataset, and on the robustness of the patterns to various technical problems, are given in the data appendix.

2.1 Introducing the Revenue Data

This paper uses an under-analyzed dataset to generate a new measure of central government revenue. We used data from Mitchell (1998) to construct the main measure, central government revenue per capita in the local currency. To do this, we translated fiscal years into calendar years to generate a data file measuring each country's annual revenues in thousands of local-currency units. Since exact population data in Mitchell's (1998) data is generally available only at census years, non-census years were estimated based on interpolating between censuses.[2] For this reason, revenue per capita cannot be estimated before the date of the first census, even when revenue data was available from an earlier date. We converted all currency measures to their equivalents in gold to generate a common scale for revenue levels.[3] This required constructing a new time series of historical exchange rates into pounds, and we then converted pounds into gold.[4] Relative

[2]We interpolated data between census years if the coverage gap was less than twenty years.

[3]We converted local currency units into British pounds. Correlates of War (COW) trade data (Barbieri, Keshk and Pollins, 2008) provide the main source for historical exchange rates. However, COW does not include data from before 1870 or from colonies (although most colonies used the mother country's currency). Additionally, since COW data uses market quotes, it exhibits frequent short gaps for smaller countries. To reduce this problem, we interpolated rates in cases in which the data coverage gap was less than five years and the difference in rates on either side of the gap did not exceed 5%. If the local currency was quoted in U.S. dollars, we then converted the rate into pounds using the current U.S. dollar-British pound exchange rate. We further supplemented the COW data using Denzel (2010) and Officer (2016).

[4]The last step is unnecessary for cross-national comparisons, but it reduces problems in data visualization stemming from the volatility of the pound. We converted revenue in British pounds to gold using the gold prices from Green (2016).

world currency prices have fluctuated violently since the end of the Bretton Woods system. For this reason, we only analyze pre-1971 data. We also excluded country-years with non-convertible currencies.[5]

Our revenue variable advances existing quantitative data on fiscal capacity in both geographical and chronological coverage. The amount of data available is impressive, extending back to the early nineteenth century in Western Europe, the early twentieth century in Africa (including colonial years), and the late nineteenth century in most of the rest of the world. Specifically, the fiscal data include at least one year for 19 Western countries and 68 non-Western countries. Sixteen of the Western countries have at least one data point in the nineteenth century, as do 28 of the non-Western countries. Appendix Figure A.1 plots revenues over time for each territory in the dataset.[6]

Although more expansive data coverage provides an advantage, it also has three important limitations. First, we are unable to normalize by GDP in most of our results. Some existing work expresses revenue in gold (e.g., Dincecco, 2011), but most of the literature measures fiscal extraction using government revenue as a percentage of GDP (Thies 2004; Beramendi, Dincecco and Rogers 2019; although Saylor 2013 critiques this approach). Normalizing by GDP accounts for variation in wealth and price levels, but also carries an important disadvantage: country-years with reliable GDP data are more restricted than those with reliable revenue data and are skewed toward wealthy countries with high state capacity. Appendix Table A.1 and Figures A.2, A.5, and A.7 show similar findings when conditioning on GDP. Second, we cannot directly account for exchange rate effects or for differences in purchasing power, although Appendix Sections A.1

[5]Although we included some currencies with fixed exchange rates, we excluded currencies for which either published exchange rates bore no relation to market supply and demand, or the exchange rate fluctuated sharply from year to year. In many cases, this meant excluding periods of instability when a country's link to either gold or the dollar changed.

[6]Although we are not the first to use the Mitchell revenue data for historical analysis, our approach to weighting the data points enables us to incorporate considerably more information than used in existing sources. For example, Besley and Persson (2014) incorporate information only from 18 rich countries and compute an unweighted average over time. Consequently, they do not calculate revenue collection for poorer countries in the nineteenth or early twentieth centuries, nor do they make time-series cross-section comparisons across a broad country and time sample. Mann (1993, 358-401) analyzes Mitchell's data on Britain for the nineteenth century.

and A.2 discuss why these limitations are unlikely to affect the results. Third, we can only measure revenue at the national level, although Appendix Section A.3 discusses why subnational tax data would likely not exhibit a qualitatively different pattern.

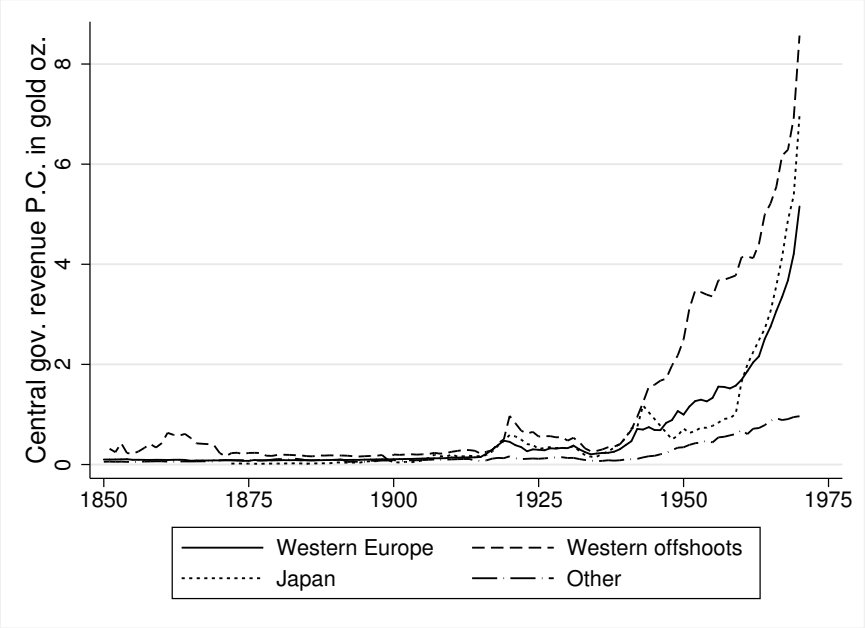
2.2 Graphical Evidence

Aggregate patterns. Figure 1 summarizes two main patterns. First, before World War I, different world regions exhibited roughly similar levels of revenue collection. Second, only afterward did a subset of nations—Western Europe, its offshoots (United States, Canada, Australia, and New Zealand), and Japan—clearly diverge from the rest of the world.[7] After 1914, many countries participated in the two world wars, a worldwide depression, geopolitical competition during the Cold War, and spent increased sums on redistributive policies following franchise expansion. Future OECD countries experienced a massive expansion in state revenue collection during this period, consistent with existing characterizations (Lindert, 2004). However, revenue collection stagnated in the rest of the world despite broad exposure to these international events and pressures. The country-by-country plots in Appendix Figure A.1 disaggregate these trends, and Appendix Table A.1 provides regression evidence that supplements the patterns shown in Figure 1.

Are these results the product of the unique features of our dataset, or our results not being normalized by GDP? Figure 2 replicates Figure 1 using data from Beramendi, Dincecco and Rogers (2019) and Andersson (2018) on revenue as a percentage of GDP. While there are noticeable differences between these authors' estimates, the overall pattern is clear. The relative rise of the West and of East Asia is in some ways more dramatic than in our data—a reversal of fortune rather than simply a divergence. The figure also illustrates the differences in coverage between our dataset and existing ones. Beramendi, Dincecco and Rogers's (2019) replication data includes only four non-OECD countries before 1920: Argentina, Brazil, Chile, and Uruguay, while Andersson (2018) includes seven additional Latin American countries and Japan. Relative to GDP, these Latin American countries had *higher* levels of fiscal extraction than Western countries in the late nineteenth century, but fell behind during the twentieth century. They, however, lack data on colonies and ex-colonies in Asia and Africa.

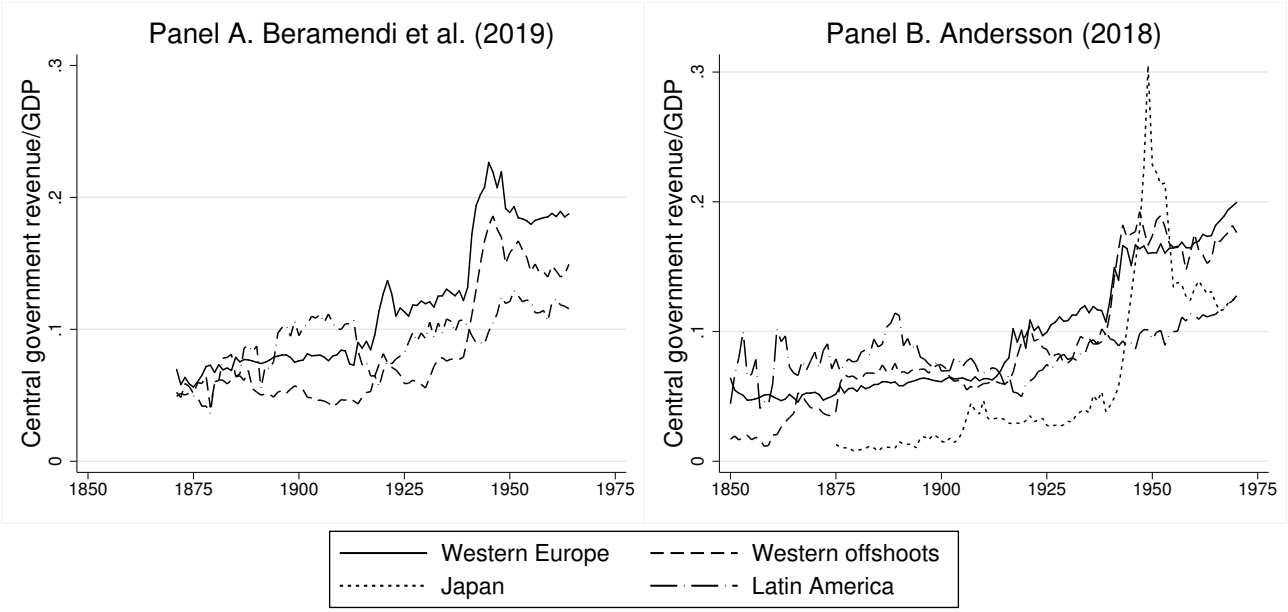
[7] Appendix Figure A.1 shows every country in the sample and its data coverage. Although available data from South Korea and Taiwan shows that the East Asian pattern is not limited to Japan, Figure 1 excludes them because each has numerous years with missing data in the mid-twentieth century.

Figure 1: The Great Revenue Divergence



Notes. The lines show estimated central government revenue per capita in ounces of gold, converted at nominal exchange rates.

Figure 2: The Great Revenue Divergence in Existing Datasets



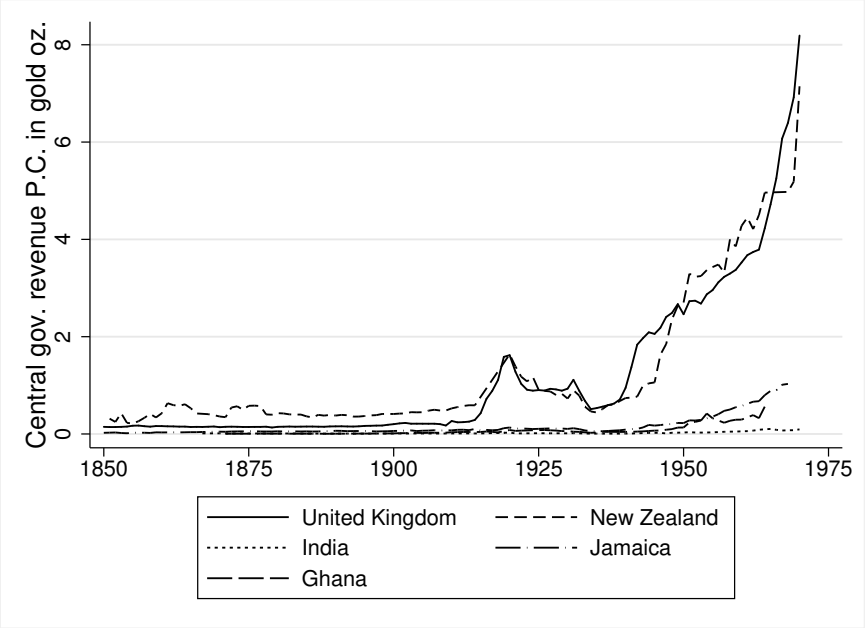
Notes. The lines show estimated central government revenue as a percentage of GDP using data from Beramendi, Dincecco and Rogers (2019) (Panel A) and Andersson (2018) (Panel B).

British Empire. Our measure aims to capture variation in the fiscal effort and fiscal capacity of governments, rather than changes in prices, exchange rates, or economic productivity. Using gold equivalents provides a consistent scale for per capita revenue figures, but using nominal exchange rates raises the possibility that longitudinal changes in revenue per capita may reflect changes in the foreign exchange market rather than changes in actual revenue. In the short term, the data exhibit many sharp changes that reflect currency revaluations. Figure 3 illustrates the growing difference between European countries and their colonies by showing changes in per capita revenue over time across five continents within the British Empire. This comparison has the advantage in that each country (except for India before 1899 and after 1947) used sterling or a currency pegged to sterling throughout the period, meaning that exchange rate fluctuations should not influence the results.

The figure shows that although New Zealand and Britain had higher levels of revenue per capita than the other major colonies in 1914, these differences were small by modern standards. Per capita revenue in Britain was slightly more than three times that in Jamaica, while by 1950 it was ten times as much. Even the modest early differences largely disappear after accounting for either income or purchasing power discrepancies. Appendix Figure A.2 normalizes the revenue amounts in Figure 3 using GDP and shows that Jamaica—a small, open economy mainly reliant on customs duties—extracted *more* resources per capita than the mother country after accounting for wealth differentials. We cannot directly account for differences in purchasing power, but this was almost certainly greater in the colonies. For example, in 1990, the purchasing power of a pound was 2.75 times higher in Jamaica than in Britain, and 3.66 times higher in India than in Britain.

However, a dramatic change occurred after World War I. Revenues in the self-governing parts of the Empire increased precipitously whereas the colonies were left behind. Between 1913 and 1950, per capita revenues in Britain increased by 560% compared to much smaller per capita increases of 42% in India and 62% in Jamaica. This divergence accelerated after World War II as colonies moved toward independence. Although many territories experienced large increases in revenue collection, none matched the stark expansion in Britain and New Zealand. Between 1913 and 1969, Britain's per capita revenue increased nearly tenfold compared to only doubling in India. Economic growth alone cannot account for these differences. Although per capita GDP in India had contracted in this period, by 8%, the British economy expanded only by 41% per capita (Bolt et al., 2018).

Figure 3: Revenue Trends in the British Empire



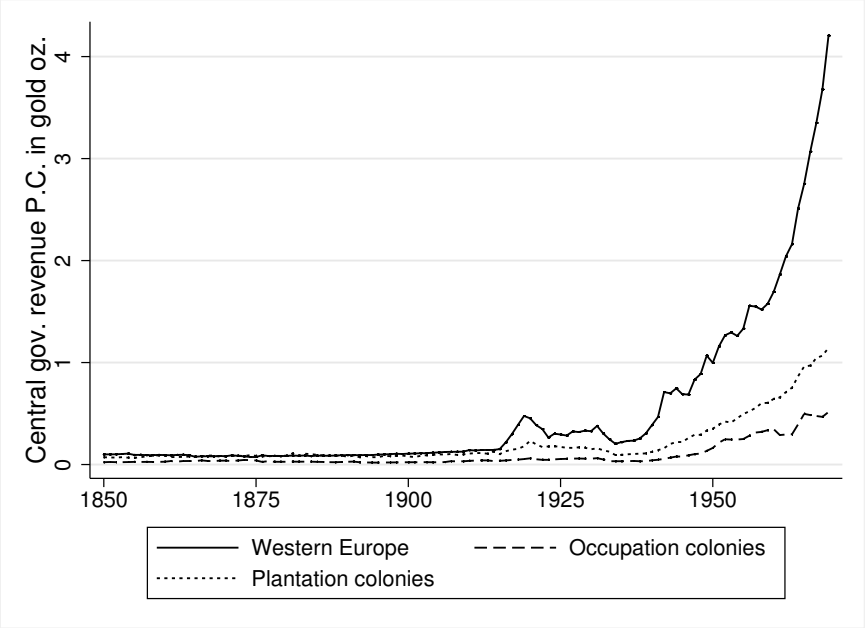
Notes. See Figure 1.

Additional comparisons. Figure 4 compares the revenue intake of Western European countries to their colonies, disaggregated into 12 colonies of occupation and seven plantation colonies.[8] Consistent with other ways of disaggregating the data, it shows that until World War I, Western European countries collected roughly the same level of revenues as its plantation colonies and not much more revenue than its occupation colonies. Furthermore, the gap did not become large and permanent until after World War II.

Appendix Figures A.4 through A.7 show evidence of revenue divergence within the French empire as well as among select other countries. Whereas several high-flying countries like France and Denmark exhibited a spike in revenue collection during and immediately after the two world wars, Brazil, Indonesia, and even Italy stagnated. Denmark's increase was less pronounced than Britain's during the two world wars—similar to much of Western Europe, which suffered negative direct effects of the war—but its post-1950 increases were even more dramatic. Whereas Denmark's per capita revenue was only 1.4 times Brazil's in 1913, this figure had ballooned to more that 17 times by 1969. In the decade before 1914, booming customs revenues

[8]This sample includes every colony with minimal missing data throughout the period. This sample excludes the British offshoot colonies and distinguishes occupation/plantation based on whether indigenous peoples or forcibly imported migrants composed a majority of the colonial population. Appendix Figure A.3 compares our pattern to that in Frankema (2010).

Figure 4: Comparing Western Europe to its Colonies



Notes. See Figure 1.

made Brazil one of the most fiscally successful states in the world. However, by 1969, Brazil collected a share of revenues relative to GDP closer to Madagascar than to Denmark.

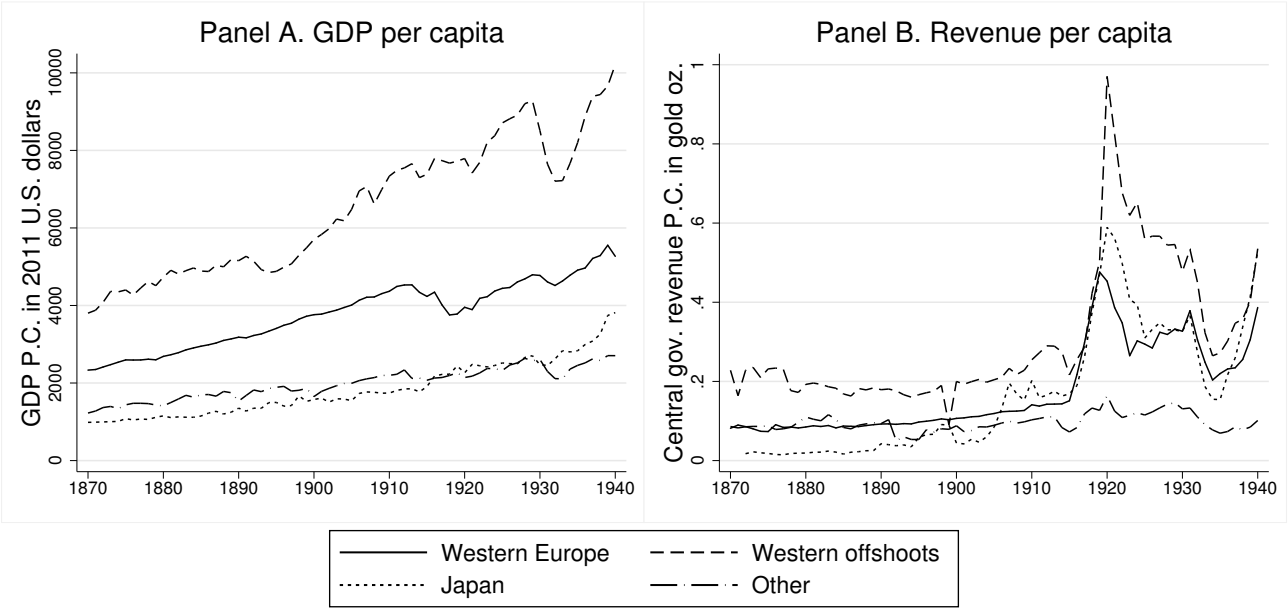
Participating in the two world wars accounts for much variation in the figures, as Scheve and Stasavage (2016) argue. However, world war participation is neither necessary nor sufficient for these historically unprecedented revenue spikes. Appendix Figure A.8 shows that every northern European country that stayed neutral in World War I (Sweden, Norway, Denmark, Netherlands, and Switzerland) experienced major revenue increases following the war, a period when their welfare states were expanding rapidly. By contrast, smaller and less enduring increases occurred in some World War I belligerents in southern and eastern Europe. For example, although the Italian state expanded during and after World War I—nominal revenue in gold increased by 70% from 1913 to 1930—neutral Sweden's revenue intake increased by 145% during the same period, eclipsing its slight fiscal disadvantage relative to Italy in 1913.

2.3 Timing of Divergence

The late timing of this revenue divergence in our data is surprising relative to (1) the timing of economic divergence and (2) existing discussions of statebuilding in Europe. First, when economic historians discuss

a "great divergence," they usually refer to the divergence in per capita economic output between Western and non-Western countries. Although scholars debate the timing and causes of this divergence, they agree it occurred no later than the mid-nineteenth century, after the Industrial Revolution had spread across Europe.[9] Figure 5 compares revenue trends to GDP trends between 1870 and 1940 using data from Bolt et al.'s (2018) update of Angus Maddison. Whereas large cross-national differences in GDP per capita were evident by 1870, government revenues in the West did not change sharply until World War I began. Therefore, the great revenue divergence postdates the great economic divergence by at least a half century, and probably more.[10]

Figure 5: When Did Divergence Occur? GDP vs. Revenue



Notes. Panel A shows per capita GDP estimates in constant 2011 U.S. dollars from Bolt et al. (2018), and Panel B shows estimated central government revenue in ounces of gold per capita converted at nominal exchange rates.

Second, the timing of revenue divergence also challenges conventional wisdom about statebuilding in Europe, which emphasizes the importance of pre-twentieth century developments. Brewer (1990), for instance,

[9] Appendix Section A.6 summarizes this debate.

[10] As noted above, there is limited coverage in GDP data outside of the West prior to the twentieth century. However, under the reasonable assumption that income per capita is negatively correlated with historical data coverage, the "Other" line is upwardly biased and underestimates the magnitude of pre-twentieth century differences.

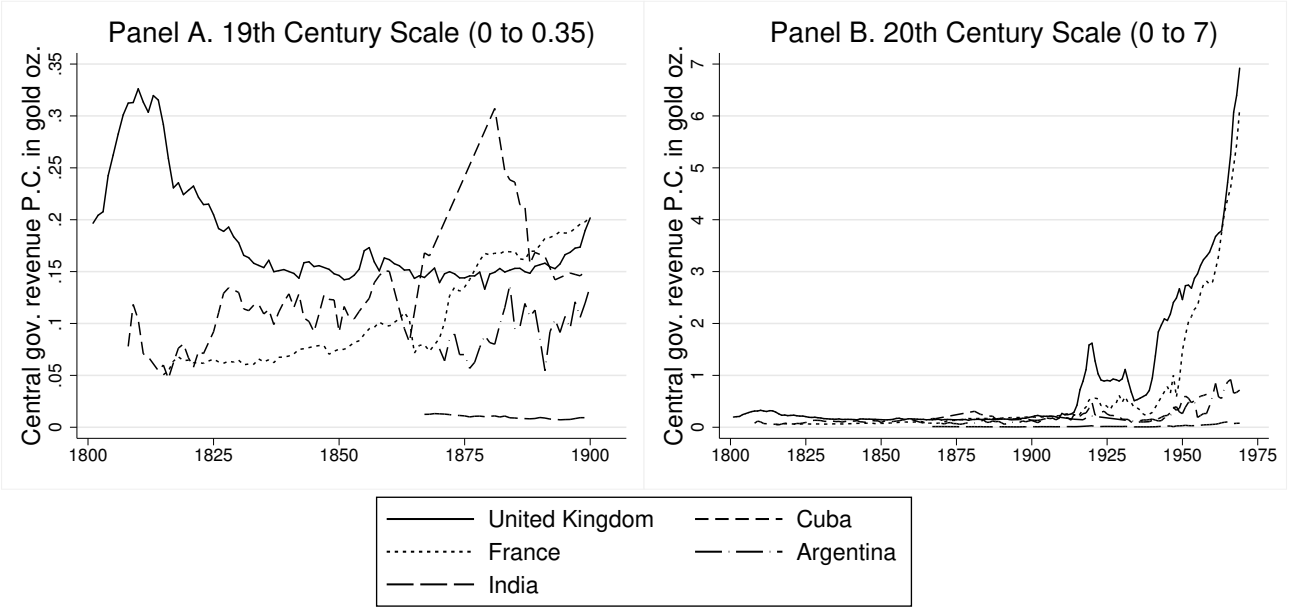
documents how the pressure of wars with France led Britain to develop a fiscally effective state during the eighteenth century, and Dincecco (2017, 69) shows that revenue collection in Britain and France greatly exceeded that in other major empires (Ottoman, China, Japan) at the end of the eighteenth century. Our data, which extend back to 1800 for several countries, replicate one important finding from these authors: Britain indeed experienced substantial early increases in state revenues, especially during the Napoleonic wars. However, our long and broad panel shows that the very large contemporary differences in revenue between Western and non-Western countries postdate this period.

Figure 6 compares per capita government revenue between Britain and several other countries. Panel A plots revenue between 1800 and 1900 and shows that although nominal per capita revenue increased by 60% between 1801 and 1814, it declined thereafter—even as Britain's economy grew rapidly and other territories experienced revenue increases. At the turn of the twentieth century, Britain enjoyed similar revenue intake as wealthy colonies such as Cuba and primary exporters such as Argentina, although it exceeded poorer colonies in Africa and Asia. Panel B plots revenue data for the same countries from 1800 through 1970 and shows that increases in nominal revenue in the nineteenth century were tiny compared to twentieth-century increases. Commensurate with the difference in magnitude between the nineteenth and twentieth centuries, the maximum value in the scale for Panel B is 20 times larger than that for Panel A. Using scaling appropriate for highlighting the twentieth-century great divergence, Britain's nineteenth-century revenue collection was miniscule—even during the Napoleonic wars.

3 Existing Research

Why did this revenue divergence occur in the twentieth century but not before? To answer this question, we build upon the rich existing literature on origins of fiscal capacity. We disaggregate existing theories based on whether they focus on the *supply* of bureaucratic institutions that enable revenue collection, or the *demand* for greater public spending. Although both perspectives yield important insights, neither can explain the twentieth-century revenue divergence. Instead, we explain why the conjunction of these two factors propels revenue gains.

Figure 6: When Did Divergence Occur? 19th vs. 20th Century Revenues



Notes. See Figure 1.

3.1 Demand

Demand-based theories of fiscal capacity focus on factors that create stronger preferences for central government revenues. The most important demand hypothesis in the literature is preparation for or participation in warfare. International wars often raise the state's need for revenue and create the necessary political consensus. Security is a high-demand public good, either to prevent invasion (Besley and Persson, 2011, 58) or because success in conflict is a core goal of rulers (Tilly, 1992). The positive relationship between international wars and statebuilding is conventional wisdom in explaining the rise of European states (Tilly, 1992; Brewer, 1990; Queralt, 2019). Other authors have made the converse point that less intense geopolitical competition in many ex-colonies in Sub-Saharan Africa and Latin America has yielded less effective statebuilding (Herbst, 2000; Centeno, 2002; Thies, 2004).

Warfare is not the only possible source of demand for fiscal capacity. High levels of political participation create incentives for higher taxation to fund public goods, as the median voter tends to be poorer under more expansive franchises (Meltzer and Richard, 1981). This political influence logic also implies that political changes that empower social groups favorable to higher public goods spending, such as industrial

elites, should lead to revenue increases (Karaman and Pamuk, 2013; Mares and Queralt, 2015; Saylor and Wheeler, 2017; Beramendi, Dincecco and Rogers, 2019).[11]

3.2 Supply

Western Europe differed in many ways from the rest of the world at the turn of the twentieth century. One crucial difference was its supply of bureaucratic institutions. In order to collect direct taxes, states must possess *information* about their citizens such as who they are, where they live, and what they earn (Kasara, 2007; Brewer, 1990). This requires bureaucratic institutions that can collect this information and enforce compliance. A state with low information capacity is thus likely to extract revenue through "shortcuts" to higher revenue levels such as indirect taxes, natural resource rents, and state-run monopolies.

Scholars have recently begun to measure states' information-collection abilities. Brambor et al. (2020) collect data on civil registration systems and state statistical offices while Lee and Zhang (2017) compare the effectiveness of censuses. Both show that government information collection was more accurate earlier in the West and in East Asia than in the rest of the world. For instance, Western Europe contained all 10 countries that introduced registration systems for births and deaths before 1850. Research on bureaucracies argues that "embedded" rationalized bureaucracies facilitate stronger states and economic development, and that such bureaucracies were more common in East Asia than in other developing countries (Evans, 1995). Similarly, Dincecco (2011, 2015) shows that centralized bureaucracies were necessary for increased taxation in early modern Europe.

Another key attribute of institutional supply is to constrain the executive from predating public funds. Examining European countries in historical perspective, North and Weingast (1989), Karaman and Pamuk (2013), and Dincecco (2015) argue for a link between constraints and taxation. Absent executive constraints, it is difficult to induce elites and other citizens to pay taxes, knowing that they might be used for corrupt purposes. Acemoglu, Johnson and Robinson (2001) establish the converse point: colonies without massive European settlement tended not to establish institutions that, after independence, effectively constrained the

[11] Others examine how non-tax revenues such as natural resources, foreign aid, and sovereign debt can substitute for tax revenues. Appendix Section A.7 reviews these theories, but argues that they are unlikely to help explain our main pattern.

executive.

The origins of cross-national differences in effective fiscal institutions and executive constraints are the subject of a vast literature that cannot be fully summarized here. Many argue that intense geopolitical competition in early modern Europe incentivized rulers to build fiscal capacity over time. This often required negotiations with nobles that, eventually, engendered parliamentary constraints. Thus, although supply institutions are difficult to manipulate in the short run, over the longer term, they are likely endogenous to demand pressures. However, in the twentieth century, it is useful to distinguish the supply differences that had emerged in previous centuries from the new demand pressures that arose in the early twentieth century.

3.3 Empirical Shortcomings of Existing Theories

Supply and demand theories of statebuilding each accurately describe conditions in Western Europe, neo-European offshoots, and East Asian states in the twentieth century. These countries have tended to experience frequent external warfare and/or strong popular pressure for welfare states, especially since 1914. Similarly, nearly all these countries have capable bureaucracies, strong executive constraints, and educated populations. Therefore, unsurprisingly, cross-national quantitative analyses and case studies consistently find evidence that various demand and supply factors positively correlate with revenue collection.

However, experiences outside these regions and before the twentieth century suggest that high demand or supply—in isolation—tends not to promote sustained fiscal extraction, in particular of high-yield tax sources such as income taxes. Many countries outside Western Europe experienced significant demand-side pressures but did not create fiscally strong states. For example, between 1940 and 1975, India fought in a world war under threat of invasion (during which it raised the largest volunteer army in world history), achieved independence alongside mass franchise expansion and an ascendent political elite strongly committed to social welfare measures, and engaged in multiple wars with Pakistan. Yet per capita central government revenue intake was 62 times higher in Western Europe than in India in 1970. Similar international pressures in the twentieth-century Middle East (Barnett, 1992) and nineteenth-century South America (Centeno, 2002) also failed to engender strong fiscal apparatuses. On the supply side, for most of the nineteenth century, Western Europe and the United States outpaced the rest of the world in terms of collecting information

about their citizens and professionalizing their bureaucracies (Brambor et al., 2020), imposing constraints on the executive, and educating their population. Britain even imposed the world's first successful income tax during the Napoleonic Wars (Dincecco, 2017). However, it suspended its income tax after the wars and did not match its previous high-revenue year (1810) until 1915.

4 Theory

Our main theoretical insight is that large-scale collection of flows such as income taxes requires *both* high demand for government services and high supply of bureaucratic institutions. If demand is low, then regardless of the latent ability to raise revenues, there will be insufficient will to overcome the resistance of taxpayers to high levels of taxation. The onset of war or franchise expansion changes this calculus. However, states facing a demand shock have two opposing options that existing theories of fiscal capacity usually do not consider simultaneously. Governments can either "build up" by investing to expand the tax base, or "build down" by exploiting the economy. Extant levels of institutional supply are important for this calculus. Governments cannot develop an effective fiscal bureaucracy overnight, which is necessary for high yields from direct taxes. Absent information about citizens, meritocratic recruitment procedures for bureaucrats, and norms of compliance with state demands, rulers are likely to pursue predatory and short-sighted means of raising revenues. A common tactic is to create easily taxed but economically inefficient government-owned monopolies. This may enable the government to exploit one-off windfalls or to collect customs revenues—for example, nationalizing industries or, earlier in European history, selling tax farming positions or defaulting on the debt—but not to collect sustained high levels of direct taxes over time such as income or value-added taxes. Empirically, the latter comprise most revenue in modern Western states.

4.1 Setup

To explicate the mechanism by which governments can respond to demand shocks by either building up or building down, we analyze a simple formal model. A government, G, decides whether to exert costly effort to restructure the economy, which we refer to as its fiscal capacity investment. This choice determines the percentage of citizens with legal rights to sell in the formal sector. Then, the government proposes a tax rate to each legal producer, who can either accept or exit to the informal economy.

Fiscal capacity investment. G's fiscal capacity investment affects the structure of the economy, which is populated by a group of citizens $i \in [0, 1]$ that are ex ante identical and atomless. The fiscal capacity choice determines the percentage of citizens with legal rights to sell in the formal sector, $L \in [0, 1]$. Initially, $L_0 \in [0, 1)$ percent of citizens have legal production rights. G pays a cost $c > 0$ if it chooses $L \neq L_0$, and otherwise pays 0. Costs of restructuring the economy could arise for numerous reasons, including money directly spent by the government to enact change as well as from the difficulties of displacing vested interests.

Taxation and production decisions. Each citizen has an endowment of 1. G proposes an individual-specific tax rate $\tau_i \in [0, 1]$ to each legal producer, who simultaneously respond by selling their endowment in the formal or the informal sector. Non-legal producers cannot engage in formal economic activities, and are not strategically relevant actors in the game. For any producer, selling in the formal sector yields consumption $1 - \tau_i$ and selling in the informal sector yields consumption e_i. This economic exit option is individual-specific and is independently drawn for each citizen from a smooth density function $F(e_i)$ with positive support on $[0, 1]$.

G has complete information about the value of the economic exit option for $v(\cdot) \in (0, 1)$ percent of legal producers, and is completely uninformed for the remaining $1 - v$. We respectively refer to two groups of producers as "visible" and "hidden" citizens. Two variables affect the percentage of legal producers that are visible: L, and bureaucratic quality, $b \in [0, 1]$. We make three key assumptions about $v(L, b)$.

Assumption 1. $\dfrac{dv}{db} > 0$ **Assumption 2.** $\dfrac{dv}{dL} < 0$ **Assumption 3.** $\dfrac{d^2v}{dLdb} > 0$

The key idea behind Assumption 1 is that higher-quality bureaucracies are better at gathering information about production. For Assumption 2, governments face greater difficulties to monitoring production in more competitive markets. For Assumption 3, higher-quality bureaucracies mitigate the challenge of collecting production information in more competitive markets (Appendix B provides more motivation for these assumptions). We also impose several additional technical assumptions to close out the model: $v(\cdot)$ is smooth in its arguments; two Inada-type restrictions, $\frac{dv}{dL}\big|_{b=0} = -\infty$ and $\frac{dv}{dL}\big|_{b=1} = 0$; and $\frac{d^2v}{dL^2} < 0$.

G's only source of consumption is government revenues, which equal the sum of taxes collected from formal-sector producers, R, times the value of revenues, α, minus any costs paid for changing fiscal capacity:

$R \cdot \alpha - \mathbf{1}_{L_G \neq L_0} \cdot c$, for an indicator variable $\mathbf{1}_{L_G \neq L_0}$ that equals 1 if $L_G \neq L_0$ and 0 otherwise. Thus, α expresses demand for revenues.[12]

4.2 Analysis

The main result from the model is that demand shocks cause the government to "build up" the economy to raise revenues if bureaucratic supply is high, but "build down" if bureaucratic supply is low. To see why, we solve backwards, starting with the taxation interaction.[13] The government can price-discriminate in its tax rate for visible producers by holding them to their reservation value from exiting to the informal sector, hence taxing at $1 - e_i$. This induces every visible citizen to produce formally and generates an average tax yield of $\int_0^1 (1 - e_i) \cdot dF(e_i)$ from the $L \cdot v(L, b)$ percentage of citizens that are both visible and legal producers. By contrast, the government cannot price-discriminate for citizens that are legal producers but hidden because it does not know their reservation value. Instead, the government offers the same tax rate to each, chosen by balancing two considerations. On the one hand, a higher tax rate generates a higher yield from every hidden citizen that produces in the formal sector rather than exits. On the other hand, a higher tax rate causes more hidden citizens to exit. We denote the optimal tax rate for hidden citizens as $\hat{\tau}$, and the average yield from the $L \cdot \big[1 - v(L, b)\big]$ percentage of citizens that are both hidden and legal producers is $\int_0^{1-\hat{\tau}} \hat{\tau} \cdot dF(e_i)$.[14] And, G collects no revenue from the $1 - L$ citizens that lack legal production rights. Thus, total revenues equal:

$$R^*(L) = L \cdot \Bigg[\underbrace{v(L, b) \cdot \int_0^1 (1 - e_i) \cdot dF(e_i)}_{\text{Revenues from visible producers}} + \underbrace{\big[1 - v(L, b)\big] \cdot \int_0^{1-\hat{\tau}} \hat{\tau} \cdot dF(e_i)}_{\text{Revenues from hidden producers}} \Bigg] \tag{1}$$

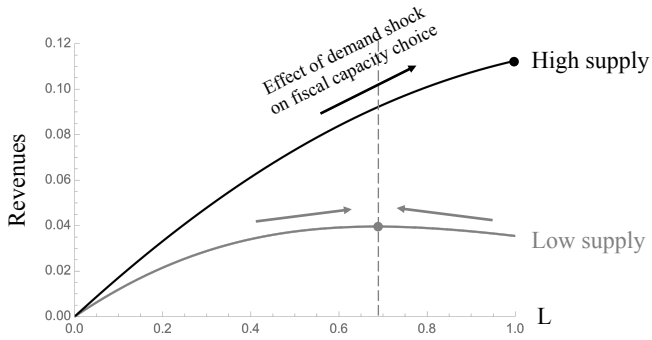
Figure 7 plots this function for governments with either high (black curve) or low (gray) bureaucratic supply. Unsurprisingly, given the information discrepancy between visible and hidden citizens, $\int_0^1 (1-e_i) \cdot dF(e_i) > \int_0^{1-\hat{\tau}} \hat{\tau} \cdot dF(e_i)$. Higher b increases revenues by increasing the percentage of visible citizens (Assumption 1), as the figure shows (also see Lemma B.1).

[12] Optimal behavior would be unchanged if producers enjoyed any consumption from government revenues (e.g., in the form of a public good).

[13] Appendix B presents and proves accompanying formal statements.

[14] This solves $\hat{\tau} \equiv \arg \max_{\tau \in [0,1]} \int_0^{1-\tau} \tau \cdot dF(e_i)$.

Figure 7: Interacting Supply and Demand



Notes: Figure 7 plots Equation 1. For the black curve, $b = 0.9$. For the gray curve, $b = 0.3$. The assumed functional forms are $v(L, b) = \frac{1}{1+e^{-(\beta_L \cdot L + \beta_b \cdot b + \beta_{Lb} \cdot L \cdot b)}}$ and $F(e_i) \sim U[0, 1]$. The fixed parameter values are $\beta_l = -2$, $\beta_b = 1$, and $\beta_{lb} = 1$.

The interesting new result arises from examining the interaction between b and L. There are two countervailing effects of L on $R^*(L)$, formalized in Lemma B.2. The direct effect of L expands the tax base by creating more legal producers. But, indirectly, L decreases the percentage of visible citizens because the economy is more complex (Assumption 2). The overall effect depends on b (Lemma B.3). Following from Assumption 3, if b is high enough, then the direct effect dominates and $R^*(L)$ strictly increases in L. By contrast, for lower b, the indirect effect dominates for high-enough L, and therefore the relationship between L and $R^*(L)$ is inverted U-shaped. Only governments with good institutions can harness the potential revenue benefits of a more competitive economy. Thus, for high-b governments, $L = 1$ maximizes revenues, whereas for low-b governments, the optimal amount is lower.

These considerations dictate G's optimal fiscal capacity strategy (Propositions B.1 and B.2). A demand shock, i.e., higher α, decreases the opportunity cost of exerting effort to restructure the economy. But, for the reasons just discussed, demand shocks can cause G to either build up or build down. If, for example, $L_0 = 0.9$ for the government in gray in Figure 7, then a demand shock will yield an equilibrium *decline* in fiscal capacity. Of course, in this simple model with only a single period, low-supply governments are indeed maximizing revenues despite pursuing an economically inefficient fiscal strategy. However, under any reasonable way of modeling evolution over time, these inefficient fiscal strategies will be unproductive over the long term. For example, if there is learning-by-doing from collecting income taxes from a diversified and competitive economy, then b would increase over time for governments that react to demand shocks by increasing L, whereas it would not for governments that predate the economy to raise revenue.

This conditional result differs from existing theories, which do not consider how high demand can cause *either* beneficial or inefficient fiscal capacity investments. For example, in Besley and Persson's (2011) formal model, a government decides whether to invest to increase the state's ability to collect future income taxes, i.e., either beneficial or no investment. The optimal choice is contingent on the likelihood that future governments will choose to provide public goods—as opposed to private transfers—which depends on the value of public goods. Demand factors such as war increase the likelihood that governments value public goods enough to induce them to invest in future fiscal capacity. Investing in future supply institutions distinguishes "cohesive" and "redistributive" states from "weak states" that face low demand and do not invest in fiscal capacity.[15] However, Besley and Persson (2011) do not consider the possibility that a ruler will respond to demand shocks by plundering the economy to raise revenues, nor how extant supply institutions affect the decision to build up or build down.

Scheve and Stasavage (2016) propose a different variant of the demand logic. Wars, especially "mass mobilization" wars such as the two world wars, create social conditions that favor creating egalitarian taxation systems and programs of social redistribution—which require high taxes to fund. We do not dispute that mobilizing for mass warfare enhances long-term fiscal capacity. But we expand on their framework by highlighting the implicit necessity of high supply: the ability to mobilize for mass modern warfare depends on preexisting political and bureaucratic institutions for implementing direct taxation. Otherwise, rulers face incentives to plunder their economy rather than to build fiscally effective states.

5 Does the Theory Explain the Empirical Pattern?

The implication that the conjunction of supply and demand explains revenue intake fits the available evidence. Although Western European and East Asian countries enjoyed an advantage in bureaucratic supply across the entire period, demand was low until World War I. Later, after independence, their colonies experienced demand shocks, but low supply undermined revenue gains. Data that disaggregates tax revenues shows that the divergence by Western states arose from their superior ability to collect direct taxes, consis-

[15]Note also that our model assumes the government remains in power with probability 1 after making the fiscal capacity investment, which is sufficient to generate a beneficial fiscal capacity investment by a redistributive state in Besley and Persson's model.

tent with our proposed mechanism for why high supply matters. Finally, associational regression evidence shows a positive interaction effect between various supply and demand measures on revenue intake in two-way fixed effects models.

5.1 Historical Evidence Before World War I

The main puzzle before World War I is why revenue intake stagnated in Western states after the Concert of Europe. Throughout the nineteenth century, Western Europe and the United States outpaced the rest of the world in supply institutions: collecting information about their citizens and professionalizing their bureaucracies (Brambor et al., 2020), constraining the executive, and mass education. Occasionally, these states capitalized on their high fiscal capacity to raise considerable revenue. Britain imposed the world's first income tax during the Napoleonic Wars and several other European states followed, and the United States collected large revenues from an income tax during its Civil War and Reconstruction (Aidt and Jensen 2009, 172; Dincecco 2017).

But the West's fiscal capacity remained latent for most of the nineteenth century. Britain reimposed an income tax in 1842 with a marginal rate that began at 2.9% and remained low into the twentieth century. In Skowronek's (1982) famous formulation, the nineteenth-century United States was a "state of courts and parties." Minimal demand for an intrusive state kept taxes low. The long nineteenth century was considerably more peaceful than the preceding or subsequent periods. Britain, for instance, fought a European power for 76 of the 150 years between 1665 to 1815, but in only three years between 1815 to 1914. Similarly, until the very end of this period, limited franchises dampened domestic incentives for social provision and redistributive taxation. Britain did not provide old-age pensions until 1908, unemployment and health insurance until 1911, or universal secondary education until 1918.

Even with low demand for taxation in the West, we might still expect these states to collect considerably more revenue than colonized states.[16] European administrators did not create modern tax institutions in their colonies, and instead imposed "hegemony on a shoestring" by investing with the limited purpose of collecting easy revenue sources (Berry, 1992). They faced little pressure to implement better fiscal insti-

[16]Such territories, including recently independent countries in Latin America, compose the vast majority of countries in the "Other" line in Figure 1. Also see Figure 4.

tutions because they could free-ride on metropolitan defense expenditures, and the authoritarian internal structure of non-settler colonies generated even lower levels of social redistribution than in contemporaneous Europe.

Despite these disadvantages, colonial and postcolonial extractive institutions succeeded spectacularly at raising revenues in some cases during the nineteenth century. They extracted surplus by coercing labor rather than investing in human capital, and by taxing certain sectors of the economy while ignoring others. In the sugar- and cotton-growing regions of the Western Hemisphere—which stretched from the southern United States to the West Indies to Brazil—Europeans forcibly imported millions of persons from Africa to serve as slaves on plantations. Cuba and Saint Dominigue (Haiti) were among the world's richest territories toward the end of the eighteenth century due to the high international value of sugar. Colonial officials could collect high levels of revenue in these areas by establishing administrative presence at a small set of ports to collect customs duties. Similar strategies pervaded areas exporting other cash crops, as in colonial West Africa (Frankema, 2010) and post-independence Argentina. The lines for Southern Cone countries in Panel A of Figure 2 and for plantation colonies in Figure 4 show the relative success of raising these indirect revenues.

Other contributors to the non-exceptionalism of the West in the nineteenth century, albeit affecting fewer cases, were established states that avoided Western colonialism and enacted domestic reforms, including Japan, China, Russia, and the Ottoman Empire. At least initially, reform efforts enjoyed broad support within the political class, although their success varied in proportion to the institutional legacy that reformers faced. In Japan, where the reforms successfully marginalized vested interests and there were long traditions of high levels of domain-level taxation and professionalized state service, reforms largely succeeded (Sng and Moriguchi, 2014). In the Ottoman Empire, the institutional inheritance was more ambiguous and domestic and foreign political resistance to reform was higher. Consequently, these reforms were less effective, although they improved on the status quo (Karaman and Pamuk, 2010, 623). It is likely that the relatively large differences in revenue collection between these empires and Western Europe in the eighteenth century (Dincecco, 2017, 69) declined in the nineteenth century because of reactions to the demand shock of European expansion. Appendix Figure C.1 presents available data on these empires before World War I.

5.2 Historical Evidence After World War I

Starting with World War I, Europe governments experienced high demand for revenues. European states not only fought two world wars, but also experienced pressure to expand the franchise and provide citizens with a broad array of social welfare benefits to reward their sacrifices, even in countries that did not directly participate in the wars. These facts are well-established in the literature (e.g., Scheve and Stasavage, 2016). The main puzzle after World War I is instead why the revenue gap between the West and the rest of the world increased exponentially after World War II, when most of the colonized world gained independence. Many anti-colonial activists believed that jurisdictional sovereignty would engender higher levels of public spending by aligning the government's incentives with their citizens rather than with European bondholders and civil servants (Naoroji, 1901; Furnivall, 2014). And, after independence, many non-Western states experienced participation in warfare (e.g., Egypt), a broad franchise (e.g., Jamaica), or both (e.g., India).

Institutional differences between the West and the rest of the world can explain the pattern. Previous investments in bureaucratic supply were necessary for Europe's enormous revenue gains. Earlier bureaucratic innovations combined with a (relatively recent) tradition of honesty, political impartiality, and adherence to the rule of law helped to habituate tax compliance (Northcote, Trevelyan and Jowett, 1854). Although these traditions were maintained by "night watchman" states, they had the capacity to raise impressive amounts of money when asked (Briggs, 1961). By contrast, most non-European countries could not replicate these conditions. Even after gaining independence, the extractive states created by European colonization did not provide a sufficient basis for raising modern sources of revenues such as income taxes or value-added taxes. As of 1960, future OECD countries on average had experienced twice as many years with a civil registration system as others (133 versus 60).[17] At this time, India had 46 times as much census-age misreporting as the United States (Lee and Zhang, 2017). Given low supply, it is unsurprising that gaining independence did not constitute a critical juncture in revenue collection, as Lee and Paine (2019) demonstrate by estimating null differences in countries' revenue intake before and after gaining independence.

Several "most likely" cases—given existing demand theories—highlight the importance of institutional sup-

[17]The latter number is an overestimate because it excludes the many non-Western countries with missing data on Brambor et al.'s (2020) registration variable, which almost certainly covaries negatively with civil registration years.

ply and exemplify the alternative modes of revenue collection that rulers pursue when demand is high but supply is low. Although Egypt and India each faced high demand for revenue given their participation in prolonged international rivalries (with Israel and Pakistan, respectively) that on several occasions flared into war, both developed large and inefficient public sectors rather than cultivated more sustainable sources of revenues. As Waterbury (1993, 134) describes for these countries: "The SOE sector does represent a captive tax base, and even as the SOEs run at a loss and seek financing abroad, they still generate a predictable source of taxes and compulsory payments to various fiscal agencies." Egypt's attempt to implement a broad land reform in the 1950s and 1960s, which would have cut out large landowners as intermediaries in the tax-collection process, failed due to basic problems of bureaucratic information about land titles and related issues (Migdal, 1988). In India, the proportion of revenue collected through direct taxes fell during the twentieth century (from 28% in 1900 to 15% in 2000, with a low of 6.5% in 1987),[18] as tax-avoidance rates remained high and the government choose to raise import duties and nationalize large sectors of the economy.

The main exceptions to the general pattern of fiscal weakness in the non-Western world are the "developmental states" of East Asia. Our theory anticipates these exceptions, which combined high supply and demand. China, Japan, Taiwan, and South Korea all had long traditions of professionalized bureaucracies, in fact, longer than those in the West. Furthermore, despite the brutalities of Japanese colonial rule in South Korea and Taiwan, many argue that Japanese institutions spurred rapid development after World War II (Kohli, 2004). These countries also experienced high demand for revenue to fund participation in World War II, their subsequent recovery, Cold War rivalries (including the Korean War), and ambitious programs of infrastructural development and public service provision.

5.3 Trends in Customs and Income Taxes

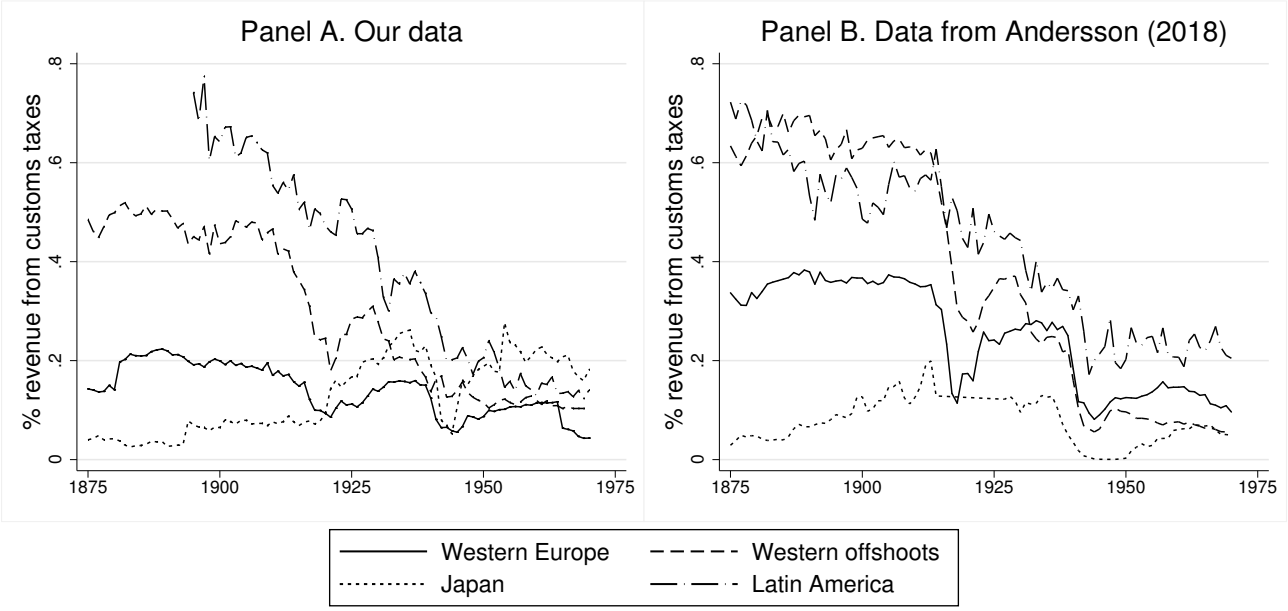
A core component in our explanation for the eventual divergence of Western countries is that higher-quality bureaucratic institutions enabled them to respond to high demand by raising revenue from "hard" taxes such as income taxes and value-added taxes, while the institutions of states outside of the West and East Asia provided a basis only for collecting "easier" indirect and customs taxes. Here we provide some evidence

[18] See *Statistical abstract relating to British India from 1894-95 to 1903-04*, Table 45; and *Handbook of Statistics on Indian Economy 2018-19*, Table 96.

from ours and related datasets for these contentions, although our data on types of taxation are considerably more fragmentary than our data on aggregate revenue.

Figure 8 shows longitudinal changes in the proportion of government revenue drawn from customs taxes for different regions. Panel A presents our data, and Panel B shows similar patterns using data from Andersson (2018). In the nineteenth century, many governments relied on customs duties to provide a majority of their revenue. This was particularly true in Latin America, the non-Western region with the highest per capita revenue, and in Western settlement colonies. Between 1901 and 1916, the proportion of Chile's revenue drawn from the customs revenue never fell below 80%, with the majority drawn from export taxes on nitrates. The United States was similarly reliant on customs taxes for much of the nineteenth century. Their economies depended on primary commodity exports that funded high levels of taxable imports, which a small number of officials at the major ports could easily tax.

Figure 8: Proportion of Central Government Revenues From Customs Taxes



Notes. The lines show the proportion of central government revenue drawn from customs tax revenue in select countries.

In some territories, customs revenues provided little revenue in the nineteenth century, either because of low levels of international trade or pressure from colonizing powers to keep barriers low for intra-imperial trade. These territories relied on other means of indirect tax collection that required little or no local fiscal capacity. Sri Lanka exemplifies a small, export-dependent colony. In 1909, government revenues consisted

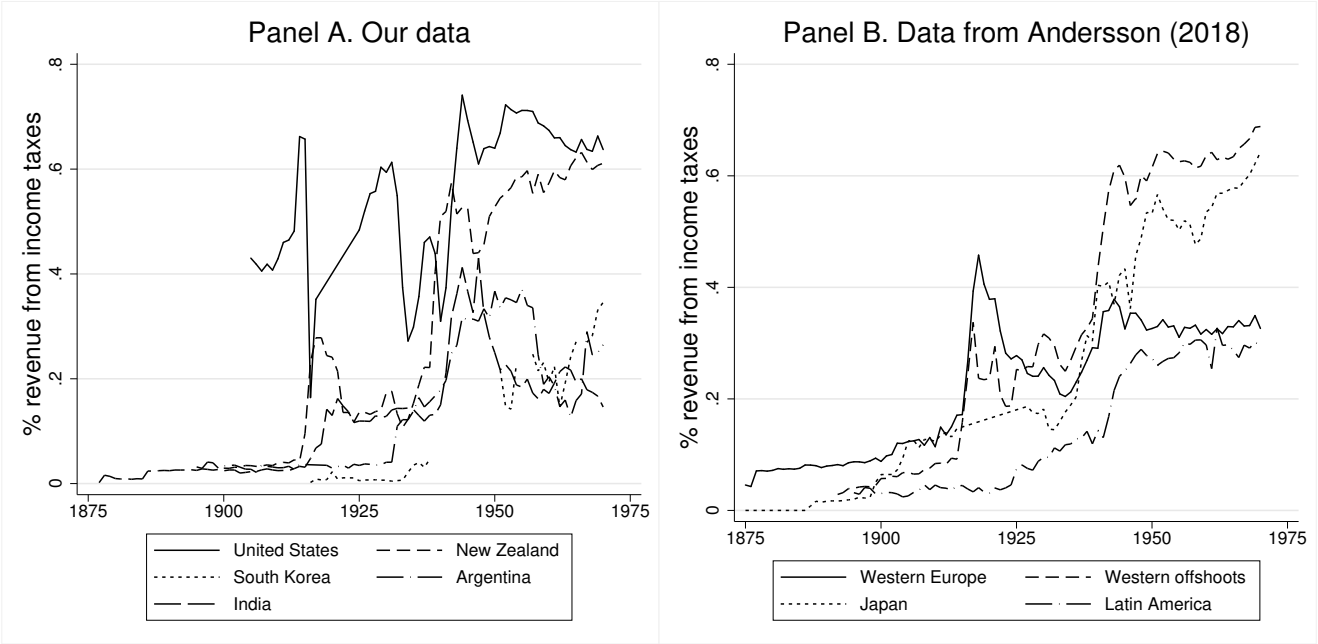
of: 24% from customs, 3% from selling land, 12% from liquor licenses, 3% from stamp taxes, 4% from sales of timber and salt, 6% from port fees, and 30% from state-railway profits (Keltie, 1911, 108).

In some colonies, even direct taxation was effectively indirect because its collection relied on intermediaries. For example, Britain collected head, hut, and other direct taxes in Africa through Native Authority chiefs acting on the state's behalf, and they retained a portion for themselves or the Native Treasury (Gardner, 2012). Similarly, in the majority of areas in colonial India, colonial officials delegated the collection of the land revenue tax to princes or large landlords, and the government faced great difficulty in raising the rates that they assessed (Lee, 2019).

Figure 8 shows a downward secular trend in customs as a share of revenues throughout the twentieth century in Latin American and Western countries. Various factors contributed, including disruptions to international trade associated with the Great Depression and two world wars, and the later rise of international agreements limiting tariffs. However, perhaps the most important contributor was secular change toward economic diversification. As Figure 9 shows, harder-to-collect taxes on income and production became increasingly important. Although most Western countries raised little revenue from income taxes in 1900 (see Figure 9 and Scheve and Stasavage 2016), these patterns changed after World War I. Income taxes became the dominant source of revenues in the West, although revenue from value-added taxes is also considerable in some Western countries (Steinmo, 1996). Income taxes represented a major technological breakthrough in taxation capacity, with Mares and Queralt (2015, 1975) praising the "unprecedented revenue generating capacity" of "the most advanced fiscal instrument to date."

By contrast, non-Western countries exhibited greater variance in the twentieth century. In some African and Asian countries, customs revenues became *more* important in the mid-twentieth century, as governments gained freedom to set tariff rates, and older land or labor taxes declined in importance or were abolished by post-independence governments intent on reform. Bates (1981) explains how many African rulers after independence used funds from agricultural marketing boards—which serve the ostensible purpose of stabilizing prices for and revenues from primary products—to raise revenues by exploiting farmers. Consequently, although Figure 9 shows that the importance of income taxes rose in general during the twentieth century, OECD countries experienced faster gains than other countries. Data from the International Monetary Fund (2017) shows that during the 1960s and 1970s, income taxes averaged 35% of government revenues in OECD countries versus 23% elsewhere. Similarly, Figures 8 and 9 show that transitions from indirect taxes

Figure 9: Proportion of Central Government Revenues From Income Taxes



Notes. The lines show the proportion of central government revenue drawn from income tax revenue in select countries.

(e.g., customs duties) to direct and production taxes occurred, in general, later and less completely in the future OECD countries than in the rest of the world. And even in non-OECD countries that transitioned to a "modern" mix of tax policies, the yields from these taxes were usually much lower than in the West and in East Asia. World regions exhibit dramatic differences in income tax avoidance, with higher rates in Africa, South Asia, Latin America, and the Middle East than in the rest of the world. Losses vary from 8% of GDP in Chad to 0.16% in Finland (Cobham and Janskỳ, 2018).

5.4 Interacting Supply and Demand: Associational Evidence

Our theory about combining supply and demand also yields a natural statistical test: the interaction of quantitative measures of these variables should positively associate with revenue intake. The following evidence shows that the patterns highlighted in the qualitative historical analysis generalize to a broader sample, although we acknowledge the numerous difficulties in measuring state capacity[19] and of identifying causal effects in cross-national data—especially considering that demand and supply are themselves endogenous

[19]Recent discussions of this point in the literature include Lee and Zhang (2017) and Lee (2019).

to many historical factors for which data are scarce. We address these concerns as best we can by estimating two-way fixed effects models for multiple measures of each variable, although we regard these tests as a plausibility probe for our theory rather than as conclusive evidence for a causal effect.

The revenues variable is the same as in Section 2, central government revenues per capita in gold ounces (logged for the regressions). The core sample includes 87 countries and consists of all country-years prior to 1971 with available revenue data (including colonies with data), although missing data on other variables reduces the number of observations. For theoretical purposes, it is appropriate to compare colonies with independent countries—the ability to raise revenues matters, not where the revenues are spent—although robustness checks control for post-independence status. We chose the demand and supply measures based on theoretical relevance and data coverage. Appendix Section C.2 describes the demand indicators (ongoing war, percentage of population with suffrage) and supply indicators (years with a registration system, constraints on the executive, and education) and provides summary statistics.

We present results from OLS models with a lagged dependent variable, country and year fixed effects, and country-clustered standard errors. Indexing countries by i and years by t, Table 1 estimates:

$$ln(Revenue/pop.)_{i,t} = \beta_R \cdot ln(Revenue/pop.)_{i,t-1} + \beta_S \cdot Supply_{i,t-1} + \beta_D \cdot Demand_{i,t-1} + \beta_{SD} \cdot Supply_{i,t-1} * Demand_{i,t-1} + \beta_i + \beta_t + \epsilon_{i,t}. \quad (2)$$

The supply and demand measures vary by column; and β_{SD}, the main parameter of interest, is the coefficient estimate for the interaction term. The year fixed effects account for secular changes in revenue collection over time. The country fixed effects account for unit-specific sources of heterogeneity.[20]

Table 1 interacts each demand measure with each supply measure. We are agnostic about the best measure of each concept, which is why we present all six combinations. The coefficient estimate for the interaction is statistically significant in every war regression, and the p-value is less than 0.10 in two of the three franchise size regressions. None of the lower-order supply or demand terms are statistically significant in

[20]We assessed the dependent variable for non-stationarity by running a series of Fisher-type unit-root tests based on augmented Dickey-Fuller tests. We calculated residuals from auxiliary regressions that include the country and year fixed effects, and these tests reject at the 1% significance level the null hypothesis that all panels contain unit roots (results available upon request).

any specification, implying that either high supply or high demand covary with high revenues only when interacted with each other. Computing long-run multipliers for the coefficient estimates in Column 1 shows that the average increase in expected revenue intake for a country-year with a war in the previous year (high demand) and 115 years of a civil registration system (high supply) is 190% higher than a country-year lacking either of these factors.[21] By contrast, the corresponding figures are 18% for high demand conditional on 0 registration years, and 72% for high supply without war.

Table 1: Assessing Supply and Demand Interaction Effects

	DV: Logged central government revenue P.C. in gold oz.					
	(1)	(2)	(3)	(4)	(5)	(6)
War$_{t-1}$*Reg. system years$_{t-1}$	0.0548***					
	(0.0199)					
War$_{t-1}$*Exec. const.$_{t-1}$		0.154***				
		(0.0439)				
War$_{t-1}$*Education$_{t-1}$			0.0136***			
			(0.00397)			
Suffrage$_{t-1}$*Reg. system years$_{t-1}$				0.0526*		
				(0.0271)		
Suffrage$_{t-1}$*Exec. const.$_{t-1}$					0.0881	
					(0.0901)	
Suffrage$_{t-1}$*Education$_{t-1}$						0.0132*
						(0.00755)
War$_{t-1}$	0.0116	-0.0418	-0.00854			
	(0.0264)	(0.0322)	(0.0228)			
Suffrage$_{t-1}$				-0.0156	-0.0405	-0.0244
				(0.0314)	(0.0459)	(0.0286)
Reg. system years$_{t-1}$	0.0395			-0.0109		
	(0.0456)			(0.0496)		
Exec. const.$_{t-1}$		-0.00662			-0.0503	
		(0.0501)			(0.0369)	
Education$_{t-1}$			-0.00244			-0.0133
			(0.0150)			(0.0130)
Country-years	4,491	3,991	4,846	4,489	3,991	4,818
Countries	68	83	81	68	83	81
R-squared	0.964	0.962	0.964	0.964	0.962	0.964
LDV?	YES	YES	YES	YES	YES	YES
Country FE?	YES	YES	YES	YES	YES	YES
Year FE?	YES	YES	YES	YES	YES	YES

Notes. Table 1 presents OLS regression estimates with country-clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Although controlling for country and year fixed effects guards against many confounding considerations, there may still be concerns about country-specific time trends. Three possibilities are: (1) our findings simply track increases in GDP over time, despite income spiking in Western Europe at least a half century

[21]This is the average value of years with a civil registration system among Western European and East Asian countries in 1946.

before the great revenue divergence occurred (see Figure 5), (2) they reflect demographic changes, or (3) they are an artifact of including colonies in the sample or of new countries entering the sample—although country fixed effects directly address the latter by comparing countries to themselves over time. Appendix Section C.3 addresses these considerations and shows similar findings when controlling for population and a post-independence indicator. Severe missingness in historical GDP data circumscribes accounting for this alternative explanation, although we provide suggestive evidence that this factor does not drive the results, either.

6 Conclusion

The early twentieth century was a time of considerable, and at times disruptive, political change. Mass-mobilization wars affected much of the world and the spread of democracy created new expectations about the role of levels of redistribution. These changes expanded the demands that governments made of their citizens and empowered political constituencies that supported those demands. However, using a new measure of central government revenue collection, we document that these demands yielded massive fiscal expansion only in select countries (Western Europe, offshoots, and East Asia), beginning during World War I. This created a historically important—and unprecedented—divergence in fiscal intake between these countries and the rest of the world, contrary to expectations from research on economic and fiscal development that anticipates earlier permanent divergence. We explain both the cross-sectional and longitudinal trends by distinguishing existing explanations in terms of "demand" and "supply" hypotheses. Whereas existing research tends to examine these in isolation, we provide a theory of how demand shocks can cause governments to either build up the tax base or to "build down" by predating the economy, and show that the optimal choice depends on extant bureaucratic supply. We then provide various pieces of evidence to establish that only the conjunction of high demand and high supply produces sustained revenue boosts.

In addition to identifying and explaining the great twentieth-century revenue divergence, the analysis generates important implications for historical research on Western Europe and beyond. Within Europe, the results suggest an alternative interpretation for why the world wars and associated franchise expansion were significant. Although these demand shocks coincided with an unprecedented mobilization of social resources (Scheve and Stasavage, 2016), explaining divergence relative to the rest of the world requires incorporating

supply-side arguments because the ability to mobilize successfully for mass modern warfare depends on ample institutional supply. Therefore, demand shocks enabled *societies with a specific set of institutions* to respond to these crises with high taxation and spending.

Conversely, our theory casts doubt on the usefulness of applying Eurocentric models—such as Tilly's (1992) thesis that war contributes to statebuilding—to explain non-European statebuilding. For example, some argue that low levels of international conflict yielded less propitious conditions for statebuilding in the post-colonial world (Herbst, 2000, 113). This argument implies that more frequent warfare would have contributed to fiscal capacity building in non-Western countries. We instead explain why high demand in the context of low supply should not promote fiscally effective states. The dearth of high bureaucratic supply in the non-European world, stemming from different historical experiences and extractive European colonial institutions, makes the bellicose European model inapplicable.

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Online Appendix

Contents

List of Tables

List of Figures

A Supporting Information for Sections 2 and 3

A.1 Exchange Rate Effects?

Our measure aims to capture variation in the fiscal effort and fiscal capacity of governments as opposed to changes in prices, exchange rates, or economic productivity. Using gold equivalents enables equally scaling the per capita revenue figures, but using nominal exchange rates raises the possibility that longitudinal changes in revenue per capita may reflect changes in the foreign exchange market rather than changes in actual revenue. In the short term, the data exhibit many sharp short-term changes that clearly reflect currency revaluations.

We took three steps to palliate this problem. First, we focus only on pre-1971 data, when the Nixon shock caused many currencies and the price of gold to float. The stability of many exchange rates for much of the pre-1971 period under the Gold Standard and Bretton Woods regimes implies that year-to-year exchange rate fluctuations are less concerning than at many other historical periods.

Second, we excluded currencies for which the published exchange rate was grossly manipulated (e.g., the Soviet ruble). Although we did not exclude all currencies with fixed exchange rates and fixed capital exchange rates, we excluded currencies that exhibited evidence that published exchange rates bore no relation to market supply and demand, or where the exchange differed considerably from long-term trends within the country. In many cases, this meant excluding periods of instability when a country's link to gold or the dollar was changed. Importantly, because our main regression models use country fixed effects, it is not necessary (though it would certainly be desirable) that currencies are perfectly valued. Instead, we only require that distortions caused by exchange rates remain constant within countries over time.

Third, the within-empire figures in the text and the appendix—which exhibit similar patterns to the aggregate dataset—depict countries that used the same currency or highly stable pegs. In these cases, exchange rate fluctuations do not influence the results because the exchange rates remain constant over time.

A.2 Price Effects?

Even after we account for artificial exchange rates or short-term fluctuations in exchange rates, our comparisons do not capture differences in prices. The ideal solution to this problem would be to normalize currencies using a purchasing power index that measures state revenue at purchasing power parity. However, the rarity of reliable price data prior to the late twentieth century—let alone price data comparable across nations—implies that accounting for prices would severely constrict the sample and would make impossible many of the illuminating historical comparisons that we present. Cross-national purchasing power data are available only since 1950 (Summers and Heston, 1991), after the great revenue divergence we identify had already occurred.

However, differences in purchasing power are unlikely to explain our pattern for two reasons. First, differences in purchasing power in 1950 were modest compared to the differences in revenue that we observe. Although purchasing power in South Africa was 73% more than Britain in 1955, nominal per capita revenues were 441% higher in Britain than in South Africa. More broadly, there do not seem to be systematic differences in purchasing power across categories of countries. In 1950, average GDP purchasing power conversion factors were similar in Western Europe and East Asia compared to the rest of the world (0.102 versus 0.91).

Second, the regression models with country fixed effects account for static cross-national differences in purchasing power. To confound the divergence trend, purchasing power would also have to diverge over time, with nominal revenue in Western Europe and East Asia increasing precipitously despite the real purchasing power of that revenue remaining static (at least relative to the non-Western world). Limited available data (i.e., only countries with PPP data in 1950 in the Penn World Tables dataset) late in our time frame show that although purchasing power increased in Western Europe/East Asia relative to the rest of the world in this period, this increase was modest relative to differences in per capita nominal revenue increases. Between 1950 and 1968, the GDP conversion factor increased by 71% in Western Europe/East Asia compared to 20% in the rest of the world. However, revenue increased by 294% in Western Europe/East Asia compared to 18% in the rest of the world during this period.

A.3 Subnational Revenue

Our data measures central government revenue, but we lack data on local and regional government revenue. Definitional problems and data issues make it impossible to construct a dataset of local revenue with similarly broad coverage. The problem of estimating the revenue of indirect rule entities in colonies is particularly intractable. However, we do not believe that the distribution of tax collection across levels of government confounds our main pattern. This alternative explanation requires that (1) substate revenues were high in future OECD countries relative to other countries before 1914 and (2) substate revenue share fell disproportionately in OECD countries after 1914. Fragmentary available data suggest that neither pattern is true. Regarding the later period, in 2015, non-central revenue was 39% of revenue in the average OECD country compared to 19% in other countries, based on our calculations of the difference between "general" and central government total revenue from the International Centre for Tax and Development (2020) dataset. The gap between general and central revenue among OECD and the non-OECD countries had also remained constant since 1980, the earliest year of data. Regarding the earlier period, indirect rule and incomplete state centralization meant that, in many developing countries, local governments took a large share of revenue in the nineteenth century. In Brazil, for instance, state governments collected 37.5% of total government revenue in 1907, compared to 31.5% in the United States at this time (calculated by authors from Keltie 1911).

A.4 Regression Evidence of the Great Revenue Divergence

Table A.1 provides numerical estimates of the pattern shown in Figure 1 by presenting a series of panel regression models with logged per capita central government revenue in gold as the dependent variable. Every specification contains a lagged dependent variable. There are three explanatory variables of interest: an indicator for "advantaged" countries (Western Europe, the offshoot settler colonies, East Asia; WE/EA), an indicator for post-1914 years each associate positively and statistically significantly with per capita revenue, and their interaction. Every model with the lower-order WE/EA term contains year fixed effects and country random effects (because of collinearity with country fixed effects), every model with the lower-order post-1914 term contains country but not year fixed effects (again because of collinearity), and every model with only the interaction term contains country and year fixed effects. The year fixed effects account for time-specific factors such as changes in the price of gold or international shocks, and the country fixed effects account for country-specific sources of heterogeneity that remain constant over time.

Predictably, WE/EA and post-1914 years each associate positively and statistically significantly with per capita revenue (Columns 1 and 2). Columns 3 through 5 interact these variables with different combinations of lower-order terms in the specifications. In each, the interaction term is positive and statistically significant,

which shows that countries in these areas of the world since 1914 exhibit higher expected revenues relative to either WE/EA or post-1914 on their own. Estimating long run-multiplier effects from the coefficient estimates in Column 3 show that per capita revenue intake was 93% higher in WE/EA than the rest of the world before 1914, and 234% higher afterwards. The findings are similar in Columns 6 and 7, which respectively add GDP per capita as a control and normalize revenue by GDP.

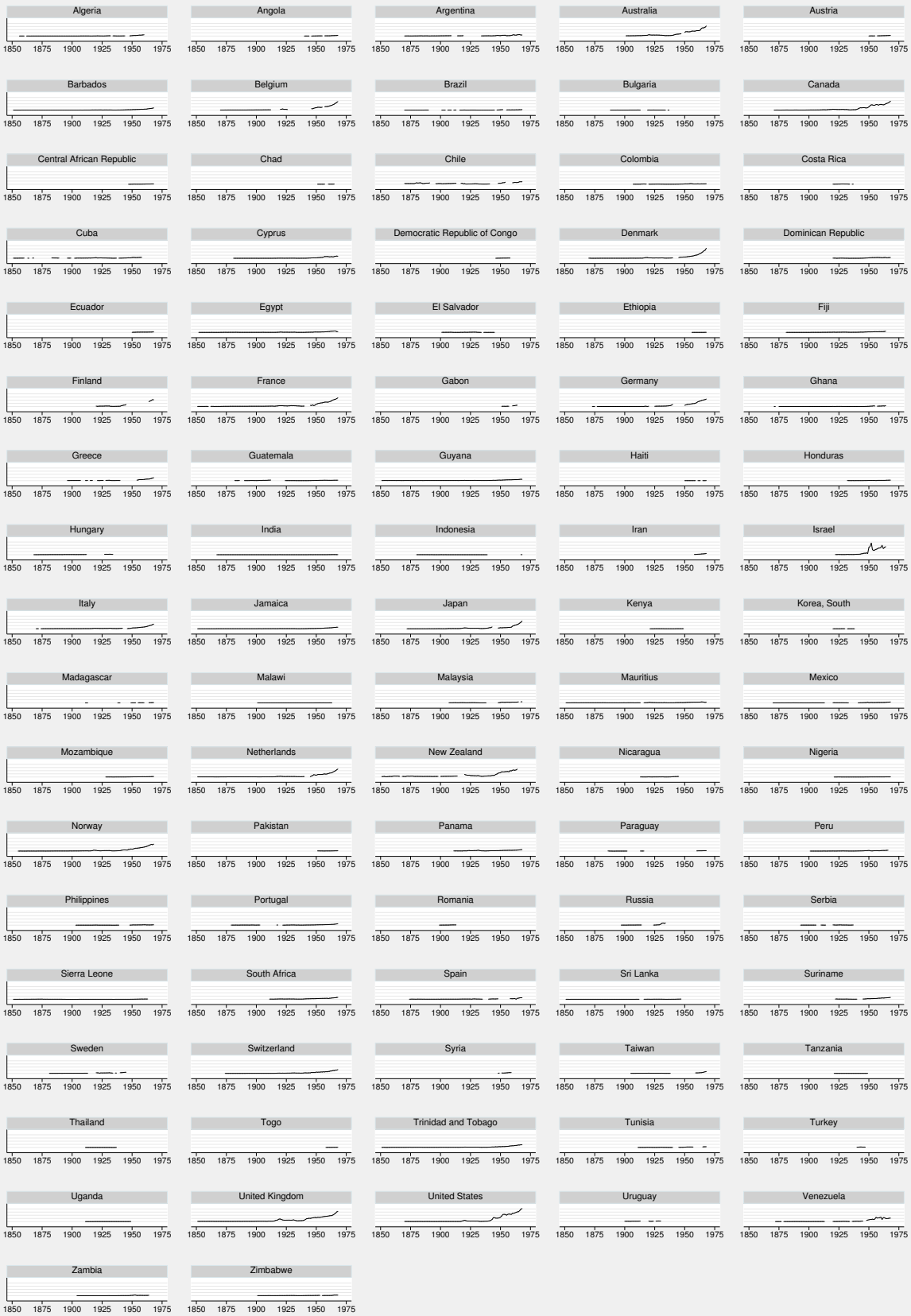
Table A.1: The Great Revenue Divergence: Regression Evidence

DV:	Revenue	Revenue	Revenue	Revenue	Revenue	Revenue	Norm. Rev.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
WE/EA	0.0308***		0.0172***				
	(0.00574)		(0.00616)				
Post-1914		0.0472***		0.0384***			
		(0.00761)		(0.00773)			
WE/EA*Post-1914			0.0263**	0.0292***	0.0678***	0.0818**	0.109***
			(0.0125)	(0.0106)	(0.0198)	(0.0314)	(0.0280)
Log GDP P.C.$_{t-1}$						-0.0190	
						(0.0514)	
Country-years	5,332	5,332	5,332	5,332	5,332	3,459	3,420
Countries	87	87	87	87	87	77	76
R-squared		0.958		0.958	0.965	0.964	0.950
Country FE	NO	YES	NO	YES	YES	YES	YES
Year FE	YES	NO	YES	NO	YES	YES	YES

Notes. Table A.1 summarizes a series of OLS regressions with country-clustered standard errors. The dependent variable is logged central government revenue per capita in gold ounces in Columns 1 through 6, and logged central government revenue in gold ounces divided by GDP in 2011 U.S. dollars in Column 7. *** p<0.01, ** p<0.05, * p<0.1.

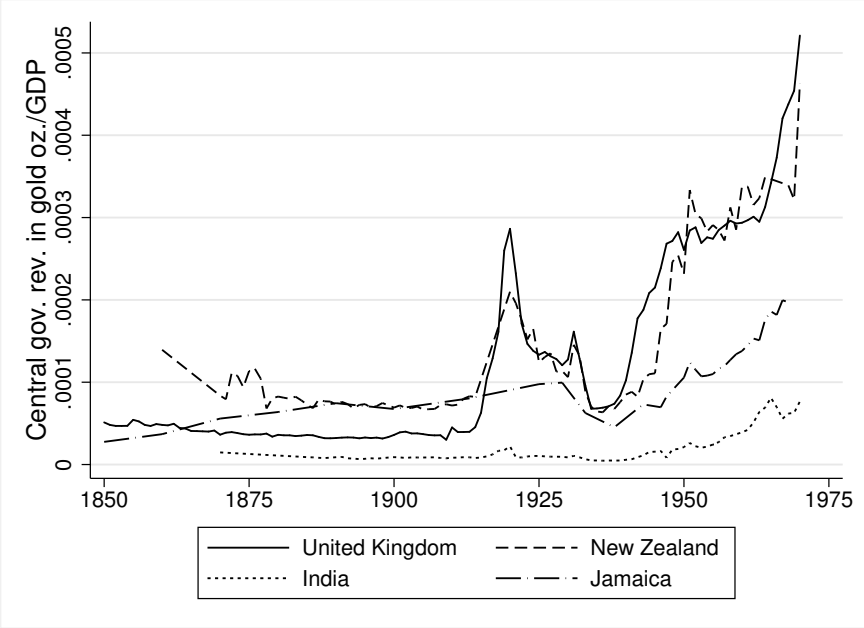
A.5 Additional Tables and Figures

Figure A.1: Revenues Per Capita in Gold by Territory, 1850–1970



Graphs by cname

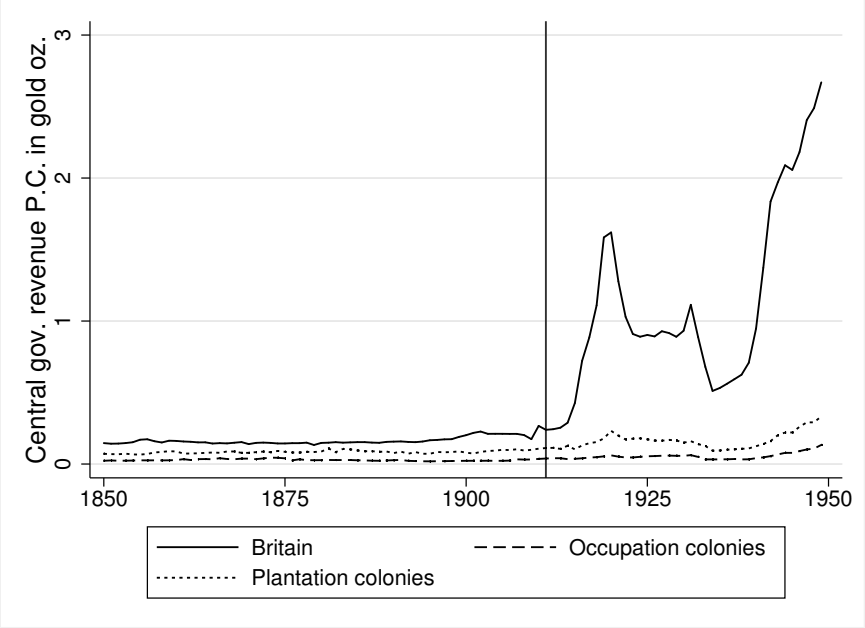
Figure A.2: Normalized Revenue Trends in the British Empire



Notes. The lines show estimated central government revenue in ounces of gold (converted at nominal exchange rates) divided by per capita GDP estimates in constant 2011 U.S. dollars from Bolt et al.'s (2018) update of Angus Maddison's data. Different units in the numerator and denominator imply that the magnitude of the normalized revenue variable cannot be interpreted in an absolute sense.

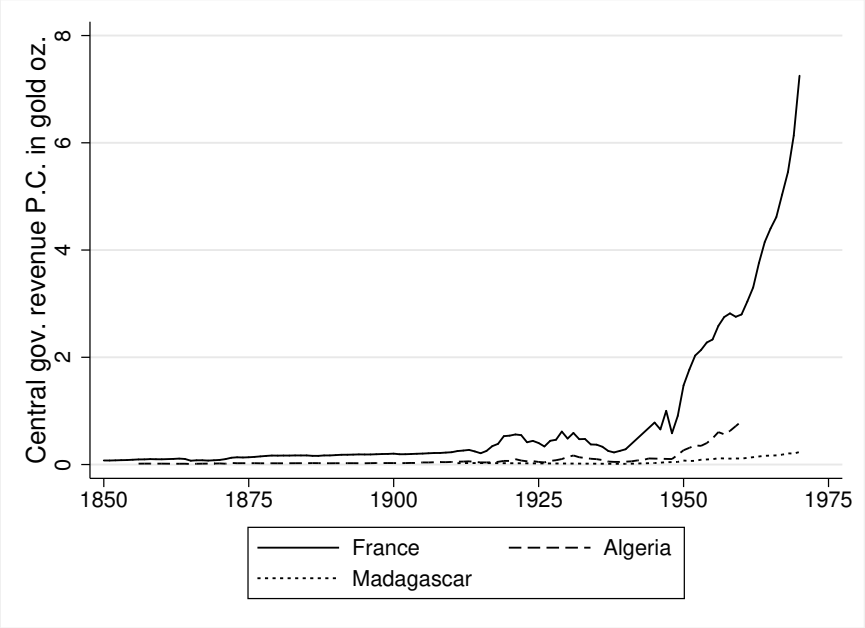
Figure A.3 differs from Figure 4 because it compares only Britain to the colonial sample. We cut the figure off in 1950 because Britain exhibited a revenues spike in the next two decades, which makes it difficult to see the difference in revenues in earlier periods when plotting the figure until 1969. This figure enables us to more directly compare our findings to those in Frankema (2010). He examines revenue trends in the British empire and shows that the cross-colony differences in per capita gross public revenue in 1911 between Britain (and offshoots) and its non-settler colonies were "vast" (453), contrary to our characterization that a large revenue divergence did not occur until at least the beginning of World War I. Despite our divergent conclusions, Frankema's data provide additional supportive evidence for our overall characterization of the timing of the great revenue divergence. Britain collected more revenues per capita than other Western European countries, yielding the higher solid black line in Figure A.3 than in Figure 4. Thus, looking solely at Britain somewhat overstates the average level of Western revenues. Additionally, both ours and Frankema's data show that plantation colonies collected considerably more revenue than occupation colonies; and in both datasets there is a roughly a two-fold difference in 1911 between British central government revenues and revenues in plantation colonies. Finally, the considerations discussed when analyzing differences within the British empire (Figure 3) apply here: the differences between Britain and colonies do not become large and sustained until World War I, and accelerate again during and after World War II; and the early discrepancies do not account for differences in income or purchasing power.

Figure A.3: Comparing Britain to Colonies



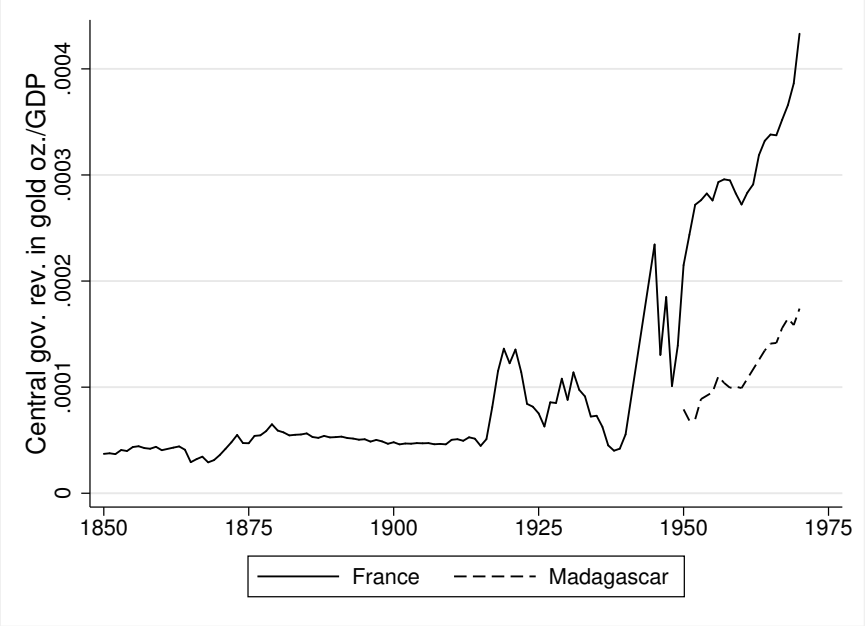
Notes. The lines show estimated central government revenue per capita in ounces of gold, converted at nominal exchange rates.

Figure A.4: Revenue Trends in the French Empire



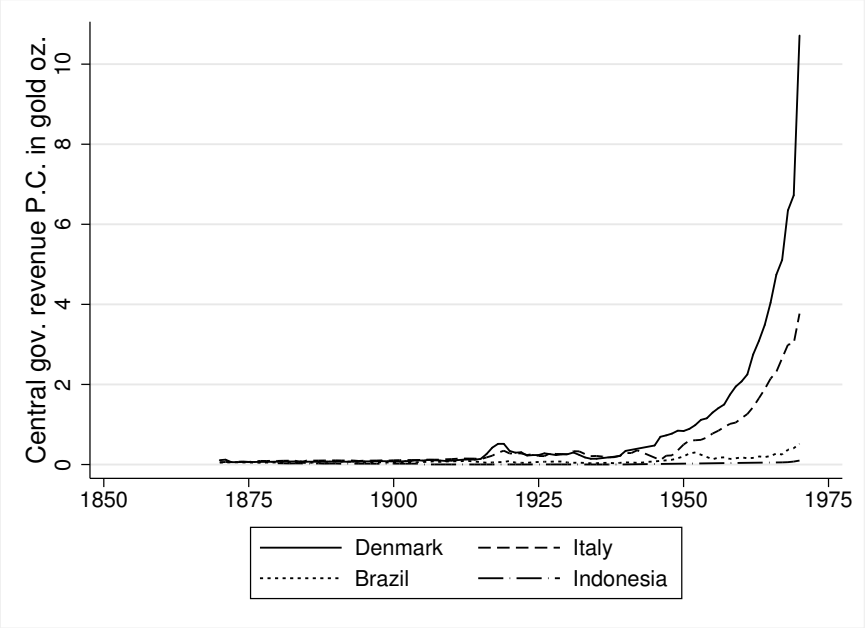
Notes. The lines show estimated central government revenue per capita in ounces of gold, converted at nominal exchange rates.

Figure A.5: Normalized Revenue Trends in the French Empire



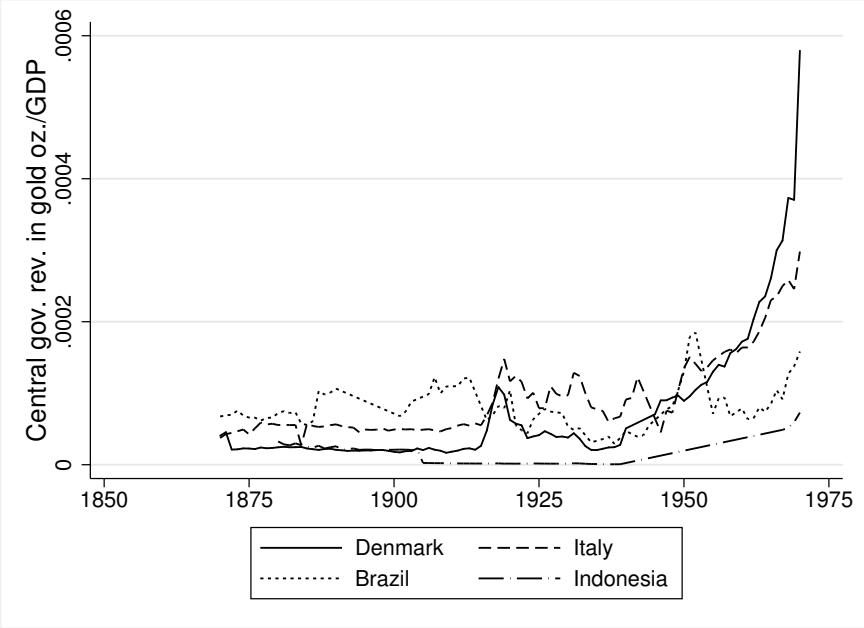
Notes. The lines show estimated central government revenue in ounces of gold (converted at nominal exchange rates) divided by per capita GDP estimates in constant 2011 U.S. dollars from Bolt et al.'s (2018) update of Angus Maddison's data. Different units in the numerator and denominator imply that the magnitude of the normalized revenue variable cannot be interpreted in an absolute sense.

Figure A.6: Revenue Trends Among Other Countries



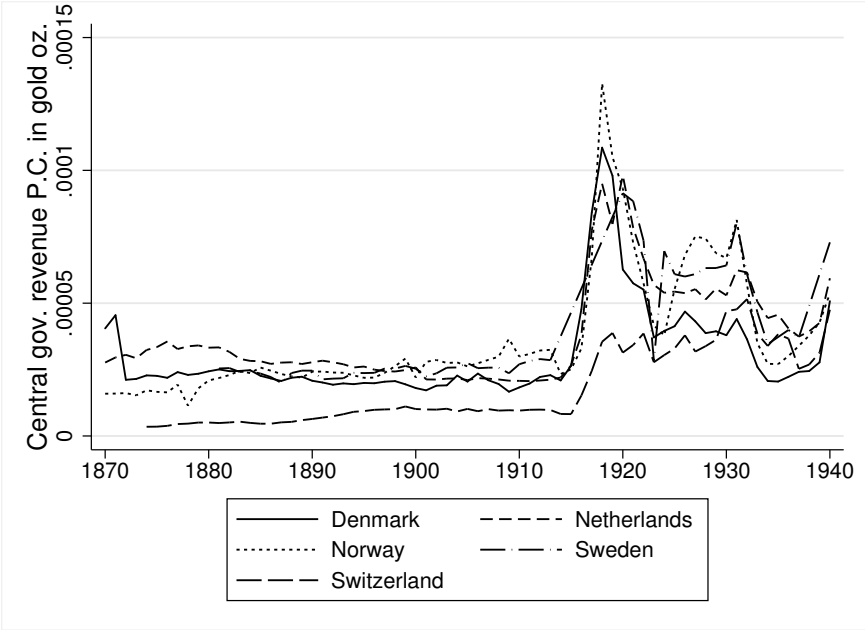
Notes. The lines show estimated central government revenue per capita in ounces of gold, converted at nominal exchange rates.

Figure A.7: Normalized Revenue Trends Among Other Countries



Notes. The lines show estimated central government revenue in ounces of gold (converted at nominal exchange rates) divided by per capita GDP estimates in constant 2011 U.S. dollars from Bolt et al.'s (2018) update of Angus Maddison's data. Different units in the numerator and denominator imply that the magnitude of the normalized revenue variable cannot be interpreted in an absolute sense.

Figure A.8: Revenue Trends in WWI Neutrals



Notes. The lines show estimated central government revenue in ounces of gold (converted at nominal exchange rates) divided by per capita income estimates from Bolt et al.'s (2018) update of Angus Maddison's data. Given the time scale, the most directly comparable figure from the body of the paper is Panel B of Figure 5.

A.6 The Great Income Divergence

Traditional accounts argue that Western Europe had already achieved higher living standards than East Asia during the early modern period, if not the Middle Ages (Broadberry and Gupta, 2006; Jones, 2003). Pomeranz (2009) counters by arguing that Western Europe and select parts of East Asia had similar living standards until the late eighteenth century, when the Industrial Revolution and the second major wave of European colonialism each began. Both schools agree that Europe exhibited noticeable economic differences from Africa/Latin America during the early modern period, although cannot precisely estimate the magnitude of these differences. The causes of this economic shift are much debated, with many scholars emphasizing various institutional advantages possessed by Western Europe in general or England in particular (North and Weingast, 1989; Acemoglu, Johnson and Robinson, 2001, 2005; Cox, 2017).

A.7 Non-Tax Revenue: Resource Rents and Borrowing

Conventional sources of tax revenue based on taxing output (head taxes, trade taxes, income taxes) do not provide the only possible source of government revenues. Governments may also benefit from natural resource production, foreign aid, and remittances from expatriates. A large literature documents the empirical importance of "rentier" revenue sources and examines their effects on political outcomes (Ross, 2012; Morrison, 2014; Menaldo, 2016). Alternatively, states can substitute for taxes by borrowing (Centeno, 2002; Queralt, 2019), which was a particularly common strategy earlier in European history. Although we not dispute the importance of non-tax revenues for many political outcomes, we not engage with them in depth here because they are unlikely to explain our core pattern. Western Europe and East Asia began to distinguish themselves from the rest of the world in the early twentieth century because of their superior ability

to increase tax revenues (Scheve and Stasavage, 2016), not because of their superior exploitation of natural resources, which was not especially high in these countries. Nor do non-tax revenues convincingly explain relative stagnation in much of the non-Western world. There are certainly some cases, such as Nigeria and Sierra Leone, where natural resource abundance plausibly contributed to fiscally weak states. However, most countries outside the OECD that extract large revenue streams are also oil-rich (Ross, 2012), and therefore their abundance in natural resources biases *against* a great revenue divergence occurring. Nor can resource curse arguments explain why many *resource poor* countries have also failed to catch up to the West. Similarly, Western countries have had better (and cheaper) access to loans for a much longer period than other parts of the world (Stasavage, 2007).

B Supporting Information for Section 4

B.1 Motivation for Key Model Assumptions

Constraints to collecting revenue. Throughout history, one of the greatest difficulties that states have faced to taxing societal output is that producers can circumvent the state's reach by migrating or by engaging in "informal" economic activities. In pre-colonial Africa and Southeast Asia, areas with low population density or with mountainous terrain facilitated migration outside the reach of nascent states that sought to expand their frontiers (Herbst, 2000). de Soto (2000) discusses the prevalence of informal economic activities in the contemporary post-colonial world and estimates that in 1997 citizens of the Third World and former communist countries held at least $9.3 trillion worth of real estate that they did not legally own. Joshi and Ayee (2008) discuss broader difficulties involved with taxing informal economic activity.

Although an omniscient government could counteract these constraints by "finding" production by their citizens or subjects, in reality, governments also face constraints to gathering information about economic production. In colonial Africa, European administrators tended to have limited information about their populations, which made it difficult to assess how much different individuals or even regions could afford to pay (Gardner, 2012). This issue continues to plague many developing countries, which lack extensive written or electronic records to monitor activity, or banking intermediaries that reduce the need for government agents to meet in person to collect taxes (Moore, 2008, 40-41). Economic exit coupled with limited information constitute the core impediments to revenue collection in the model.

What factors enable revenue collection? Bureaucratic capacity affects the severity of the impediments to revenue collection caused by economic exit and limited information. Although no government can perfectly monitor and assess all individuals' economic activity, states with higher-quality bureaucracies are better at collecting information (***Assumption 1***). For example, Evans (1995, 52) describes the Economic Planning Board in South Korea in the 1960s. The agency coordinated economic policy by controlling the budget process, which enabled "the concentration of talent and expertise and gives economic policy a coherence that it lacks in a less clearly organized state apparatus." By contrast, in Zaire under Mobutu Sese Seko, the bureaucracy followed the dictum to "make the quest for wealth and money an obsession," which encouraged citizens to engage in economic production outside the reach of the state (47).

The structure of the economy is another important factor. When only one or a handful of firms produce in a market, as opposed to a more competitive market structure, governments can more easily collect taxes. This premise constitutes ***Assumption 2*** in the model. Restricted market competition generates rents for firms, which the government can tax. Examples include access to import permits or to required licenses (Haber, 2006, 701). This often creates a symbiotic political relationship whereby the government has easier access to information about the firm's production, and the firm gains economic advantages from its political access. The government can also promote state-owned monopolies that further relax monitoring problems. "In cases where the government becomes the primary employer and producer and assumes the role of setting prices, its task is simplified to monitoring the activities of corporations and agencies that it owns and manages" (Chaudhry, 1993, 252). These considerations apply not only to regulating the domestic market, but also to tariff and other trade barriers.

Better bureaucracies can also mitigate the monitoring challenges created by greater market competition (***Assumption 3***). Chaudhry (1993, 251-2) discusses how "creating and regulating markets requires myriad financial, legal, and civil institutions, with stable and firm long-term commitments to regulate the actions of producers, importers, and labor; enforce contracts; and ensure the free exchange of information among economic groups." The government can only provide legal and other institutions to underpin market com-

petition by possessing considerable information about the private sector.

How can governments boost revenue intake? Governments actively shape the structure of economic production rather than take it as fixed, and can choose whether to promote or to restrict market competition. Providing an example of "building up," Engerman and Sokoloff (1997, 284) summarize the view from economic historians of the early United States: "broad advances in productivity were induced by the growth in volume and geographic extent of commence, originating in the extension of networks of low-cost transportation and increases in income" amid "the dramatic expansion of markets that characterized the period."

Alternatively, governments can "build down" by actively seeking to limit market competition and to create economic rents by engaging in co-optation arrangements (Haber, 2006, 701). Bates (1981) discusses how many African governments retained government-pricing schemes for agricultural marketing boards after independence—originally created to smooth income from cash crop exports—because they provide an easy source of taxation (15). State-owned enterprises are prevalent across the post-colonial world because they provide a "captive tax base" (Waterbury, 1993, 134). The Soviet Union provides an extreme example of eliminating all economic competition and forcing individuals to work for the state. Governments can also protect domestic markets from international competition, such as through mercantilist trade policies (Queralt, 2015), tariffs, or subsidized "infant industry" production. Such policies can generate considerable customs revenue.

B.2 Formal Statements and Proofs

Lemma B.1 (Supply effect)**.** *R^* strictly increases in b.*

Proof. Using Equation 1:

$$\frac{dR^*}{db} = L \cdot \left[\int_0^1 (1 - e_i) \cdot dF(e_i) - \int_0^{1-\hat{\tau}} \hat{\tau} \cdot dF(e_i) \right] \cdot \frac{dv(L,b)}{db}$$

This term rearranges easily to:

$$L \cdot \left[\int_0^{1-\hat{\tau}} (1 - e_i - \hat{\tau}) \cdot dF(e_i) + \int_{1-\hat{\tau}}^1 (1 - e_i) \cdot dF(e_i) \right] \cdot \frac{dv(L,b)}{db}$$

The bounds of the first integral assume $e_i < 1 - \hat{\tau}$, and thus the term in brackets is strictly positive. Therefore, $\frac{dv}{db} > 0$ (Assumption 1) implies the overall term is strictly positive. ■

Lemma B.2 (Labor supply effects)**.** *An increase in legal producers L affects equilibrium revenues, R^*, through two effects:*

1. ***Part a.*** *Strictly raises R^* through a direct effect of increasing the tax base.*
2. ***Part b.*** *Strictly lowers R^* through an indirect effect of decreasing the percentage of visible producers.*

Proof. The derivative of Equation 1 with respect to L can be decomposed into two components:

$$\frac{dR^*}{dL} = \underbrace{v(L,b) \cdot \int_0^1 (1-e_i) \cdot dF(e_i) + \big[1 - v(L,b)\big] \cdot \int_0^{1-\hat{\tau}} \hat{\tau} \cdot dF(e_i)}_{\text{Part a. Direct effect}}$$

$$+ \underbrace{L \cdot \left[\int_0^1 (1-e_i) \cdot dF(e_i) - \int_0^{1-\hat{\tau}} \hat{\tau} \cdot dF(e_i) \right] \cdot \frac{dv(L,b)}{dL}}_{\text{Part b. Indirect effect}} \tag{B.1}$$

The first term is clearly positive. The strict positivity of the expression in brackets in the second term follows from the proof of Lemma B.1. Therefore, $\frac{dv}{dL} < 0$ (Assumption 2) implies the second term is strictly negative. ■

Lemma B.3 (Interaction effect)**.** *A unique threshold $\tilde{b} \in (0,1)$ exists such that if $b < \tilde{b}$, then a unique $L_G^* \in (0,1)$ maximizes $R^*(L)$; and otherwise $L_G^* = 1$.*

Proof. We can set up an optimization problem with inequality constraints:

$$L_G^* \equiv \arg\max_L \; R^*(L) + \lambda_1 \cdot L + \lambda_2 \cdot (1-L)$$

The KKT conditions are:

$$\frac{dR^*(L)}{dL} + \lambda_1 - \lambda_2 = 0, \;\; L \geq 0, \;\; L \leq 1, \;\; \lambda_1 \geq 0, \;\; \lambda_2 \geq 0, \;\; \lambda_1 \cdot L = 0, \;\; \lambda_2 \cdot (1-L) = 0$$

We first show that $L > 0$. Suppose not, and $L = 0$. Then we need $\lambda_2 = 0$ to satisfy the second complementary slackness condition. $L = 0$ also implies $\frac{dR^*(L)}{dL} > 0$, but combining this with the requirement of $\lambda_1 \geq 0$ violates the first-order condition because $\frac{dR^*(L)}{dL} + \lambda_1 > 0$.

Next, we check whether $L = 1$ is a solution. If so, then we need $\lambda_1 = 0$ to satisfy the first complementary slackness condition, which reduces the first-order condition to:

$$\int_0^{1-\hat{\tau}} \hat{\tau} \cdot dF(e_i) + \left[\int_0^1 (1-e_i) \cdot dF(e_i) - \int_0^{1-\hat{\tau}} \hat{\tau} \cdot dF(e_i) \right] \cdot \left[v(1,b) + \frac{dv(1,b)}{dL} \right] - \lambda_2 = 0$$

Applying the intermediate value theorem proves the existence of at least one $\tilde{b} \in (0,1)$ that satisfies $\frac{dR^*(L,\tilde{b})}{dL}\big|_{L=1} = 0$.

- At $b = 0$, $\frac{dv}{dL} = -\infty$, which yields $\frac{dR^*(L,0)}{dL}\big|_{L=1} < 0$.
- At $b = 1$, $\frac{dv}{dL} = 0$, which yields $\frac{dR^*(L,1)}{dL}\big|_{L=1} > 0$.
- $v(\cdot)$ is continuous in b.

Uniqueness follows from:

$$\frac{d^2R^*(L,b)}{dLdb}\Big|_{L=1} = \left[\int_0^1 (1-e_i)\cdot dF(e_i) - \int_0^{1-\hat{\tau}} \hat{\tau}\cdot dF(e_i)\right]\cdot\left[\underbrace{\frac{dv(1,b)}{db}}_{>0 \text{ by Asst 1}} + \underbrace{\frac{d^2v(L,b)}{dLdb}\Big|_{L=1}}_{>0 \text{ by Asst 3}}\right] > 0$$

If $b < \tilde{b}$, the unique solution is $(L_G, \lambda_1, \lambda_2) = (L^*_{int}, 0, 0)$, for L^*_{int} implicitly defined as $\frac{dR^*}{dL}\big|_{L=L^*_{int}} = 0$. If instead $b > \tilde{b}$, then the unique solution is $(L_G, \lambda_1, \lambda_2) = \left(1, 0, \frac{dR^*(L,b)}{dL}\big|_{L=1}\right)$.

Finally, to prove these are maximizers, we show that $R^*(L)$ is strictly concave in L:

$$\frac{d^2R^*}{dL^2} = \left[\int_0^1 (1-e_i)\cdot dF(e_i) - \int_0^{1-\hat{\tau}} \hat{\tau}\cdot dF(e_i)\right]\cdot\left[2\underbrace{\frac{dv(L,b)}{dL}}_{<0} + L\cdot\underbrace{\frac{d^2v(L,b)}{dL^2}}_{<0}\right] < 0$$

■

Given this, we can state the subgame perfect Nash equilibrium strategy profile, which is unique with respect to the restriction that G offers the same tax rate to all hidden producers. The proof for the fiscal capacity investment decision follows directly from the proof for Proposition B.2.

Proposition B.1 (Equilibrium strategy profile)**.**

- ***Fiscal capacity investment:***
  - *If* $\alpha < \frac{R^*(L_0)+c}{R(L^*_G)}$*, then* $L^*_G = L_0$.
  - *If* $\alpha > \frac{R^*(L_0)+c}{R(L^*_G)}$ *and* $b < \tilde{b}$*, then* $L^*_G = L^*_b$.
  - *If* $\alpha > \frac{R^*(L_0)+c}{R(L^*_G)}$ *and* $b > \tilde{b}$*, then* $L^*_G = 1$.
- ***Taxation:*** *G offers $\tau_i = 1 - e_i$ to each visible citizen and $\tau_i = \hat{\tau}$ to each hidden citizen.*
- ***Selling decision for legal producers:*** *If $\tau_i \leq 1 - e_i$, then citizen i sells on the formal market. If $\tau_i > 1 - e_i$, then citizen i sells on the informal market.*

Proposition B.2 (Effect of demand shock)**.** *Consider* $\alpha' < \frac{R^*(L_0)+c}{R(L^*_G)} < \alpha''$.

Part a. Inefficient fiscal capacity investments. *Suppose $b < \tilde{b}$ and $L^*_b < L_0$. Then increasing α from α' to α'' yields $L^*_G < L_0$.*

Part b. Beneficial fiscal capacity investments. *Otherwise, increasing α from α' to α'' yields $L^*_G > L_0$.*

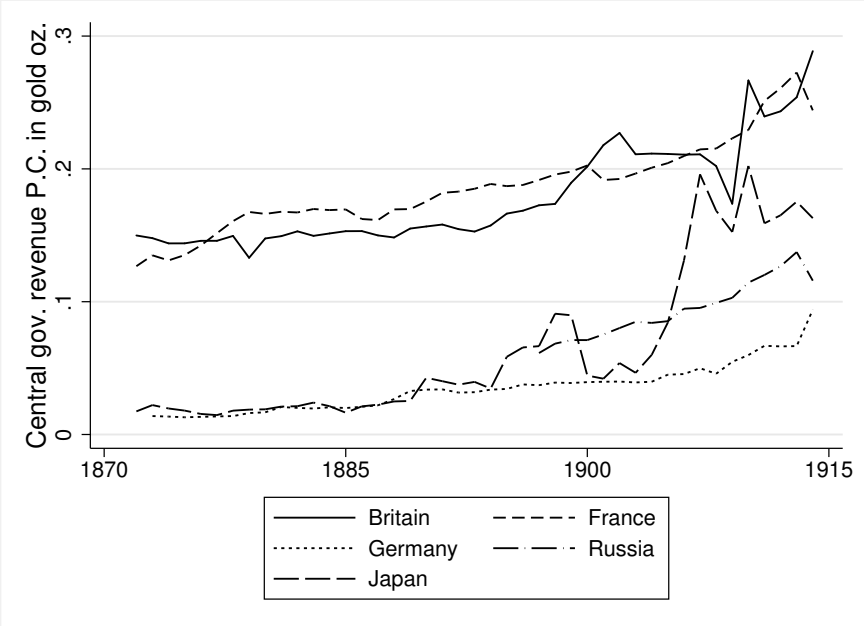
Proof. G makes a fiscal capacity investment if and only if $R^*(L^*_G)\cdot\alpha - c > R^*(L_0)$. This simplifies to $\alpha > \frac{R^*(L_0)+c}{R(L^*_G)}$. Lemma B.3 yields the claims about the ordering of L^*_G and L_0. ■

C Supporting Information for Section 5

C.1 Additional Figures

Our data on great powers outside of Western Europe is fragmentary prior to World War I: we have data for Japan since 1872 and from Russia since 1897, but no reliable revenue data exist for China or the Ottoman empire. Throughout this period, Britain and France raised more revenue than the other powers. Japan experienced rapid gains, especially after 1900, to eclipse both Russia and Germany, although it did not quite catch up to Britain and France. Reforms in Russia appear to have positively affected revenue and, perhaps surprisingly, Russia collected more revenue per capita than Germany. Thus, whereas Britain and France raised 6.3 times and 2.8 times more per capita revenue, respectively, than Russia in the 1780s (Dincecco, 2017, 69), by 1914, these respective gaps had narrowed to 2.5 times and 2.1 times.

Figure C.1: Great Powers, 1872–1914



Notes. The lines show estimated central government revenue per capita in ounces of gold, converted at nominal exchange rates.

C.2 Supply and Demand Measures

The following describes the supply and demand measures used in Table 1.

Supply. Fiscal capacity depends on the amount of detailed knowledge that a state possesses about its citizens. This factor strongly relates to the ability of states to raise funds because states that easily gather information about their citizens are better able to tax them (Kasara, 2007; Brewer, 1990). By contrast, states unable to exert this type of control are vulnerable to burgeoning informal sectors that are difficult to measure or to threaten. To measure state information capacity, we count the number of years in which a state possessed a mandatory civil registration system for births, marriages, and deaths. Such a system is essentially a precondition for effective direct taxation because otherwise bureaucrats face difficulties simply identifying the citizenry. Most of the data points come from Brambor et al. (2020), and we compiled data for several

additional countries. Broadly, the measure accords with intuitive conceptions regarding variance in a state's history of institutional capacity. Whereas Sweden, Britain, and France all had registration systems before 1800, Yemen and Haiti only implemented mandatory systems in the 1990s. We divide by 100 (so, effectively, the variable is hundreds of years with a registration system) to make the coefficient estimates more easily interpretable.

To measure political constraints on decision makers, we use the executive constraints subscore from Version 9 of the V-Dem dataset (Coppedge, 2018), which captures the degree to which the executive is constrained by the legislature and judiciary. We prefer this measure to the similar Polity IV executive constraint subcomponent because Polity does not include data for colonial-years (Polity, 2012).

The third supply measure uses van Leeuwen and Li's (2014) data on average years of educational attainment. High levels of human capital enable a state to create an efficient bureaucracy.

Demand. Following existing research, the analysis focuses mainly on international wars to proxy for demand for revenues. A robust literature associates participation in interstate war with higher levels of fiscal extraction, and also discusses the absence of such conflicts in many former colonies causing lower levels of fiscal capacity. We include an indicator variable for whether or not the country participated in international warfare in the previous year using the Correlates of War dataset (Sarkees and Wayman, 2010).

Higher levels of political participation should also associate with higher levels of demand for tax revenue. To measure political participation, we use we use the legally enfranchised population percent from V-Dem, which captures the breadth of input on political decision-making. V-Dem has consistent historical coverage throughout the nineteenth century for independent states, but for territories colonized through 1945, its data only go back to 1900. Because the percentage of population with the franchise was zero or essentially zero before 1900 in nearly every colony that gained independence after 1945, we impute a value of 0 for all such cases.

Table C.1: Summary Statistics

Variable	Mean	Std. Dev.	N
Log revenues per capita in gold	-2.102	1.402	5540
Ongoing war	0.109	0.311	5540
Percentage of population with suffrage	0.394	0.379	5505
Hundreds of years with a registration system	0.617	0.570	4670
Executive constraints	0.53	0.285	4145
Avg. years of education	3.29	2.733	5037
Log GDP P.C.	8.031	0.766	3619
Log population	8.364	1.802	5540
Independent country	0.6	0.49	5540

C.3 Controlling for Covariates

Although controlling for country and year fixed effects guards against many common confounding considerations, there may still be concerns about country-specific time trends that could drive the results. Three possibilities are: (1) our findings simply track increases in GDP over time, even though income spiked in Western Europe at least a half century before the great revenue divergence occurred (see Figure 5), (2) they reflect demographic changes, or (3) they are an artifact of including colonies in the sample or of new countries entering the international system, although country fixed effects address the last concern.

To address the second concern, Table C.2 adds logged population (from Mitchell 1998) and a post-independence indicator and shows largely similar results as Table 1 (the p-value in Column 4 is 0.117), although the war variables exhibit stronger evidence as important demand factors for revenues than does franchise size.

To address the first concern, Table C.3 controls for GDP per capita (from Bolt et al.'s 2018 update of Angus Maddison's data). Although the results from Table C.3 are consistent with our argument, the p-values are higher than in Table 1. However, a considerable amount of missing GDP data drastically alters the sample, which better explains the differences between Tables 1 and C.3 than GDP per capita itself. Of the 3,642 country-years with revenue data before 1971 among countries outside of Western Europe, offshoots, or East Asia, 55% are missing GDP data. By contrast, missingness is limited among WE/EA: less than 2% of the 1,850 country-years. Therefore, given the limited data coverage of historical GDP data, controlling for this factor eliminates considerable relevant variation in our explanatory factors by dropping many observations outside of WE/EA—obviating the main advantage of our revenue data. Table C.4 supports this argument in a different way by omitting the GDP control but using the same sample as in Table C.3. The similarity of the findings between Tables C.3 and C.4 suggest that the differences from Table 1 arise because of missing data rather than because GDP per capita drives the results. Unfortunately, however, the limitations of historical GDP data make it impossible to more definitively rule out this alternative explanation. Other GDP datasets exhibit even greater limitations in historical coverage—especially outside Western Europe—than Bolt et al. (2018), such as Penn World Table and the World Inequality Database that draws primarily from Thomas Piketty's research.

Table C.2: Assessing Interaction Effects, with Population and Independence Covariates

	DV: Logged central government revenue P.C. in gold oz.					
	(1)	(2)	(3)	(4)	(5)	(6)
War$_{t-1}$*Reg. system years$_{t-1}$	0.0542***					
	(0.0204)					
War$_{t-1}$*Exec. const.$_{t-1}$		0.158***				
		(0.0451)				
War$_{t-1}$*Education$_{t-1}$			0.0137***			
			(0.00400)			
Suffrage$_{t-1}$*Reg. system years$_{t-1}$				0.0485*		
				(0.0267)		
Suffrage$_{t-1}$*Exec. const.$_{t-1}$					0.0836	
					(0.0916)	
Suffrage$_{t-1}$*Education$_{t-1}$						0.0124
						(0.00786)
War$_{t-1}$	0.0123	-0.0430	-0.00731			
	(0.0262)	(0.0323)	(0.0226)			
Suffrage$_{t-1}$				-0.0151	-0.0467	-0.0296
				(0.0354)	(0.0447)	(0.0295)
Reg. system years$_{t-1}$	0.0244			-0.0181		
	(0.0502)			(0.0535)		
Exec. const.$_{t-1}$		-0.0162			-0.0554	
		(0.0533)			(0.0411)	
Education$_{t-1}$			-0.00659			-0.0167
			(0.0151)			(0.0121)
Log population$_{t-1}$	-0.0296**	-0.0513***	-0.0481***	-0.0249**	-0.0461***	-0.0452***
	(0.0131)	(0.0164)	(0.0110)	(0.0114)	(0.0153)	(0.0120)
Independent$_{t-1}$	0.00446	0.0141	0.00879	0.00466	0.0204	0.00588
	(0.0155)	(0.0216)	(0.0194)	(0.0196)	(0.0234)	(0.0177)
Country-years	4,491	3,991	4,846	4,489	3,991	4,818
Countries	68	83	81	68	83	81
R-squared	0.964	0.962	0.965	0.964	0.962	0.964
LDV?	YES	YES	YES	YES	YES	YES
Country FE?	YES	YES	YES	YES	YES	YES
Year FE?	YES	YES	YES	YES	YES	YES

Notes. Table C.2 presents OLS regression estimates with country-clustered standard errors. *** p<0.01, ** p<0.05, * p<0.1.

Table C.3: Assessing Interaction Effects, Add GDP P.C. Covariate

	DV: Logged central government revenue P.C. in gold oz.					
	(1)	(2)	(3)	(4)	(5)	(6)
War$_{t-1}$*Reg. system years$_{t-1}$	0.0306					
	(0.0318)					
War$_{t-1}$*Exec. const.$_{t-1}$		0.168***				
		(0.0530)				
War$_{t-1}$*Education$_{t-1}$			0.00885			
			(0.00548)			
Suffrage$_{t-1}$*Reg. system years$_{t-1}$				0.0753**		
				(0.0330)		
Suffrage$_{t-1}$*Exec. const.$_{t-1}$					0.101	
					(0.0786)	
Suffrage$_{t-1}$*Education$_{t-1}$						0.0183*
						(0.0107)
War$_{t-1}$	0.0312	-0.0570	0.0132			
	(0.0405)	(0.0412)	(0.0350)			
Suffrage$_{t-1}$				-0.0595	-0.0781**	-0.0776**
				(0.0422)	(0.0357)	(0.0312)
Reg. system years$_{t-1}$	0.181***			0.0774		
	(0.0521)			(0.0782)		
Exec. const.$_{t-1}$		0.00881			-0.0276	
		(0.0495)			(0.0435)	
Education$_{t-1}$			-0.0331			-0.0452***
			(0.0208)			(0.0144)
Log GDP P.C.$_{t-1}$	-0.0309	-0.0174	0.0146	-0.0421	-0.0298	0.000281
	(0.0474)	(0.0513)	(0.0359)	(0.0496)	(0.0486)	(0.0374)
Country-years	3,121	3,056	3,293	3,121	3,056	3,293
Countries	61	74	74	61	74	74
R-squared	0.965	0.963	0.964	0.965	0.963	0.964
LDV?	YES	YES	YES	YES	YES	YES
Country FE?	YES	YES	YES	YES	YES	YES
Year FE?	YES	YES	YES	YES	YES	YES

Notes. Table C.3 presents OLS regression estimates with country-clustered standard errors. *** p<0.01, ** p<0.05, * p<0.1.

Table C.4: Assessing Interaction Effects in Sample with GDP Data (Excluding GDP Control)

	DV: Logged central government revenue P.C. in gold oz.					
	(1)	(2)	(3)	(4)	(5)	(6)
War$_{t-1}$*Reg. system years$_{t-1}$	0.0306					
	(0.0311)					
War$_{t-1}$*Exec. const.$_{t-1}$		0.166***				
		(0.0537)				
War$_{t-1}$*Education$_{t-1}$			0.00893			
			(0.00558)			
Suffrage$_{t-1}$*Reg. system years$_{t-1}$				0.0725**		
				(0.0322)		
Suffrage$_{t-1}$*Exec. const.$_{t-1}$					0.0891	
					(0.0931)	
Suffrage$_{t-1}$*Education$_{t-1}$						0.0183
						(0.0110)
War$_{t-1}$	0.0330	-0.0551	0.0119			
	(0.0416)	(0.0433)	(0.0366)			
Suffrage$_{t-1}$				-0.0536	-0.0684	-0.0777**
				(0.0404)	(0.0443)	(0.0325)
Reg. system years$_{t-1}$	0.162**			0.0552		
	(0.0637)			(0.0923)		
Exec. const.$_{t-1}$		0.00605			-0.0278	
		(0.0532)			(0.0411)	
Education$_{t-1}$			-0.0320			-0.0452***
			(0.0225)			(0.0158)
Country-years	3,121	3,056	3,293	3,121	3,056	3,293
Countries	61	74	74	61	74	74
R-squared	0.965	0.963	0.964	0.965	0.963	0.964
LDV?	YES	YES	YES	YES	YES	YES
Country FE?	YES	YES	YES	YES	YES	YES
Year FE?	YES	YES	YES	YES	YES	YES
Sample	GDP	GDP	GDP	GDP	GDP	GDP

Notes. Table C.4 presents OLS regression estimates with country-clustered standard errors. The sample in every regression contains only country-years with GDP data. *** p<0.01, ** p<0.05, * p<0.1.

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