Investing in State Capacity:

Haiti, 1932-1949

Craig Palsson

Huntsman School of Business

Utah State University

craig.palsson@usu.edu

March 19, 2021

Abstract

A state's development is constrained by its fiscal and legal capacity. States can improve their fiscal and legal capacity through investments, but can states invest in the components independently? If investments in fiscal and legal capacity are independent, then when customs revenues are high the state should invest in legal capacity but when they are low it should invest in fiscal capacity. I test this prediction by looking at Haiti in 1942 when U.S. mobilization caused a negative shock to customs revenues. I show the fall in revenues stimulated investment in fiscal capacity, consistent with the model, but that it also caused the state to invest in legal capacity, which is inconsistent with a model where investments are independent. The results show that institutional constraints may tie investments in fiscal and legal capacity, which in turn could constrain state development.

A growing consensus among economic historians and development economists is the role of state capacity in development (Johnson and Koyama 2017, Geloso and Salter 2020, Dincecco 2015). State capacity has two components: fiscal capacity (the ability to collect taxes) and legal capacity (the ability to enforce property rights and the rule of law) (Besley and Persson 2009). In this paper, I address whether countries can invest in fiscal and legal capacity independently. Independence is assumed in the most popular model of developing state capacity (Besley and Persson 2009), but states might not be able to invest in just one component of capacity. For instance, in France, where witch trials can proxy for legal capacity, investing in fiscal capacity required improving legal capacity (Johnson and Koyama 2014). Exploring the indepial is not a trivial exercise of testing a model assumption. If fiscal and legal capacity are not independent, it could explain why low-income countries fail to invest in state capacity.

To develop testable implications of independence, I use a simple model of a low-income state investing in capacity. The model has two periods where citizens get utility from private consumption and a public good. Because it is a low-income country, the marginal utility of both private consumption and the public good are high. In each period, the state provides the public good using tax revenues from income taxes and customs. But in the first period, the state can invest in improving fiscal and legal capacity in the second period. The model shows that when customs revenues are high, the state does not invest in fiscal capacity because it reduces private consumption. But the state will invest in fiscal capacity when customs revenues are low enough to cause the marginal utility of private consumption to fall below the marginal utility of the public good. In contrast, if fiscal and legal capacity investments are independent, then when customs revenues are high the state invests in legal capacity, but when they fall it does not increase its investment in legal capacity. Thus, if customs revenues fall and the state increases investments in legal capacity, we have evidence that investments in fiscal and legal capacity are not independent.

To test the model's implications, I turn to Haiti during the 1930s and 1940s. During this period, Haiti was a low-income country with low fiscal capacity. Through the 1930s, Haiti relied on customs revenues for over 80% of government revenues. But in 1942, the Haitian government faced a sudden loss in customs revenues due to the United States' entrance into World War II. Consistent with the model, Haiti responded to the revenue shock by investing in fiscal capacity. In 1942, Haiti reformed its income tax and increased tax rates on almost every level of income. While this legislative reform indicates the state was trying to invest in state capacity, we need further data to investigate the effect on fiscal and legal capacity.

To test for the independence of investments in fiscal and legal capacity, I collect data on tax revenues and public land rentals from 1932 to 1949. Tax revenue data come from annual reports made by the fiscal department. Property rental data come from state-owned property leased to households. The government published the property data in its gazette, *Le Moniteur*, from which I collected the universe of properties approved. The property rental data is used for testing the expansion in legal capacity, and the tax revenue data is used for testing expansions in both fiscal and legal capacity.

The tax data show that with the increase in tax rates came an improvement in collection methods. The tax reform was only one form of investing in fiscal capacity. Income taxes were flat for the decade ahead of the 1942 reform, but by 1947 tax revenues were ten times higher than the pre-reform average. Decomposing the growth in tax revenues shows that economic growth accounts for 40% of the increase while the other 60% is attributed to changes in fiscal capacity. Fiscal capacity can be decomposed into changes in the tax rate, which are semi-observable, and changes in collection methods, which are unobservable. The decomposition shows that changes in collection methods contributed at least 30% of the increase in fiscal capacity and could be as high as 80%.

To investigate the prediction that the customs revenue shock will not increase legal capacity, I look at the public land rental program. The government leased public land to farmers, and the processing time for requests proxies for legal capacity. The average processing time for properties requested between 1939 to 1941 was between 30 to 40 months. A major contributor to such long delays was a demand surge caused by Haitian refugees from the Dominican Republic. To see how legal capacity (i.e. delays) changed, I use a hazard analysis, which can account for changes in state capacity that occur while properties are under review. The survival curves show that after 1942 the probability that approval would take longer than eight months dropped from 85% to 20%. Moreover, the large reduction in delays occurred while request volume remained high. Such a change suggests legal capacity increased in tandem with fiscal capacity. I confirm this result in a synthetic control analysis that shows rents paid on the properties increased.

The results suggest fiscal and legal capacity are not independent. There are two reasons, in this context, why this is the case. First, the model assumes the revenues from internal taxes and customs are fungible. But legally the two were not treated the same. The appropriations law did not allocate any customs revenues to investments in legal or fiscal capacity—all investments had to come from internal revenues. A second reason the investments were not independent was because

the same administration ran tax collections and the land rental program. Hiring more personnel for collecting taxes gave the land rental program more officers.

This paper furthers the work on state capacity by exploring the relationship between fiscal and legal capacity. It has been previously established that Latin American countries have lower fiscal capacity because of their access to customs revenue (Centeno 1997). This paper suggests that because institutional arrangements could link fiscal and legal capacity, the lack of fiscal capacity could explain the lack of legal capacity. Another unique cotribution from this paper is the growth of state capacity without a direct military conflict. Many accounts of building state capacity show the power of conflict to motivate investments (Besley and Persson 2010, Arias 2013, Gennaioli and Voth 2015), but in the case of Haiti, while an external military conflict triggered the investments, there was no direct threat that inspired a coalition to shift their preferences towards building capacity.

1   Theoretical Independence of Investments in State Capacity

The theoretical foundation for this paper comes from Besley and Persson (2009). They model how the country's political economy affects how the government invests in state capacity. Besley and Persson divide state capacity into two components: legal and fiscal capacity. In their paper, investing in state capacity involves building infrastructure and institutions. So legal capacity "reflects legal infrastructure such as building court systems, employing judges, and registering property," and fiscal capacity is "the build-up of institutions such as an administration (like the IRS in the United States) for the collection of income taxes, a system for the monitoring of tax compliance, etc." While these definitions map directly into the empirical work in this paper, Johnson and Koyama (2017) give more general definitions. Legal capacity is the state's ability to "enforce its rules across the entirety of the territory it claims to rule," and fiscal capacity is the state's ability to "garner enough tax revenues from the economy to implement its policies."

Since the Besley and Persson model includes several mechanisms that are not relevent to this paper, I distill the model into its fundamental pieces to generate the testable predictions I explore in my empirical work. The model has two periods ($s \in \{1, 2\}$). In both periods, citizens get utility from private consumption (c) and a public good (G):

$$u_s = \alpha \ln(G_s) + \ln(c_s). \tag{1}$$

Note that I assume a log-linear utility function. This is a departure from the Besley and Persson

model, where they assume a linear utility function. The problem with a linear utility function is that private consumption and the public good become perfect substitutes and the marginal utility of both is constant. Thus, if the marginal utility of the public good is higher than that of private consumption, then the government wants to expand state capacity until it can tax 100% of income and provide the public good. The conclusion is that states do not invest in capacity because the citizens prefer private consumption. To allow for a trade-off between private consumption and the public good, I assume a log-linear utility function.

The citizen's consumption depends on income and state capacity. In each period, the citizen receives an endowent (Y_s), but he loses some of it because of poor property rights. Property rights protections are deterimned by legal capacity $(\pi_s \in [0,1])$ such that the citizen keeps only $\pi_s Y_s$. The citizen also faces an income tax. The income tax is determined by fiscal capacity (τ_s), which is composed of two parts: the tax rate (t) and the collection methods (x), with $\tau = tx$. Since the citizen consumes whatever income is left, $c_s = (1 - \tau_s)\pi_s Y_s$.

The government wants to maximize the total utility of the population across both periods. The government gets revenue from internal taxes $(T_s = \tau_s \pi_s Y_s)$ and customs $(M_s = M)$. In both periods, the government uses revenue to supply a public good (G_s). But in the first period, the government can choose to invest in expanding state capacity for the second period.

The Besley and Persson model assumes that investments in legal and fiscal capacity are independent. First, the cost of investing in the components of state capacity are independent, with the cost of investing in legal capacity as $L(\pi_2 - \pi_1)$ and the cost of investing in fiscal capacity as $F(\tau_2 - \tau_1)$. Second, the revenues for investing in capacity and providing the public good are fungible. This independence assumption is under investigation. I will derive testable predictions under the assumption that they are independent then see if they hold in the data.

Thus, the government's objective function is

$$\max_{G_1, G_2, \pi_2, \tau_2} \sum_{s \in \{1,2\}} \left(\alpha \ln G_s + \ln((1 - \tau_s)\pi_s Y_s) \right) \tag{2}$$

subject to

$$G_1 + L(\pi_2 - \pi_1) + F(\tau_2 - \tau_1) = \tau_1 \pi_1 Y_1 + M. \tag{3}$$

$$G_2 = \tau_2 \pi_2 Y_2 + M \tag{4}$$

To understand the equilibrium, consider a social planner who can allocate resources without worrying about taxes. The social planner equilibrium equalizes the marginal utility across the public good and private consumption for both periods. Thus, if the government can reach the social planner's equilibirum at the current level of fiscal capacity, there is no need to invest. Since all income starts with the citizen, the government will only invest if the marginal utility of the public good is higher than the marginal utility of consumption. This partially explains low fiscal capacity in low-income countries where the marginal utility of consumption is very high. Furthermore, changing fiscal and legal capacity affect the marginal utility of consumption in the second period. Increasing fiscal capacity decreases the marginal utility of the public good and increases the marginal utility of consumption. But increasing legal capacity lowers the marginal utility of both private consumption and the public good since stronger property rights increases the income available for consumption and, therefore, taxable income. The government does not want to tax citizens to provide the public good, and with high customs reveneues it can provide the public good without investing in capacity and decreasing private consumption. Thus, high customs revenues will decrease the returns from investing in fiscal capacity.

We want to understand what happens to a country when it experiences a large drop in customs revenues. Consider two states of customs revenues, high (M_H) and low (M_L). First, consider high customs revenues (M_H). I define high customs revenues as an M high enough that without any changes in state capacity, the marginal utility of the public good is lower than the marginal utility of private consumption:

$$\frac{\alpha}{M_H + \tau_1 \pi_1 Y_1} \leq \frac{1}{(1 - \tau_1)\pi_1 Y_1}. \tag{5}$$

What do investments in fiscal and legal capacity look like in this equilibrium? First, there is no need to invest in fiscal capacity because the marginal utilty of private consumption is so high. Indeed, if it can, the government will lower fiscal capacity to allow more private consumption. Second, the government will increase legal capacity. In this model, investing in legal capacity is the only way that the government can transfer customs revenues to private consumption. So in a world with high customs revenues, we see no investment in fiscal capacity but some investment in legal capacity.

Now consider low customs revenue (M_L). Like with high customs revenues, I define low customs revenues as an M low enough that the marginal utility of the public good is higher than the marginal utility of private consumption:

$$\frac{\alpha}{M_L + \tau_1 \pi_1 Y_1} > \frac{1}{(1 - \tau_1)\pi_1 Y_1} \tag{6}$$

This reverses the incentives to invest in the components of state capacity. Because the marginal utility of the public good is so high, it is worth sacrificing some private consumption to get more of the public good. So the government will invest in fiscal capacity. But by investing in fiscal capacity, the government has more revenue to provide the public good in the second period. Thus, the marginal utility of the public good in the second period will be lower than the marginal utility from the public good in the first. The government can increase the level of the public good in the first period (and thereby decrease its marginal utility) by investing less in legal capacity. Hence, when customs revenues are low enough, the government will invest in fiscal capacity but will not increase investments in legal capacity.

Thus, the model gives two testable predictions from a change in customs revenue. First, a significant drop in customs revenue should cause the government to invest in fiscal capacity. Second, the drop should cause the government to decrease investments in legal capacity. These predictions come from the assumption that investments in fiscal and legal capacity are independent. If they are not independent, then we could see either implication violated. For instance, if investments are not independent, we may see countries with high customs revenues investing in fiscal capacity or countries with low customs revenues investing in legal capacity.

2 Haiti and the Response to World War II

To test the model's predictions, I use a unique sequence of events in Haiti in the 1930s and 40s. Because of World War II, the government experienced a shock to customs revenues. Additionally, the government was already shouldering the burden of a refugee shock that strained its capacity.

2.1 U.S. Mobilization and the 1942 Tax Reform

In the early 20th century, the Haitian government had little need for fiscal capacity because of high customs revenues. In a 1927 report, officials supervising the American occupation said a study of 34 countries found Haiti to be the most dependent on customs revenues (Haiti Bureau du representant fiscal 1927 pp. 64-65). During the study period, customs supplied about 90% of the government's revenues. Its dependence far exceeded the next two countries in the study: Salvador (66%) and the Dominican Republic (50%). By 1941, customs revenues had declined from the Great Depression, so they only supplied 82% of government revenues (Banque nationale de la Republique d'Haiti 1942 p. 62). But the heavy dependence on customs became a critical weakness when the U.S. entered

Table 1. Income tax schedule, 1932 and 1942

Bracket	1932 Rate	1942 Rate	Factor Increase
Personal Income			
Less than 5,000	3%	3%	1.0
5,001–10,000	3%	4%	1.3
10,000–12,500	3%	5%	1.7
12,501–15,000	4%	5%	1.3
15,001–25,000	4%	8%	2.0
25,001–30,000	5%	8%	1.6
30,001–75,000	5%	12%	2.4
75,001–100,000	6%	12%	2.0
More than 100,000	6%	15%	2.5
Corporate Income			
Less than 5,000	5%	3%	0.6
5,000–10,000	5%	4%	0.8
10,001–15,000	5%	5%	1.0
15,001–30,000	5%	8%	1.6
30,001–50,000	5%	12%	2.4
50,001–100,000	6%	12%	2.0
More than 100,000	6%	15%	2.5

Notes: Figures are in gourdes, unadjusted for inflation.

World War II.

At the close of 1941, when the U.S. mobilized in response to Pearl Harbor, the Haitian government faced a budget crisis. America's entrance into the war restructured Haiti's trade, diverting high-tariff imports like cars and cement. Customs receipts in 1941-42 were lower than at any point in the previous 20 years, including every year of the Depression (Banque nationale de la Republique d'Haiti 1942 p. 62). Anticipating the drop, the Haitian government rushed to find new revenues. "Before many weeks of war had passed, it became evident that new methods would have to be devised and special arrangements made in order to enable the country to ride out the storm" (Banque nationale de la Republique d'Haiti 1942 p 2). The new sources included appealing to the U.S. for help, receiving a line of credit from the Export-Import Bank, and passing a special tax on the country's largest export, coffee (Banque nationale de la Republique d'Haiti 1942 p. 2-3, 7). But such measures were insufficient.

Consistent with the model, the drop in customs stimulated investmetns in fiscal capacity. Desperate for revenue, the government resorted to reforming the income tax. Table 1 shows how the 1942 reform changed rates. The top tax rate in the old law was 6%, but under the new law it soared

to 15%. The old tax law treated corporate income (from *societes anonymes*) differently than personal income. But the new law treated the two sources the same. We do not know how much revenue the government collected from each bracket, but the median rate increase was 70%. If the Haitian Internal Revenue Service (HIRS) could collect the revenues, the reform should significantly increase internal revenues.

But collecting the revenues was a real problem because of personnel issues at HIRS. From 1926 to 1931, HIRS employed 80-90 rural agents responsible for collecting communal taxes. By 1933, the number had jumped to 151, but the administrators had little confidence in the new hires. "Due to the fact that there are many districts in which receipts are so sparse that it is not possible to pay local agents adequate salaries for their collection, the Internal Revenue Service is still considerably handicapped in getting honest and efficient local officers. The turnover is consequently very large among these local agents," (Haiti Bureau du representant fiscal 1933 pp. 128-129). Moreover, only a fraction of the agents worked in the regions outside of the western population center: the three regions bordering the Dominican Republic in the East employed 36 agents total in 1933, and only 17 in 1931.

2.2 Land Rentals and the Trujillo Massacre Refugees

Like with all countries, measuring legal capacity in Haiti is difficult. I approach this challenge by looking at the government's land rental program. The government owned idle land throughout the country and leased it to generate revenue. The program reflects the government's legal capacity because the leases granted the tenant property rights. For instance, tenants chose the property, cultivated their own crops, kept all income generated from it, and had exclusive access to it. Protecting property rights on the rented properties was not a public good: only one person could hold the title, and that person could prevent others from using the property. Thus, rented plots were both rival and excludable. Since the program provided exclusive rights, the tenants paid rent on the lease. The lease, however, did not give tenants alienation rights, so the tenant could not sell the property or use it as collateral. Though the property rights were not complete, the law did give the tenant a set of property rights that required legal capacity to protect.

Enforcing rights over properties sometimes stretched the State's legal capacity. A report in 1928 listed some of the cases that came before the court (Haiti Bureau du representant fiscal 1928, pp. 73-75). Here is one example:

One of several cases submitted to the district cadastral commission at Cap-Haitien

9

during the year involved the habitation Canal in the commune of Terrier-Rouge. A claim to the entire habitation was presented. It was found that one part of the property had been occupied by tenants of the State, and another portion by the claimant and his ancestors; and search by a surveyor resulted in the finding of the original boundary stones marking the privately owned portion. The claimant accepted the decision of the district cadastral commission rejecting his claim to the state-owned portion and admitting his ownership of the remainder. Another claim submitted to this commission involved the habitation Cheneau, in the same commune, and was based on an old deed which was found to have been forged in every essential particular.

The example exhibits the legal capacity needed to establish a claim: adjudicating competing claims, physically searching the property for the original boundary, convincing the claimants to accept the decision, and investigating fraudulent titles.

The challenges with running the program were amplified by a shock to demand caused by the Trujillo Massacre. In October 1937, President Rafael Trujillo of the Dominican Republic ordered the Dominican army to massacre ethnic Haitians living in his country. The massacre was focused along the border in the North-Western region of the Dominican Republic, but the entire country felt its effects. From the 1936 to 1950 census, at least 30,000 Haitians disappeared from the Dominican Republic (Palsson 2020), of which about 12,000 died in the massacre (Vega 1995). Palsson (2020) discusses the causes and consequences of the massacre, but the important detail for this paper is that many of the Haitians fleeing the Dominican Republic settled in Haiti. Many of the refugees were repatriated Haitians, but a significant portion were Dominicans of Haitian descent who had never been to Haiti. The magnitude of the refugee shock is unknown, but Palsson (2020) suggests that it increased the population of districts near the refugee camps by 8%.

Despite the large refugee population movements, Haiti's government, led by President Stenio Vincent, did little to support them or to confront the Dominican Republic. The government started refugee camps near the border in the North and South (see Figure 1) to coordinate aid but failed to provide the promised services (Lundahl 1979 pp. 303-4). Refugees were pictured in *Life* magazine waiting in long lines to get basic goods from the government.[1] President Vincent did not strengthen border security or threaten Trujillo (Smith 2009, pp 31-32). Even when diplomacy yielded a commitment from Trujillo to pay a meager $750,000 indemnity, the actual payment fell to $525,000, of which little went to the refugees (Heinl et al. 1996 p. 482). In fact, President Vincent

---

[1] *Life*, December 6, 1937.

Figure 1. Location of Refugee Camps and Tax Precincts
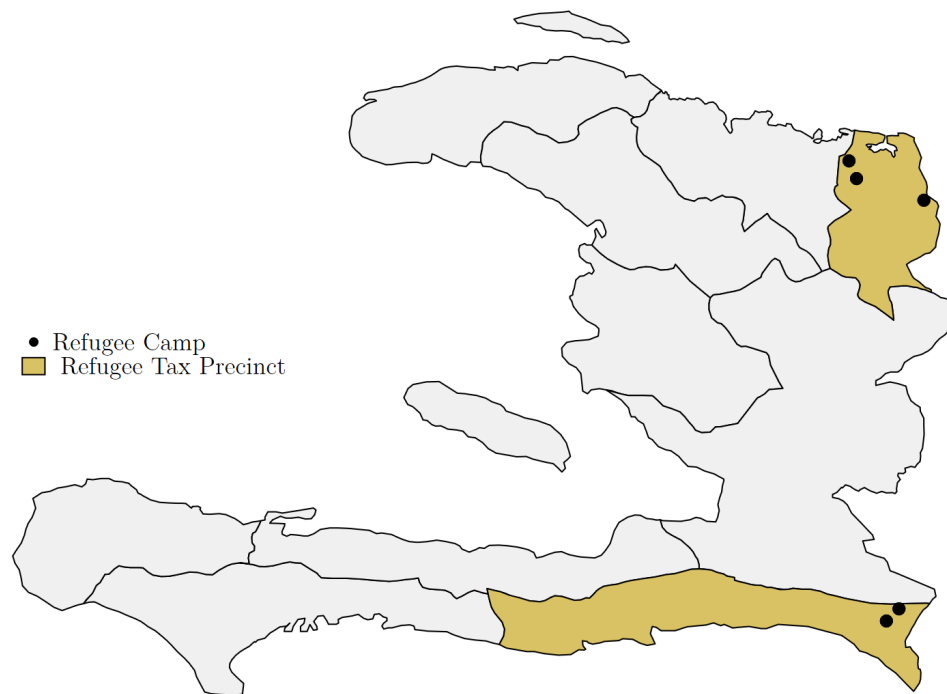
Notes: The map represents the 10 tax precincts during this period. The two colored precincts contain the refugee camps and are the treated precincts in the synthetic control analysis in Section 4.3.

went out of his way to avoid conflict with Trujillo by appealing to the U.S. for mediation (Roorda 1996).

There is a compelling case that President Vincent did not respond because his administration was protecting rents for him and the elite, but this view is incomplete without also understanding state capacity. The case for protecting rents centers on Vincent's plan to seek reelection. An aggressive response could have plunged his country into disastrous conflict, threatening his political prospects and future rents (Smith 2009 p. 32). Vincent seemed more concerned with the threat to the elite's rents in Port-au-Prince, allocating more soldiers to protect the capital rather than the border. His reluctance might have also had a racial element, since the political elite were light-skinned *mulatre* and the victims were dark-skinned *noirs* (Heinl et al. 1996 pp. 482-483). But the focus on rent extraction ignores the government's capacity constraints. Sometimes state capacity is recognized as a barrier to creating a credible military threat against the Dominican Republic (Heinl et al. 1996 pp. 482; Smith 2009 pp. 31-32), but if capacity constrained the military response then it likely also constrained the humanitarian response.

Although the government failed to adequately provide aid through its refugee camps, the camps were not the only form of aid the refugees relied on. The refugees also applied for properties under the rental program (Palsson 2020). It is this demand for property that will allow us to test the state's legal capacity.

3 Data on tax revenues and property requests

To empirically examine the model's prediction, I collected data on tax revenues and properties requested in the land rental program.

3.1 Tax Revenues

Data on tax collection come from the Fiscal Department's Annual Reports. The reports were created by American officials overseeing the occupation. From 1932 to 1949, the reports contained consistent and detailed information on tax collections across the country's 10 precincts (shown in Figure 1).

The data show that the tax reform not only increased tax revenues when it passed, revenues continued to rise in each subsequent year. Table 2 shows that revenues before the reform averaged 484,000 gourdes per year. But in 1943, the first year the reform was fully implemented, the

Table 2. Income Tax and Total Internal Taxes Collected by Haitian Government, 1932-1946

	Income Tax	Total Internal Taxes	Income as % of Total
Pre-Reform			
1932	438	3,931	11%
1933	609	4,991	12%
1934	527	5,049	10%
1935	525	4,520	12%
1936	465	4,695	10%
1937	462	4,965	9%
1938	476	4,991	10%
1939	396	5,022	8%
1940	469	5,246	9%
1941	472	4,879	10%
Reform Partially Implemented			
1942	637	5,337	12%
Reform Fully Implemented			
1943	2,741	8,668	32%
1944	3,703	10,489	35%
1945	4,635	10,550	44%
1946	4,364	10,878	40%
1947	4,845	11,933	41%
1948	9,449	18,105	52%

Notes: Figures are in thousands of gourdes. Data come from Annual Reports of the Fiscal Representative.

Figure 2. Revenues from property taxes, 1930-1949
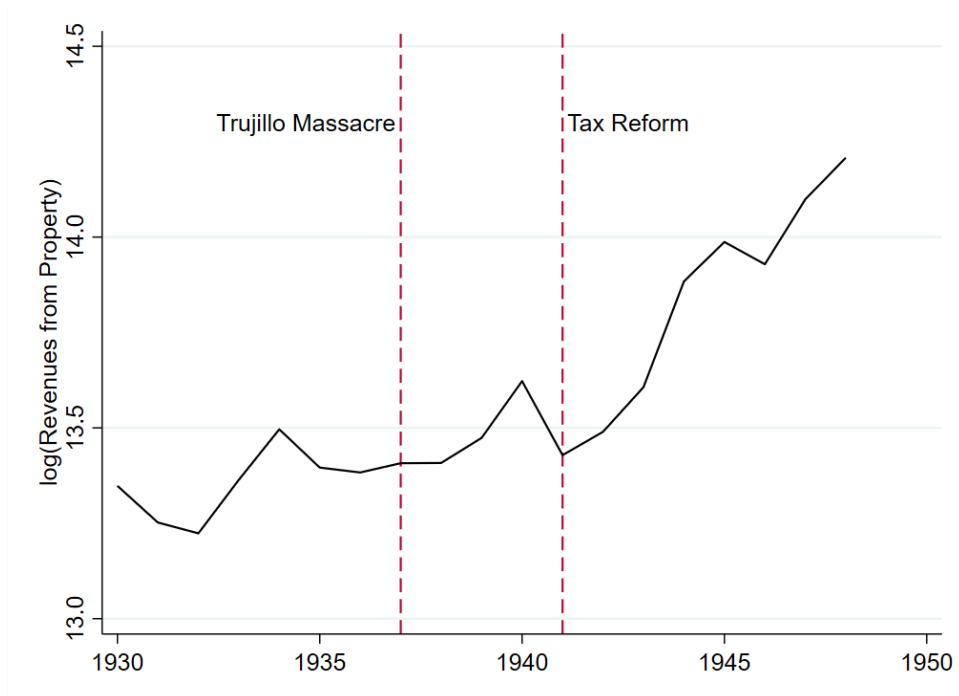
Notes: Data come from the Annual Reports of the Fiscal Representative. Includes revenues from property transfer fees and public land rentals.

government collected 2,741,000 gourdes, more than five times the pre-reform average. Then revenues increased every year, reaching ten times the pre-reform average from 1945-1948, and even hitting 9,449,000 in 1949. The figures in Table 2 are nominal, but comparing them to total tax revenue shows the increase was not a result of inflation. Before the reform, the income tax was about 10% of all internal taxes. After the reform, the income tax became the most important source of internal revenue, comprising 50% of total internal taxes by 1948. The substantial growth in income taxes suggest the reform did more than just increase tax rates.

The Fiscal Department's Annual Reports also provide data on revenues from property-related taxes. Although Haiti did not have a land tax, the government charged rent on land leased to citizens and it charged fees on mortgages and property transfers. Figure 2 shows the total annual revenues from these two sources. Revenues were gradually increasing through the 1930s, but there was a clear break in trend after the tax reform. Because the tax reform did not directly affect property taxes, the increase in revenues hints that the government was investing in legal capacity. I explore this idea later.

Finally, the Annual Reports give data on budget and personnel expenditures. I use these data to look for investments in state capacity.

Figure 3. Average delay between request and approval, 1931-1949
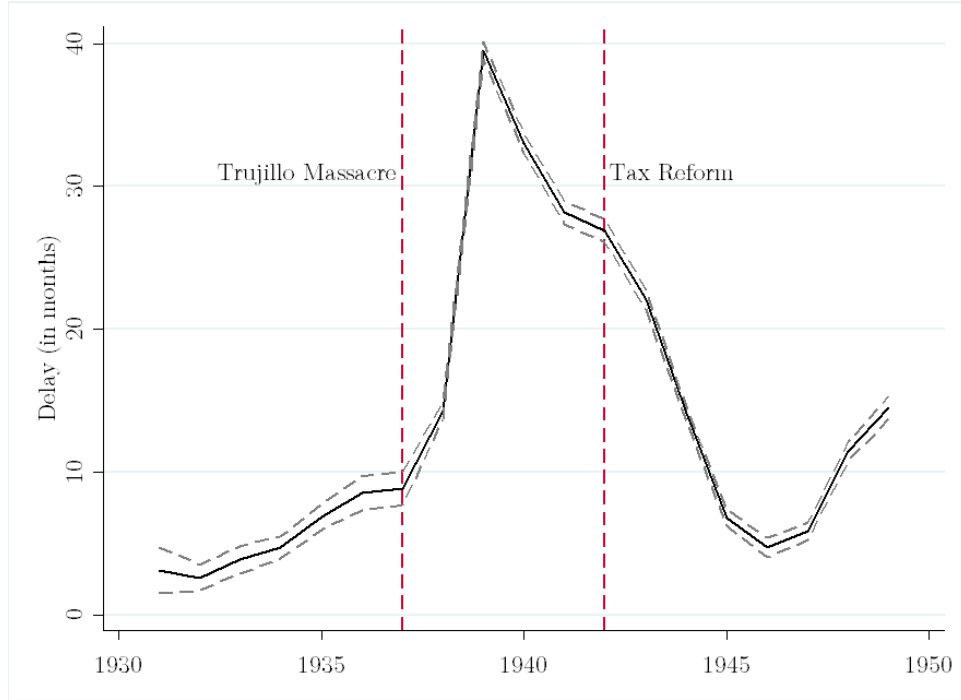
Notes: Delays are calculate from notifications in *Le Moniteur*. Confidence intervals come from a pooled regression with delays as the dependent variable and year-dummies as the only explanatory variable.

3.2 Property requests

The data on property requests are key to examining legal capacity. The data come from notifications published in the government's gazette, *Le Moniteur.* The law required the government to publish a notification in *Le Moniteur* once it approved a lease in case there were competing claims. Palsson (2020) uses data on the universe of agricultural properties published from 1928 to 1950 for (N=5,792). In this paper, I expand the data to include notifications from the same period for urban properties (N=1,519) and properties where the type was not specified (N=1,280). Together, the data include 8,591 properties leased over 22 years. Each notification contains key descriptive information about the requested land, such as the district (*commune*) where it was located, when it was requested and when it was approved.

A common measure of effective property rights systems is the delay between requesting a title and receiving it (de Soto 2000), so for each property, I calculate the processing delay. The delay data show that prospective tenants had to wait significantly longer once the refugees arrived. Figure 3 shows the average delay for a property by the year it was requested. Before the massacre, the average delay was below 10 months. But after the refugees came in 1937, there was an unambiguous

15

increase in delays. Delays peaked for land requested in 1939: the average requester had to wait 40 months. After the peak, delays decreased steadily until in 1945 they returned to the pre-massacre levels.

The trends in Figure 3 suggest that capacity was strained and relieved, but it is hard to tell the timing of the improvements in capacity. The peak in 1939 seems to indicate that the investments in capacity happened quickly. But a 40 month delay from 1939 means the properties were approved in the middle of 1942, which means the improvement in capacity coincided with the tax reform. Thus, there is evidence that legal and fiscal capacity are connected, and I investigate the connection further below.

4   Evidence for Capacity Constraints

One conclusion from the model is that the government does not need to invest in capacity if the government can achieve the social planner's equilibrium under the current level of capacity. Thus, before testing the model's predictions, we need to establish evidence that the government faced a binding capacity constraint. We can examine the constraints of both fiscal and legal capacity by looking at the land rental program.

Public land rentals are good for examining fiscal capacity because there is a defined amount of taxes to collect. One way to measure fiscal capacity is to compare the government's potential revenues with its actual revenues and calculate a recovery rate. But for many taxes it is difficult to calculate the recovery rate because potential revenues fluctuate based on economic activity. For example, income taxes depend on how well businesses perform, which can be difficult for the government to observe. But potential revenues from public land rentals are well-defined because rent was fixed. So potential revenues were just the amount due on outstanding contracts, which we can easily compare to the rent collected.

The recovery rate on rent suggests that fiscal capacity was low. Table 3 shows that from 1930 to 1932 the average recovery rate for all land rental revenue was 51%. But there was significant varation across the 10 administrative regions. There were three regions with average recovery rates at or above 70%, while three other regions recovered less than 40% of revenues, on average. The data to calculate recovery rates was not reported in most years, so we will not be able to observe how the tax reform affected recovery rates. But they still reveal an important feature of the state's limited fiscal capacity. If the government could not collect the full amount of taxes when the potential revenues were well-defined and the locations were fixed, it is likely that it also struggled

Table 3. Fraction of Land Rents Recovered by District, 1930-1932

	1930	1931	1932	Average (1930-32)
Leogane-Nippes	0.72	0.84	0.68	0.75
Cayes	0.79	0.55	0.76	0.70
Fort Liberte	0.79	0.67	0.63	0.70
Port-au-Prince	0.64	0.60	0.75	0.66
Port-de-Paix	0.56	0.54	0.78	0.63
Jacmel	0.63	0.46	0.45	0.51
Cap Haitien	0.65	0.32	0.44	0.47
Jeremie	0.52	0.33	0.23	0.36
St Marc	0.36	0.35	0.37	0.36
Gonaives	0.22	0.31	0.31	0.28
Total	0.55	0.45	0.52	0.51

Notes: Recovery rates come from the Annual Reports of the Fiscal Representative.

to collect all potential revenues for other taxes.

Note that the recovery rates indicate fiscal capacity was low, but they do not tell us whether they were sub-optimal. As the model shows, if the marginal utility of private consumption is high enough, then the government will choose a lower level of fiscal capacity. One way that could manifest is by leasing properties but not collecting rents. But the model also says when the state chooses lower fiscal capacity it will then invest in legal capacity. If the state was investing in legal capacity, then the long delays in Figure 3 are puzzling.

One evidence that the delays are evidence of a capacity constraint comes from an anomaly for properties requested immediately around the massacre. The anomaly is seen when comparing the difference in average delays for agricultural and urban properties in the months just before and after the massacre. Refugees primarily demanded agricultural plots, which required more resources to survey and appraise: urban properties were systematically processed faster than agricultural properties, as seen in Table ??. Comparing the rural and urban properties allows us to observe the immediate effect of refugees on delays. I estimate the following regression

$$\ln Delay_{it} = \beta_t(Ag_i \times \delta_t) + \delta_c + \delta_t + \varepsilon_{it} \tag{7}$$

where $Delay_{it}$ indicates the processing delay for property i in month t; Ag_i indicates whether property i was an agricultural property; and δ_j and δ_t are district and time fixed effects. The coefficient β_t gives the difference in delays between agricultural and urban properties in month t. The sample period is limited to requests made from November 1937 to October 1939, a two year window centered on the massacre.

Figure 4. Difference in delay between urban and rural properties before and after massacre
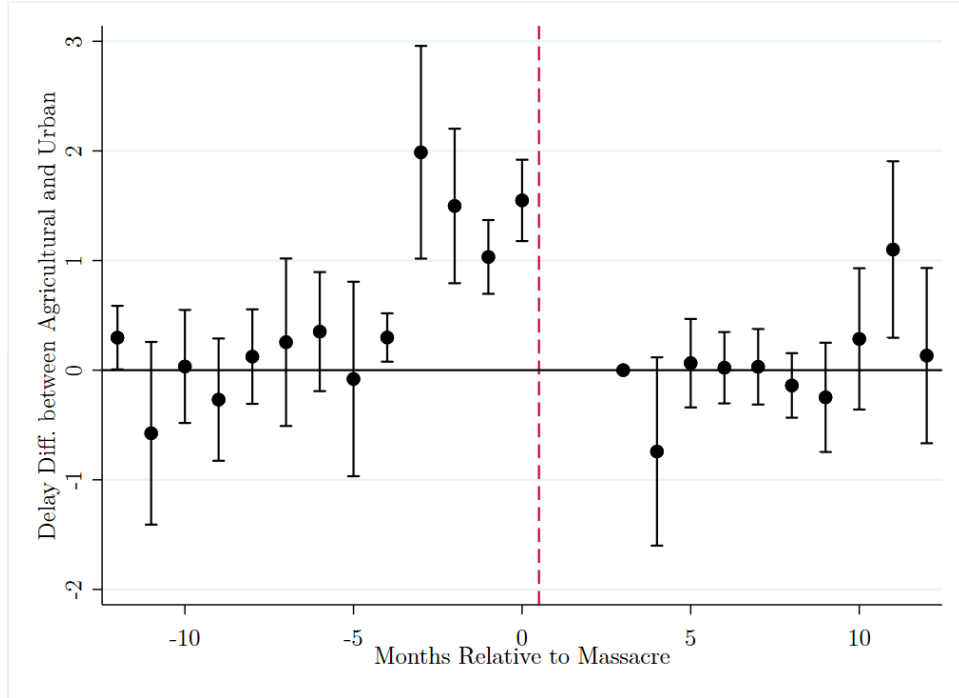
Notes: Omitted month is three months after the massacre (January 1938). No agricultural properties were requested in November or December 1937 (1 and 2 months after the massacre).

Figure 4 plots the β_ts from the above regression. The difference in delays between agricultural and urban properties stays consistent through most of the surrounding months, except for an anomaly for plots requested in the four months before the massacre. For such requests, delays for agricultural properties spiked: instead of waiting ten months, tenants had to wait five years.

The pre-massacre spike in delays can be explained by the government diverting its limited capacity to address the needs of the refugees. When the average process time was seven months, plots requested in July 1937 were still being processed when the refugees entered in October. The government had few employees to administer the program and survey properties. The urgency of the refugee crisis required the government to send its few employees to help with the requested plots. Thus, the requests that were still being processed were put on hold until the government could cover the refugees' needs. The refugees strained the government's legal capacity, and it looks like the government was unable to respond until five years after the 1937 massacre, which would be after the 1942 tax reform. Thus, we have further evidence for a connection between legal and fiscal capacity.

The evidence above indicates that Haitian government faced fiscal and legal constraints. But we cannot conclude whether the constraints were optimal or not. This means we cannot say the

state must invest in capacity, but it would not be surprising to see the government choose to invest.

5   Evidence on the Independence of Fiscal and Legal Capacity

If investments in fiscal and legal capacity are independent, then the model has two predictions. First, when customs revenues drop sufficiently, then investments in fiscal capacity will increase. Second, the drop will not increase investment in legal capacity. The tax reform after the customs drop and the increase in income tax revenue are consistent with the first prediction. But how much of the increase can be explained by capacity investments? And what happened to legal capacity?

5.1   Fiscal Capacity

Table 2 shows that income tax revenues increased. But the reform increased rates, so of course revenues would increase. The question is how much of the increase came because of the change in rates, how much came from investing in capacity, and how much came from other factors.

In the model, we defined tax revenues as $T = \tau \pi Y$. Thus, changes in state capacity will reveal themselves through changes in tax revenues ($\Delta \ln T$). By definition,

$$\Delta \ln T = \Delta \ln \tau + \Delta \ln \pi + \Delta \ln Y. \tag{8}$$

The increase in tax revenue can be decomposed into three parts: the change in fiscal capacity ($\Delta \ln \tau$), the change in legal capacity ($\Delta \ln \pi$), and economic growth ($\Delta \ln Y$). Note that according to the definition of τ in Section 1 we can decompose τ even further into the product of the tax rate (t) and the fraction of income it can observe through collection methods (x). The government can change t through legislation and x through improving collections. Thus, the full decomposition is

$$\Delta \ln T = \Delta \ln t + \Delta \ln x + \Delta \ln \pi + \Delta \ln Y. \tag{9}$$

It is clear that the change in rates explains only a small portion of the increase. Table 1 shows that the biggest increase in taxes was for someone making more than 100,000 gourdes; this person saw his tax rate go from 6% to 15%. Revenues from this person would have increased by a factor of 2.5. But by 1947 income taxes had increased by a factor of 10. Thus, even if all pre-reform taxes were collected from individuals and businesses in the top bracket, we can at most explain 25% of the increase. The reform's limited role in the growth of revenues was acknowledged by fiscal

officials at the time. When income tax revenues hit the first high in 1943, the officials recognized the role of the reform. But when revenues continued to rise the next year, they pointed to other causes. "Since no increase in the rates occurred during the year, the rise in collections was due to greater business profits and improved methods of collection" (Banque nationale de la Republique d'Haiti 1944, p. 7). The official's comments highlight the role of the two other factors—"greater business profits" ($\Delta \ln Y$) and "improved methods of collection" ($\Delta \ln x$)—but ignore the role of legal capacity ($\Delta \ln \pi$).

To do the full decomposition, I need to be able to measure each component. The easiest to measure is $\Delta \ln t$, but it is still challenging because we do not know the average increase in tax rates. Instead, I calculate the upper and lower bounds by using the minimum tax increase (3% to 4%) and the maximum (6% to 15%). The challenge to calculating $\Delta \ln Y$ is that we do not have good estimates of Haiti's economic growth because Haiti did not start measuring GDP until the 1950s. To proxy for economic growth, I use seven economic indicators that should track growth: the total value of deposits in all Haitian banks, the total value of loans circulating within Haiti, the total value of exports from Haiti, and the prices of Haiti's four primary exports (coffee, cotton, sisal, and sugar). I use synthetic control methods to weight the indicators and show how income taxes would have evolved if only economic growth mattered. Finally, I attribute the residual to the unobservable capacity components $\Delta \ln x$ and $\Delta \ln \pi$.

The decomposition is shown in Figure 5. Economic growth can account for 40% of the increase in tax revenues. The other 60% is attributable to improvements in state capacity. The change in tax rates accounted for at least 10% of the increase in income tax revenue and could explain up to 41%. Thus, investments in legal capacity and collections explain at least 19% of the increase and could explain up to 50%.

Attributing up to half of the increase in revenues to improvements in collections may seem too much, but there is good evidence that the government made large investments as a result of the reform. First, the tax reform led to an unintended increase in the HIRS budget. The HIRS budget was tied to internal revenues through an appropriations law created before the reform. Table 2 shows that internal revenues were relatively constant in the pre-reform period. As such, from 1934 to 1941, the nominal budget for the IRS was flat, as shown in Figure 6. But because the income tax was an internal tax, and because the reform rapidly boosted the revenue collected, the budget for the internal revenue service soared. By 1944 the budget had doubled. As the budget expanded, so did expenditures. Prior to the reform, expenditures were constrained by the budget. But after

Figure 5. Decomposition of income tax revenue growth, 1941-1948
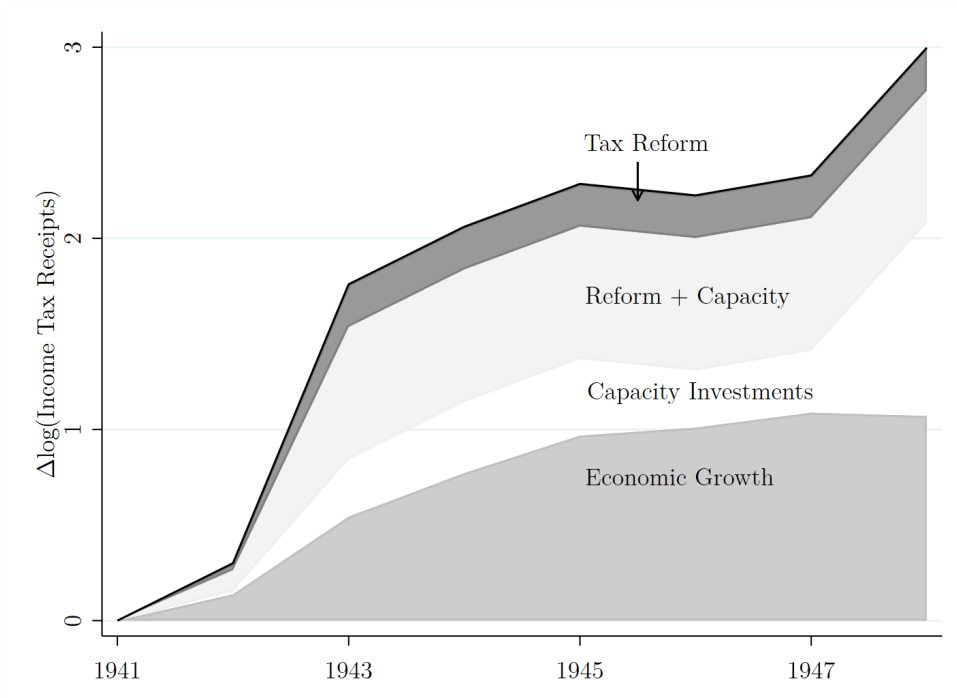
Notes: The graph decomposes the growth in income taxes into separate components. The contribution of economic growth comes from measuring proxies for economic activity (see paper for details). The darker tax reform region provides the lower bound of the 1942 tax reform's contribution, and the dark region plus the light region provide the upper bound. The residual (white) is attributed to capacity, though some of the reform's upper-bound region could also be attributed to capacity.

Figure 6. Budget, expenditures, and wages for the internal revenue service, 1930-1948
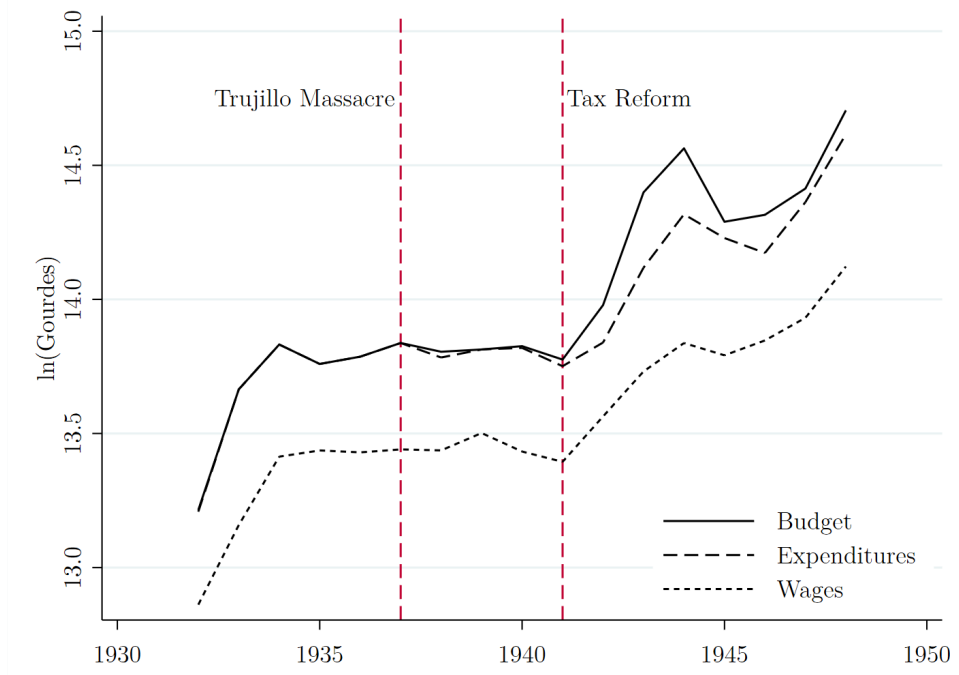
Notes: Data come from the Annual Reports of the Fiscal Representative.

the reform, as seen in Figure 6, the budget expanded so quickly that expenditures could not keep pace.

Much of the increase in expenditures seems to have gone towards improving fiscal capacity through personnel. Figure 6 shows HIRS spent a significant share of its budget on wages, and that expenditures for wages increased after the reform. Some of the increase in wages went to employees already at HIRS, but it also went to new employees. Specifically, in the first year of the expanded budget, "the staff of traveling inspectors was considerably increased" (Banque nationale de la Republique d'Haiti 1943, p. 12). HIRS not only hired traveling inspectors, it purchased new automobiles for them to use (*idem.*). In a rural country with few major population centers, traveling inspectors were crucial to collecting taxes.

Personnel was not the only investment to improve collections; there were also non-wage expenditures. Prior to the reform, HIRS did not have much physical infrastructure, but the increased budget allowed for such investments. "The Internal Revenue Service maintains agencies throughout the Republic, and many of these agencies in the past have been poorly housed or completely lacking in Government owned quarters. A program of construction of internal revenue offices was undertaken in the course of the year" (Banque nationale de la Republique d'Haiti 1944 p. 11). Fur-

thermore, HIRS had historically struggled to track who owed taxes, but with the new budget "the Internal Revenue Service also undertook the construction of an archives building," (Banque nationale de la Republique d'Haiti 1943, p. 12) which was completed the next year (Banque nationale de la Republique d'Haiti 1944, p. 11).

Thus, improvements in fiscal capacity contributed significantly to the increase in tax revenues. But the improvements in capacity could also include improvements in legal capacity. To explore whether legal capacity increase, we move to the land rental delays.

5.2 Legal Capacity

Using the data from the land rental program, I show two causal arguments that legal capacity improved. First, the tax reform improved the ability of HIRS to process land rental requests. Figure 3 showed that the refugees increased processing delays, and that the delays shrank after the tax reform. Here, we want to explore the causal effect of the refugee shock and tax reform using a hazard model. I estimate a Cox hazard model, where the hazard for property request i being processed is given by:

$$\lambda_i(t|X_i(t)) = \lambda_0(t) \exp(\beta' X_i(t)) \tag{10}$$

where $\lambda()$ is the hazard function (failure is defined as the government processing the request); λ_0 is the base rate hazard; t is the number of months in the queue; and X are the included covariates for property request i. The covariates include permanent features of the property request–its type (urban or rural) and the number of properties in the queue when the property was requested—as well as time-varying features—a dummy for whether t is after the massacre and another dummy for whether t is after the tax reform.

The effects of the increase in tax revenue and the influx of refugees are captured with the time-varying dummy variables. The indicators vary over time because the property request sits in a queue. So if a property request was submitted in July 1937, the dummy variable for whether the massacre had occurred would equal zero; but if the request was still in the queue in November 1937, the dummy variable would equal one. Similarly, the tax reform dummy is equal to zero for months before May 1942 and one for May and all months after. Thus the hazard function accounts for the events happening while the request is still processing, which is important for capturing the dynamics of the investments.

The primary interest of the analysis is to see how the revenue shock and refugee influx affected

Figure 7. Probability that property is still pending given the number of months since requested
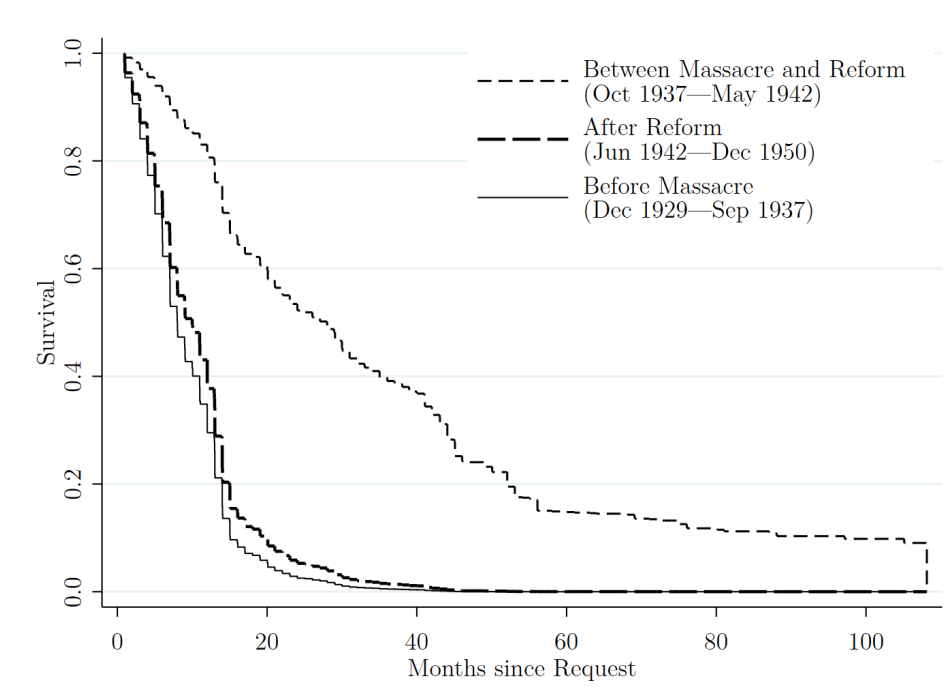
Notes: Survival curves derived from a Cox proportional hazard model that controlled for property type, the number of properties in the program's queue at the time of the request, and dummy variables for when the massacre and reform occurred.

the processing time for requests. From the hazard model, we can derive survival curves (where death means the property was processed) evaluated at three different points: before the massacre, between the massacre and the tax reform, and after the tax reform.[2] The three survival curves are plotted in Figure 7. Note that a decrease in survival rates indicates the government is processing requests faster, while an increase in survival rates indicates the government is struggling. Before the massacre, the solid line indicates there was a 20% chance approval would take longer than eight months. Between the massacre and the tax reform, survival rates increased substantially. The probability that approval would take longer than eight months increased to 85%, and there was a 20% chance it would take longer than four years. But once the tax reform increased the government's capacity, the curve returned to pre-massacre levels. The return to the pre-massacre survival curve, even as more requests enter, suggests there might be an equilibrium level of state capacity relative to the demands placed on it. The massacre moved the government away from this equilibrium, but the tax reform allowed the government to return to it.

The survival curves show the refugees strained the government's capacity and that the tax reform increased capacity. Before the refugees arrived, the government was in a capacity-request equlibrium. But the refugee shock pushed the government out of the equilibrium by flooding it with requests. Because the government did not expand capacity, delays increased. But once World War II forced the government to change its income tax law, the government invested the extra tax revenue in expanding capacity. The government returned to the pre-refugee capacity-request equilibrium.

The second argument that the tax reform caused an increase in legal capacity comes from rents collected on the properties. The rented properties were disproportionately in areas with refugees, and if legal capacity improved than we would expect rent collection to increase in these areas. To test this hypothesis, I compare rent collections in tax precincts with and without refugess using a synthetic control analysis. The data on rent collections are available only at the tax precinct level, of which there are ten in the country during this period. Of those ten, only two hosted refugee camps (see Figure 1). Thus, the small sample size makes a difference-in-differences approach difficult. Fortunately, a generalized version of difference-in-differences is available in the synthetic control approach (Abadie et al. 2010). Synthetic control and difference-in-differences are similar, except in difference-in-differences the analysis attributes equal weight to all control observations

---

[2]Note that these three points correspond to three combinations of dummy variables. Before the massacre, both dummy variables equal zero. Between the massacre and the reform the massacre dummy equals 1 but the reform dummy equals zero. And for after the reform both the massacre and reform dummies equal one.

whereas the synthetic control analysis weights control observations to best match the treatment group. Although I focus on the results from the synthetic control analysis, the Appendix contains the results from a difference-in-differences analysis and compares them to the synthetic control, revealing similar results.

Because I have limited data, constructing the synthetic control is straightforward. The goal is to compare rent collections in precincts with refugees (treated precincts) to precincts without refugees (control precincts). Because the precincts are treated by the refugees before the tax reform, I use October 1937 as the treatment date. The analysis, then, will look at how the precincts behave when the refugees arrive and if there was a change in 1942 at the tax reform. The sythetic control weights are estimated from taxes collected from October 1933 to September 1937. Receipts are transformed with a logarithmic transformation and normalized to zero in 1937 (the financial year before the refugees arrived).

The synthetic control analysis shows that the refugees had a large and sustained impact on public land rental receipts, and the effect was magnified by the tax reform's effect on capacity. Figure 8a plots the treatment and synthetic control. From 1933 to 1937, the two groups followed similar patterns. But after 1937, the precincts diverged. Between the refugees' arrival in 1938 and the tax reform in 1941, rental revenues in refugee precincts were about 20% higher than non-refugee precincts (p-values are significant and reported in Table A1). Then when the tax reform passed, refugee precincts increased yet again by about 20%, widening the gap between the two types. As non-refugee districts collected more, the gap narrowed, but stayed large in 1949.

The evidence in Figure 8a is consistent with the increase in tax revenues being invested in legal capacity. But one factor that could confound the analysis is if there was a separate economic shock that also increased land values and was coincident with both the timing of the reform and the location of the refugees. For instance, U.S. mobilization may have increased demand for goods produced in the refugee precincts, which subsequently increased land values. Such a concern is valid but fails to explain why there are unmistakable shifts not just when the U.S. mobilized but also when the refugees first came. Regardless, to address the concern, I do a placebo synthetic control analysis, replacing the dependent variable with documentary recording fees; i.e. fees collected from recording mortgages and property transfers. Looking at recording fees is a great placebo test because, like the rental receipts, the fees are related to the value of land, but the refugees did not have the assets to get mortgages or buy property.

Figure 8b displays the treatment and synthetic control units using property transfer receipts as

Figure 8. The effect of refugees on receipts from public land rentals, 1930-1949

(a) Land Rental Receipts

(b) Property Transfer Receipts
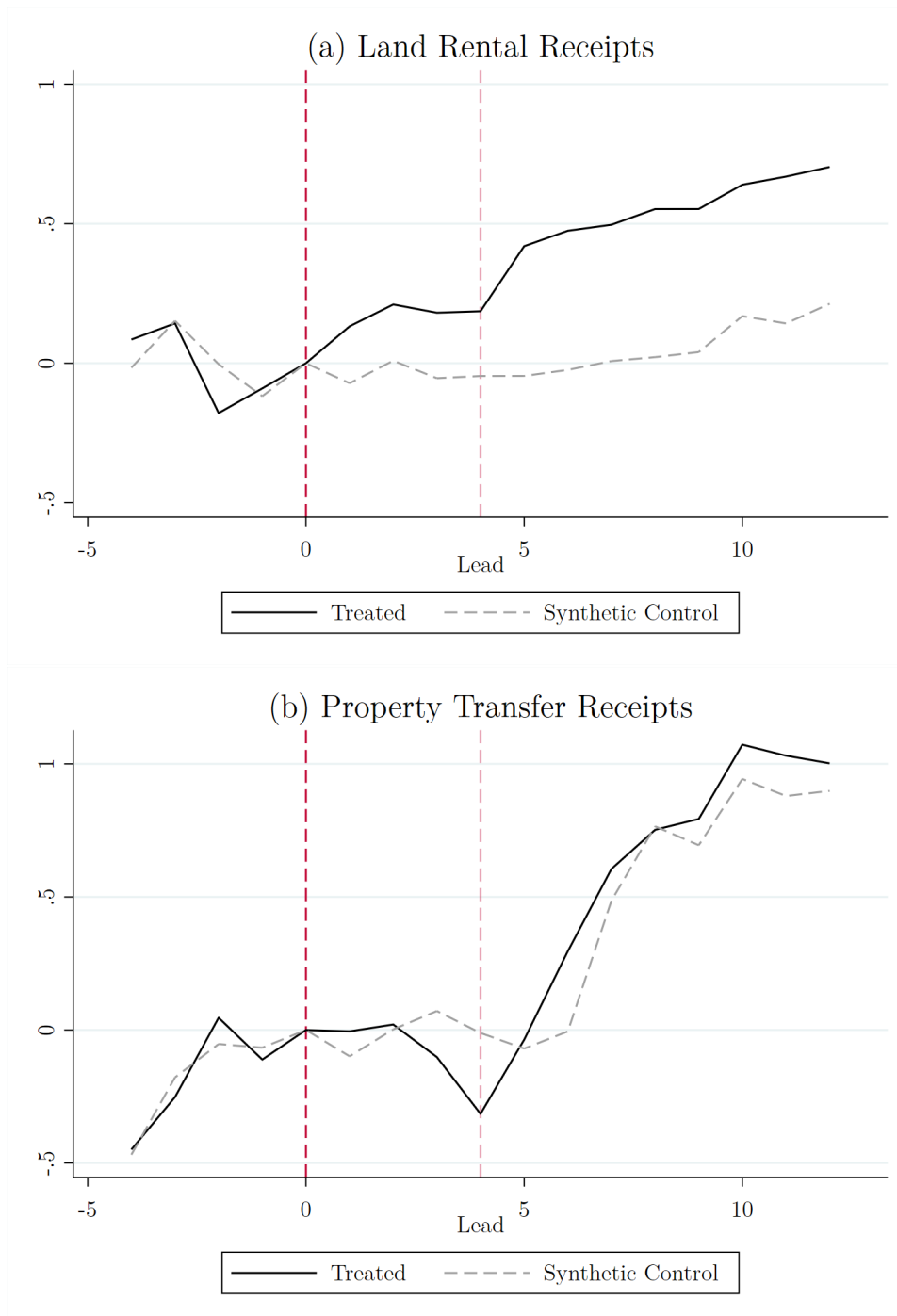
Notes: Figures display the treatment and synthetic control units. Panel (a) displays land rental receipts, the variable of interest, and (b) shows property transfer receipts, the placebo. The dark red line indicates when treatment was assigned in the synthetic control analysis (when the refugees arrived). The light dashed line indicates the 1942 tax reform, though the analysis did nothing to account for it.

the dependent variable. The patterns in property transfer receipts are distinct from the patterns found for land rental receipts. There were no shocks in recording fees that were unique to refugee precincts, neither following the refugees' entrance nor after the tax reform. The post-1942 increase affected all precincts equally. An increase in fiscal capacity improved the state's ability to collect taxes from property transfers, but only an increase in legal capacity could create the unique increase in rental revenues found in refugee precincts.

The two analyses in Figure 8 show that there was a distinct trend in land rental receipts caused by the refugees and tax reform, but can we say that the mechanism was an improvement in legal capacity? After all, it seems the state would need time to prove its commitment to protecting property, yet we see immediate jumps in revenue in Figure 8a. There are two arguments that support the legal capacity hypothesis. First, the jump in revenues in 1943 came when the government finally gave the refugees the titles they had requested when they arrived. The refugees had had to wait for titles because legal capacity had choked the government's response (see Figure 7). Second revenues can only increase if the state protects the property. Tenants were not obligated to remain on the rented land, and many farmers avoided taxes through squatting on public land. If tenants felt that the rent they were paying did not justify the protections they received, they could exercise their outside option and squat somewhere else. This is especially true for refugees who had waited years to get their requests approved. Rental revenue could only increase if the property was protected; i.e. if the state had sufficient legal capacity. Improving legal capacity both got the refugees the properties they requested and convinced them it was worth paying rent.

The evidence shows that despite the strong demand shock from the refugees, the state did not expand legal capacity until after the 1942 reform. Why didn't the government invest in legal capacity in 1938 when customs revenues were 16% higher?

6   Why are they not independent?

The effect of Haiti's tax reform on the the government's land rental program suggests that investments in fiscal and legal capacity are not independent. But why should that be so? I discuss two reasons: appropriations and administration.

First, the model assumes that revenues from income tax and customs are fungible. But, at least in Haiti, the appropriations law treated them differently. The appropriations law gave HIRS 15% of the government's internal revenues (Banque nationale de la Republique d'Haiti 1942 p 15). None of HIRS's budget came from customs revenue. Thus, even when there was a surge in demand

for rental properties, improving legal capacity would have required changing the appropriations law to reallocate the customs revenue. And the same goes for changes in internal revenues: when the income tax increased, HIRS had a large increase in budget, and taking that money away from HIRS would have required further legislation. Reforming legislation was not impossible, but as in any polity it was a complicated, costly process.

The second reason why investments were not independent was because the same administration collected taxes and processed land rentals. When the government expanded personnel to collect income taxes, those same personnel could be used to run the land rental program. While this particular arrangement is unique to Haiti, it highlights just one way in which the model's generalizations can differ from institutional reality.

These institutional constraints are unique to Haiti, but do they have general lessons? If institutional constraints tie investments in legal capacity to investments in fiscal capacity, then such countries have to decide if the benefit of increasing legal capacity is worth the cost of investing in fiscal capacity. A state might want to improve property rights by giving clearly defined titles to land. But to support that program it levies a property tax. For individuals, is a title to land worth paying a land tax? In some cases it could be, but in other cases the marginal gain from protected property might not justify the loss in consumption. For the state, both titling property and collecting a property tax require investing in legal and fiscal capacity, but it might avoid such investments if the individual can't even justify the trade-off.

7   Conclusion

This paper provides evidence that states can not separate investments in fiscal and legal capacity. Starting from a model where such investments are independent, I show that Haiti's experience runs counter to the model's predictions. Rather than investing in legal capacity when customs revenues were high, the Haitian government waited to invest in legal capacity until after low customs revenues forced it to invest in fiscal capacity. The combined investment in legal and fiscal capacity can be explained by institutional constraints and complementarity between the two investments.

The results from Haiti prompt questions about the independence of investments in other contexts. One trouble investigating it further is that legal capacity is difficult to measure. Evidence from France, one of the few places where we can measure both fiscal and legal capacity, suggests that investments had to occur together (Johnson and Koyama 2014). Since many other Latin American countries had a similar reliance on customs revenues, it could be promising to look at

such countries for further evidence.

Regarding Haitian history, this paper points to fruitful directions to pursue. The land rental data show that HIRS improved its ability to process property requests, but we do not have concrete details on how the program achieved this. HIRS likely used the new personnel to help with processing, but administrative records could clarify the microfoundations of expanding state capacity.

Figure A1. The Trujillo Massacre's effect on land requests for districts within 20 km of a refugee camp
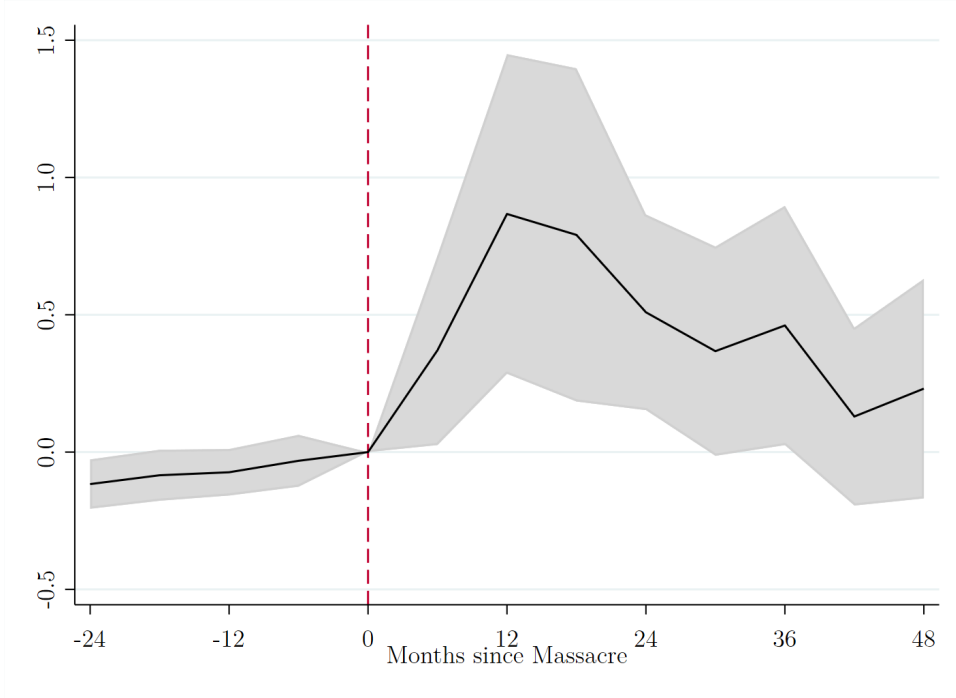
Notes: The shaded area represent 95% confidence intervals.

A Appendix

A.1 Confirming refugee effect on property requests

Palsson (2020) shows the Trujillo refugees increased requests for government land rentals, but the analysis was limited to only agricultural properties. Since this paper expands the sample to urban and unknown properties, I repeat the difference-in-differences analysis. The treatment group in the difference-in-differences analysis is districts that are close to a refugee camp (i.e., within 20 km). The data are condensed into six-month periods, and the following regression estimated:

$$\sinh^{-1}(Req_{it}) = \delta_i + \beta_t D_{it} + \varepsilon_{it} \tag{11}$$

where Req_{it} is the number of requests per 1,000 inhabitants in commune i in the six-month period t, δ_i is a commune fixed effect, and δ_t is a period fixed effect. The D_{it} is an interaction between treatment status (district is within 20 km of a refugee camp) and the six-month period t; hence, the β_t are the difference in requests between treatment and control districts in period t. The coefficients are estimated for each period before and after the massacre to test for pre-treatment

trends. Because in many years Req_{it} equals 0, the dependent variable is transformed using the inverse hyperbolic sine, which is similar to the logarithmic transformation but evaluated at zero (Burbidge et al. 1988). To account for serial correlation, standard errors are clustered at the commune level. The results are plotted in Figure A1 and confirm (a) there were no pre-treatment differences in request trends and (b) the refugees had a large, causal impact on requests.

A.2 Comparing Synthetic Control to Event Study

The syntehtic control analysis presented in Section 4 provides convincing evidence that the refugees and the capacity expansion had significant effects on tax revenues. But a weakness of the synthetic control analysis is that researchers have some degrees of freedom in selecting the synthetic control. To assuage concerns about researcher bias, I also estimate a difference-in-difference event study and compare the estimated treatment effects to the synthetic control. To test for refugee effects on tax receipts, I run the following regression

$$\ln T_{it} = \delta_i + \delta_t + \beta_t(Refugee_i \times \delta_t) + \varepsilon_{it} \tag{12}$$

where T_{it} is, for tax precinct i in year t, the tax receipts from land rentals (though in other situations below, the dependent variable will be taxes in other categories). The regression includes fixed effects for the year (δ_i) and the precinct (δ_t). The $Refugee_i$ variable is an indicator for whether the tax precinct hosted a refugee camp, and the β_t gives, for year t, the difference in receipts between refugee and non-refugee tax precincts. Because there are only 10 precincts, I obtain confidence intervals for β_t using the wild bootstrap-t methods described in Cameron et al. (2008) and implemented in Stata by Judson Caskey.

Table A1. Treatment effect estimates for synthetic control and difference-in-differences analysis

| | Land Rental Receipts | | Property Transfer Receipts | |
	SC	ES	SC	ES
1938	0.204	0.217	0.094	0.107
	[0.00]	[0.495]	[0.27]	[0.51]
1939	0.202	0.145	0.018	0.0235
	[0.02]	[0.020]	[0.83]	[0.66]
1940	0.235	0.227	-0.173	-0.129
	[0.14]	[0.00]	[0.38]	[0.52]
1941	0.232	0.221	-0.304	-0.27
	[0.06]	[0.00]	[0.02]	[0.10]
1942	0.465	0.448	0.034	0.0689
	[0.00]	[0.010]	[0.83]	[0.67]
1943	0.499	0.497	0.301	0.335
	[0.00]	[0.00]	[0.03]	[0.01]
1944	0.489	0.423	0.119	0.16
	[0.00]	[0.00]	[0.44]	[0.17]
1945	0.531	0.447	-0.013	0.0139
	[0.02]	[0.00]	[0.95]	[0.93]
1946	0.513	0.43	0.099	0.129
	[0.02]	[0.01]	[0.69]	[0.31]
1947	0.471	0.389	0.129	0.159
	[0.08]	[0.05]	[0.55]	[0.285]
1948	0.527	0.416	0.152	0.198
	[0.11]	[0.06]	[0.45]	[0.29]
1949	0.49	0.387	0.103	0.137
	[0.17]	[0.14]	[0.38]	[0.24]

Notes: P-values in brackets. The column headers indicate the approach used to estimate the treatment effects—SC means synthetic control and ES means event study.

References

Abadie, A., Diamond, A. and Hainmueller, J.: 2010, Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program, *Journal of the American Statistical Association* **105**(490), 493–505.

Arias, L. M.: 2013, Building Fiscal Capacity in Colonial Mexico: From Fragmentation to Centralization, *The Journal of Economic History* **73**(3), 662–693.

Banque nationale de la Republique d'Haiti: 1942, Annual Report of the Fiscal Department for the Fiscal Year October 1941–September 1942, Port-au-Prince, Haiti: Imprimerie de l'Etat.

Banque nationale de la Republique d'Haiti: 1943, Annual Report of the Fiscal Department for the Fiscal Year October 1942–September 1943, Port-au-Prince, Haiti: Imprimerie de l'Etat.

Banque nationale de la Republique d'Haiti: 1944, Annual Report of the Fiscal Department for the Fiscal Year October 1943–September 1944, Port-au-Prince, Haiti: Imprimerie de l'Etat.

Besley, T. and Persson, T.: 2009, The origins of state capacity: Property rights, taxation, and politics, *American Economic Review* **99**(4), 1218–1244.

Besley, T. and Persson, T.: 2010, State capacity, conflict, and development, *Econometrica* **78**(1), 1–34.

Burbidge, J. B., Magee, L. and Robb, A. L.: 1988, Alternative transformations to handle extreme values of the dependent variable, *Journal of the American Statistical Association* **83**(401), 123–127.

Cameron, A. C., Gelbach, J. B. and Miller, D. L.: 2008, Bootstrap-based improvements for inference with clustered errors, *The Review of Economics and Statistics* **90**(3), 414–427.

Centeno, M. A.: 1997, War and taxation in nineteenth-century Latin America, *American Journal of Sociology* **102**(6), 1565–1605.

de Soto, H.: 2000, *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*, Basic Books.

Dincecco, M.: 2015, The rise of effective states in Europe, *The Journal of Economic History* **75**(3), 901–918.

Geloso, V. J. and Salter, A. W.: 2020, State capacity and economic development: Causal mechanism or correlative filter?, *Journal of Economic Behavior and Organization* **170**, 372–385.

Gennaioli, N. and Voth, H.-J.: 2015, State capacity and military conflict, *The Review of Economic Studies* **82**(4), 1409–1448.

Haiti Bureau du representant fiscal: 1927, Annual Report of the Financial Adviser-General Receiver for the Fiscal Year October 1926–September 1927, Evening Post Job Printing Office, Inc.

Haiti Bureau du representant fiscal: 1928, Annual Report of the Financial Adviser-General Receiver for the Fiscal Year October 1927–September 1928, Evening Post Job Printing Office, Inc.

Haiti Bureau du representant fiscal: 1933, Annual Report of the Financial Adviser-General Receiver for the Fiscal Year October 1932–September 1933, Evening Post Job Printing Office, Inc.

Heinl, R. D., Heinl, N. G. and Heinl, M.: 1996, *Written in Blood: The Story of the Haitian People, 1492–1995* (rev. and exp. ed.), Houghton Mifflin Co.

Johnson, N. and Koyama, M.: 2014, Taxes, lawyers, and the decline of witch trials in france, *Journal of Law and Economics* **57**(1), 77–112.

Johnson, N. and Koyama, M.: 2017, States and economic growth: Capacity and constraint, *Explorations in Economic History* **64**, 1–20.

Lundahl, M.: 1979, *Peasants and Poverty: A Study of Haiti*, Croom Helm.

Palsson, C.: 2020, Small farms, large transaction costs: Haiti's missing sugar, *Working Paper* .

Roorda, E. P.: 1996, Genocide next door: The Good Neighbor Policy, the Trujillo regime, and the Haitian massacre of 1937, *Diplomatic History* **20**(3), 301–319.

Smith, M. J.: 2009, *Red and Black in Haiti: Radicalism, Conflict, and Political Change, 1934–1957*, University of North Carolina Press.

Vega, B.: 1995, *Trujillo y Haiti* (vol. 2: *1937–1938*), Fundación Cultural Dominicana.