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ABSTRACT

Between 1946 and 1976, the European powers granted independence to all of their large colonies in Africa and Southeast Asia. This paper attempts to provide an economic explanation for this remarkable ending to the era of colonialism. The main theoretical innovation is to consider the effect of population increase on the allocation of time by the indigenous population between productive and subversive activities. The analysis suggests that the increase in population during the colonial period increased the potential return to extralegal appropriation of the profits of colonial companies until the colonies became a net burden on the metropolitan governments. The analysis also suggests that there was less subversive activity in colonies in which the market for indigenous labor was monopsonized because monopsonistic employers internalized the potential negative effect of extralegal appropriation on net profits.

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At the end of World War II, most of Southeast Asia as well as most of Africa consisted of European colonies. But, between 1946 and 1976 the European metropolitan powers granted independence to all of their large colonies in Southeast Asia and Africa (with the exception of Southern Rhodesia, which became independent in 1981). Is there an economic explanation for this remarkable series of decisions that brought the era of colonialism to an end?

The large European colonies in Southeast Asia and Africa were similar in important respects. An important motivation for establishing each of these colonies was the income to be earned by exploiting their natural resources. In most of the colonies the main natural resource was agricultural land, but in some colonies (for example, Northern Rhodesia and the Belgian Congo) extractable minerals were more important. Moreover, in all of the colonies the exploitation of natural resources involved the employment of large amounts of indigenous labor. Perhaps most interestingly, in all of the large European colonies in Southeast Asia and Africa the indigenous population and, hence, the potential supply of indigenous labor apparently increased substantially during the colonial period.[1]

There were also important differences among the large European colonies in Southeast Asia and Africa. In some colonies, especially colonies like Algeria, the Dutch East Indies, French Indochina, British India, and Kenya, in which production was carried out on many relatively small farms, the market for indigenous labor seems to have been com-

[1]Holland (1985) refers to "a population explosion ... almost everywhere in the colonial world." For all of Africa, Matras (1973) estimates that total population, which apparently was not growing prior to the colonial period, increased by more than 150 percent from 1900 to 1971. In individual African colonies, Carr-Saunders (1936) and Clark (1967) estimate that the population of Algeria increased by about 90 percent from 1901 to 1931 and by about 92 percent from 1920 to 1962, the Colonial Office (1964) reports that population growth began in Kenya in the 1920's and reached an annual rate of three percent by the 1960's, Thompson and Adloff (1957) report estimated population increase in French Snbsaharan Africa of 37 percent from 1926 to 1951, and Allen (1964) estimates that the population of Northern Rhodesia grew at an annual rate of about 2.5 percent from 1923 to 1943. For all of Asia, Matras estimates that total population increased by about 146 percent from 1900 to 1971. In individual Asian colonies, Nitisastro (1970) estimates that the population of Java, the major island in the Dutch East Indies, increased by about 90 percent from 1916 to 1960 and Kumar (1983) estimates that the population of British India increased by more than 50 percent from 1872 to 1941.

petitive, whereas in other colonies, like those in French Subsaharan Africa, British West Africa, Northern Rhodesia, and the Belgian Congo, in which one or a few large plantations, trading companies, or mining companies employed, either directly or indirectly, most of the indigenous labor, the labor market seems to have been monopsonized.[2] In addition, in some colonies, such as Algeria, the Dutch East Indies, French Indochina, British India, and Kenya, subversive activity by the indigenous population was intense in the period before independence and seems to have played a major role in inducing the metropolitan power to grant independence, but in other areas, such as French Subsaharan Africa, British West Africa, Northern Rhodesia, and the Belgian Congo, subversive activity seems to have presented only a minor problem for the metropolitan power. Interestingly, the cases in which anticolonial subversive activity was intense are also cases in which the market for indigenous labor seems to have been competitive, whereas in the cases in which the labor market seems to have been monopsonized subversive activity was not intense.

This paper attempts to provide an economic explanation for the end of colonialism in Southeast Asia and Africa. The main theoretical innovation is to consider the effect of population increase on the allocation of time by the indigenous population between productive and subversive activities. Among other questions, the analysis asks whether and, if so, how the increase in population during the colonial period was a factor in the process leading to the end of colonialism. The analysis also seeks to explain the apparent relation between the structure of the colonial labor market and the amount of anticolonial subversive activity.

The Indigenous Population

Consider the following model of a representative colony. The population of the colony

[2]These inferences about the structure of labor markets come from the discussions in Larzeg (1976) and Prochaska (1990) on Algeria, Vlekke (1960) on the Dutch East Indies, Robequain (1944) on French Indochina, Kumar (1983) on British India, van Zwanenberg (1975) on Kenya, Suret-Canale (1971) on French Subsaharan Africa, Kay (1972) on British West Africa, Thompson and Woodruff (1953) on Northern Rhodesia, and Lemarchand (1964) on the Belgian Congo.

consists of a large number, N, of identical indigenous families. The indigenous families divide their time between productive and subversive activities. The productive activity is wage employment offered by the colonial company or companies that are exploiting the natural resources of the colony.[3] The subversive activity is banditry or similar forms of extralegal appropriation of the profits of the colonial company or companies.[4]

The income of an indigenous family from wage employment is $w\ell$, where w is the wage rate and ℓ is the fraction of its time that this family allocates to wage employment. The total income of indigenous families from extralegal appropriation is $\beta R\pi$, where R is the total number of units of indigenous natural resources, π is the gross profits obtained from each unit of indigenous natural resources, and β is the fraction of gross profits lost to extralegal appropriation. This total income from extralegal appropriation is divided among the indigenous families proportionately to the time allocated by each family to extralegal appropriation. Thus, the income of an indigenous family from extralegal appropriation is $\beta R\pi b/NB$, where b is the fraction of its time that this family allocates to extralegal appropriation and B is the fraction of its time that the average family allocates to extralegal appropriation.[5]

A natural assumption is that, for $\beta < 1$, β is an increasing function of NB/R,

[3]This model does not consider other employment arrangements, such as sharecropping, and abstracts from the possibility of employment in an indigenous sector. Introducing these complications would not change the qualitative conclusions drawn below.

[4]An alternative would be to model subversive activity as an attempt to take control of the natural resources of the colony — that is, as a direct attempt to drive out the metropolitan power and its colonial companies — rather than as an attempt only to appropriate the current profits of colonial companies. The main results of the analysis would obtain in this alternative framework as well.

[5]In this model the allocation of time to extralegal appropriation reduces aggregate output and income by taking time away from productive activities. But, given aggregate output and income, the total gain to indigenous families from extralegal appropriation exactly equals the total loss to colonial companies from extralegal appropriation. In other words, the analysis abstracts from the possibility that the process of extralegal appropriation destroys output. This possibility would leave the indigenous families with a total gain that is smaller than the total loss to colonial companies. The analysis also abstracts from the possibility that, in addition to the income from extralegal appropriation, indigenous families receive a nonpecuniary benefit because extralegal appropriation advances the cause of independence. This possibility would make the total gain to indigenous families larger than the total loss to colonial companies. Introducing these complications also would not change the main results of the analysis.

which is the total time that indigenous families allocate to extralegal appropriation per unit of indigenous natural resources. A simple technology of extralegal appropriation that incorporates this assumption is

$$\beta = \begin{cases} \phi\frac{NB}{R} & \text{for } \phi\frac{NB}{R} < 1 \\ 1 & \text{for } \phi\frac{NB}{R} \geq 1 \end{cases} \tag{1}$$

where $\phi \geq 0$. In equation (1) the parameter ϕ determines the effectiveness of time allocated to extralegal appropriation. As long as β is less than unity, the larger is ϕ the larger is both the average and marginal effect of NB/R on β.[6] Given equation (1), the income of an indigenous family from extralegal appropriation, $\beta R\pi b/NB$, is equivalent, for $\beta < 1$, to $\phi\pi b$.

Each indigenous family takes w and $\phi\pi$ as given and selects ℓ and b, subject to the constraint $\ell + b = 1$, to maximize its income i. The above assumptions imply that

$$i = w\ell + \phi\pi b. \tag{2}$$

Given equation (2), the Kuhn-Tucker conditions for maximizing i imply

$$\ell = \begin{cases} 0 & \text{for } w < \phi\pi \\ [0,1] & \text{for } w = \phi\pi \\ 1 & \text{for } w > \phi\pi \end{cases} \tag{3}$$

and $b = 1 - \ell$. Equation (3) indicates, among other things, that each family would allocate all of its time to one activity only if the return to that activity is not smaller than the return to the other activity and that each family would allocate time to both activities only if the returns to both activities are equal. In equilibrium, because all indigenous families

[6]The piecewise-linear specification of the technology of appropriation simplifies the analysis of the model. To simplify the analysis further we incorporate in the parameter ϕ the effect of whatever efforts the metropolitan government makes to suppress subversive activity in the colony. In addition, we implicitly include expenditure on suppressing subversive activity in the fixed costs of administering the colony that are introduced below. For a more general model of extralegal appropriation activity and its suppression, see Grossman (1991).

are identical, ℓ is equal to L, which is the fraction of its time that the average family allocates to wage employment, and b is equal to B.

A Competitive Labor Market

Suppose that each colonial company exploits one unit of indigenous natural resources — for example, each unit could be a standard sized farm — and that the number, R, of such resource units and, hence, the number of colonial companies is large. With a large number of employers, the labor market is competitive.

Output per unit of indigenous natural resources, which is the same as output per colonial company, is λh^{α}, $0 < \alpha < 1$, where h is units of labor time employed on each unit of indigenous natural resources and where λ is a parameter that reflects productivity as well as the relative price of product produced by the colonial companies. Given this technology, the gross profits obtained from each unit of indigenous natural resources, which is the same as the gross profits of each colonial company, are

$$\pi = \lambda h^{\alpha} - wh. \tag{4}$$

Each company takes the wage rate as given and selects h to maximize π. This maximization implies that h satisfies

$$h^{1-\alpha} = \frac{\lambda\alpha}{w}. \tag{5}$$

The market-clearing condition for the labor market is

$$Rh = NL. \tag{6}$$

Taken together, equations (4), (5), and (6) imply that the market-clearing wage rate equals the marginal product of labor and satisfies

$$w = \frac{\lambda\alpha}{(\frac{NL}{R})^{1-\alpha}}, \tag{7}$$

and that the resulting gross profits of each colonial company are

$$\pi = \lambda(1-\alpha)\left(\frac{NL}{R}\right)^{\alpha}. \tag{8}$$

Equations (7) and (8) show that the wage share of output is α and that the profit share of output is $1-\alpha$. Total gross profits of the colonial companies are

$$R\pi = (1-\alpha)Y, \tag{9}$$

where $Y = \lambda R^{1-\alpha}(NL)^{\alpha}$ is the total output of the colonial companies.[7] The profits of the colonial companies net of extralegal appropriation are

$$(1-\beta)R\pi = (1-\beta)(1-\alpha)Y. \tag{10}$$

By substituting equations (7) and (8) for wages and profits into equation (3), which describes the labor-supply behavior of each indigenous family, and equating ℓ to L, we can calculate the equilibrium behavior of the average indigenous family. Then, substituting into equations (7) and (10), we can calculate the equilibrium wage rate and the equilibrium net profits of the colonial companies. There are three possible cases depending on the value of N/R.

I) If $\frac{N}{R} < \frac{1}{\phi}\frac{\alpha}{1-\alpha}$, then we have $w > \phi\pi$ and indigenous families choose $L = 1$. In this case, the population is sufficiently small that, even with all time allocated to wage employment, the wage rate is larger than the return to extralegal appropriation. Consequently, indigenous families allocate all of their time to wage employment. Moreover, with $B = 1 - L = 0$, the fraction of profits lost to extralegal appropriation, β, is also zero. Accordingly, from equation (7) the equilibrium wage rate is

$$w = \frac{\lambda\alpha}{(N/R)^{1-\alpha}}, \tag{11}$$

and from equation (10) the net profits of the colonial companies are

$$(1-\beta)R\pi = R\pi = \lambda(1-\alpha)R^{1-\alpha}N^{\alpha}. \tag{12}$$

[7]This setup abstracts from the cost of any capital invested by the colonial companies. In another paper, Grossman & Iyigun (1993), we analyze the profitability of colonial investment.

Equations (11) and (12) imply that with a small population the equilibrium wage rate is a decreasing convex function of population and that net profits are an increasing concave function of population. In other words, with a small population the conventional wisdom is correct that population growth depresses wages and raises profits from the exploitation of natural resources.

II) If $\frac{1}{\phi}\frac{\alpha}{1-\alpha} \leq \frac{N}{R} < \frac{1}{\phi}\frac{1}{1-\alpha}$, then we have $w = \phi\pi$ and indigenous families choose $L = \frac{1}{\phi}\frac{\alpha}{1-\alpha}\frac{R}{N}$. In this case, with a fraction of time allocated to wage employment that is positive, less than unity, and a decreasing function of population, the marginal product of labor and the wage rate are equal to the return to extralegal appropriation. Moreover, with $B = 1 - L$, we have, from equation (1), $\beta = \phi\frac{N}{R} - \frac{\alpha}{1-\alpha}$, and both B and β are positive and increasing functions of population. In this case, from equation (7) the equilibrium wage rate is

$$w = \frac{\lambda\alpha}{(\frac{1}{\phi}\frac{\alpha}{1-\alpha})^{1-\alpha}} \tag{13}$$

and from equation (10) the net profits of the colonial companies are

$$(1-\beta)R\pi = \lambda(\frac{1}{\phi}\frac{\alpha}{1-\alpha})^{\alpha}[R - \phi(1-\alpha)N]. \tag{14}$$

Equations (13) and (14) imply that with a larger population the equilibrium wage rate as well as gross profits become independent of population and net profits are a decreasing linear function of population. In other words, with a larger population the opportunity to engage in extralegal appropriative activity overturns the conventional wisdom that population growth depresses wages and raises profits.

III) If $\frac{N}{R} > \frac{1}{\phi}\frac{1}{1-\alpha}$, then we have $w = \phi\pi$ and indigenous families choose $L = \alpha$. Moreover, with $B = 1 - L$, we have, from equation (1), $\beta = 1$. In this case, the population is so large that, in order for the wage rate to equal the return to extralegal appropriation, the indigenous families must allocate enough time to extralegal appropriation to appropriate all profits. In this case, net profits are zero.

Taken together, these three cases imply that, if population is positive, but not too large, then the net profits of the colonial firms are positive. Moreover, the highest net profits occur at a population such that $\frac{N}{R} = \frac{1}{\phi}\frac{\alpha}{1-\alpha}$, which is the largest population for which no time is allocated to extralegal appropriation. In sum, with a competitive labor market, if the indigenous population is small — specifically, if $\frac{N}{R} < \frac{1}{\phi}\frac{\alpha}{1-\alpha}$ — then population growth increases the profits earned in the colony, but that, if population continues to grow — specifically, if $\frac{N}{R}$ reaches $\frac{1}{\phi}\frac{\alpha}{1-\alpha}$ — then further population growth generates extralegal appropriative activity and steadily reduces the net profits earned in the colony.

Suppose that the government of the metropolitan power incurs a positive cost, cR, to administer this colony and provide necessary infrastructure. Equations (12) and (4) imply that, if the population of the colony is within a critical range such that $\frac{N}{R}$ is larger than $\left(\frac{c/\lambda}{1-\alpha}\right)^{1/\alpha}$ but smaller than $\frac{1}{\phi(1-\alpha)}[1-\frac{c}{\lambda}(\frac{1}{\phi}\frac{\alpha}{1-\alpha})^{-\alpha}]$, then the net profits of the colonial firms exceed cR. Accordingly, assuming that this critical range is not empty, if the criterion for establishing and maintaining a colony is that the metropolitan government can impose sufficient taxes on the colonial firms to cover the cost of administration and infrastructure, then this colony will be viable if and only if its population is within this critical range. If the metropolitan government is willing to subsidize this colony (for example, because of strategic geopolitical considerations), then the critical population range can be larger. But, as long as the metropolitan government is not willing to bear the entire cost cR, the bounds of the critical population range are positive and finite. This analysis suggests that a colony with a competitive labor market and a growing population has a life cycle in which a period of falling wages and rising profits is followed by a period of constant wages, positive and increasing subversive appropriative activity, and declining net profits, until finally, assuming that there is not an offsetting decrease in the ratio c/λ, the colony becomes a net burden on the metropolitan government and is given its independence.[8]

[8]The analysis of two related models, in Grossman (1993, 1994), suggests that, if either a tax-financed wage subsidy or a land reform were administratively feasible, then these policies could reduce the amount

With independence, sovereignty is transferred to an indigenous government, which can redistribute the profits from the exploitation of indigenous natural resources either by taxing or by expropriating the colonial companies.

A Monopsonized Labor Market

Suppose that, instead of R colonial companies each exploiting one unit of indigenous natural resources, a single colonial company exploits all R units of indigenous natural resources. As the only employer of indigenous labor, this company monopsonizes the labor market.

Assume, for heuristic purposes, that this monopsonist faces the same technologies of production and extralegal appropriation as the competitive companies. Specifically, for the monopsonist output per unit of natural resources is h^{α} and β is the fraction of gross profits lost to extralegal appropriation. Accordingly, the monopsonist's net profits are

$$(1-\beta)R\pi = (1-\beta)R(\lambda h^{\alpha} - wh), \quad \text{with} \quad h = \frac{NL}{R}. \tag{15}$$

To maximize $(1-\beta)R\pi$, the monopsonist chooses a wage rate and an amount of employment to offer to each and every indigenous family, subject to the labor-supply behavior of each indigenous family, as given by equation (3), the dependence of β on B, as given by equation (1), and $L+B=1$. The solution to this problem is to set w equal to $\phi\pi$ and to set ℓ and, hence, L equal to unity. In other words, the monopsonist sets the wage rate such that each indigenous family is indifferent between allocating time to wage employment and to extralegal appropriation and the monopsonist offers the indigenous families sufficient wage employment to absorb all of their time.

Accordingly, in the monopsonistic equilibrium indigenous families allocate no time to extralegal appropriation. This property obtains because the monopsonist internalizes the potential negative effect of extralegal appropriation on net profits. In other words, the

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of extralegal appropriation and could prolong temporarily the viability of a colony with a competitive labor market and a growing population.

monopsonist does not take β as given, but rather takes into account that an increase in L both increases output and decreases B and, hence, decreases the amount of profits lost to extralegal appropriation. In contrast, each competitive employer took L, B, and β as given and considered only the effect of the choice of employment on output.

Substituting $w = \phi\pi$ and $L = 1$ into equation (15), we can solve for the equilibrium gross and net profits of the monopsonist, which are

$$(1-\beta)R\pi = R\pi = \frac{\lambda R^{1-\alpha}N^{\alpha}}{1+\phi N/R} \tag{16}$$

and we can solve for the equilibrium monopsonistic wage rate, which is

$$w = \phi\pi = \frac{\phi\lambda(N/R)^{\alpha}}{1+\phi N/R} \tag{17}$$

Equations (16) and (17) imply that both the monopsonistic wage rate and the profits of the monopsonist are smooth hump-shaped functions of population and that both functions have a maximum at a population such that $\frac{N}{R} = \frac{1}{\phi}\frac{\alpha}{1-\alpha}$. In other words, with a small population, population growth raises profits, but also raises wages as the monopsonist equates the wage rate to the potential return to extralegal appropriation. With a larger population, however, population growth depresses both profits and wages. As population continues to grow, both profits and wage approach zero asymptotically.

Comparing equation (16) to equations (12) and (14), we see the following: First, if $\frac{N}{R} < \frac{1}{\phi}\frac{\alpha}{1-\alpha}$, then the profits of a monopsonist are larger than the total profits of competitive companies. But, as population grows, the profits of a monopsonist increase more slowly than the total profits of competitive companies. Second, if population grows until $\frac{N}{R} = \frac{1}{\phi}\frac{\alpha}{1-\alpha}$, then both the profits of a monopsonist and the total profits of competitive companies are at their highest levels, and they are equal. Third, if population continues to grow so that $\frac{N}{R} > \frac{1}{\phi}\frac{\alpha}{1-\alpha}$, then the profits of a monopsonist decrease more slowly than the total net profits of competitive firms and the net profits of a monopsonist again become larger than the total net profits of competitive firms. Note, however, that in this case

the profits of a monopsonist are smaller than the total gross profits of competitive firms. With a large population, the larger net profits of a monopsonist result from the ability of the monopsonist to internalize the potential negative effect of extralegal appropriation on profits.

Comparing equation (17) to equations (11) and (13), we see the following: First, if $\frac{N}{R} < \frac{1}{\phi}\frac{\alpha}{1-\alpha}$, then the monopsonistic wage rate is less than the competitive wage rate. But, as population grows, the monopsonistic wage increases, whereas the competitive wage decreases. Second, if population grows until $\frac{N}{R} = \frac{1}{\phi}\frac{\alpha}{1-\alpha}$, then the monopsonistic wage and the competitive wage become equal. Third, if population continues to grow so that $\frac{N}{R} > \frac{1}{\phi}\frac{\alpha}{1-\alpha}$, then the monopsonistic wage decreases and again becomes less than the competitive wage, which remains constant. Note that with a large population the indigenous families allocate no time to extralegal appropriation in the monopsonistic equilibrium, but not in the competitive equilibrium, even though the monopsonistic wage is less than the competitive wage. The explanation is that the total gross profits of competitive companies, but not their net profits, are larger than the profits of a monopsonist.

Most importantly, equation (16) implies that, similarly to the competitive case, if the population of the colony is neither too small nor too large, then the monopsonist's profits exceed cR, the cost of administering and providing necessary infrastructure for the colony. Thus, a colony with a monopsonized labor market and a growing population will have a life cycle that is similar to the life cycle of a colony with a competitive labor market. Specifically, with either a monopsonized labor market or a competitive labor market, population growth produces a period of rising profits followed by a period of declining profits, until finally the colony becomes a net burden on the metropolis. But, for any given level of cR, or any given level of cR less the subsidy that the metropolitan government is willing to provide to the colony, the critical population range for which the colony remains viable is larger with a monopsonized labor market than with a competitive labor market. In addition, with a competitive labor market the period of rising profits has

falling wages and the period of falling profits has both constant wages and positive and increasing extralegal appropriative activity, whereas with a monopsonized labor market wages rise when profits are rising and wages fall when profits are falling and there is no extralegal appropriative activity.

Summary

This paper has suggested an economic explanation for the decisions of the European metropolitan powers between 1946 and 1976 to grant independence to all of their large colonies in Southeast Asia and Africa. This explanation emphasizes the substantial population increase during the colonial period and argues that this increase in population increased the potential return to extralegal appropriation of the profits of the colonial companies. The analysis suggests that a colony with a growing population has a life cycle in which population growth produces a period of rising profits followed, because of the increasing potential return to extralegal appropriation, by a period of falling net profits until the colony becomes a net burden on the metropolitan government.

The analysis also distinguished between colonies in which the market for indigenous labor was competitive and in which subversive activity by the indigenous population was intense prior to independence and colonies in which the labor market was monopsonized and in which subversive activity was not intense. The analysis attributes this relation between the structure of the labor market and the amount of subversive activity to the ability of a monopsonist to internalize the potential negative effect of extralegal appropriation on net profits. Although with a monopsonized labor market subversive activity was not intense and the colony remained viable for a larger population, population growth still depressed net profits and the colony still eventually became a net burden because the monopsonist had to keep the wage rate equal to the potential return to extralegal appropriation.

In most of the colonies in Africa and Southeast Asia, population increase reflected

mainly natural population growth, but in some colonies immigration was important. In either case, population increase during the colonial period presumably was not an exogenous event, but rather a result of changes produced by colonialism itself – specifically, increased employment opportunities and decreased mortality due to the introduction of European technologies. Given the relation between population increase and the net profits of colonial companies, the metropolitan powers at first would have welcomed the population growth that colonialism induced, but eventually this population growth became the undoing of colonialism itself.

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