

# **Policies of Attraction: Colonial Rule, Property Rights and Economic Development in the Philippines**

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October 2007

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Abstract: The U.S. implemented several land reforms during its occupation of the Philippines. Using data from the censuses of 1903 and 1918, we consider the impact of two important changes: the redistribution of the friar lands formerly belonging to the Catholic Church, and the implementation of a formal land titling program. We find that the land reforms had the unintended consequence of increasing the incidence of squatting; however, the friar lands program was successful in reducing land inequality. In addition, we also investigate the impact of these reforms on the doubling of Philippine rice productivity and the decision to switch to commercial crops between 1903 and 1918.

## 1. Introduction

Can institutional change be imposed from the outside? The question is of obvious relevance. Foreign missions—sometimes through the United Nations, sometimes alone—are trying to reform institutions in Sierra Leone, Liberia, Iraq, Afghanistan, Kosovo, Bosnia, East Timor, the Solomon Islands, and Haiti. National and multilateral development agencies routinely recommend legal and institutional changes to national governments, often with very concrete inducements. The U.S. often demands changes in the institutions governing investment and investor protections as a condition in free trade agreements, and the European Union requires accession countries to adopt tens of thousands of pages of laws and regulations. Many authors have argued, however, that externally-imposed systems are extremely difficult to “transplant” successfully. They need to be adapted to local conditions, require very long times to take root, and are not as effective as locally developed institutions.<sup>1</sup>

We use U.S. colonial rule in the Philippines as a test case of the hypothesis that externally-imposed institutional reforms are extremely difficult to implement. Specifically, we examine the impact of two major reforms to property rights undertaken by the American colonial administrators. The first was the purchase of the “friar lands” from the Catholic Church and their subsequent redistribution to Filipino peasants. The second is the implementation of the Torrens system of land registration throughout the Philippines. The Torrens system involved conducting detailed cadastral surveys and issuing formal written titles to the landholders. We should note that several developing countries have undertaken large-scale land titling programs in recent years,<sup>2</sup> and that

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<sup>1</sup> Daniel Berkowitz, Katharina Pistor, and Jean-Francois Richard, "Economic Development, Legality, and the Transplant Effect," *European Economic Review* 47 (2003): 165-195; Berkowitz, Daniel, and Karen Clay. 2004. "Initial conditions, institutional dynamics and economic performance: Evidence from the American states." Unpublished.

<sup>2</sup> Vietnam issued nearly 11 million land titles to rural households in the 1990s (Do and Iyer, 2008); Thailand distributed 8.7 million land titles since the early 1980s; Indonesia issued 1.87 million titles between 1996 and 2000 (SMERU, 2002); Peru distributed 1.2 million titles to squatters in several cities (Field, 2003).

the existing empirical evidence on the impact of land titling and redistribution on investment, productivity and poverty alleviation is mixed.<sup>3</sup>

The U.S. made very large and prolonged efforts to reform Philippine property rights institutions. The political economy of the American occupation gave the U.S. administration two reasons to follow through on the reforms. First, widespread anti-imperial sentiment in the U.S. required Washington to show tangible signs of progress (albeit at minimal cost to the American taxpayer) in order to retain domestic support. Republicans put considerable effort into implementing the “policy of attraction.”<sup>4</sup> The policy of attraction involved reforms of property rights, law enforcement, taxation, public education, and infrastructure designed to demonstrate that U.S. rule benefited the Filipinos. In the words of the 1912 Republican platform, “We accepted the responsibility of the Islands as a duty to civilization and the Filipino people. To leave with our task half done would break our pledges, injure our prestige among nations, and imperil what has already been accomplished.”<sup>5</sup> Conversely, every Democratic platform between 1900 and 1912 called for Philippine independence “as soon as a stable government can be established.”<sup>6</sup> The Democrats, however, could not ignore the widespread opinion that chaos in the Philippines would adversely impact the strategic interests of the United States. They could not therefore abandon the Philippines at an acceptable political cost unless they could demonstrate that a stable self-sufficient government had in fact been

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<sup>3</sup> For instance, Besley and Burgess (2000) analyze land reforms in India, and find that greater tenant rights leads to substantial reductions in poverty, but no significant increase in output. On the other hand, Banerjee, Gertler and Ghatak (2002) find significant increases in land productivity as a result of a specific reform which increased tenant rights.

<sup>4</sup> The official government policy was usually called “benevolent assimilation.” The phrase “policy of attraction” was often used by revolutionaries opposed to U.S. occupation; the phrase originated in a telegram from the U.S. secretaries of war and interior to Emilio Aguinaldo (Philippine Insurgent Records, 1896-1901, National Archives, Washington, D.C., no. 849).

<sup>5</sup> Republican Party Platform of June 7th, 1916. John T. Woolley and Gerhard Peters, *The American Presidency Project* [online]. Santa Barbara, CA: University of California (hosted), Gerhard Peters (database). <http://www.presidency.ucsb.edu/ws/?pid=29591>.

<sup>6</sup> Democratic Party Platforms of July 7, 1908, and June 25, 1912. John T. Woolley and Gerhard Peters, *The American Presidency Project* [online]. Santa Barbara, CA: University of California (hosted), Gerhard Peters (database). <http://www.presidency.ucsb.edu/ws/?pid=29591>.

established.<sup>7</sup> Second, the U.S. administration wanted to reduce the likelihood of future conflict inside the Philippines. The Americans faced a widespread insurrection when they took control of the Philippines in 1898. A combination of brutal counterinsurgency and an offer of blanket amnesty to insurgent leaders ended the organized rebellion by 1902, but localized violence continued into the 1910s. Resurgent violence would not only engage American troops; it would delay the point at which the U.S. could be assured that a stable government had in fact been created. American policymakers on both sides of the aisle, therefore, wanted to insure that the population remained satisfied with their material progress in a post-conflict setting.

One might reasonably conclude that the combination of an occupying power with strong incentives to generate broadly-based economic growth and a long time-horizon would lead to successful externally-imposed institutional change. Such a strong conclusion would not be consistent with the province-level data that we have collected from the Philippine censuses of 1903 and 1918. We find that the extent of weak rights increased over the period. The U.S. managed to title only 3 percent of cultivated land in 15 years, despite the establishment of a cadastral survey and special land courts. More astonishingly, the most precarious form of property right—squatting—grew from less than 2 percent to almost 10 percent of all farm holdings between 1903 and 1918.

What caused the failure to title more lands? The cause does not seem to have been tax avoidance. Rather, the cause seems to have been the relatively high cost in time and money of obtaining formal property rights combined with a generally low level of property crime. The high cost—compared to Philippine incomes—discouraged families whom otherwise might have chosen to register their lands under the Torrens system. At the same time, the law enforcement system set up by the Americans reduced the chances that unclaimed lands would be seized by a third parties, reducing the most

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<sup>7</sup> As time went on and the Japanese threat loomed larger, the consensus that the Philippines were a strategic asset for the U.S. faded as military analysts came to regret the American commitment to the islands' defense.

immediate benefit to registering a land claim. We also find that inequality of farm holdings increased over this period, with a greater increase in areas of more secure titling. This seems to suggest that the benefits of better property rights might have been captured by large landowners to the detriment of small farmers.

Squatting increased because the U.S. simultaneously made it difficult to apply for homesteads on public lands and failed to prevent its illegal occupation. Increases in squatting in 1903-18 occurred primarily in those provinces with large concentrations of public land. The U.S. received 60,365 and approved 29,435 of them, but only 5.6% of the approved applications resulted in titles. The glacial pace had two causes. First, the 20 peso (US\$10) registration fee proved high for many homesteaders. Second, in 1918 alone (the first year for which there are records) the government received 3,613 protests accusing homesteaders of occupying private property—*twelve* times the actual number of homestead titles issued in that year.<sup>8</sup> The U.S. also issued “free patents” to families that could demonstrate that they had occupied public lands prior to 1902, but very restrictive requirements slowed applications to a crawl.

The United States, it seems, trapped itself in a Catch-22 of its own making. The U.S. did not want to establish a precedent that land could be seized, so it negotiated the sale of the friar lands with the Catholic Church. Since the friars knew that the U.S. needed to purchase the lands, the resulting price was quite high. The U.S. then established a system of courts, land surveys, property registers, and police. The expense—when added to the expense of physical infrastructure and a massive expansion of the primary schools—left few revenues left over to subsidize access to courts and registries, whereas farmers without title could not be excluded from the benefits of improved police protection. Raising more revenues was made difficult by the move to free trade with the US in 1909, which deprived the insular government of its single largest source of revenues.

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<sup>8</sup> Annual Report of the Director of Lands for the year 1918, p. 880.

The U.S. was also reluctant to allow the Philippines to increase its bonded debt beyond strict limits.

The rest of the paper is structured as follows: Section 2 details the historical background and the reforms implemented by the US colonial administration, and Section 3 briefly describes our data. Sections 4, 5 and 6 present our main empirical results and Section 7 concludes.

## 2. Historical Background

### 2.1 Spanish Colonial Rule

The first European to arrive in the Philippines was the Portuguese explorer Ferdinand Magellan in 1521. Spanish colonization of the Philippines began in 1565, when Spanish troops defeated the king of Cebu. The city of Manila was established in 1571, and the islands were administered as a colony of New Spain (Mexico). Control moved directly to the Spanish Crown after Mexico declared its independence in 1821.

Spanish colonial rule brought Catholicism to the islands, though substantial Muslim populations remained in certain places like the island of Mindanao. Over time, several different orders of missionaries established their presence in the Philippines. Predominant among them were the monastic orders of the Dominicans, the Franciscans, the Augustinians, and the Augustinian Recollects (Recoletos).<sup>9</sup> In 1903, there were 746 regular parishes, 105 mission parishes and 116 missions in the Philippines.<sup>10</sup>

The missionary orders were responsible for setting up several educational and health institutions. Further, in most areas, the friar in his role of parish priest was the sole representative of the Spanish Government, as well as the only educated person with knowledge of both Spanish and the native language. As such, he was the *de facto*

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<sup>9</sup> The Jesuits, Capuchins, Benedictines and the Paulists had a much smaller presence on the islands.

<sup>10</sup> *Reports of the Taft Philippine Commission*, p 23.

administrator of his parish. In this secular capacity, the parish priest inspected schools, administered labor drafts and the collection of head taxes, oversaw elections to municipal offices and the police force, and signed off on the municipal budget.<sup>11</sup> He was the president of the health board, the president of the prison board and the chief advisor for the municipal council.<sup>12</sup> As Governor Taft put it, "The friars, priests, and bishops, therefore, constituted a solid, powerful, permanent, well-organized political force in the islands which dominated policies."<sup>13</sup>

Over time, the Filipino population harbored considerable resentment against the friars in their secular role. One major reason for this was the friars' control over large feudal estates, acquired over time by purchase, legal battles, ecclesiastical privileges, and, at times, outright usurpation. To their credit, the friars brought innovations such as irrigation systems to the lands under their control, and introduced cash crops such as sugarcane, tobacco and coffee. Other innovations were less savory. The friars used public labor for private purposes throughout the Spanish period. Land usurpations produced major revolts in 1743, 1872, and 1896. High fees for baptisms, weddings, funerals and other sacraments contributed to local resentments, and were the subject of several Spanish imperial investigations.<sup>14</sup> Another major grievance against the friars was the barriers raised to the advancement of Filipino clergy.

The Cavite uprising of 1872 set the stage for the far more severe 1896 revolt. Over the subsequent decade, a group of overseas Filipino students emerged to agitate for reform, exemplified by the so-called Propaganda Movement led by Jose Rizal. Though Rizal never advocated for independence from Spain, he was arrested by the Spanish au-

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<sup>11</sup> The head tax was called the "cédula," after the identity document that recorded whether it had been paid. The head tax under the Spanish could also be paid in kind, with fifteen days of labor to the Crown. See Vicente Pilapil, "Nineteenth-Century Philippines and the Friar-Problem," *The Americas*, Vol. 18, No. 2. (Oct., 1961), pp. 127-148, p. 132.

<sup>12</sup> *Reports of the Taft Philippine Commission* (p 25-26), based on conversation with the provincial of the Franciscan order.

<sup>13</sup> *Reports of the Taft Philippine Commission*, p 27.

<sup>14</sup> LeRoy, 1903, p. 664, 666.

thorities in 1892.<sup>15</sup> Rizal's arrest prompted the formation of armed groups like the Katipunan (led by Andres Bonifacio) which prepared for revolt against Spanish rule. In 1896, an armed rebellion broke out in several provinces around Manila. After many months of fighting, the rebels concluded a peace treaty with the Spaniards in December 1897. Emilio Aguinaldo, the leader of the rebel movement, left for Hong Kong. Fighting continued, however, in the provinces around Manila.

## 2.2 U.S. Colonial Rule in the Philippines

American intervention ended Spain's rule in the Philippines. The U.S. fought Spain over Cuba, but the Philippines were a Spanish possession and the United States routinely kept a squadron of vessels in the western Pacific. War plans drawn up in 1897 called for the Asiatic Squadron to take the islands in order to deny Spain revenue, provide a base of operation, and gain leverage in the subsequent peace settlement.<sup>16</sup> When the U.S. declared war on April 25th, 1898, the Navy sent the Squadron a terse order: "Proceed at once to the Philippine Islands. Commence operations at once, particularly against the Spanish fleet. You must capture vessels or destroy. Use utmost endeavors."<sup>17</sup> On May 1st, Admiral George Dewey sailed into Manila Bay and destroyed the Spanish fleet. Lacking orders to the contrary, Dewey supplied arms to the Philippine guerrillas operating in nearby Cavite and sent a cruiser to fetch Aguinaldo from his Hong Kong exile. Washington, however, soon told Dewey to avoid "political alliances with the insurgents."<sup>18</sup> Dewey complied, and kept Philippine troops from participating in the final assault on Manila in August.

The U.S.'s main interest in the Philippines was the retention of Manila or Subic Bay as a base for the Asiatic Squadron. President McKinley initially intended only to

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<sup>15</sup> The Spanish executed Rizal in 1896.

<sup>16</sup> Kramer, *Blood of Government*, p. 91.

<sup>17</sup> *Annual Reports of the Navy Department for the Year 1898* (Washington: Government Printing Office, 1898).

<sup>18</sup> Kramer, *Blood of Government*, p. 94.

take a sovereign base, along the lines of Guantánamo Bay in Cuba. The Navy, however, reported that they could not defend a base without control of Luzon. Naval analysts also worried that Aguinaldo would be unable to establish a stable government, opening the way for foreign intervention. McKinley debated annexing only Luzon, but rejected the idea for political reasons—taking one island while leaving the remainder under Spanish rule (or as a separate republic) smacked too much of craven European-style imperialism. As a result, on December 21, 1898 (eleven days after the Treaty of Paris transferred Cuba, Guam, the Philippines, and Puerto Rico to the U.S.) McKinley declared that U.S. policy in the Philippines was one of “benevolent assimilation, substituting the mild sway of justice and right for arbitrary rule.”<sup>19</sup> Unlike in Cuba, the U.S. made no intimation that the Philippines would receive self-government anytime soon.

The Philippine rebel leaders soon went into violent opposition. In January 1899, they set up a government at Malolos. After the U.S. Senate ratified the Treaty of Paris in February 1899, insurgency resumed in most parts of the Philippines. It took two years—and an offer of total amnesty for the rebel fighters—to bring the violence under control. The war in the Philippines became the signature issue of the 1900 presidential elections, and the insurgents carefully monitored the election returns. When the Democrats lost under Williams Jennings Bryan, insurgent morale collapsed, and surrenders multiplied. Emilio Aguinaldo himself surrendered in March 1901, and subsequently called on his followers to accept U.S. administration. During the upheaval in 1896-97 and 1899-1901, 40 priests were killed and 403 imprisoned. Of the 1124 priests in 1898, by 1903 only 472 priests remained, almost all of them in Manila.<sup>20</sup>

In 1900, with hostilities winding down, the U.S. sent the Taft Commission to assess the situation in the Philippines.<sup>21</sup> The Taft Commission arrived with a mandate to not

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<sup>19</sup> Kramer, *Blood of Government*, p. 110.

<sup>20</sup> *Reports of the Taft Philippine Commission*, p 23.

<sup>21</sup> William Howard Taft was a prominent federal judge who later served as President and Chief Justice of the United States.

only to study conditions in the islands, but also to establish local government, develop a career-oriented civil service, implement tax measures and legislate needed laws. Arguably the most immediately pressing task of the Commission was to resolve the “burning political question, discussion of which strongly agitates the people of the Philippines,” of whether the friars should return to the parishes they occupied before the revolution.

### 2.3 The Friar Lands Policy

In resolving the problem of the friars and their lands, the Taft Commission was recommended to keep in mind the principle of just compensation and the provisions of the Treaty of Paris, which promised to protect the property rights of the Spanish, specifically including “ecclesiastical bodies.”<sup>22</sup> The Commission conducted detailed interviews with the friars, local elites and American military officers on the twin questions of whether the friars should be allowed to go back to the parishes, and whether they should be given back the lands they owned.

On the first question, the Commission concluded that the return of the friars to their parishes was not advisable due to the continuing resentment against them. The grandson of a Franciscan friar put it very pithily: “All the friars have to do is to go back to their parishes and sleep one night, and the chances are that they would never awaken.”<sup>23</sup> Taft therefore became “convinced that a return of the friars to their parishes will lead to lawless violence and murder, and the people will charge the course taken to

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<sup>22</sup> Article VIII of the Treaty of Paris reads: “In conformity with the provisions of Articles I, II, and III of this treaty, Spain relinquishes in Cuba, and cedes in Porto Rico and other islands in the West Indies, in the island of Guam, and in the Philippine Archipelago, all the buildings, wharves, barracks, forts, structures, public highways and other immovable property which, in conformity with law, belong to the public domain, and as such belong to the Crown of Spain *And it is hereby declared that the relinquishment or cession, as the case may be, to which the preceding paragraph refers, can not in any respect impair the property or rights which by law belong to the peaceful possession of property of all kinds, of provinces, municipalities, public or private establishments, ecclesiastical or civic bodies, or any other associations having legal capacity to acquire and possess property in the aforesaid territories renounced or ceded, or of private individuals, of whatsoever nationality such individuals may be.*”

<sup>23</sup> “Testimony of Don Felipe Calderon,” *Senate Document* 190, p 140.

the American government, thus turning against it the resentment felt towards the friars."<sup>24</sup> On the second question, Taft concluded, "It would avoid some very troublesome agrarian disturbances between the friars and their quondam tenants if the insular government could buy these large haciendas of the friars and sell them out in small holdings to the present tenants."<sup>25</sup>

In 1902, Taft traveled to Rome to meet with Pope Leo XIII. He wanted to use the Pope's influence over the friars to push through the sale of the friar lands, and make sure that the Spanish friars left the Philippines after the sale. The Pope endorsed the decision to sell the lands, but he left the negotiations of the specifics to the friars in the Philippines. The Pope also declared that he supported a voluntary withdrawal and the gradual introduction into the Philippines of clergy from other countries, especially the United States.

The negotiations with the friars in Manila were protracted, with most of the disagreements centering around the valuation of the friar lands. The friars wanted full compensation for all improvements made on their estates, and the Dominicans went so far as to sell the sugar mills and the railroads on their haciendas to third parties. The U.S. Supreme Court finally ruled that the Friar Lands Act covered land improvements, including railroads and sugar mills. On December 22, 1903, the United States finally agreed to buy 170,916 hectares (403,000 acres) at a price of just above 12 million pesos.<sup>26</sup> The insular government issued special bonds to raise this money. The bonds offered a 4% interest rate and were payable between ten and thirty years, at the option of the government. In theory, they were not backed by the U.S. Treasury, but by the revenues of the government of the Philippine Islands.

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<sup>24</sup> *Report of the Taft Commission*, p 31.

<sup>25</sup> *Report of the Taft Commission*, p 32.

<sup>26</sup> In 1903, one U.S. dollar was worth approximately two pesos.

Did the American colonial administrators pay too much for the friar lands? This has been a subject of considerable debate. Governor Taft had initially estimated the annual income from the friar lands at not more than 450,000 pesos, implying that the final sale price represented more than 26 times the annual income. Taft justified the price as follows: "It is not thought that the income from the islands for several years will be enough to meet the actual outgo ... It is to be noted, however, that the insular government has not entered upon the purchase of these lands with a view to a profitable investment, but that it is knowingly paying a considerable sum of money merely for the purpose of ridding the administration of the government in the islands of an issue dangerous to the peace and prosperity of the people of the islands."<sup>27</sup> In other words, the U.S. was willing to pay a premium to get the friars out of the Philippines. In this goal, they largely succeeded: by the end of 1904, the remaining Spanish bishops in the Philippines had been replaced by American bishops. The problem now was to decide what to do with the lands acquired by the Philippine government.

The US Congress agreed with the Taft Commission that the best course of action would be to sell the lands to their tenants. The Philippine Organic Act of 1902 and the Friar Lands Act of 1904 specified that: "Actual settlers and occupants at the time said lands are acquired by the government shall have the preference over all others to lease, purchase or acquire their holdings."<sup>28</sup> The government, therefore, immediately began the process of breaking up the friar estates and selling them to Filipino peasants. Since the legislation precluded any sales larger than 16 hectares,<sup>29</sup> this process involved surveying the land, subdividing it into parcels and determining an appropriate sale price for each parcel.<sup>30</sup> This process took a number of years, and was not completed before

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<sup>27</sup> *Report of the Philippine Commission 1903*, p 44.

<sup>28</sup> Philippine Organic Act, Section 65.

<sup>29</sup> This provision was violated in many instances, with some American officials and local elites managing to acquire large estates. For instance, Emilio Aguinaldo received 1055 hectares from the Imus estate.

<sup>30</sup> Governor Taft strongly felt that this low limit would discourage large-scale plantation agriculture, and recommended several times that the limit be raised considerably.

1908 on any estate.<sup>31</sup> The current occupant of the land was then given the first option to purchase this land. The government chose not to subsidize the administrative costs of this program, with the result that the purchaser had to pay for the cost of the surveys and any administrative expenses including attorney's and registration fees. Furthermore, in order to recoup the interest expense on the bonds, the government raised the price of the lands as time went on. For instance, the original purchase price of the Guiguinto estate was 155,567 pesos, but its final selling price was determined in June 1908 to be 200,276 pesos, an increase of nearly 28%.<sup>32</sup>

## 2.4 Land Registration

The Taft Commission also reformed the laws governing land titles. "A very large percentage of the lands are occupied and claimed by individuals without any record title whatever," observed the Taft Commission. Many of the titles had been destroyed during the wars and political instability of the preceding years. Despite the lack of formal record title, most landholders had a good title of possession, that is, their right to the land was conceded by the neighbors. However, the government feared that the disadvantages of this informal system would grow over time.

In order to improve the chaotic state of land rights, the insular government passed the Land Registration Act of 1903. The Act provided for the Torrens system of land registration in the Philippines. Under the Torrens system, the government sets up a centralized land registry. No document (such as a sales registry or a mortgage) can be considered effective unless and until it is recorded at the centralised registry. Purchasers only need to verify one record, the title in the central registry, and the owner of a property cannot have their title challenged or overturned except in cases of fraud or error. Registration under the Torrens system, therefore, requires an investigation of the title

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<sup>31</sup> Rene Escalante, *The American Friar Lands Policy*, Table 14, p 129.

<sup>32</sup> Rene Escalante, *The American Friar Lands Policy*, Table 15, p 130.

and all possible liens on the property in order to work. The government therefore created an “assurance fund” for landowners to draw upon in case they lost their land by reason of a title investigation under the Land Registration Act. In addition, the Land Registration Act created a Court of Land Registration with nationwide jurisdiction to administer the new system. Once Torrens titles made it through the court, they would be legally unassailable, completely transparent, and fully transferable. It should be noted that the old system of registration was *not* discontinued, and that registration of titles under the new act was left optional with landowners.<sup>33</sup>

Land registration under the new system was not cheap, especially since the insular government chose not to subsidize it. In addition to an application fee of \$20, registration costs included a charge worth 0.1% of the property valuation to pay for the examination of title and a levy worth 1% percent of the property’s value for the assurance fund. The applicant also had to pay for the cost of any new survey which might be required. A shortage of registers of deeds and examiners of title in the provinces (where such functions were under the purview of provincial treasurers who had many other responsibilities) further added to the transaction cost of seeking a Torrens title.

The Philippine government could not have afforded to subsidize land titling without substantial new tax revenues or transfers from the U.S. mainland. The Payne-Aldrich Tariff Act of 1909 brought the Philippines under the U.S. tariff wall (with a few minor exceptions eliminated in 1913), which had the problematic side-effect of depriving the insular government of most of its tariff revenues. It is possible to calculate how much a subsidized land-titling program would have cost the insular government. The following table assumes that the average untitled farm was the same size of the median farm plot—that is, roughly 15 percent of the size of the average farm—and that the average value-per-acre of such farms were about the same as ordinary farms. The assur-

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<sup>33</sup> Report of the Court of Land Registration, *Report of the Philippine Commission* 1903, p 322.

ance charge, however, does not drive the cost of registration: rather, the main cost is the flat fee per-farm. Registering all the farms in the Philippines would have taken up three-quarters of the government's annual revenue.

**Philippine land titles in 1918:**

Total number of farms		1,955,276
Total farm acreage		4,563,723
Number of untitled farms		1,141,353
Number of non-Torrens title farms		1,884,591
Total farm assessed value	\$	928,537,400
High estimate of untitled farm value	\$	542,015,013
Low estimate of untitled farm value	\$	81,302,252
High estimate of non-Torrens farm value	\$	894,969,931
Low estimate of non-Torrens farm value	\$	134,245,490
Cost of titling, untitled farms only, low estimate	\$	23,721,385
Flat registration fees	\$	22,827,060
Proportional-to-value charges	\$	894,325
% of central government revenue		35%
% of central government revenue, after direct subsidies to provinces		41%
% of central government revenue, after direct and indirect subsidies to provinces		45%
Cost of titling, untitled farms only, low estimate	\$	39,168,520
Registration fees	\$	37,691,820
Proportional-to-value charges	\$	1,476,700
% of central government revenue		57%
% of central government revenue, net of direct subsidies to provinces		68%
% of central government revenue, net of direct and indirect subsidies to provinces		75%

*All data is from the 1918 census, Volume IV-2, p. 82.*

### 3 The Philippine Censuses of 1903 and 1918

Our main data sources are the comprehensive censuses carried out by the U.S. administrators in the Philippines in 1903 and 1918. In future work, we also plan to document long-term trends using the 1939 census. The censuses contain detailed province-level data on geographic characteristics, demographic variables (population, gender, age and racial composition), agriculture and industry.

We first document the impact of the U.S.-led changes in property rights regimes on land ownership, land concentration and the expansion of cultivation in the Philippines. We then consider other outcome variables such as agricultural land use, specifically the choice to grow commercial crops; agricultural investments such as irrigation or greater capital use; average farm size; agricultural productivity (output per hectare, output per worker and total factor productivity in agriculture); occupational change or investment in sectors other than agriculture.

We construct two measures of the extent of friar lands. The first is simply a dummy for whether the province contained any friar lands at all, and hence would be subject to this specific reform. The friar lands were concentrated in 8 out of our 42 provinces. These provinces were Bataan, Bulacan, Cavite, Cebu, Isabela, Laguna, Mindoro and Rizal. The second is a continuous measure which is computed as the area of friar lands divided by the total farm area in the province. The average proportion of friar lands was 42% in the provinces with friar lands, ranging from 7% in Cebu to 94% in Cavite.

To examine the effect of the progress in land titling, we constructed a very simple measure of the extent of titling: the proportion of farms which had no formal title as of 1918. (This information is not available in the 1903 census.) The 1918 census lists five kinds of formal documents a landholder could possess: Torrens titles issued under U.S. rule (3.6% of farms), judicial decrees (1.5%), private deeds issued under the old Spanish system (22.8%), Royal titles (3.1%), and a possessory titles (7%). A royal title was a grant directly from the Spanish Crown, whereas, possessory titles were titles claimed (under Spanish law) by occupying the land for a sufficient period of time. The majority of farms (58%) in the Philippines possessed no formal title at all in 1918.

#### **4 Land Reform, Land Utilization and Ownership Patterns**

Table 1 documents the changes in land utilization and the patterns of land ownership between 1903 and 1918, using data from the respective censuses. Columns (1) and

(2) provide averages for all the provinces, Columns (3) and (4) document these changes for provinces with no friar lands and Columns (5) and (6) show the results for provinces where friar lands were present; these are the provinces in which land redistribution policies were implemented. Columns (7) and (8) document changes in land utilization and land ownership in provinces which were recorded as having more than 50% of their farms titled in 1918. Columns (9) and (10) summarizes data for provinces with low level of titling i.e. those in which less than half the farms were titled as of 1918. These comparisons give us a sense of the pre-existing differences across these different types of provinces before the reforms were implemented. We can also form preliminary estimates of the changes brought about time by the reforms.

We note first that land in the Philippines was relatively under-utilized at the beginning of this period. Only 17% of the total land area had been claimed as farm land, and only 47% of the farm land was being cultivated. The reason is that the Philippines was, in fact, a frontier economy in the early 20th-century. The country's overall population density was only 66 people per square mile in 1903, compared with 108 for Vietnam, 163 for Maharashtra, 312 for Japan, 388 for Punjab, 494 for West Bengal, and 615 for Java. In fact, the Philippines' population density was 13 percent lower than *Indiana* in 1903.<sup>34</sup>

Over the 15 years after 1903, land utilization increased on both the extensive and the intensive margins. By 1918, 26% of total area was claimed by farms, and 56% of this increased area was under cultivation. The net effect was a 67% increase in total cultivated area. Over this same period, the population of the Philippines expanded by only 32%. Comparing column (3) with column (5), we find that the intensity of cultivation was fairly similar across provinces with and without any friar lands. While provinces with

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<sup>34</sup> Land areas from the CIA World Fact Book. Populations from the *Encyclopedia Britannica* of 1911, except in the case of India, where estimates normalized for current administrative boundaries can be found at <http://www.populstat.info/Asia/indiap.htm>.

friar lands had more of their area demarcated as farm land (21% versus 16%), provinces without friar lands cultivated a larger fraction of their farm area (48% compared to 44%).

The distribution of farms, farm area and cultivated area by ownership type reveals a startling fact: there was a *deterioration* in the share of the population possessing formal property rights between 1903 and 1918. In 1903, 81% of farms and 76% of cultivated area was held by owners. In 1918, the corresponding fractions were 75% and 67%. This is accompanied by an increase in the fraction of farms and cultivated area being held by people who have a “no rental” status i.e. are neither the owners nor the tenants. (We use the term “squatters” to refer to this category of landholders.) The fraction of farms occupied by squatters increased from 2.7% in 1903 to 9.5% in 1918; the fraction of cultivated area under squatters increased from 2.6% to 9.2%.

Figures 1A and 1B show that this increase in the incidence of squatting is very similar across provinces with and without friar lands (corresponding data in columns 3 to 6). In the provinces with no friar lands, the increase in squatting is mostly due to a corresponding decrease in ownership. In the provinces with friar lands, however, the fraction of cultivated area held by tenants is essentially unchanged between 1903 and 1918, and the number of farms held by owners actually increased. In these provinces, the increase in the incidence of squatting is matched by a decrease in the incidence of sharecropping. Since one of the goals of the Friar Lands Program was to convert sharecroppers into landowners, it is somewhat disquieting to see that the decline in sharecropping is matched by an increase in squatting rather than landownership. It is even more disquieting to observe that the increase in squatting is observed in areas with relatively high levels of land titling; in fact, this increase is very similar to that observed in areas with lower extent of titling (Figures 1C and 1D; columns 7 to 10 of Table 1).

What might explain the increase in the incidence of squatting? One potential explanation is the rapid expansion of cultivated area during these years. People holding land

which had been newly brought under cultivation may not have had time to register their land with the authorities (as owners or tenants), in which case they would be recorded as “no rental.” We would then expect a positive correlation between the increase in squatting and the increase in cultivated area. However, we do not find much evidence on this. Table 2 shows that there is a strong negative correlation between the increase in squatting and the increase in the fraction of area cultivated. The positive correlation between the increase in squatting and the percentage increase in area cultivated is mainly driven by the presence of a few provinces which were almost completely uncultivated in 1903;<sup>35</sup> this correlation becomes much less in magnitude (0.12) and disappears in significance if we exclude provinces which had less than 0.05% of their area cultivated in 1903.

What are the costs of squatting? The main risk is being evicted from your land without any legal recourse. A higher population density on cultivated land implies greater competition for land—more and closer neighbors with the opportunity to move in on the land you occupy—and hence a greater risk of arbitrary eviction if you don't have a formal contract. If this risk significantly affected people's behavior in the Philippines, then we would expect squatting to be negatively correlated with population density. This does indeed turn out to be the case: the provinces which showed the least decreases in population per hectare of cultivated area are the ones which show the lowest increases in the incidence of squatting.

What are the benefits of squatting? One hypothesis might be that squatting is a way to avoid high land registration costs. The problem with this hypothesis is that squatting is not the same thing as lacking formal title: in 1918, 58% of farms lacked a formal title, but only 9.6% were occupied by families with *no* ownership rights whatsoever.

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<sup>35</sup> These provinces therefore have extremely high values for percentage changes in cultivated area because of the extremely low starting point e.g. the province of Sulu displays a 60-fold increase in cultivated area, even though only 1.3% of total province area was cultivated in 1918.

Another possible benefit from squatting is the avoidance of land taxes. The American occupation introduced property taxes for the first time, empowering both provincial and municipal governments. If that were the case, then property tax rates should be positively correlated with squatting. We put together data on province-level property tax rates from the 1918 census (computed as the ratio of property tax collected to the assessed value of real property). However, we do not find any significant correlation between the tax rates in 1918 and the increase in squatting over 1903-1918.<sup>36</sup> One might argue that assessed value is in fact endogenous, since provinces could vary in the zeal with which their assessors valued properties. Our results, however, do not vary when we use alternate measures of property tax rates, such as property taxes per hectare or property taxes per person.

Table 2, Panel B shows the regression results once we put in all these factors. We find that the increase in population density per cultivated hectare, the increase in cultivated area overall are significant predictors of the increase in informal land rights. In other words, squatters settled the Philippine frontier under American rule. As the population fanned out into lands that had been formerly guarded by the friars or the Spanish crown, the U.S. failed to enforce property rights. This suggests that the risks of losing land might have been a significant determinant of Filipino farmers deciding whether or not to have formal claims to the land. We plan to construct a better measure of the risk of losing land by putting together data on the incidence of property and violent crimes across provinces.

## **5 Land Reform and the Distribution of Farm Sizes**

What effect did the land reforms have on land distribution? One of the desired outcomes of the friar lands reform was to break up large feudal estates into smaller plots.

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<sup>36</sup> The property tax rate is calculated as the ratio of property tax collections to the assessed value of real property. We get similar results if we use property tax collected per hectare or per head.

In addition, changes in farm size are likely to be important determinants of agricultural investments and productivity.<sup>37</sup> Table 3 documents the changes in the distribution of farm sizes between 1903 and 1918.

Both the number of smaller farms and the share of land occupied by such farms rose. In 1903, the 440,000 farms smaller than one hectare occupied 7.2% of farm area and 10.5% of cultivated area. (Table 3, Columns 1 and 2). By 1918, the total number of such small farms had almost tripled to 1.2 million, and they occupied 11.4% of farm area and 14.6% of lands under cultivation. Over this same period, there was a drop in the number and share of area held farms of more than 15 hectares. In 1903, nearly 49% of farm area and 34% of cultivated area was under large farms. In 1918 that had fallen to 40% and 27%.

In order to determine the effect of these changes on the overall land distribution, we plotted Lorenz curves based on the data in Table 3. Figures 2A graphs the cumulative fraction of farm area in different size categories against the cumulative fraction of total farms in that size category for provinces with no friar lands; Figure 2B documents the same for provinces with friar lands. A 45 degree line would represent a perfectly equal distribution of land i.e. small farms which constitute 31% of all farms would also control 31% of cultivated area and so on. We see that the lines drawn for the actual farm size distributions in both 1903 and 1918 are considerably below this 45 degree line, suggesting a high degree of inequality in land ownership. In fact, we see that the distribution of farm sizes has become more unequal in 1918 for provinces in which there were no friar lands. The Gini coefficient of inequality (measured by the area between the farm size distribution line and the line of perfect equality) increased from 0.57 to 0.60 for such areas.

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<sup>37</sup> See Binswanger et al (1995) for an overview of the theoretical and empirical literature on the determinants of farm size, as well as the impact of farm size on productivity.

In contrast, Figure 2B shows that the friar lands reform was successful in reducing the inequalities in land ownership, *but only at the higher end of the spectrum*. The overall Gini increased from 0.58 to 0.60—a result superficially like the non-friar provinces—but the effects varied greatly over the entire land distribution. Equality grew substantially in the upper quartile of the land distribution, as the reforms broke up the largest estates and American policy prevented new ones from emerging. Conversely, equality *fell* in the rest of the distribution, as some small farmers failed to obtain the capital they needed to expand their plots—while other small farmers succeeded and expanded.

What was the relationship between titling have on land distribution? Figures 3A and 3B document the trends in the farm size distribution for areas with greater and lesser degree of formal land titling. The distribution of farm sizes became more unequal in the areas with a higher extent of titling (Figure 3A), while the distribution remained essentially unchanged for the areas with lower levels of titling (Figure 3B). The Gini coefficient increased from 0.59 to 0.65 in the more-titled provinces, and fell from 0.57 to 0.56 in the less-titled areas.

Which way did causality run? Did titling cause land inequality to increase, or was it merely an effect of increasing land inequality? The third specification in Table 2, Panel B, provides a clue. The coefficient on the proportion of farms with titling is negative and significant at the 95-percent level, indicating that titling appears to have discouraged squatting. Since squatting seems to have been one of the cheapest ways for poor families to acquire or expand their homesteads, titling would be expected to make it easier for larger farmholdings to defend their land. Conversely, a lack of titles among poor smallholders would make it easier for large landowners to expand their holdings at the smallholders' expense.

Table 4 documents the correlations of these changes in the farm size distribution with other changes happening during this time, similar to the relationships documented in Table 2. Land inequality (and the area under large farms) is positively correlated

with the increases in farm area and cultivated area over this period, suggesting that most of the increase in cultivation is coming as a result of the actions of large landholders. The increase in inequality is also correlated with the increase in informal tenure, which might mean that while large landholders increased their area of operations, smaller landholders were not able to expand their property rights in a similar way. However, these correlations are not statistically significant, and more careful analysis (such as multiple regression models) is needed to examine these relationships in detail.

## 6 Property Rights and Agricultural Outcomes

In this section, we document trends in agricultural choices and agricultural productivity, and see whether there was differential progress in these measures across areas which saw different changes in the property rights institutions.

The U.S. eliminated most tariffs on Philippine products in 1909, and brought the islands fully within the country's tariff wall. As a result, the amount of land devoted to cash crop production grew faster than the amount of land devoted to rice. (See Table 5.) In 1903 more than half of the cultivated land in the Philippines grew rice, but this fraction declined to around 40% by 1918. Note, however, that the large increase in cultivated area (see Table 1) means that the absolute area devoted to rice still increased over this time period. The other major crops during this period were corn, hemp and sugarcane. The decline in the share of area devoted to rice was matched by a corresponding increase in the proportional area devoted to corn and sugar, while the area devoted to hemp declined.<sup>38</sup>

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<sup>38</sup> Hemp was the Philippines' major export crop at the time of the American takeover. Exports grew from 70 thousand long tons in 1899 to 175 in 1912, although they declined from 54 percent of all exports to 40 percent. After 1912, production fell to a nadir of 116 in 1914. The Philippine government blamed the decline on a haphazard system of grading and inspection which caused customers to doubt the quality of product. As a result, in 1914 the government created 89 inspection stations, and hemp production recovered thereafter. Lee (1920), "Abaca (Manila hemp): The Fiber Monopoly of the Philippine Islands."

We see a few differences in the crop composition across areas with and without friar lands. Provinces with friar lands devoted proportionately more area to corn and sugarcane and considerably less area to growing hemp. Areas with less titling devoted a lot more area to corn rather than rice, compared to areas with higher levels of titling. (We intend to check if this is due to geographical differences in future versions.)

We also find a large increase in the intensive margin of agriculture. Rice yields almost doubled from 13 kilograms per hectare (kg/h) to 24 kg/h over this period. Table 7 controls for yields in 1903, irrigation, formal credit, and the growth in cultivated land. Puzzlingly, titling variables appear to have very little to do with the increase in rice production. Rather, what appears to have happened was the spread of “best practice” across the islands, as areas with low yields converged on higher-yielding places.

We observe increases in per hectare productivity for corn, hemp and sugar as well.<sup>39</sup> Provinces with friar lands show particularly large increases in sugarcane and hemp production, while areas with high levels of titling show a five-fold increase in hemp yields. In future analysis, we intend to see if titling affected the crop mix. We are now attempting to see if titling affected productivity in cash crops or the choice of crop mix.

## 7 Conclusion

We examined the impact of two major features of the property rights in the Philippines introduced during the U.S. colonial occupation. The record is mixed. The U.S. did finance the purchase and redistribution of the friar lands. It also implemented a major property rights reform, including the introduction of the Torrens system and special land courts. The U.S. also established a national police force—the Constabulary—and strengthened local governments capable of protecting property rights. Yet despite all this, most landholdings remained without title. Even more dramatically, the percent-

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<sup>39</sup> (We have double-checked the national census totals for 1918 against the national production totals in the Philippine *Statistical Bulletin*: 1918 does not appear to have been an outlier.)

age of squatters—those lacking any property rights over their lands whatsoever—rose precipitously.

The U.S. failure seems rooted not in an inability to enforce private property rights, but a failure to enforce *public* ones. Squatting grew because the Philippines was, in effect, a frontier economy during the first few decades of the American occupation, and moving into new lands without claim or title was easiest way to bring new lands under cultivation. American policy made formal land titles very expensive to obtain; locking squatters off public lands would have only served to keep the poorest people in the country from have access to the Philippines' large supplies of empty land at a time of rapid population growth.

The failure of land policy appears to have contributed to increasing land inequality. Where the U.S. made a concerted effort to prevent the emergence of large estates, such as on the friar lands, it succeeded. Where it did not, disparities in formal titling translated into disparities in access to land. In short, the U.S. created effective institutions to enforce property rights but failed to provide them as a true public good—access went to those who could pay. As a safety valve, the U.S. allowed squatters to move into the frontier, but this was a poor substitute for a concerted public effort to provide land titles. Such an effort, however, would have been quite expensive.

The next steps in this project will be to investigate the links between land titling and violence and land titling and agricultural productivity. We are in the process of coding and analyzing the necessary data from the census and statistical bulletins.

**Table 1: Land Reform, Farm area and Land Ownership**

	All provinces		Provinces with				Level of land titling			
			No Friar Land		Some Friar land		High		Low	
	1903	1918	1903	1918	1903	1918	1903	1918	1903	1918
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Panel A</b>										
# provinces	42		34		8		18		24	
Province total area	705579		769376		434440		631562		761091	
Fraction farm area	0.172	0.261	0.164	0.249	0.207	0.314	0.201	0.295	0.150	0.236
Fraction cultivated area	0.0894	0.150	0.086	0.145	0.103	0.175	0.105	0.174	0.078	0.133
Cultivated area/farm area	0.467	0.559	0.474	0.568	0.440	0.518	0.480	0.579	0.458	0.544
Number of farms per province	19,417	46554	19260	46873	20087	45199	13848	35969	23594	54493
<b>Panel B:</b> Fraction of farms held by:										
Owners	0.808	0.749	0.840	0.760	0.673	0.704	0.749	0.706	0.853	0.783
Cash tenants	0.033	0.077	0.029	0.061	0.050	0.145	0.065	0.113	0.009	0.050
Share tenants	0.132	0.105	0.104	0.101	0.252	0.119	0.162	0.102	0.109	0.107
Labor tenants	0.001	0.004	0.001	0.004	0.001	0.002	0.000	0.006	0.001	0.002
Squatters	0.027	0.095	0.027	0.095	0.024	0.096	0.023	0.112	0.029	0.082
<b>Panel C:</b> Fraction of farm area held by										
Owners	0.753	0.666	0.768	0.668	0.687	0.657	0.717	0.630	0.780	0.694
Cash tenants	0.043	0.059	0.034	0.050	0.082	0.098	0.079	0.086	0.017	0.039
Share tenants	0.162	0.115	0.155	0.113	0.193	0.126	0.159	0.113	0.160	0.117
Labor tenants	0.001	0.005	0.004	0.006	0.002	0.002	0.000	0.007	0.000	0.004
Squatters	0.040	0.106	0.041	0.103	0.037	0.117	0.043	0.109	0.043	0.102
<b>Panel D:</b> Fraction of cultivated area held by										
Owners	0.756	0.669	0.786	0.678	0.630	0.635	0.691	0.634	0.805	0.696
Cash tenants	0.045	0.058	0.038	0.048	0.074	0.100	0.083	0.087	0.016	0.037
Share tenants	0.173	0.128	0.150	0.119	0.270	0.164	0.194	0.126	0.156	0.130
Labor tenants	0.000	0.005	0.000	0.005	0.001	0.002	0.000	0.007	0.001	0.003
Squatters	0.026	0.092	0.027	0.090	0.025	0.099	0.032	0.091	0.022	0.092

Sources: Authors' calculations from censuses of 1903 and 1918. All areas are in hectares.

**Table 2: Correlations of ownership changes with other changes in province characteristics**

**Panel A:** Change in proportion of cultivated area under informal tenure

Correlation with	
Growth in farm area proportion	-0.3228*
Growth in cultivated area proportion	-0.3377*
% Growth in cultivated area	0.3636*
Property tax per hectare	0.1581
Change in population per cultivated hectare	-0.3588*
Proportion of farms on public land	0.4701*

\* indicates that the correlation is significant at the 5% level of significance  
Correlations are computed excluding Manila City.

**Panel B:** Regression analysis

Dependent variable = Change in proportion of cultivated area under informal tenure

	(1)	(2)	(3)
Growth in cultivated area proportion	-0.237 (0.169)	-0.344** (0.131)	-0.275** (0.126)
Property tax/Assessed value	21.072 (24.763)	-22.975 (15.017)	-17.448 (14.620)
Change in population per cultivated hectare	-0.0001** (0.000)	-0.005*** (0.002)	-0.005** (0.002)
Proportion of farms on public land	0.226 (0.244)	0.440*** (0.056)	0.406*** (0.051)
Proportion of farms with title			-0.071** (0.035)
Observations	41	37	37
R-squared	0.33	0.74	0.76

Robust standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%  
Column (1) excludes Manila City and column (2) excludes four other outliers.

**Table 3: Land Reforms and Distribution of Farm Sizes**

Land Ownership categories	All provinces		Provinces with				Level of land titling			
			No Friar Land		Some Friar land		High		Low	
	1903	1918	1903	1918	1903	1918	1903	1918	1903	1918
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fraction of farms of size:										
<0.35 hectares	0.188	0.319	0.181	0.311	0.210	0.353	0.141	0.306	0.221	0.329
0.35-1 hectares	0.225	0.214	0.224	0.214	0.230	0.210	0.180	0.194	0.257	0.229
1-2 hectares	0.195	0.182	0.185	0.182	0.239	0.184	0.198	0.182	0.191	0.182
2-5 hectares	0.207	0.173	0.210	0.178	0.196	0.154	0.248	0.189	0.179	0.161
5-10 hectares	0.084	0.058	0.089	0.060	0.063	0.047	0.107	0.061	0.068	0.056
10-15 hectares	0.029	0.018	0.030	0.181	0.023	0.016	0.037	0.021	0.023	0.016
>15 hectares	0.059	0.037	0.064	0.037	0.039	0.037	0.088	0.047	0.038	0.028
Fraction of farm area in farms of size:										
<0.35 hectares	0.014	0.041	0.015	0.043	0.008	0.034	0.008	0.026	0.019	0.052
0.35-1 hectares	0.058	0.073	0.061	0.074	0.046	0.069	0.036	0.057	0.075	0.085
1-2 hectares	0.087	0.106	0.086	0.104	0.091	0.116	0.071	0.092	0.099	0.117
2-5 hectares	0.163	0.193	0.167	0.194	0.146	0.192	0.166	0.190	0.161	0.197
5-10 hectares	0.122	0.123	0.128	0.126	0.098	0.113	0.129	0.116	0.117	0.130
10-15 hectares	0.060	0.065	0.060	0.065	0.057	0.063	0.061	0.063	0.059	0.067
>15 hectares	0.496	0.397	0.482	0.394	0.553	0.413	0.530	0.455	0.470	0.352
Fraction of cultivated area held by										
<0.35 hectares	0.021	0.051	0.023	0.052	0.014	0.048	0.010	0.028	0.030	0.069
0.35-1 hectares	0.087	0.095	0.088	0.094	0.084	0.100	0.053	0.068	0.112	0.116
1-2 hectares	0.129	0.141	0.123	0.135	0.154	0.167	0.106	0.118	0.146	0.159
2-5 hectares	0.218	0.240	0.219	0.237	0.213	0.252	0.222	0.236	0.215	0.242
5-10 hectares	0.140	0.136	0.148	0.139	0.108	0.119	0.143	0.133	0.138	0.137
10-15 hectares	0.064	0.062	0.066	0.063	0.056	0.059	0.059	0.066	0.067	0.060
>15 hectares	0.341	0.273	0.334	0.278	0.370	0.253	0.407	0.349	0.292	0.217

Sources: Authors' calculations from censuses of 1903 and 1918. All areas are in hectares.

**Table 4: Correlations of changes in the farm size distribution with other changes in province characteristics**

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Correlation with:	Change in % cultivated area held by large farms (>15 hectares)	Change in % cultivated area held by small farms (less than 2 hectares)	Change in Gini coefficient of cultivated land
Growth in farm area proportion	0.3689	-0.2631	0.2305
Growth in cultivated area proportion	0.1855	-0.0853	0.2371
% Growth in cultivated area	-0.0605	0.0559	0.2747
Property tax rates	0.1473	-0.2704	-0.0326
Increase in %area with informal tenure	0.2572	-0.2184	0.1988

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All correlations are computed after excluding the provinces of Manila City and Rizal.

\* indicates that the correlation is significant at the 5% level of significance

**Table 5: Land Reform, Crop Choices and Agricultural Productivity**

	All provinces		Provinces with				Level of land titling			
			No Friar Land		Some Friar land		High		Low	
	1903	1918	1903	1918	1903	1918	1903	1918	1903	1918
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Panel A: Fraction of cultivated area devoted to</b>										
Rice	0.504	0.405	0.499	0.404	0.526	0.409	0.602	0.478	0.44	0.357
Corn	0.086	0.153	0.074	0.128	0.138	0.257	0.018	0.06	0.135	0.22
Hemp	0.13	0.108	0.154	0.124	0.035	0.046	0.100	0.100	0.152	0.115
Sugarcane	0.041	0.052	0.036	0.044	0.062	0.084	0.061	0.088	0.026	0.027
<b>Panel B: Yield per hectare of</b>										
Rice	13.54	24.36	13.75	24.71	12.63	22.80	14.09	25.27	13.18	23.77
Corn	10.10	15.23	9.74	15.19	11.58	15.39	11.26	13.64	9.28	16.35
Hemp	485.0	962.1	511.3	1001.7	343.1	804.0	282.4	1129.9	591.2	867.7
Sugarcane	2.170	17.840	2.28	16.06	1.74	24.30	2.13	17.93	2.19	17.77

Sources: Authors' calculations from censuses of 1903 and 1918.

All numbers are calculated excluding the province of Manila City.

Figures for rice and hemp exclude a few provinces which have inconsistent data regarding area under cultivation of rice.

Yields for sugar and hemp include only provinces which devoted a non-zero fraction of their area to the crop in 1903.

**Table 6: Correlations of changes in agricultural outcomes with changes in property rights**

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	Change in % cultivated area under rice	Change in rice yield per hectare	Change in % cultivated area under sugarcane
Correlation with Growth in farm area proportion	-0.1388	-0.249	0.097
Growth in cultivated area proportion	-0.0283	-0.1656	0.1775
Property tax rates	0.1078	-0.0003	0.0206
Change in %area with informal tenure	-0.1891	-0.0049	0.0365
Change in cultivated area gini	-0.5097*	-0.1255	0.0601
Change in % area under large farms	-0.3999*	-0.2159	0.1149

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All numbers are calculated excluding the provinces of Manila City and Rizal.  
Figures for rice exclude a few provinces which have inconsistent data regarding area under cultivation of rice.

**Table 7: Yield regressions****Notes on outliers:**

Regressions with 40 obs exclude Manila City & Rizal.

Regressions with 37 obs exclude Cotabato, Nueva Vizcaya and Isabela as well, which display percentage of area under rice > 100%.

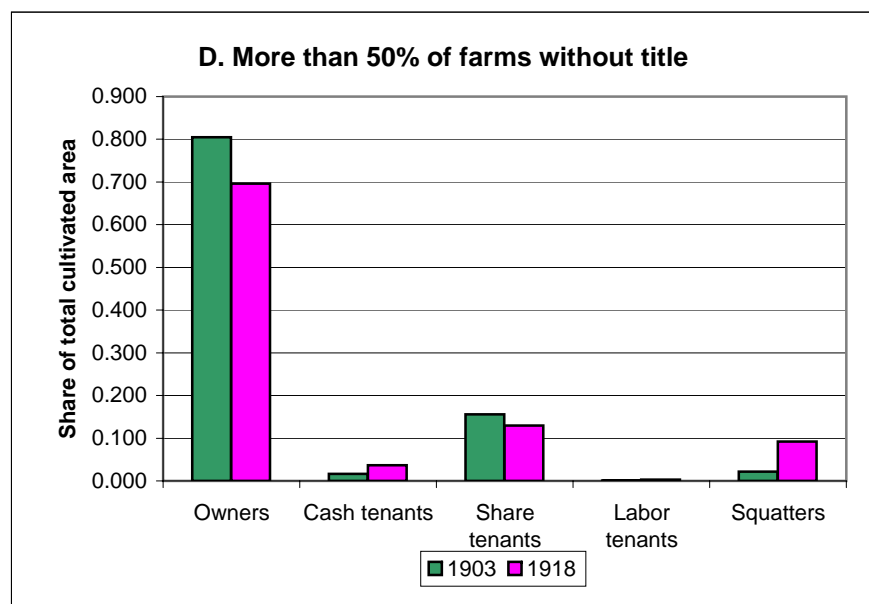
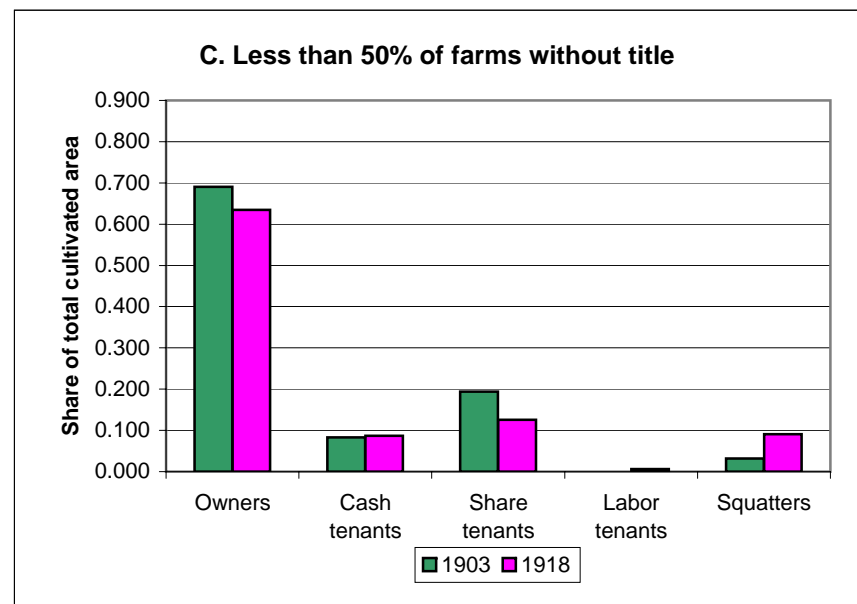
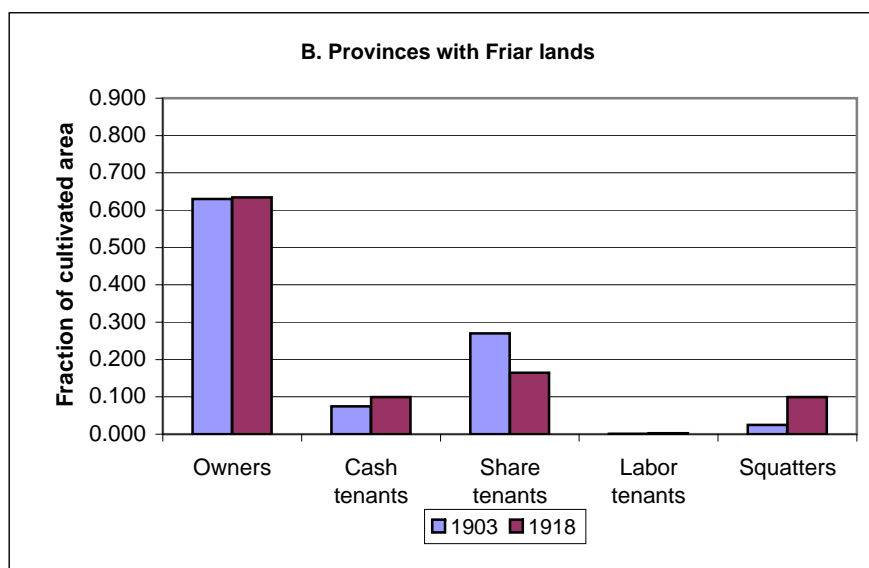
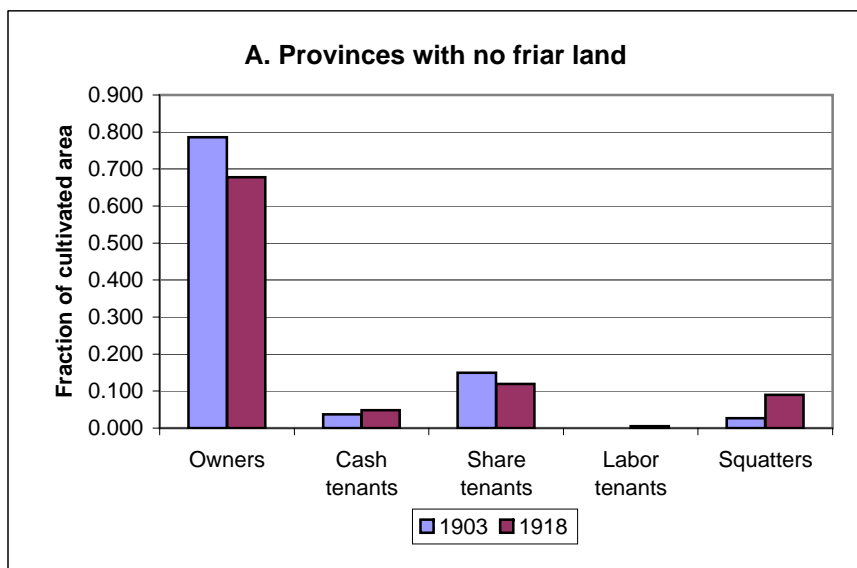
Regressions with 35 obs exclude Misamis-Bukidnon-Lanao & Pangasinan, which show rice yields increasing by more than 60kg per hectare.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	<b>Dep var = Change in Rice yield</b>									
Rice yield	-0.583*** (0.166)	-0.117 (0.669)	-0.984*** (0.174)	-0.933*** (0.159)	-0.999*** (0.177)	-0.149 (0.721)	-1.015*** (0.173)	-0.870*** (0.178)	-0.062 (0.737)	-0.981*** (0.185)
Change in area under rice	2.411 (3.117)	9.740 (7.564)	4.514 (4.129)	6.811 (4.223)	6.398 (4.754)	9.510 (7.227)	4.379 (4.328)	10.808** (4.969)	5.096 (9.530)	3.051 (4.302)
Growth in cultivated area proportion	-29.376 (42.221)	-66.502 (60.856)	-1.362 (27.014)	14.935 (25.914)	-5.520 (28.951)	-64.400 (66.315)	1.086 (26.150)	-0.722 (26.082)	-87.944 (84.891)	-6.578 (27.758)
railroad1918	0.495 (5.760)	1.506 (6.630)	-4.324 (2.818)	-4.608 (3.042)	-3.953 (2.986)	1.988 (7.827)	-3.675 (3.016)	-0.957 (3.717)	-1.778 (11.012)	-4.913 (3.261)
Luzon dummy	-0.502 (4.878)	2.041 (4.687)	1.825 (1.964)	0.985 (2.356)	1.669 (2.050)	1.026 (3.716)	0.823 (2.074)	2.165 (2.217)	5.033 (5.159)	1.916 (2.183)
Change in Population density (cultivated area)				0.462 (0.356)						
Change in Cultivated area Gini					9.552 (12.936)					
Proportion of farms irrigated						6.311 (32.509)	6.934 (8.210)	15.847** (7.379)	-7.141 (48.893)	2.548 (10.183)
Loans per hectare								2.244 (2.196)		
Proportion of farms with title									12.120 (13.603)	4.991 (5.890)
Proportion of farms on public land									-88.388 (78.317)	-21.804 (27.133)
Change in % cult area under squatters									56.229 (51.159)	14.887 (22.977)
Constant	20.362*** (6.288)	16.345** (7.531)	21.467*** (2.612)	21.208*** (3.086)	21.686*** (2.694)	15.634 (9.506)	20.541*** (3.345)	14.375*** (4.185)	14.546 (15.925)	19.666*** (4.825)
Observations	40	37	35	33	35	37	35	29	37	35
R-squared	0.22	0.06	0.56	0.58	0.57	0.06	0.56	0.65	0.12	0.58
<b>Mean of dependent variable</b>	<b>9.34</b>	<b>10.92</b>	<b>7.42</b>	<b>6.64</b>	<b>7.42</b>	<b>10.92</b>	<b>7.42</b>	<b>6.66</b>	<b>10.92</b>	<b>7.42</b>

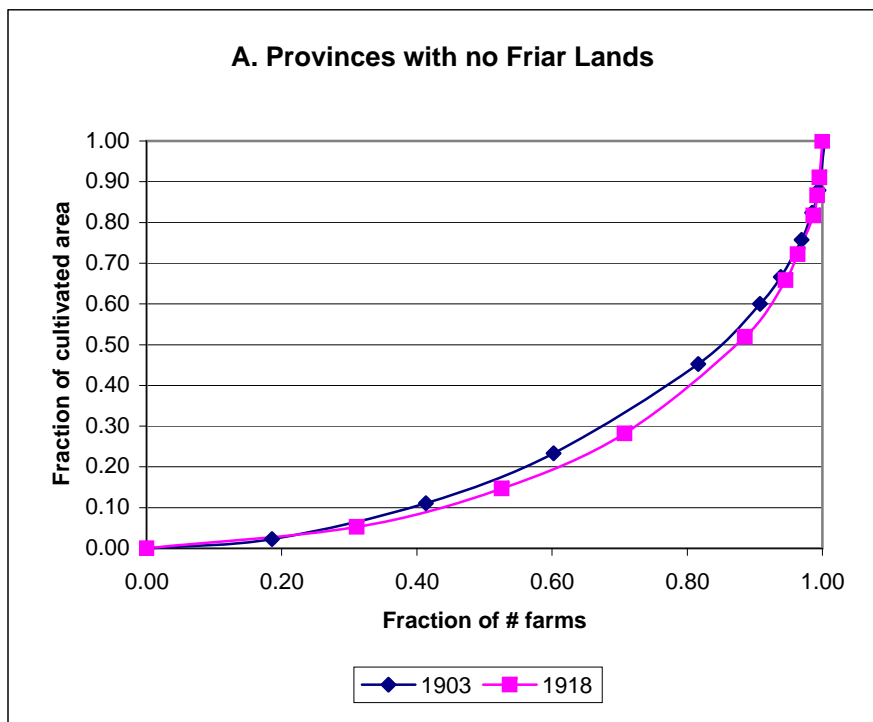
Robust standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

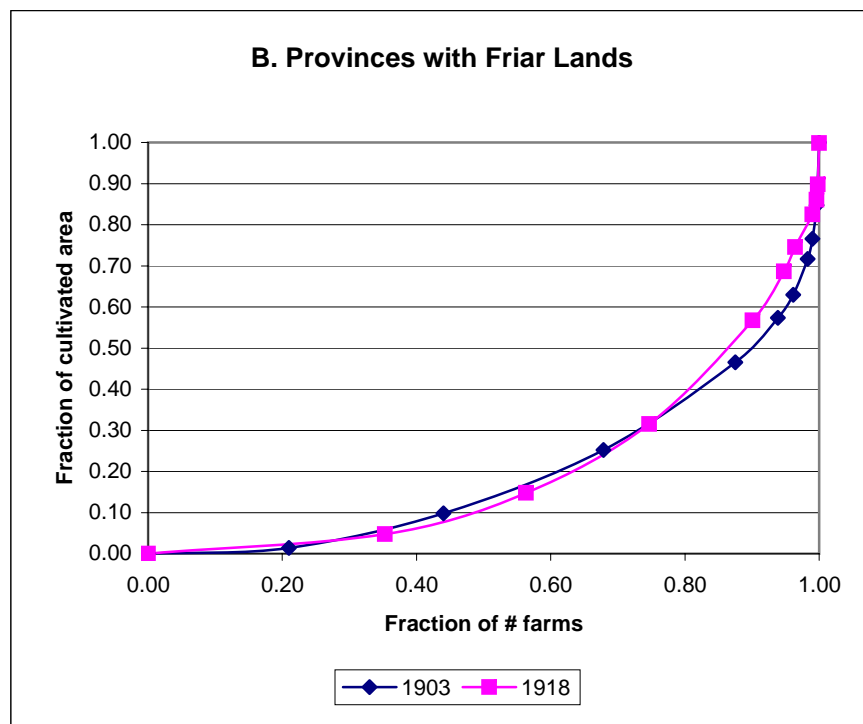
**Figure 1: Land Reform and Ownership Distribution of Cultivated Land**



**Figure 2: Friar Lands and Farm Size Distribution of Cultivated Area**

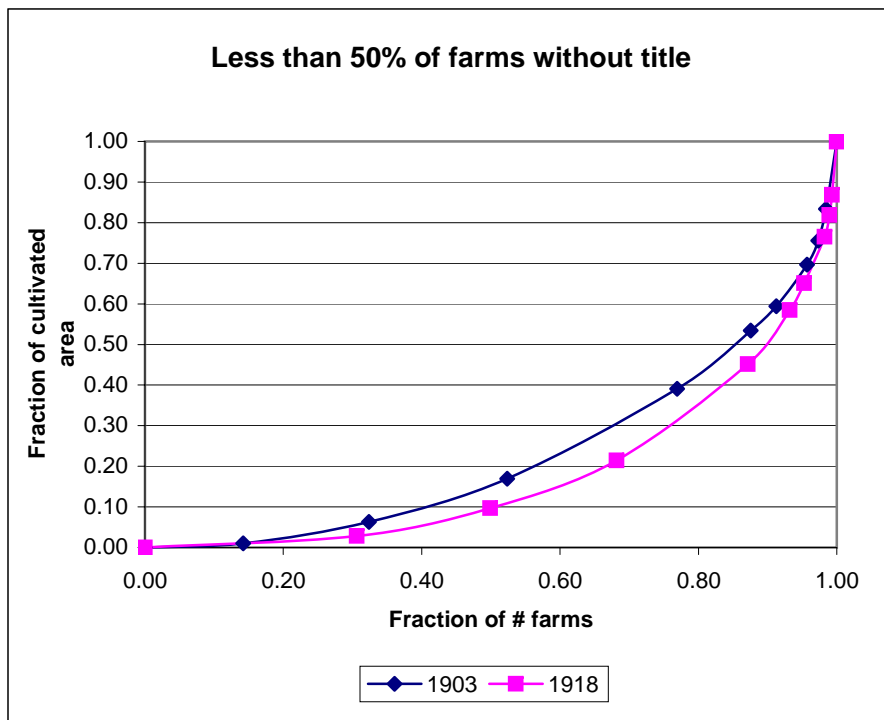


Gini 1903 = 0.57  
 Gini 1918 = 0.60

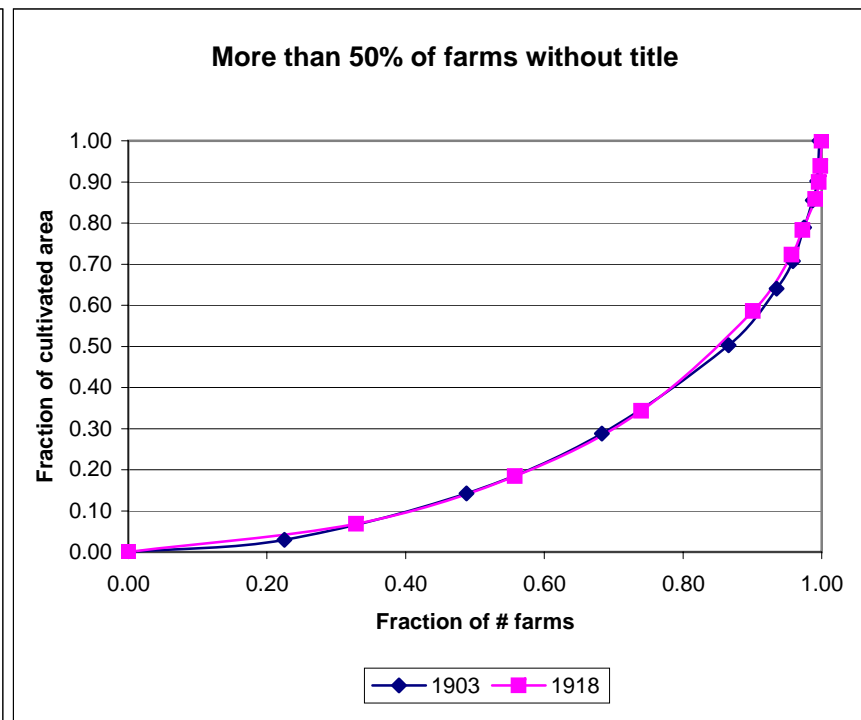


Gini 1903 = 0.58  
 Gini 1918 = 0.61

**Figure 3: Land Titling and Farm Size Distribution of Cultivated Land**



Gini 1903 = 0.585  
 Gini 1918 = 0.652



Gini 1903 = 0.565  
 Gini 1918 = 0.562