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Summaries of Doctoral Dissertations

The Dissertations of Jingyi Huang, Pawel Janas, and Sebastian Ottinger 2022 Allan Nevins Prize Competition of the Economic History Association

Next year marks the 50th anniversary of the formal establishment of the Allan Nevins Prize.[1] So, with four decades worth of data on past finalists for this award, I thought it fitting to begin my discussion by looking back at their history.

Where do Nevins finalists go? Figure 1 shows the first job placement of Nevins finalists by decade. I focus on two outcomes: the fraction who landed positions in the top-40 U.S. economics departments or equivalently ranked international schools, and the fraction who obtained tenure-track positions at REPEC-ranked departments.[2]

Nevins finalists have consistently enjoyed strong academic placements. Roughly one-quarter obtained tenure-track positions in top-40 U.S. departments, and more than half placed in ranked departments. These outcomes are similar to the placements of graduates from the best U.S. economics departments. For example, Oyer (2006) found that between 1980 and 2002, roughly half of the graduates from top-7 economics departments placed in ranked tenure-track positions, while 30 percent placed in top-50 international departments.

Figure 1 shows no clear trends in placements over time. This is somewhat surprising, given the marked changes in the overall job market for new PhDs, and the standing of economic history within the profession. If anything, recent cohorts of finalists have enjoyed slightly better job outcomes. For example, more than 70 percent of post-2010 graduates have placed in ranked departments, as compared to less than 50 percent in the previous three decades. These patterns align with broader trends in the visibility of economic history research in recent years (Abramitzky 2015).

Where do Nevins finalists come from? Figure 2 presents the graduate schools that have produced multiple Nevins finalists. I split the sample into two equal-sized groups of finalists: those graduating from 1973–1996 and those graduating from 1997–2022.[3]

In both time periods, finalists are disproportionately drawn from a handful of departments. Interestingly, while the two distributions look similar, the composition of schools has shifted. Early on, the top Nevins-producing schools were Chicago, Stanford, Illinois, and Washington. More recently, schools like UCLA, Northwestern, Harvard, and Arizona have produced a disproportionate share of finalists.

[1] Although an annual dissertation prize had been given out in prior years, the Columbia-Nevins Prize was first endowed and formally established in the 1973–1974 academic year (Boustan 2015).

[2] Ranked departments are those in the top 25 percent of all U.S. departments, based on the 2022 REPEC ranking. I also include placements at equivalently ranked international departments.

[3] In the first decade of the award, typically more than three prize finalists were selected. As a result, the two samples do not span the same number of years.

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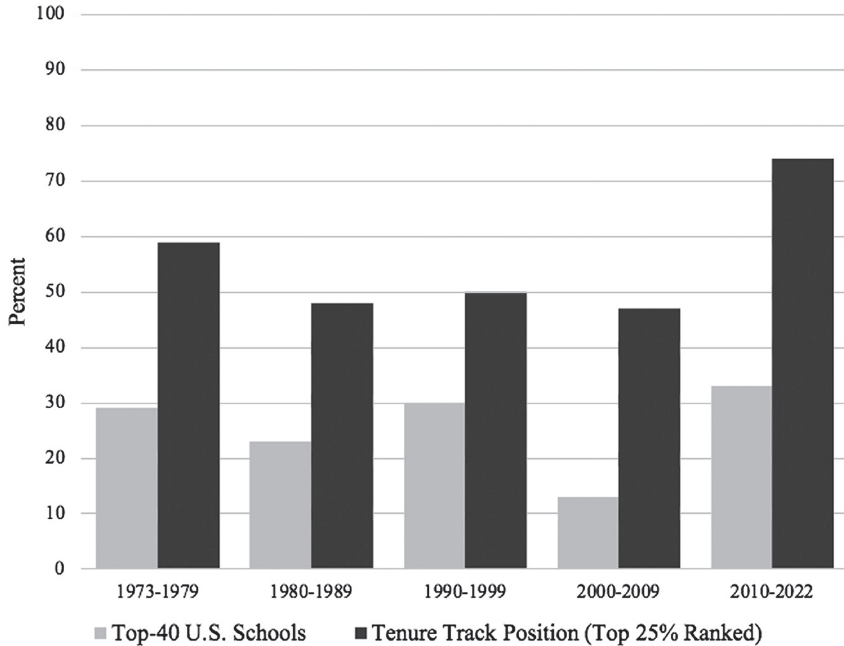

FIGURE 1
FIRST JOB PLACEMENT OF NEVINS FINALISTS BY DECADE

Notes: School rankings were made based on the 2022 REPEC ranking of economics departments.
Sources: Finalists were retrieved from various issues of the *Journal of Economic History*. Job placements were found through online searches.

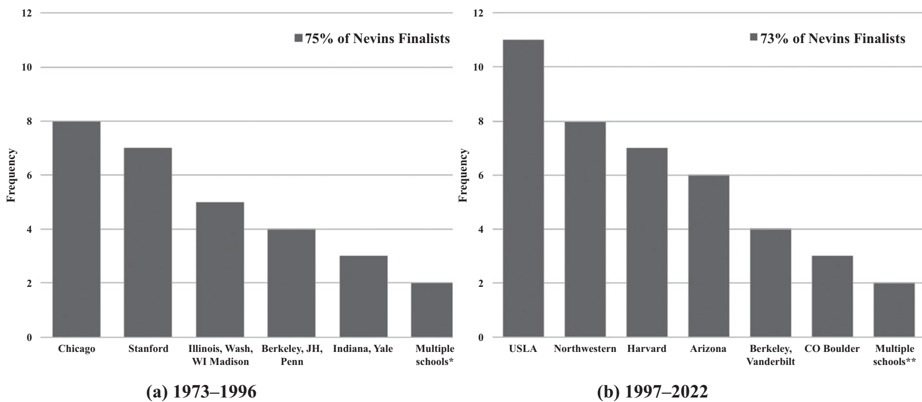

FIGURE 2
SCHOOLS THAT PRODUCED MULTIPLE NEVINS FINALISTS

Notes: Multiple schools* with two Nevins finalists from 1973–1996 include Columbia, Harvard, MIT, UC Davis, UCLA, and UNC Chapel Hill. Multiple schools** with two Nevins finalists from 1997–2022 include Columbia, LSE, Michigan, Pittsburgh, UC Davis, and Yale.
Sources: Finalists were retrieved from various issues of the *Journal of Economic History*.

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Sifting through the volumes of the *Journal*, I was struck by how many recent dissertation summaries thanked advisors who themselves were past Nevins finalists. Indeed, although I do not have a clever instrument, I suspect the data would show a strong correlation between the placement schools of past Nevins finalists and the PhD-granting schools of subsequent cohorts. This is not surprising, given the longstanding tradition within the Economic History Association of supporting research by graduate students. Today we welcome three new researchers into the field. I am sure they will contribute, not just through their research but also by continuing to foster and mentor younger cohorts of students in economic history.

It is a great honor to present the candidates for the 2022 Allan Nevins Prize. I received ten submissions for the prize. The quality of the dissertations was outstanding, which made my task especially difficult. Nevertheless, the three finalists stood out. Let me briefly discuss their work.

JINGYI HUANG

Jingyi Huang's dissertation is titled "The Impact of Innovation, Regulation, and Market Power on Economic Development: Evidence from the American West." It is an impressive study of interrelated issues in the development of the American West. In the first chapter, Huang explores the impact of the refrigerated rail car on American agriculture. This invention saved substantial shipping costs for livestock, and reduced the risk of weight loss or animal death during transport. Her empirical analysis exploits differences across counties in suitability for livestock versus grain production. Huang finds that the introduction of refrigerated rail cars caused agricultural production to shift towards areas more suitable for ranching that persisted for decades.

These are interesting findings that add to our understanding of the influence of innovation in American agriculture. Whereas previous research has focused primarily on the aggregate impacts of railroads (i.e., Fogel 1964; Donaldson and Hornbeck 2016), this paper highlights how refrigeration altered comparative advantage to reshape the geographic patterns of agricultural activity. Given that the potential gains from this technology depend not just on underlying land suitability, but also on proximity to markets, I would encourage Huang to delve more deeply into the sources of these geographic patterns.

Huang's second chapter is a detailed exploration of Chicago's meatpacking industry in the early twentieth century. Farmers shipped livestock to be sold to a group of five meatpackers, who openly colluded to manipulate wholesale prices. Huang highlights a fascinating, dynamic element to this collusion. Given lags in shipment, farmers had to pre-commit to sell before observing the spot price, and so were vulnerable to dynamic price manipulation. Huang documents this market collusion through both narrative evidence and descriptive statistics based on weekly price data from the major stockyards.

To estimate the costs of dynamic market collusion, Huang exploits a change in the regulatory environment that caused the cartel to stop holding their weekly price-fixing meetings. Although they could still manipulate markets through static collusion, the cartel could no longer coordinate dynamic pricing. Applying a structural model, she compares outcomes across both regimes to quantify the *additional* costs associated with dynamic price collusion. She finds that dynamic market manipulation hurt farmers through lower wholesale cattle prices, and imposed significant costs on downstream

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consumers through higher food prices. This chapter provides an example of first-rate economic history that speaks to current policy, particularly in developing countries, where small rural producers often enter relationships with a handful of powerful buyers.

In her final chapter, Huang assembles county-level data on nineteenth-century fence laws across a number of western states to study how the assignment of liability rules affects resource allocation. She compares "fence out" laws, which assign responsibility to farmers to protect land from livestock incursion to "fence in" laws, which assign responsibility to ranchers. In contrast to Ronald Coase's (1960) classic paper, her empirical results suggest that the assignment of property rights did, in fact, influence agricultural outcomes.

PAWEL JANAS

The title of Pawel Janas's dissertation is "Financial Crises and Growth: U.S. Cities, Counties, and School Districts during the Great Depression." I must admit that when I first read this title, I was skeptical. Given the extensive literature on the Depression, I thought, what more can be learned? I was wrong. Janas provides many fascinating new insights into this historical episode, drawing on an impressive array of novel data sources.

In Chapter 1, Janas investigates how local governments responded to the decimation of their revenue base during the Great Depression. Drawing on newly collected data on city spending and municipal bonds, Janas compares changes in spending outcomes across more or less leveraged cities during the Depression. He also implements a novel strategy based on the *timing* of bond due dates to compare outcomes across cities with similar debt levels, that were more less exposed to debt repayment during the Depression. Janas finds that financially constrained cities faced downgraded credit ratings during the Depression, and were forced to make significant cuts across a broad category of public spending. Beyond the headline findings, the detailed spending data allow Janas to provide a first-ever in-depth portrait of the operations of local governments through this unique period of financial distress.

In his second paper, Janas studies how adolescents educational choices were affected by the Great Depression. There is a sizeable literature on the elasticity of schooling choices with respect to youth labor market opportunities (e.g., Atkin 2016; Baker, Blanchette, and Eriksson 2020). Nevertheless, Janas highlights another mechanism at play during the Depression: the sharp drop in school funding temporarily reduced school quality, potentially lowering the incentive to stay in the classroom. Drawing on several new data sources, Janas provides convincing empirical evidence that the Depression did increase overall educational attainment, but that this effect was partially offset by worsening educational quality. Exploring how educational choices were influenced by within-household dynamics, such as parental job loss or migration, might be an interesting extension of the current analysis.

In his third chapter, Janas studies the role of the Atlanta Fed in affecting local access to credit and economic outcomes by acting as a lender-of-last-resort. His empirical strategy follows prior work (Richards and Troost 2009; Ziebarth 2013), but he brings several new sources of data, including county-level measures of pre-Depression financial constraints. He confirms the relationship between Fed policies and local credit conditions that has been documented by other researchers, but finds no evidence that

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the Atlanta Fed's policies improved local economic outcomes. These are interesting and surprising findings. As he continues this line of research, I would like to see him delve more deeply into understanding *why* his results diverge from the prior literature.

SEBASTIAN OTTINGER

Sebastian Ottinger's dissertation, "Essays on Political Economy and Economic Geography," is made up of three distinct papers, two of which address fundamental questions in American economic history, while the third focuses on Europe. In the first chapter, Ottinger studies the role of immigrants in shaping the geographic patterns of American economic activity. In doing so, he links two seemingly distinct historical phenomena: the massive inflow of foreign workers during the Age of Mass Migration and the rise of the U.S. manufacturing belt. He motivates the analysis with several case studies, describing the role of immigrant entrepreneurs in establishing local hubs of economic activity.

His empirical analysis is based on the insight that immigrants arrive endowed with different skills depending on their country of origin. He assembles data on comparative advantage across 49 manufacturing industries in 13 European origin countries to capture the "embodiment" of skills among new arrivals. Exploiting the unequal spatial distribution of different immigrant groups across U.S. counties in 1850, he then explores how differences in this measure of "immigrant specialization" affected the geographic patterns of industrial development in the latter nineteenth and early twentieth centuries.

Ottinger finds that the comparative advantage embodied in new immigrants predicts the growth in specific local manufacturing industries in subsequent decades. The early establishment of these industries persisted until well into the twentieth century, potentially due to agglomeration forces that locked in an early advantage. Interestingly, he also finds evidence that greater "immigrant specialization" predicts the entry of pioneer firms into a particular county-industry, and that these new firms were disproportionately *owned* by immigrants.

This is fascinating research that demonstrates the critical role of immigration in the emergence of the U.S. manufacturing belt. His work also highlights the contingent nature of economic history, which, in this case, depended on the particular destination choices of millions of new arrivals to the country.

In his second paper, coauthored with Max (Winkler) Posch, Ottinger studies how local political leaders responded to the political threat of the formation of new coalitions with minority groups. They study the short-lived electoral success of the Populist Party in the 1892 presidential elections, who sought support from both poor White and Black farmers, threatening the Democratic establishment in the South. Using archival newspaper data, Ottinger finds that Democratic leaders responded to this political threat through anti-Black propaganda. The effects are particularly large in counties with high levels of wealth inequality, where elites presumably have more to lose from redistributionist policies. Sadly, it appears that this propaganda was effective, as it contributed to persistent gains for Democrats in subsequent elections. Overall, I think this work provides important new insights into the determinants of racism and political repression of African Americans in the Postbellum South.

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The Impact of Innovation, Regulation, and Market Power on Economic Development: Evidence from the American West

This dissertation is an empirical analysis of how the interaction between innovation, market power, and regulation reshaped the American West between the late nineteenth and early twentieth centuries. American agricultural production experienced drastic technological change and regulatory shifts during this period. I focus on the long-term effect of mechanical refrigeration on agriculture productivity, how this innovation influenced market power in the meatpacking industry, and finally, the influence of liability rules on agricultural land use and livestock production. The evolution of technology, market structure, and legal frameworks in the past century provides a valuable angle to understand current policy challenges.

LONG-TERM EFFECT OF MECHANICAL REFRIGERATION ON U.S. AGRICULTURAL PRODUCTION

Despite the historical importance of refrigeration, few studies have empirically analyzed its long-term impact on American agriculture. Prior to refrigerated rail cars, livestock needed to be transported alive from farms to urban markets to be slaughtered and sold. The transportation process was costly and risked animals losing weight or dying on the trip. In 1880, meat packers in the Midwest acquired the patent to build the first refrigerated rail car. The invention significantly reduced the shipping cost of beef: carcasses could be shipped for one-third the cost of shipping live cattle. Within ten years, from 1880 to 1890, the number of cattle slaughtered in Chicago more than quadrupled, and the meatpacking industry became the second-largest manufacturing sector in terms of output value.

The research design exploits the variation in relative natural suitability for livestock versus grain production across counties to capture the impact of refrigeration. Perishable goods, such as beef, experienced a drastic reduction in transportation costs after 1880. Meanwhile, this change did not influence other non-perishable products, such as wheat. In other words, counties more suitable for livestock production were more influenced by the new technology, thus allowing an event-study analysis that compares changes in counties more or less suitable for livestock production before and after 1880.

The event study shows that after 1880, when refrigeration was commercially adopted in the meatpacking industry, counties that were relatively more suitable for ranching than farming witnessed more farmland development and higher output value. For every percentile increase in the relative suitability ranking, counties experienced a 0.1 percentage point increase in the share of land areas being developed as farmland and a

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0.5 percent increase in output value and land value. The effects also differ for counties across the range of relative suitability but persist over time. The results were driven primarily by the top two quartiles, but the impact on output and land value persisted until 1960.

MONOPSONY, CARTELS, AND MARKET MANIPULATION: EVIDENCE FROM THE U.S. MEATPACKING INDUSTRY

In addition to shifting upstream agricultural production, how does the new technology affect market power and the competition structure in the manufacturing sector? In this chapter, I answer this question by analyzing the American meatpacking industry in the early twentieth century.

Due to the high fixed costs, mechanical refrigeration created a few firms with unprecedented market power in the meatpacking industry. By the early twentieth century, five firms dominated the meatpacking industry. Under weak antitrust enforcement, they formed a monopsonistic cartel to manipulate the wholesale cattle market. The cartel dominated both the input market (cattle) and product market (beef): the five packers purchased 95 percent of cattle sold at the ten largest stockyards and produced more than 80 percent of refrigerated beef for urban markets. In an era of weak antitrust enforcement, they openly colluded to manipulate the wholesale cattle market from 1893 to 1920.

Standard monopsony models focus primarily on static and immediate responses to cartel strategies. However, for markets with substantial time to ship or time to build, current market outcomes may influence future supply decisions and thus make sellers vulnerable to a more complex form of dynamic manipulation. Because sellers must make future production or shipment decisions based on current market information, they must commit to the market before observing the realized spot market price at the time of delivery. If a monopsonistic cartel incorporates the delayed supply responses in the collusive strategy, the canonical static model may fail to properly assess the cartel damage on the market.

Two factors make this historical case particularly well suited to examining the effect of a dynamic monopsonistic cartel strategy. First, because the cartel was eventually challenged in court, the resulting litigation created detailed documentation on the cartel's manipulation strategies. The court found that the cartel members were guilty of "bidding up through their agents, the prices of livestock for a few days at a time, to induce large shipments, and then ceasing from bids, to obtain livestock thus shipped at prices much less than it would bring in the regular way." Second, exogenous changes in the regulatory environment forced the cartel to switch from the aforementioned dynamic strategy to a static, fixed market share agreement in 1913, while other features of the market remained unchanged. Thus, I observe the market outcomes under both dynamic and static strategies, but with the same market participants. This allows me to compare the empirical outcomes under the dynamic strategy to counterfactuals suggested by the well-understood static monopsony model.

The main analyses leverage exogenous regulatory changes that forced the cartel to switch from dynamic to static strategies. I first construct and estimate a static model of the cattle wholesale market using data after 1913, when the cartel strategy coincided with the static model. I then use the estimated static model to solve for market outcomes for the dynamic period *before* 1913. This recovers the counterfactual cattle wholesale prices and cartel quantities as well as downstream wholesale beef prices. The difference

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between the observed market outcomes under the dynamic strategy and the counterfactuals suggested by the static model is, therefore, the "additional" damage of the dynamic cartel strategy not captured by standard models.

I find two sets of key results. First, regarding the wholesale cattle market, the dynamic strategy causes more damage to small sellers than what is suggested by the standard model. Without cartel manipulation, the average cattle wholesale price would increase by 23.4 percent, which would increase the profit margin by 57 percent for the sellers. The average total quantity purchased by the cartel would also increase by 14 percent, or 15,000 more heads of cattle per week sold at the four stockyards. Second, regarding the downstream wholesale beef market, the dynamic strategy hurts urban consumers by reducing the beef supply and increasing household food expenditure. However, the effects are much smaller: without cartel manipulation, downstream wholesale beef prices would reduce by 6 percent, and total household food expenditures would reduce by $3.6 per year.

FENCE LAWS: LIABILITY RULES AND AGRICULTURAL PRODUCTIVITY

This chapter uses the historical evolution of fence laws in the American West to analyze the long-term effect of liability rules on resource allocation and productivity. In his seminal article, Coase (1960) uses an example between a farmer and a cattle-raiser adjacent to each other to illustrate that the assignment of property damage liability does not affect the allocation of resources. Cattle may stray and destroy the crops on the farmer's land. Regardless of whether the farmer or the cattle-raiser is legally liable for the trespassing damage, the land allocation between the two types of production should reach the same equilibrium, as long as the liability is well-defined and enforced, and the transaction is costless. However, despite the wide application, most research focuses on the effects of establishing and enforcing property rights. Few empirical works study how the assignment of property damage liability may influence resource allocation.

In the American West, counties assign the liability of protecting against animal trespassing to either farmers or ranchers. Under the "fence-out" rule, farmers can claim damage from owners of the trespassing animals *only if* they have enclosed the land with fences that satisfy specific regulatory requirements. Meanwhile, under the "fence-in" rule, farmers can claim damage from livestock owners *regardless* of whether the farms are enclosed with fences. In other words, the liability for livestock trespassing is assigned to farmers in some areas and livestock owners in others. Ranchers and farmers have long contested fence regulations. Prolonged public debates and occasional violent conflicts between farmers and ranchers suggest that this supposedly innocuous rule had profound economic implications.

I compiled data on all county-level fence-related regulation changes from the first state (or territorial) legislature until 1930. To the best of my knowledge, this is the first dataset that fully captures the legal environment for property rights protection during this period. I combine the fence law data with the decennial censuses, measuring land use, land value, output value, and productivity over the past century. This data provides a comprehensive legislative history of liability rules for the western states.

The analysis exploits the county-level fence laws variation over time to quantify the effects of liability rules on agricultural productivity. Consistent with historical accounts, the baseline difference-in-differences results show that fence-in rules incentived

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agricultural development. Compared to fence-out counties that required farmers to construct fences, the fence-in law increased the density of farmland and the share of improved farmland. By making ranchers liable for trespassing damages, the fence-in rule also increased grain cultivation area. This eventually translates to a higher total value of farm output for fence-in counties, although the higher productivity was not reflected in land values.

CONCLUSIONS

With newly constructed historical data and clear identification strategies, this dissertation provides new causal evidence on the persistent impact of innovation and regulation. It quantifies the long-term economic impact of some of American history's most important technological and regulatory changes. The results also expand our understanding of the interaction between innovation and regulation and how they can influence market structure and economic development. First, mechanical refrigeration benefited upstream agricultural production, especially in places relatively more suitable for ranching. Meanwhile, the high fixed cost of the new technology also created a highly concentrated market, resulting in welfare losses for both small suppliers and consumers. Finally, while antitrust laws improved welfare by restricting market manipulation, other seemingly innocuous regulations, such as the fence laws, created persistent resource misallocation.

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Financial Crises and Economic Growth: U.S. Cities, Counties, and School Districts during the Great Depression

I study the impact of financial frictions on local public good provision and economic activity during the Great Depression in the United States. To date, research has shown that the fragility of households and firms during crises is an important determinant of their outcomes: highly indebted households and firms with fractured creditor relationships seem to bear the brunt of recessions (Chodorow-Reich 2014; Mian, Rao, and Sufi 2013). Yet, leveraged local governments have received much less attention, despite the vast size of the municipal bond market and the economic importance of local public services.

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PUBLIC GOODS UNDER FINANCIAL DISTRESS

In the first chapter of my dissertation, I ask: when faced with financial constraints during a crisis, how much do municipalities adjust local public goods, and how much of this curtailment is due to financial market frictions?

I shed new light on these questions by studying how U.S. cities responded during the Great Depression. Building upon the work of Siodla (2020), I construct a historical dataset of local public good provision and debt from multiple archival sources on U.S. cities. I also supplement the city-level data with a second database of over 29,000 municipal bonds outstanding in 1929. To estimate the impact of leverage on local public good provision, I compare expenditure in more or less leveraged cities before and after the onset of the Great Depression using a difference-in-differences framework. I find that municipalities in the 75th percentile of pre-Depression leverage saw a 5 percentage point decrease across current expenditures and a 15 percentage point decrease in capital investment relative to cities in the 25th percentile. I find a significant effect on police and firefighting spending and capital investment and quantitatively smaller but significant effects on the other categories, such as health and sanitation.

I then unpack financial leverage into two distinct mechanisms: a causal refinancing supply-side channel and a non-causal demand-side channel. I study the refinancing channel by exploiting the quasi-exogenous timing of bonds becoming due right after the financial market crash of 1929, which led to a collapse of bond markets in the early 1930s (Hillhouse 1936). As a result, municipalities could not easily issue new debt to repay the principal owed on bonds that were becoming due during this time, and cities with more of these outstanding bonds were plausibly more constrained in allocating revenue between debt service and public goods. These bonds, however, were primarily issued well in advance of the onset of the Depression, such that the specific timing of these debt-repayment shocks was unlikely to be driven by the demand for new investment during the Depression (Almeida et al. 2009; Benmelech, Frydman, and Papanikolaou 2019).

I find that cities with more debt that matured during the Depression curtailed public good provision on capital investment and public service expenditure more than similar cities that did not face the same financial shock. Specifically, one standard deviation in the amount of bonds due is associated with a decline in current spending and capital investment of about 2.5 and 20 percent, respectively. Altogether, these results suggest that roughly 20 percent of the drop in expenditure can be explained through a re-allocation of budgets towards debt repayment. The lack of infrastructure demand from highly leveraged cities, on the other hand, can account for some of the leverage effects in the early years of the Depression but only a small portion of it after 1933. My findings suggest that financial market frictions played a significant role in the decrease in local public goods during the Great Depression in the United States.

CRISES AND INTERGENERATIONAL MOBILITY

In the second chapter of my dissertation, I shift my attention to the impact of reducing one particular public good during the Depression: public education. Specifically, I study the schooling behavior and intergenerational mobility of young urban males in the United States during the 1930s. Broadly, education is one mechanism through which younger generations climb the socioeconomic ladder and sever intergenerational links

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in economic outcomes—understanding the interaction between macroeconomic shocks and microeconomic mechanisms driving changes in human capital investment is essential for guiding education and labor policy (Goldin and Katz 1997; Black, McKinnish, and Sanders 2005; Cascio and Narayan 2015; Kerwin, Hurst, and Notowidigdo 2018). In this chapter, I take advantage of the decentralized public education system of the United States in the 1930s to study how schooling decisions are affected by changes in education quality and the opportunity cost of youth labor. When a crisis hits, do differences in quality and opportunity costs at the local level result in varying levels of educational attainment and, ultimately, intergenerational mobility? If so, who are the winners and losers of crises?

I study these questions by merging newly collected local data on youth unemployment and school quality during the Depression with linked full-count Census records (Abramitzky, Boustan, and Rashid 2020). First, I collect unemployment-by-occupation-by-age data from the Special Unemployment Census of 1931. Since the Unemployment Census canvassed only 18 regionally dispersed cities and 3 boroughs of New York City, I create estimates of youth unemployment for all other cities by taking a weighted average of regional youth unemployment-by-occupation rates, using 1930 occupation-by-city shares aggregated from the 1930 complete count Census as weights. Then, to obtain education quality measures, I digitize biennial records from the Census of Education from the U.S. Office of Education on revenues and expenditures at the city level from 1922 to 1938. I follow the economics of education literature and proxy quality with the change in the total real spending per pupil. I show that expenditure is closely related to the student-teacher ratio, average real teacher wages, and school term length.

My empirical strategy attempts to explain the within-city variation in high school graduation rates across cohorts using a difference-in-differences design using across-city variation in unemployment and public education spending cuts. The strategy thus compares the education outcomes of individuals on the cusp of making secondary schooling decisions during the Great Depression with those who graduated before the Great Depression within the same city, conditional on national trends and static city determinants of educational attainment.

I find that increases in the youth unemployment rate in 1931 significantly increased secondary school graduation rates: one standard deviation (4 percent) increase in unemployment caused a 1.2–1.6 percentage point increase in the graduation rate for the Depression-era cohorts and 0.9–0.12 more years of schooling. On the other hand, cuts in education spending decreased graduation rates by about a quarter of this effect. To put these numbers in perspective, I find that youth unemployment can account for 18–21 percent of the total increase in high school graduation during the 1930s, while education spending cuts attenuated this effect by 4–5 percent.

LENDER OF LAST RESORT AND LOCAL ECONOMIC OUTCOMES

In the last chapter of my dissertation, I focus on banking panics and local manufacturing activity. I use archival panel data on local manufacturing and banking conditions in the United States to investigate the link between policy, bank failures, and firm production and employment. I use the divergent policies enacted by the Atlanta Federal Reserve Bank, first brought to the literature by Richardson and Troost (2009) with additional contributions by Jalil (2014) and Ziebarth (2013), as my empirical laboratory. Unlike the other Federal Reserve banks at the time, Atlanta acted as a lender of last resort inside its region by extending credit to solvent but illiquid banks to prevent bank

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runs. Because the Federal Reserve borders bisect states and consumer markets, I can compare the local economic trajectories before and during the Great Depression using the quasi-exogenous incidence of bank failures.

In the first part of my analysis, I investigate the difference in bank failures between counties just outside the Atlanta border and those just inside it and explore its robustness. I find that banks failed less often inside the Atlanta region in 1929 and 1930, even after accounting for pre-existing differences in local banking conditions, excluding outliers and individual border segments, and measuring bank distress in various ways. I perform placebo randomization tests of the Federal Reserve's borders and find that the baseline results are unlikely to have occurred by chance. Additionally, I do not find much evidence that bank distress differed across the borders of Federal Reserve districts that did not follow different lender-of-last-resort policies. The results, taken together, suggest that credit conditions were more favorable in the early years of the Depression in the counties of the Atlanta district.

I turn to local manufacturing outcomes in the second part of my analysis. By combining an industry-level credit survey with pre-Depression industry-by-county data, I construct proxies for the financial constraints of small and medium-sized manufacturers in each county around the Atlanta region border. The survey shows that most of these manufacturers relied on commercial banks to finance both working capital and long-term investment, but the degree of these constraints varied by industry. By exploiting the geographical differences in the types of manufacturing along the Atlanta border, I compare economic activity across counties with fewer and more banking failures. Since commercial banks survived at a higher rate inside the Atlanta region, I hypothesize that manufacturing output and employment shrank less and recovered quicker there than in counties just outside the Atlanta region. Furthermore, I test whether the results are strongest for counties with firms in highly constrained industries.

I do not find evidence to support this hypothesis, which contrasts with the results of the existing literature. First, manufacturing outcomes were worse, not better, in counties inside the Atlanta region, despite having more banking resources. Second, I find evidence that the county-level financing constraints, on average across all counties, predict worse outcomes after, but not before, the Depression. Yet, the combination of pre-Depression measures of financial constraints and banking panics during the Depression was not an important determinant of local economic outcomes, as one might expect. Even though the Atlanta Federal Reserve's policies strengthened the banking sector early in the Depression, there was no positive downstream effect on firms, possibly due to the banking sector's reluctance to extend credit.

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Essays on Political Economy and Economic Geography

Can historical accidents explain regional specialization in manufacturing? Can politics be a source of hateful media content? Did national leaders before Napoleon matter? These are the questions in the fields of economic geography and political economy that I study in the three chapters of my dissertation. Throughout, historical settings provide quasi-experimental variation to identify causal effects.

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IMMIGRANTS, INDUSTRIES, AND PATH DEPENDENCE

Manufacturing industries cluster in space. Examples abound—in the past and present, in the United States and elsewhere. Detroit emerged as the nation's center of the automobile industry and remains so today. In the twentieth century, San Francisco Bay became "Silicon Valley." In the twenty-first century, Shenzhen—on a bay on the other side of the Pacific—became a global center of smartphone production. Jena, a medium-sized city in eastern Germany, arose as a center of the optics industry in the nineteenth century and remains so today.

Why do specific manufacturing industries end up clustering in particular regions? Economists have advanced three explanations and tested two empirically. The first emphasizes the natural resources of an area that might render it particularly suitable for specific industries. Second, a region's market access to consumers and suppliers of crucial inputs might do so as well. However, while these explanations can account to some extent for why particular regions specialize in specific industries, a considerable amount of regional specialization remains unexplained by both. A third, hitherto untested explanation is commonly advanced in a diverse plethora of case studies for specific industries (Krugman 1992), supported by established economic theory (Arthur 1990). Take two identical regions. Suppose, randomly, one of them gets an early start in a particular industry, and agglomeration forces are sufficiently strong. In that case, this region will emerge as a center of that industry and remain so. Co-agglomeration of industries along this industry's supply chain further cements the "lock-in" of this industry there. However, empirical evidence supporting these theories and anecdotal accounts is scarce.

In the first chapter of the dissertation, I provide such empirical evidence, leveraging the co-occurrence of two major developments in U.S. economic history in the nineteenth century. From this century on, the United States emerged as the most technologically advanced nation in the world, with a high degree of geographic specialization across its regions. Simultaneously, the United States attracted large numbers of immigrants from all over Europe. I create a measure of the potentially embodied industries of early or later immigrants that affect local employment patterns. This measure, henceforth immigrant specialization, combines the settlement patterns of all European origins in 1850 with the immigrants' origin specialization in all manufacturing industries based on their international trading patterns.

Immigrant specialization was a significant, sizable, and robust factor in employment patterns across U.S. counties in the early twentieth century, holding fixed initial employment patterns as of 1850, as well as other well-documented determinants of local specialization, such as market access or natural resource endowments. This baseline association is stronger in the novel industries of the Second Industrial Revolution and for immigrants from Germany, which was emerging as an industrial powerhouse in those industries only after 1850.

I show that this was more than an episode of immigrants bringing their industries immediately. Rather, early immigrants induced local specialization through exchange with their origins after arrival and by attracting later immigrants. Several pieces of evidence support this. First, the baseline association is even stronger for some industries that did not exist by 1850, such as electrical manufacturing or the auto industry. Second, on the frontier of settlement around 1850, the association between immigrant specialization and employment patterns is negative, indicating, if anything, negative

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selective migration to those counties. An instrumental variable strategy based on the movement of the frontier and the aggregate arrivals of European origin in the prior decade supports this. So does the historical record. Early immigrants to this frontier mainly were farmers, and major cities and industry specialization in these only formed decades after 1850.

The rich data available in the complete count census allows me to provide direct evidence for the mechanism underlying the baseline association of how early immigrants induced local specialization. To do this, I identify the pioneer entrepreneurs in each county and industry, that is, the first individual recorded as an owner or manager in a particular industry for each county. Immigrant specialization predicts the pioneers' entry, mostly after 1880. Their early entry helped select equilibria in county industries, shaping their destinations' specializations for generations.

The traces of the early immigrants can still be found in specialization patterns today. Immigrant specialization remains a strong predictor of employment patterns in 2000 for those industries that emerged after 1850, particularly on the frontier of settlement then, where early immigrants found a tabula rasa and had the most opportunity to imprint local specialization.

This paper exploits only one of potentially many shocks that might lead some locations to have an early start in an industry and build their comparative advantage in those to form a cluster. It lends direct empirical support to the importance of such early shocks and subsequent path dependence in shaping regional specialization in manufacturing.

THE POLITICAL ECONOMY OF PROPAGANDA: EVIDENCE FROM U.S. NEWSPAPERS

The second chapter of the dissertation, co-authored with Max (Winkler) Posch, studies the origin of hateful media content, drawing on the U.S. South after Reconstruction.

The People's Party, with its aim of redistributing from rich to poor, posed a threat to the Democratic establishment in the South. The Populists, as the People's Party was known, too, remained ambiguous regarding their position on race. This provided the segregationist Democratic establishment in the South with an incentive to fan racial outrage to alienate white voters from the Populists.

We use text data from local newspapers to identify hateful anti-Black content and show that its prevalence increased after the 1892 Presidential election, at which the Populists first ran on a nationwide platform, and in counties in which the Populists likely gained votes at the expense of the Democrats.

Additional results suggest a strong political motive behind this increase, indicating that Democratic political elites supplied this hateful content to further their electoral prospects and remain in control of local politics. All of the increase is driven by newspapers affiliated with the Democrats, and triple-difference results document that even within counties where at least one Democrat-affiliated newpaper and other newspapers are available, this increase is present in Democrat newspapers only. On the other hand, we find no effect for independent newspapers, which should have (profitably) reacted to local swings in demand as well. This and a battery of other results suggest that political elites used newspapers affiliated with them to supply propaganda to split their competitors' potential electorate.

While politics may remain a source of hateful media content in the present day and other contexts, the setting of the U.S. South after Reconstruction, with newspapers as

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tightly politically controlled media (Gentzkow et al. 2015), the lack of alternative media forms—since radio and TV had yet to be invented—and the fact that newspapers served highly local markets, offers an optimal testing ground for theories of divide and rule by elites for political gain (Glaeser 2005).

HISTORY'S MASTERS: THE EFFECT OF EUROPEAN MONARCHS ON STATE PERFORMANCE

The third and final chapter of my dissertation, co-authored with Nico Voigtländer, is set in European economic history and studies the effect of national leaders on the performance of the states they govern. While scholars since the nineteenth century have pondered the importance of national leaders, economists have brought identification to this debate (Jones and Olken 2005), exploiting the accidental deaths of modern heads of state. We turn to the historical leaders before Napoleon and advance a new identification strategy to identify the effect of national leaders' cognitive ability on the performance of their states.

We create a novel reign-level dataset for European monarchs, covering all major European states between the tenth and eighteenth centuries. We document a strong positive relationship between rulers' cognitive ability and state-level outcomes. To address endogeneity issues, we exploit the facts that (i) rulers were appointed according to hereditary succession, independent of their ability, and (ii) the widespread inbreeding among the ruling dynasties of Europe over centuries led to quasi-random variation in ruler ability. We code the degree of blood relationship between the parents of rulers, which also reflects "hidden" layers of inbreeding from previous generations. The "coefficient of inbreeding" is a strong (negative) predictor of ruler ability, and the corresponding instrumental variable results imply that ruler ability had a sizeable effect on the performance of states and their borders.

This supports the view that "leaders made history," shaping the European map until its consolidation into nation-states. We also show that rulers mattered only where their power was largely unconstrained. In reigns where parliaments checked the power of monarchs, a ruler's ability no longer affected their state's performance. Thus, the strengthening of parliaments in Northern European states (where kin marriage of dynasties was particularly widespread) may have shielded them from the detrimental effects of inbreeding.

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The Dissertations of Hanzhi Deng, Victoria Gierok, and Mark Hup 2022 Alexander Gerschenkron Prize Competition

I begin with an overview of some key characteristics of the submissions for the 2022 prize and then discuss the process I used to narrow down the submissions to finalists and then to select the prize recipient. I then discuss each finalist's dissertation in brief.

I received 24 valid dissertation submissions from graduates of economics, economic history, and history departments. The majority of dissertations came from institutions located in England, Europe, and the United States, but Europe is leading. Dissertations from U.S.-based institutions included several from history departments, with only four coming from U.S. economics departments. Nearly half (11) covered geographic areas of Europe and the United Kingdom. The next best-represented region was Asia (7), and an additional four explored international and comparative topics. Striking was the dearth of coverage of Africa and South America, with only one dissertation each.

The submissions covered a broad span of time periods—ranging from the late thirteenth to the twenty-first century—with nearly equal numbers exploring pre-industrial (7), nineteenth to early twentieth century (8), and post-World War I (7) topics. Two dissertations explored multiple or very long time periods. The range of topics was even more impressive and provided me with a "Summer Course on World Economic History Since 1282." The non-exhaustive list includes the following examples: Economic and political causes and consequences of migration; entrepreneurship under Russian socialism; wealth inequality, poverty, inheritance, political power (multiple); state fiscal capacity and related political institutions (multiple); India's caste system, income inequality, and social mobility; war reparations and sovereign debt; maritime rules, risk sharing, and trade in early modern Genoa (two); the role of regulation in banking and financial crises; communism, labor productivity, and economic efficiency; early modern globalization, empire, trade, and public debt; tropical agriculture, cash crops, globalization, and climate change; global currency unions and international monetary systems.

A couple of other patterns caught my eye: the gender breakdown and the extent of co-authorship of dissertation chapters. On the first topic, based largely on name identification and photos where names were not clearly gendered (to me), I found only 3 women in the pool of submissions, compared with 21 men. Given the gender breakdown in the economics profession and in the field of economic history more narrowly, I found this result surprising and concerning.

The other notable finding was the widespread practice of co-authorship in part and even in all of the dissertations submitted. Eleven candidates co-authored at least one chapter. Of those, five co-authored at least half of their dissertations, and one of those co-authored the entire dissertation. With the exception of one of the finalists, co-authored dissertations did not generally seem more complex or to involve substantially more involved data collection. Since the prize goes to an individual, I gave greater weight to the accomplishment of a sole-authored work.

THE CRITERIA

First off, it is important to emphasize that every dissertation submitted for the 2022 prize constituted a package of high-quality research and industrious efforts on the part

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of the candidates. For that, I congratulate each and every candidate. In order to begin to differentiate among the submissions, I set up a rubric of sorts and then rated each dissertation on a scale of 1 to 5.

My rubric assessed the originality of the topic or question being asked, the novelty of the data collection, empirical and analytical rigor, and quality of writing. I paid special attention to the demonstration of intellectual breadth and independent work and looked for dissertations that employed the methodological approaches of both economics and history and, preferably, would answer questions of wide interest. In other words, the ideal dissertation would be a sole-authored piece of work that took up an enduring dilemma or raised a new question that the field should be grappling with but has not. This model dissertation would then develop an integrated approach based on the latest methods from economics, combined with rich, historical, and institutional detail, and then proceed to unearth and analyze novel data sources. Indeed, it is a tall order to even conceive of such a dissertation, never mind execute it successfully. More than three of the dissertations submitted actually cleared this hurdle, but three of them stood out as truly outstanding examples of the best of what economic history research can offer.

THE FINALISTS

I give a very brief overview of the major contributions of each finalist's dissertation, presented in alphabetical order.

Hanzhi Deng: A History of Decentralization: Fiscal Transitions in Late Imperial China, 1850–1911

Dr. Hanzhi Deng completed his doctorate in economic history at the LSE under the supervision of Prof. Kent Deng. Motivating Dr. Deng's research is the long-standing, general question of state capacity, or the ability of governments to achieve policy goals, such as economic development and improving the well-being of the population. More narrowly, he wants to understand how China transitioned to a modernized fiscal state through evolving fiscal regimes. The originality of Dr. Deng's dissertation comes in the re-framing of China's political-economic development, particularly the causes and consequences of internal political and religious strife in the late nineteenth and early twentieth centuries. Encompassing seven chapters and two appendices, Deng's dissertation helps us understand the role of and regional variation in local governments' fiscal capacity and bureaucratic strength within a centralized, dynastic political system that was, at that time, relatively weak and struggling with political upheaval.

Dr. Deng begins the work with two chapters to set up the theoretical and historical contexts for his analysis. This careful attention to institutional details not only motivates the study for the reader but also allows him to improve the specification of his quantitative analysis. Then, using multifaceted, detailed, local-level data from novel sources, he employs multiple analytical approaches to grapple with causal relations.

In his first empirical analysis (Chapter 3), Deng studies the effects of the Taiping Rebellion of 1851–64 to understand the role of political disorder in fiscal state development and redirects the focus from the standard "Western" view to the impacts of indigenous shocks. He collects a prefectural-level dataset on the newly-created internal trade ("lijin") taxation for 18 provinces, along with a detailed accounting of Taiping warfare, also by prefecture, on a monthly basis. The fascinating analysis of battles demonstrates dramatic cross-sectional and temporal variation in intensity. Deftly weaving together

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the evidence, Deng is able to elucidate the role of local governments and conclude that the unusual level of local autonomy granted by the Qing central court in the early 1850s created a "bottom-up" fiscal restructuring and led to significant expansion. Highlighting the incentives and informational advantages of local governments, Deng traces the rapid transformation from a centralized, land-based tax regime into a decentralized and flexible system based on goods production and trade.

Deng then explores additional modes of indirect taxation (Chapter 4), comparing domestic and maritime customs and highlighting the effect of the ongoing warfare on destroying customs infrastructure and leading to greater dependence on the lijin. Meanwhile, the loss of the Second Opium War led to a Western-run maritime customs system. Deng argues that this dual system improved efficiency and ultimately benefited fiscal balances compared to the old direct, land-based system. In the last two empirical chapters, Deng considers changing patterns of public borrowing (Chapter 5) and expenditures (Chapter 6), and connects the new, local orientation and control to a growing responsiveness and accountability in public goods provision and economic growth.

Deng's collection of Late Qing era fiscal reports, in combination with data on indirect taxation, foreign borrowing, public spending, and local industrialization, as well as atlases of late Qing rebellions and wars, will form the basis for a range of ongoing studies and contribute much needed data for future researchers studying this turbulent period in Chinese history. Deng's dissertation also contributes to the ongoing debates over the "fiscal Great Divergence" between China and Europe and, in so doing, demonstrates how China's development of local fiscal capacity spurred industrialization. Given the ongoing debates over the "Great Divergence," I anticipate that Hanzhi Deng's novel contribution will make a lasting impression on the field.

Victoria Gierok: The Development of Wealth Inequality in the German Territories of the Holy Roman Empire, 1300–1800

Dr. Gierok completed her doctorate in history at Oxford University under the supervision of Stephen Broadberry. Her work contributes to an area of research, both long-standing and of increased recent interest, into the drivers of inequality and the relationship between inequality and economic growth. Based on a wealth of original data and spanning seven chapters and six appendices, Dr. Gierok's dissertation provides a completely new understanding of patterns and drivers of inequality and poverty in Germany during the pre-industrial age. In the process, she adds to new research that extends and revises the patterns famously laid out by Simon Kuznets in his model of inequality over the arc of the industrial revolution (the so-called "Kuznets Curve").

Gierok's approach is to develop a ground-up characterization of wealth inequality and poverty rates—comparing rural versus urban—and to assess the impact of disease, war, gender discrimination, economic institutions (guilds), and fiscal extraction. As the core of the work, she develops two massive new databases (one collaborative) on household wealth taxes and municipal budgets. The household-level dataset covers more than 35 urban and over 100 rural communities at 25-year intervals between 1300 and 1850, amounting to over 100,000 observations. The city-level dataset covers over 30 city budgets. The samples represent the demographics and politics of pre-industrial Germany.

Dr. Gierok provides an extremely thorough institutional and statistical analysis, employing careful modeling of distributions and identifying causal influences. She provides several new insights into long-term patterns of poverty and wealth inequality

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in pre-industrial Germany (Chapter 3). First, taking the very long-term view, she shows that inequality passed through two extended waves: a decline following the Black Death of the mid-1300s; an upswing starting around 1450 until the start of the Thirty Years' War in 1618; another decline until 1700; followed by another increase. Gierok's new characterization starkly differentiates Germany's experience from that of other European regions throughout the early modern period, where wealth inequality increased more steadily. The clear culprit is the dramatic, deleterious impact of the Thirty Years' War and its corollaries of plagues and famines.

Next, Gierok develops poverty estimates and demonstrates how poverty generally followed a similar path as inequality, with the notable exception of the peak during the Thirty Years' War, when both poverty and inequality rose (Chapter 4). She also highlights the disproportionately negative impact of the war on rural communities, where combatants destroyed cultivated land and livestock.

In a deeper dive into the detailed records of one city, Freiburg, Gierok takes on the issue of gender discrimination in the guild system and its effects on economic growth from the late fifteenth to the late seventeenth century (Chapter 5). Again, the tax registers reveal clues, in this case pointing to low rates of female headship in this guild-dominated city. With the onset of the Thirty Years' War, however, women began to gain traction in the guilds and especially in the textile trade. Overall, women fell disproportionately into poverty and found meager economic opportunity. This strikingly rich study could form the basis of a broader analysis of the impact of economic institutions, such as guilds, on gender disparities over an extended trajectory.

Gierok's penultimate chapter (Chapter 6) provides a range of new estimates of fiscal extraction for a representative sample of 49 German cities from 1300 to 1800 and highlights the role of taxation in driving inequality and poverty. Her novel measures of per capita "fiscal pressure" shows that these forces remained relatively low throughout the late Middle Ages but increased over the decades leading up to the Thirty Years' War—causing Germany to overtake even more advanced areas of England, the Netherlands, and France. The benefit of the new fiscal data is that it will aid in explaining the coincident increase in wealth inequality and the connection to the widespread and enduring impacts of pandemic disease and war.

This dissertation far exceeds the more common standard of three papers "stapled" together and surely sets the stage for a full-length monograph. Moreover, the databases she presents should provide material for Gierok and many other researchers to exploit and expand on for years to come.

Mark Hup: Essays on Fiscal Modernization, Labor Coercion, State Capacity and Trade

Dr. Hup completed his PhD in economics at the University of California at Irvine under the supervision of Dan Bogart. Another dissertation addressing the problem of state capacity, the three papers in his dissertation take on various aspects of the tax system in Colonial Indonesia of the late nineteenth and early twentieth centuries. Hup undertakes a political economy analysis of the institutional and trade-related drivers behind the shift from coerced labor to monetary taxation to provide a new understanding of the centralization and monetization of fiscal extraction in Indonesia. He first creates a novel, longitudinal database of provincial-level coerced labor, taxation, and trade and then provides careful quantification of institutional factors with attention to identification issues.

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Beginning with a study of fiscal modernization from 1874 to 1905, Hup finds countervailing forces that pushed the Indonesian state toward centralization of financing through monetary poll taxes, but also delayed such a transition away from forced labor (corvee) due to indigenous officials working to expand state capacity on the local level. In the subsequent decades, as Hup shows in his second chapter, labor-intensive trade expansion propelled further reductions in forced labor. As workers could buy out of corvee stipulations, they effectively converted labor into monetary tax revenues. Hup also shows that the drop in trade during the Great Depression reversed the trend, creating a relatively flexible system that allowed workers to opt in and out of monetary versus labor-based taxation, thereby alleviating information-collection requirements on the state.

Hup's third essay takes up the issue of tax farming—the privatized collection of taxes on behalf of the state—that was widely used in earlier periods and is still used today in some places. Using a novel province-level dataset of tax revenues and state officials in colonial Java from 1874–1905, he shows how Indonesian state capacity expansion led to less reliance on tax farming around the turn of the twentieth century. Further, consistent with his hypothesis, he finds that the majority of indigenous populations, who were traditionally excluded from tax farming, pushed to convert tax collection to state collection bureaucracy.

Overall, Hup's three essays, complete with well-documented institutional details, provide a new understanding of the emergence of the modern fiscal state in Indonesia, an area whose economic history has received relatively little attention. This case also highlights the complexity and importance of optimal taxation schemes and how they evolve with state capacity, as well as the interplay and consequent political power dynamics between colonial administrators and the populations they ruled.

COMMON ELEMENTS OF EXCELLENCE

To summarize briefly the accomplishments of the three finalists for the 2022 Gerschenkron Prize, I underscore the common elements of excellence across the three works. All of the finalists asked big and deep questions, demonstrating intellectual curiosity and an unusual level of independent and richly-detailed work. Only one chapter of one of the three dissertations had co-authorship, and that stemmed from an enormous, externally-funded, collaborative data collection effort. The three dissertations all opened up a "black box" of aggregate, long-run patterns with the painstaking collection of truly novel micro- or municipal-level data and the use of rigorous analysis, both statistical and institutional. By coincidence, all three dissertations related to taxation, either as the topic itself or as the evidentiary basis that elucidated the topic of concern, such as wealth inequality. This fact points to the treasure trove of original source material that likely awaits diligent and energetic economic historians willing to undertake the painstaking work of unearthing, cleaning, and analyzing such records in myriad countries over a span of many centuries.

It was a real challenge to decide on and then among the finalists for the 2022 Gerschenkron Prize. I extend my congratulations to all 24 candidates who submitted their work, the three finalists, and especially to Dr. Hanzhi Deng as the ultimate recipient of the prize.

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A History of Decentralization: Fiscal Transitions in Late Imperial China, 1850–1911

A key question regarding the state building of late Qing China (1850–1911) is why a precarious central court led not to a collapse but to the remarkable transformation of its fiscal-military regime. It offers us an opportunity to speak to the spectacular state capacity literature, where the making of a fiscal state is a time-honored theme.

Pioneering historians outline a Whig-style roadmap for state evolution, including the phases of a tribute, domain, tax, and fiscal state,[1] while explaining such transitions is quite challenging. The financial history scholarship identifies several clusters of driving forces, such as the early takeoff of financial sectors (Dickson 1967; Brewer 1990), *ex ante* commercial prosperity (Mathias and O'Brien 1976; Mathias 1979; O'Brien 1988), and professional bureaucracy (O'Brien and Hunt 1999). Meanwhile, historical sociologists stress the role of a common geopolitical factor in Europe—international wars—in the making of fiscal-military states.[2] Furthermore, new institutional economics establishes a more coherent framework: the combination of historical and rational-choice institutionalism not only incorporates structural factors and shocks but also accepts multiple potential outcomes of institutional evolution; this enables the actors in the repertoire to rationalize their behaviors in a dynamic way.[3]

The aforementioned literature broadly defines a "fiscal state": first, a unified legal and bureaucratic system with state sovereignty; second, monetized taxation with a broad tax base; and third, adoption of public credit tools with long-term commitment from the state. However, this definition suffers from external validity problems when applied from European nation states to other regimes such as city states and empires.[4] Heterogeneities of regimes force us to rethink the current framework, and it can be particularly helpful to reexamine the following four issues.

The first is the role of wars: international wars were indisputably important in modern Western Europe, but this pattern may not apply in other geopolitical environments.[5]

[1] See Schumpeter (1954) and Ormrod, Bonney, and Bonney (1999) for their groundbreaking contributions.

[2] The term "fiscal-military state" coined by Brewer (1990) has been widely recognized. Meanwhile, see Tilly (1975, 1990) for the eminent thesis that "war made the state." Finer (1997) and Epstein (2000) focus on specific political or socioeconomic aspects. Other works centering on wars offer more nuanced mechanisms of fiscal-military transitions by combining certain structural factors and timings of transitions (Poggi 1978; Downing 1992; Ertman 1997).

[3] See North and Weingast (1989) for the "constitutions and commitment" paradigm in Britain. For more theories, see Levi (1989), Besley and Persson (2008, 2009, 2010, 2011), and Genniaoli and Voth (2015). For empirical evidence, see Rosenthal (1998), Kiser and Linton (2002), Dincecco (2009), Karaman and Pamuk (2013), and Dincecco and Katz (2016). For recent surveys, see Hoffman (2015) and Johnson and Koyama (2017).

[4] Regarding discussions on a Swiss city state, see Altorfer-Ong (2007). For the heterogenous empires—bureaucratic and colonial ones—see Karaman and Pamuk (2010), Gardner (2012), and Frankema and van Waijenburg (2014).

[5] For instance, see Dincecco, Fenske, and Onorato (2019) for Sub-Saharan African evidence.

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Furthermore, the role of internal insurrections is usually understated, while existing studies suggest contradictory results.[6] The second issue is the pattern of political participation: representative institutions occupy a central place in European narratives, whose importance may be overstated in other contexts.[7] The third issue is tax base: indirect taxation enjoyed remarkable growth in the modern Western world; for contemporary times, contrastingly, direct taxation has become increasingly important as a channel of redistribution and welfare provision.[8] However, this temporal pattern may not be accepted as a global law. The final issue is the principal-agent problem, the severity of which is mainly determined by country size and distance from the periphery to the power center. The literature on nation states underlines the efficiency and economy of scale brought by centralization.[9] However, what a giant bureaucratic or colonial empire needed was not absolute centralization, but a sophisticated trade-off between centralization and decentralization.[10]

This thesis revises the current fiscal-military state theories by reexamining fiscal changes of late Qing China, a key observation in the Great Divergence debate. It employs the new institutionalist framework and investigates how both pre-1850 socioeconomic conditions, such as demographic patterns and fiscal infrastructure, and post-1850 shocks, such as the Taiping Rebellion (1851–64), ultimately reshuffled the imperial fiscal regime; it also examines how central and local agents reconsidered their endowments and constraints and thereby rationalized their behaviors.[11] This thesis avoids treating Qing China as a single research unit;[12] instead, it deconstructs the political hierarchy into multiple layers and emphasizes the spatial and temporal variations of fiscal practices at the provincial and prefectural levels.

By emphasizing the role of local governments, this thesis concludes that local fiscal-military autonomy granted by the precarious Qing central court in the early 1850s served as the ultimate impetus for bottom-up fiscal restructuring and expansion. Rational local agents with strong incentives and information advantages transformed the over-centralized, rigid, and land-tax-based fiscal regime into a decentralized and dynamic one within several decades. This local-centered fiscal regime became increasingly responsive to socioeconomic challenges and accountable for public goods provision and economic growth.

This thesis aims to make several contributions. First, it transcends the current nation-state benchmarks by analyzing a bureaucratic empire whose regime accountability, elite

[6] Besley and Persson (2010) indicate a negative effect of internal war; for corresponding empirical evidence, see Centeno (2002), Cárdenas, Eslava, and Ramirez (2014), and Ch et al. (2018). Contrastingly, Slater (2010) and Rodríguez-Franco (2016) show how internal conflicts foster rather than impede fiscal development.

[7] See Mann (1987) and Tan (2013) for imperial China, where representative institutions were severely lacking.

[8] See Besley and Persson (2009). For more discussions from the expenditure side, see Lindert (2004) and Hoffman (2015).

[9] See Dincecco (2009), He (2013), and Koyama, Moriguchi, and Sng (2015) for more details about Japan.

[10] For example, in imperial China, the *prima facie* fiscal centralization was maintained in the long Ming-Qing history, but the state apparatus as a whole undertook tremendous communication costs (Sng 2014). This thesis argues that due to this severe principal-agent problem, the fiscal regime suffered a long-term malaise.

[11] See Hall and Soskice (2001), Thelen (2004), and Ogilvie (2007) for relevant theoretical perspectives.

[12] The risks of doing so have been widely recognized, so narrowing down the scope and conducting regional studies have been common practices (Skinner 1977; Pomeranz 1993, 2000).

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structure, and geopolitical condition differed greatly. Secondly, it provides more conceptual nuance about state capacity by identifying and distinguishing "central/local capacity" and "taxation/spending capacity." Thirdly, it reinterprets the paths and mechanisms of China's modernization[13] and develops a coherent narrative for various bottom-up fiscal phenomena. Finally, it offers general implications on how fiscal capacity triggered and facilitated industrial modernization, a key theme in the Great Divergence literature.

FORCED DECENTRALIZATION: TAIPING REBELLION AND LOCAL INDIRECT TAXATION

The early-nineteenth-century Qing public finance had suffered a chronic malaise, and the abrupt Taiping Rebellion (1851–64) triggered the unprecedented transitions. The rebellious regime failed to attract gentry elites and mass people, whereas the Qing state took this opportunity to strengthen its legitimacy and capacity. The precarious central court abandoned the *ancien régime* and granted local governments the greatest fiscal-military autonomy in exchange for dynastic longevity. Hence local governments not only established new armies and militias but also introduced a novel tax, the *lijin*, to finance their military actions. *Lijin* was an indirect tax on transported goods, usually levied at the transportation hubs on key roads and waterways.[14] The Qing regime survived the Taiping crisis with timely *lijin* income, and local governments firmly preserved their *lijin* funds in the postwar decades.

This chapter quantifies the prefectural intensity of Taiping warfare with archival materials;[15] it uses available surveys to map the rise, spread, and postwar persistence of the *lijin* institutions at the local level, too.[16] It presents an internal "war making state" story by constructing the link between the Taiping Rebellion and the rise of indirect taxation, through which the *de facto* local fiscal system gradually took shape.

INDIRECT TAXATION: DOMESTIC CUSTOMS, MARITIME CUSTOMS, AND LIJIN INSTITUTIONS

This chapter continues discussing indirect taxation and expands the scope to all types of late imperial indirect taxation, namely *lijin*, domestic customs (*changguan*) and maritime customs (*yangguan*).[17]

Before 1850, the Qing state had maintained a domestic customs network, but it was only able to capture very few long-distance flows of goods, thereby making a limited fiscal contribution. After 1850, two novel institutions—*lijin* by local governments,

[13] For revisionist interpretations of China's modernization in recent years, see Halsey (2015) and Li (2019).

[14] Although long-distance trade was disturbed by warfare, resilient short-distance trade still provided local governments with sufficient tax sources.

[15] This chapter constructs the Taiping warfare data by referring to atlases (Guo 1989; Hua 1991), chronologies (CMH 2003; TSU 2013), and archival materials consisting of memorials and edicts (FHAC 1996).

[16] The *lijin* surveys come from Luo (1936) and Chen (2015).

[17] This chapter aggregates domestic customs revenue data (Ni 2017), maritime customs revenue data (Tang 1992), and *lijin* data (collected in this thesis) to examine the overall performance and structural change of late Qing indirect taxation. Furthermore, it employs data on population (Cao 2001), wages (IISH 2019), and GDP (Broadberry, Guan, and Li 2018; Ma and de Jong 2019) to measure the temporal changes of Qing indirect taxation capacity.

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and maritime customs as an independent apparatus under Sir Robert Hart[18]—formed an unintentional "duopoly" and served as two new cash cows for the empire because of their distinct tax bases and clearcut accountability, while the old domestic customs were crowded out. From 1850 to 1900, the overall Qing indirect tax revenue achieved a steady growth, the share of which in total government income grew from less than 30 percent to over 60 percent. The ratio of tax to GDP increased significantly, too.

Furthermore, this chapter finds an interesting competition between *lijin* and maritime customs due to the commutation tax (*zikoubanshui*) scheme, in which the merchants engaged in import-export trade could choose to pay either *lijin* (to local agents) or commutation tax (to maritime customs). This competition fully manifested the rationality and pragmatism of *lijin* and maritime customs, as both applied great efforts to attract more taxpayers, such as lowering tax rates and simplifying clearance procedures.

FOREIGN BORROWING: LOCAL FISCAL CAPACITY AND THE ADOPTION OF DEBT FINANCE

This chapter connects taxation to debt finance. How did the Qing state tackle fiscal shortfalls? Before 1850, the central court was responsible for all local exigency management and interregional resource redistribution. However, after 1850, the steadily growing tax revenue and the access to foreign capitals via the treaty port system enabled local governments to employ foreign loans, secured by local future revenue, to mitigate their fiscal constraints. This chapter studies the fundamentals of over 230 late Qing foreign loans during 1853–1912;[19] it links the foreign borrowing data to the late Qing taxation data of previous chapters and finds a strong relationship between taxation capacity and borrowing capacity at the provincial level.

At the initial stage, local officials raised small short-term loans without *ex ante* central consent for military exigencies, but in the long term, as local governments became more accountable to a wide range of public affairs, they began to launch developmental projects such as telegraph and railway construction and intentionally sought funds from foreign banks. This chapter finds that such "developmental" loans accounted for the bottom-up introduction of China's modern infrastructure and expanded the scale of public budgets permanently. Through a typology, this chapter deduces that most loans with long-term prospects for public interest were initiated by local governments, rather than the central court, in the late Qing era.[20]

PUBLIC SPENDING: LOCAL FISCAL AUTONOMY AND SELF-STRENGTHENING INDUSTRIALIZATION

Expedient transitions during the Taiping crisis unexpectedly reshaped the Qing intergovernmental fiscal relations. From then on, the central court refrained from monitoring the national budget and focused only on a limited number of affairs, such as central official salary payment and royal household consumption, for which it required provinces

[18] See Van de Ven (2014) for a survey of the maritime customs system.

[19] The compilations employed are Xu (1962), PBCCO (1991), and Xu (1996).

[20] In comparison, the Qing central court resorted to foreign loans in a very late phase for massive war reparations in 1895–98 and 1901, which brought disastrous and prolonged consequences to the entire fiscal system by crowding out other investment opportunities and intensifying the central-local conflicts.

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to send fixed annual portions to Beijing. Once the latter had fulfilled their obligations under this apportionment scheme (*tanpaizhi*), they could control excessive revenues, and their local budgets were no longer supervised by Beijing. Hence, they were incentivized not only to cultivate new fiscal sources but also to rationalize local spending structure. During 1850–1911, the share of central spending in the total government budget declined sharply, while local spending on modern military investments, local infrastructure, etc. grew steadily in both amount and share. Diverse spending patterns across provinces well manifest the nature of fiscal decentralization.

Among various spending accounts, this chapter studies an important aspect—local industrial investment since 1860—by compiling relevant sources and constructing a dataset of over 4,000 enterprises.[21] Local governors with local funds introduced modern industries for both defense purposes and long-term economic gains. This Self-Strengthening Movement covered a series of heavy and light industries and marked the start of China's native industrial modernization. Official-led arsenals and shipyards intentionally brought in Western technological and managerial expertise and thus offered an external economy of scale for private firms. Improvements of infrastructure, such as railways and telegraphs, proposed and financed mainly by local governments, were also conducive to a conceivable industrial takeoff for not only the late Qing but also the early republican periods. In a word, when the central court remained conservative, local governments resorted to a more dynamic and developmental statecraft.

CONCLUDING REMARKS

Decentralization during the Taiping crisis was a triggering condition for late Qing fiscal transitions. It reshaped the objectives, tasks, endowments, and constraints of local actors and hence initiated a series of irrevocable transitions in taxation, borrowing, and spending. The central court gradually refrained from fiscal-military imperatives and acquiesced to such transitions;[22] by contrast, local governments as "stationary bandits" were sufficiently incentivized to undertake such reforms towards a modern state.

From a quantitative perspective, transitions engendered substantial changes to the fiscal structure at the aggregated level. By 1850, the national fiscal revenue had been approximately 40 million silver taels,[23] over 70 percent of which had been land tax revenue. Regarding expenditure, the center had monitored over 75 percent of the national budget, while local governments had been stipulated to retain a rather small fund. After five decades, the national revenue more than doubled to nearly 100 million taels in 1900, and the share of land taxation declined to 40 percent. Novel indirect taxation became the mainstay of Qing finance and contributed to half of total government revenue. Furthermore, foreign borrowing became increasingly important: the ratio of annual borrowing to tax revenue reached 13 percent in the 1900s.[24] In terms of spending, the central court handled less than 15 percent of the budget, with the remainder in local hands. Their new spending items accounted for 50 percent of the national budget.

[21] Data sources are Liu (1937), Du (1991), and Zhang (1992).

[22] The Qing central court did attempt to intervene in certain local affairs, such as *lijin* taxation, modern army building, and railway construction, but due to a lack of information, incentive, and expertise, it was incapable of launching any developmental programs. Its clumsy efforts further intensified the central-local conflicts and eventually brought an end to the empire in 1911.

[23] One *kuping* silver tael, as a central standard, equals 37.27 grams of silver.

[24] I exclude the massive war reparation loans.

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The post-1850 fiscal expansion was more than evident, and local governments made the major contribution. During 1850–1900, per capita tax burden rose from 0.1 to 0.25 silver taels, and the ratio of taxation to GDP increased from 0.8 percent to 1.4 percent. Although it was below the levels of the Western benchmarks, the progress *per se* was notable and accelerated in the twentieth century.[25] China embarked on an onerous but irreversible path of state modernization, and a small, rigid, and agrarian state in line with Confucian statecraft would never have a second opportunity.

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[25] Throughout the entire republican period (1912–49), the role of land taxation became increasingly marginalized; instead, customs taxation, salt sales, *lijin* (the later *tongshui*), and borrowing became the mainstay of government income.

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The Development of Wealth Inequality in the German Territories of the Holy Roman Empire, 1300–1800

Economic inequality has been declared the "defining challenge of our time" by former U.S. President Barack Obama (*Guardian*, 4 December 2013). The global public agrees: In a 2013 Pew Research Center study of 39 countries across the world, inequality emerged as the top concern in 31 countries (Pew Research Center 2013). This may explain why Thomas Piketty's book *Capital in the Twenty-First Century* became an instant bestseller despite its hefty page count and abundance of statistical analysis—usually a hindrance to making it onto the New York Times bestseller list. In his book, Piketty showed that both wealth and income inequality in Western Europe and the United States were extremely high and remained so in the eighteenth and nineteenth centuries. It was only the two world wars of the twentieth century that led to a substantial decline in inequality levels. Piketty's explanation of this trend relies on his "universal economic law," which states that inequality will increase when the return to capital, *r,* exceeds the economic growth rate, *g*. However, the long-run causes of inequality and its relationship with economic growth are still insufficiently understood. This was particularly the case for the pre-industrial period during which economic growth was slow and highly volatile (Broadberry and Wallis 2017). This dissertation contributes to our understanding of inequality by providing the first estimates of wealth inequality, poverty, and fiscal extraction for pre-industrial Germany between 1300 and 1800. It shows that wealth inequality was high and rising in early modern Germany—even during periods of stagnant or negative growth, such as the sixteenth century. Only epidemics such as the Black Death (ca. 1350) and large-scale warfare during the Thirty Years' War (1618–1648) led to a considerable decline in inequality. However, the consequences of that war for the economy and living standards as a whole were bleak—as a spike in poverty rates suggests. Moreover, fiscal extraction in the run-up to and during the war likely exacerbated inequality before its eventual leveling effect. In sum, this dissertation outlines the effects of major historical events and institutions on inequality.

THE INEQUALITY DEBATE: REVISING THE KUZNETS CURVE?

Chapter 1 reviews the evidence and debate surrounding inequality and its causes in the past. The most widely accepted explanation of rising inequality in the past has been the "Kuznets curve" (Kuznets 1955). Named after economist Simon Kuznets, who first hypothesized that rising inequality in the first phases of the industrial revolution and declining inequality thereafter were driven by sectoral productivity differences, the Kuznets curve had become the dominant paradigm for understanding economic inequality well into the 1980s (Atkinson 1997). While Kuznets' model seemed to hold true for much of the post-war period, the recent resurgence of inequality in Western countries has led to questions about its validity. Studies of wealth and income inequality show that

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inequality was already high and rising during the early modern period, before the onset of modern economic growth (Alfani 2015; Ryckbosch 2016; Santiago-Caballero 2011; Van Zanden 1995). Epidemics, warfare, revolt, and state collapse have been suggested as the main forces reducing inequality in pre-industrial times (Scheidel 2017).

FIVE HUNDRED YEARS OF INEQUALITY DATA

Chapter 2 introduces the two databases collected from archival and published sources that form the foundation of this dissertation. The first database, *Wealth Inequality in Pre-Industrial Germany* (WIPIG), comprises more than 100,000 household-level observations of wealth tax payments across 30 cities and 70 rural communities in the period 1300–1850. Data have been retrieved from a number of archives in Germany as well as published records of archival sources, including those found in studies by the German Historical School. These data were collected in close collaboration with Felix Schaff (EUI) and Guido Alfani (Bocconi University). The second database, *Germany City Budgets* (GCB), comprises 2,200 city-year observations across more than 40 cities in the period 1350–1800. It is based on records of city budgets, detailing revenue and expense streams at the aggregate and disaggregate level—that is, including a breakdown of income streams from taxation, credit, and other revenue sources as well as a breakdown of expenditure on interest payments, construction, administration, and warfare. It also includes 1,000 observations on urban wealth tax rates between 1350 and 1800. To assess the representativeness of these datasets, I constructed a reference universe of towns based on data from Bairoch, Batou, and Chèvre (1988), De Vries (1984), Wahl (2016), and the *Deutsche Städtebuch* (Keyser 1939–1974). I show that both datasets are broadly representative of the larger universe of towns in pre-industrial Germany along characteristics such as population size, geography, religion, political institutions, and status within the wider Empire.

THE FOUR PHASES OF WEALTH INEQUALITY AND POVERTY IN PRE-INDUSTRIAL GERMANY

Chapter 3 is a joint work with Felix Schaff (EUI) and Guido Alfani (Bocconi University) and has been published in this *Journal* (Alfani, Gierok, and Schaff 2022). It presents the first estimates of wealth inequality for pre-industrial Germany for the period between 1300 and 1850. It shows that wealth inequality followed four phases: a decline in inequality after the Black Death around 1350 that lasted until circa 1450, a considerable rise in inequality over the long sixteenth century, reaching its peak before the outbreak of the Thirty Years' War in 1618–1648, a precipitous fall in inequality during and after this devastating conflict, and again a slow rise starting in 1750. It contrasts these findings with available evidence for other European regions, such as pre-industrial Italy, the Netherlands, and Spain. The Thirty Years' War distinguishes Germany from Italy, the Netherlands, and Spain, which experienced consistently rising inequality after the Black Death. The chapter not only shows that this war and the plagues and famines that followed in its wake were particularly destructive and long-lasting compared to other pre-industrial wars. It also provides novel evidence of the severe economic impact of the war and the broader seventeenth-century crisis.

Given the considerable effect of the Thirty Years' War on inequality in Germany, Chapter 4 further investigates this effect by tracing the development of the poorest stratum of the population. It provides the first consistent poverty estimates for pre-industrial

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Germany for the period between 1300 and 1800. It argues that measuring poverty via three measures—absolute poverty, relative poverty, and the Poverty Gap Index—overcomes a roadblock that has prevented researchers from producing consistent long-run estimates previously. Poverty moved largely in tandem with inequality throughout the pre-industrial period. However, the Thirty Years' War led to a sharp rise in poverty rates while inequality declined. Urban communities experienced this spike first, whereas rural communities saw poverty rise towards the end of the conflict. Considerable migration into the cities, which provided a safe haven for many rural dwellers, is one possible explanation for this effect. While cities were spared destruction, the countryside suffered considerably. Destruction of cultivated land, the confiscation of livestock and capital, and the extortion of financial aid are potential explanations for the rising poverty rates in rural Germany. The war had long-lasting effects on the German economy, however, and although inequality and poverty rates declined after the war, the full consequences for the economy are still underexplored. This chapter concludes by observing that from circa 1750 onward, poverty started to increase again—much earlier than the onset of modern economic growth and industrialization.

THE ROLE OF GUILDS AND GENDER: A CASE STUDY OF FREIBURG

Having established the broad outlines of inequality and poverty, Chapter 5 explores the role of gender and guilds by focusing on the case study of Freiburg between 1481 and 1675. Both factors have been highlighted in the literature as important factors influencing economic growth and the distribution of resources. Freiburg presents an ideal case study to explore both aspects because it is a mid-size town in southwestern Germany characterized by strong guilds. An analysis of Freiburg's tax registers between 1481 and 1675 reveals the following: First, female headship rates in Freiburg were on the lower end of the spectrum compared to similar cities such as Wildberg. This suggests that guild-dominated cities limited female independence. Only during and in the aftermath of the Thirty Years' War did female headship rates increase. This increase is notable across all guilds, but guilds in the textile trade report particularly high female headship rates. Second, among the non-guild households, women make up a disproportionally high percentage. These non-guild households had very limited economic opportunities; women lived more precarious lives than men and were more frequently affected by poverty. This is further confirmed by comparing the distribution of tax payments along gender dimensions. Third, an analysis of tax revenues by guild shows that their contributions remained fairly stable over time, with the exception of the tailors and butchers guilds, whose contributions declined substantially. In sum, this suggests that strong guild dominance influenced the distribution of resources within a city—often to the detriment of women.

CITIES OF EXTRACTION: FISCAL PRESSURE IN URBAN GERMANY

Chapter 6 investigates the role of taxation in public finances and provides the first estimates of fiscal extraction for a representative sample of German cities. Prior studies of fiscal capacity have focused on Prussia and Habsburg Austria and measured fiscal extraction solely through per capita tax revenues. In this chapter, I argue that we should measure fiscal capacity along a broader range of measures: (1) type and number of taxes, (2) tax design and coverage, (3) tax rates, (4) the share of expenses on public administration relative to the entire budget, (5) the tax share relative to total revenues, and (6) per capita tax pressure in local currencies as well as gold. The latter measure involves

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finding conversion rates for a large number of local currencies—another contribution of this chapter. The resulting estimates show that fiscal extraction rose considerably from circa 1550 onward. This was achieved by raising additional wealth and consumption taxes and increasing tax rates. While extraction peaked during the Thirty Years' War (1618–1648), this rise in extraction six decades before the Thirty Years' War questions the state-and-war-making paradigm, which explains state-making primarily as a function of warfare. Finally, this chapter shows that the tax pressure on citizens in urban Germany was considerable compared to the tax pressure in other European regions that were fiscally more advanced European regions, such as England and the Netherlands.

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Essays on Fiscal Modernization, Labor Coercion, State Capacity and Trade

How and why did money-based and centralized fiscal institutions emerge? I use newly-collected data from colonial Indonesian archival sources to study historically widespread aspects of taxation—corvée labor and tax farming—that have largely, but not completely, disappeared in modern times. I aim to shed light on what drove these practices and thereby aid our understanding of fiscal modernization, a key aspect of long-run development (Besley and Persson 2011; Dincecco 2015; Johnson and Koyama 2017). While a growing literature focuses on developments such as the income tax, the value-added tax, and third-party information (e.g., Pomeranz 2015; Jensen 2022), many other aspects of fiscal modernization remain unclear. The key question that runs as a thread through the dissertation is: What explains the emergence of centralized fiscal institutions and information-intensive monetary taxation?

The first two essays study taxation in the form of coerced labor, a practice known as corvée labor. Major projects such as the Great Pyramid of Giza, the Great Wall of China, and the Suez Canal were partially built by corvée labor. Furthermore, corvée persisted into the twentieth century (Van Waijenburg 2018), and several million people are still subject to corvée duties today, often under the banner of "informal taxation" (Olken and Singhal 2011; International Labour Organization 2017). The third essay studies tax collection by private parties, a practice known as tax farming. Prior to centralized tax collection by state actors, tax farming constituted large shares of tax revenues in states such as early modern England and France (Johnson and Koyama 2014). Moreover, tax farming is still used today in several developing countries.

The first essay is the first study to estimate the effect of state capacity expansion on corvée labor. From the perspective of a state's central bureaucracy, tax payments in labor have three main advantages. First, corvée is feasible when the state's information-collection capabilities are minimal and when the economy's monetization level is low. Second, corvée enables a high level of local discretion that can rely on local knowledge and respond to local circumstances. Third, corvée is useful when the state is unable to credibly commit to refraining from appropriating monetary tax streams. These three reasons together indicate that corvée may be a vital element of the "contract" between the state's central bureaucracy and its local agents.

However, tax payments in labor also suffer from several disadvantages as compared to tax payments in money in terms of portability, storability, and fungibility. Furthermore, the same local discretion that can benefit the state can also harm it. Local officials, for example, may extract a high level of corvée because they do not internalize the negative effects that such high corvée duties impose on other taxes that flow to the central state. Limitations on state capacity, however, arguably restrict a state's ability to switch towards monetary taxation, especially that which is information-intensive. For example, monetary taxation requires the state to know local earning capabilities and monetization levels, while levying corvée requires no such information.

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How, then, did state capacity affect the use of corvée labor overall and in relation to monetary taxes? My analysis distinguishes between central and local state actors. I propose that the central colonial bureaucracy and local officials were in a principal-agent relationship in which preferences and incentives regarding types of taxation were not necessarily aligned. In colonial Indonesia, local officials to a large extent determined the level and allocation of corvée and benefited from its wider use. Expansions of local state bureaucracies could thus increase corvée usage. Central state actors, meanwhile, pushed for replacing corvée with a monetary head tax as part of an effort to increase their control of state extraction. Such a replacement enabled the state to impose a centrally determined head tax charge per person, to instruct local indigenous officials to hand over collected head tax revenues to higher-ranking European officials, and to siphon off a share of the revenues to the capital. To be able to implement such a replacement, the administrative bureaucratic machinery needed to be capable enough to gather the information required for monetary taxation. However, increased state capacity also enabled the state, or rather the officials that populated local state bureaucracies, to extract more. In short, this essay posits two countervailing mechanisms linking state capacity and corvée usage. The net effect is ultimately an empirical question.

To empirically test the relationship between state capacity and corvée labor, I construct a new database covering 18 Javanese provinces (*residenties*) over 32 years (1874–1905). I use the number of officials as a measure of local state capacity. Furthermore, I distinguish between indigenous and European officials to capture central-local tensions within the local bureaucracies. I first document the wide use of corvée labor as hundreds of thousands of laborers provided millions of work days to the state for free. I then find that national-level policy successfully centralized state finances by gradually replacing corvée with a head tax. At the same time, a province-level panel data analysis shows that local state capacity expansion, primarily by indigenous officials working as agents for the state, slowed the movement away from corvée. My estimates are supported by an IV strategy, which uses effective distance to the capital as an instrument for local state capacity. Moreover, I detect no relationship between head tax revenues and the number of local officials. The lack of such a relationship indicates the tax reform was successful in limiting the discretion of local officials. Lastly, the enactment of the head tax reform in 1882 significantly reduced the positive relationship between local indigenous officials and corvée.

The relationship between state capacity expansion and fiscal modernization therefore depends on what part of the state is expanding and whether interests across types of taxation differ within the state bureaucracy. Opposing interests of different state actors can be pivotal in understanding fiscal modernization, tax structure, and labor coercion, so it is imperative to break open the black box of state capacity and analyze specific actors within the state. Furthermore, rising monetary tax revenues may be the flipside of falling in-kind tax revenues, so incorporating in-kind tax revenues into analyses of state development and fiscal modernization can be key.

The second essay studies the impact of trade shocks on corvée labor. To do so, I construct the first database on corvée usage and product-level exports covering 16 non-Javanese provinces over 41 years (1900–1940). To guide the empirics, I build a simple model of taxation choice that embeds a trade-off between taxation in labor and taxation in money. Corvée usage reduces the labor available for private production, so monetary tax revenue based on private production drops. The more productive a laborer is in

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private production, or the higher his output price is, the higher the opportunity costs of corvée are for both the state and the laborer. This encompassing interest, which stems from the coercer being the state rather than a private employer, differs from Acemoglu and Wolitzky's (2011) seminal model of private labor coercion. The opportunity costs of corvée induce the state to limit its usage, even though corvée labor is nominally free, and make corvée usage sensitive to changes in productivity. If laborers have a high marginal revenue product, the state prefers not to use corvée and instead taxes laborers' output. The model thus predicts a negative relationship between labor productivity and labor coercion in the form of corvée.

A trade boom is such a period of high productivity. I hypothesize that export booms, especially in labor-intensive goods, reduce corvée usage. This effect can run through two channels: (i) higher opportunity costs for the state and (ii) higher outside options for the laborers. While the state might want to reduce corvée impositions on productive laborers, it faces an information problem. It cannot accurately gauge the productivity of all the hundreds of thousands of laborers liable to corvée. The so-called "ransom" option solved this problem by allowing laborers to buy themselves out of corvée duties. The buy-out option meant the state could rely on laborers' private information. More productive laborers faced higher opportunity costs of being submitted to corvée and would thus be more willing to pay off such duties. By allowing laborers to self-select out of corvée, the state achieved a shift from in-kind to monetary taxation without requiring higher information-collection capabilities. Furthermore, the buy-out option enabled corvée usage to flexibly adjust to the waxing and waning of economic opportunities.

The data show a negative relationship between corvée usage and exports. Moreover, the number of ransomers closely follows exports. To econometrically gauge the effect of productivity changes on corvée usage, I use variations in province exports. Part of the variation in exports is driven by price shocks, and these price shocks are exogenous from the perspective of individual laborers who make the ransom decision. I find that trade expansions, especially of labor-intensive exports, reduce corvée usage. Furthermore, the increase in non-oil exports can nearly fully explain the large drop in corvée during the 1920s trade boom. The effect runs through laborers buying themselves out of corvée duties. The opposite took place during the trade collapse of the Great Depression. The fall and rise in in-kind taxation are thus mirrored by opposite movements in monetary tax revenues. While some studies find a positive relationship between trade and private labor coercion (e.g., Saleh 2020), I argue public labor coercion follows a different logic due to the state's encompassing interest. The nature of the relationship between coercer and coerced is thus key to understanding labor coercion.

The third essay examines the relationship between tax farming and state capacity. To do so, I expand the first essay's database with data on tax farm revenues and non-indigenous Asian officials. The results indicate that state capacity expansion reduced reliance on tax farming, but also that different segments of the state bureaucracy had different relationships with tax farming. Officials from the group traditionally excluded from tax farming—the indigenous—are most strongly related to reduced reliance on tax farming. In contrast, officials from the group traditionally wooed as tax farmers—the non-indigenous Asians—are related to increased reliance. These findings provide evidence for centralized fiscal institutions emerging when the state becomes less dependent on using a divide-and-rule strategy that routes revenue streams through politically weak middlemen and away from potentially politically powerful groups.

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Overall, the three essays shed new light on key aspects of state development, taxation, and labor coercion. As central-local tensions and information problems are arguably aspects of any large state organization, the findings have wider resonance. The results plausibly inform a variety of contexts in which states' central bureaucracies attempt to centralize and modernize taxation by replacing in-kind and privately-collected taxation with centrally-collected monetary taxation.

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