Why Decolonization?

Roberto Bonfatti
London School of Economics
R.Bonfatti@lse.ac.uk

May 15, 2007

Abstract

This paper investigates the economic factors underlying decolonization, an institutional development of paramount importance in the history of most developing countries. I build a simple trade model of colonialism linking decolonization to the evolution of world factor endowments. In the model, a labour (or land) intensive colony and its capital intensive colonizer trade, creating gains from trade. These are then shared according to the balance of power existing between the two countries: while the colonizer control formal political power, the colony can stage a successfull revolution at some stochastic cost. The allocation of gains from trade is also determined by the fact that the rest of the world is interested in trading with the two countries. The more similar is the rest of the world to the colonizer in terms of factor endowments, the higher the incentives for the colony to stage a revolution, the larger the probability that the colonizer must surrender gains from trade and, possibly, grant independence.

JEL Codes: D74, F13, H77.

Keywords: Trade policy, Decolonization, International relations.

1 Introduction

There is a recent and growing literature in economics which tries to explain how political events or the evolution of political institutions are determined by economic factors. For example, Roemer (1985) and Grossman (1991, 1993) study the determinants of revolutions; Acemoglu and Robinson (2000) and Jack and Lagunoff (2007) study the decision by the elite to extend the franchise; Acemoglu and Robinson (2001 and 2006) study the establishment and stability of democracy and dictatorship. This article seeks to analyse the decision by some country to give up control over another country, after it conquered and administered it for some time. In particular, it is concerned with the decision by European powers to surrender control over their colonies at various points in time during the past two centuries. In this sense, it stands in a very narrow strand of economic literature (Grossman, 1993; Grossman, 1995).

To a political economist, decolonization is an interesting political event for a number of reasons. First, it marked the end of an institutional arrangement (colonialism) which is known to have had significant influence on subsequent economic development. Second, for many countries it marked the beginning of a period of very uncertain institutional development: for example, a period of frequent institutional changes (as in Latin America) or one which saw the persistence of largely kleptocratic states (as in Africa). Third, if one is interested in the economic determinants of the institutions of international relations, decolonization provides a good example of a rapid and substantial change in such institutions.

Contemporary economists have devoted much attention to the impact of colonialism on development. For example, Grier (1998) finds that among former colonies, countries that were colonized for longer periods performed better in terms of subsequent GDP growth; Engerman and Sokoloff (2000) argue that comparative institutional development in the American continent can be predicted by the interaction of natural endowments and European colonialism; Acemoglu and Robinson (2001) study the impact of different types of colonization on subsequent institutional development and economic performance; and Bertocchi and Canova (2002) show, for the case of Africa, that colonial origins and economic penetration are good predictors of various economic and social indicators, that are commonly used to predict growth[1]. Only a few papers (for example, Engerman and Sokoloff, 2000, and Acemoglu and Robinson, 2001) have provided some theoretical explanations for this evidence, based on the different type of institutions implanted by colonizers in different countries.

At the same time, there have been many studies explaining poor post colonial institutional development: to quote only two, Acemoglu and Robinson (2006) and Padro-i-Miquel, (2006) give theories which explain, respectively, the frequent regime changes of Latin America and the persistence of kleptocratic regimes in Africa. Interestingly, no formal paper in economics has yet attempted at analysing the interation between post-colonial institutional development and the action of the former colonizers, perhaps because of the shadow of ideology cast over this topic by the economic debate in the 1960s and 1970s.

Very little attention instead has been devoted by economists on the economic determinants of international relations: all modern models of the international economy (financial flows, trade, aid,) take the institutions of international relations (intended as the rules which determines the influence of one country over policy in another) as given. Focusing on the case of decolonization, this paper builds a simple trade model in which the institutions of international relations are determined endogenously. Appropriately extended, I believe my model will yield a framework to studying how the actions of former colonizers might have affected post colonial institutional and economic development at the same time.

There is a large literature which deals with decolonization at large, and with the economic reasons for it in the specific. To the best of my knowledge, however, the only work that carries out a formal analysis of this topic are two papers by Herschel Grossman (1993, 1995). In the first and most relevant of these, the author adapt a general equilibrium model of revolutionary activity to argue that indigenous population growth combined with the structure of the labour market in some colonies increased the private returns to subversive activity, until the colonies became a net burden to the colonizers.

My paper provides an alternative explanation for why at some point in time colonialism became an unprofitable business. The model links decolonization

[1] Many more studies could be cited: for example Alam (1994), La Porta et Alii (1999) and Fielding and Torres (2005).

to the evolution of world factor endwoments and trade patterns. In its simple environment, a labour (or land) intensive colony and its capital intensive colonizer trade, creating substantial gains from trade. The way in which gains from trade are shared between the two countries depends on the balance of power between the two: while the colonizers control formal political power, the colonized have the ability to stage a successfull revolution at some stochastic cost. The allocation of gains from trade between the two countries is also influenced by the fact that the rest of the world is interested in trading with the them, but in ways which depend on its relative capital intensity. The more capital intensive is the rest of the world relative to the colonizer, the higher the incentives for the colony to stage a revolution, the larger the probability that the colonizer has to grant independence.

The rest of the paper is organized as follows. Section 2 provides some support for the decision to take a trade view of colonialism. Section 3 describes the economic and political models and solves for the overall equilibrium. Section 4 discusses a few important features of the model. Section 5 talks briefly about the further work that I am planning to undertake, and concludes.

2 Colonialism and trade

Western colonialism took many forms in modern history. From the early phase of expansion (of the Portuguese and Spanish in XV century; of the English, French and Dutch in XVI century) down to the first wave of decolonization (the Americas around 1800), the New Imperialism of late XIX century, and the second wave of decolonization after WWII, different colonizers have sought to defend their interest in the colonial business through very different military, administrative and economic structure.

From an economic perspective, one feature of Western colonialism that has remained remarkably constant over time is the importance of trade. After an initial phase of conquest, in which the main return on the military efforts of the colonizers was the appropriation of precious materials and slaves, colonies and protectorates incorporated in the European empires were normally introduced into a trade circuit through which their abundant endowments of labour and natural resources could be exploited. Only to some extent this trade was voluntary (i.e: subject to a set of rules, but based on the free productive decisions of people living in the colonies): while in settlers' colonies like Canada or Australia trade was on an entirely voluntary basis, in most Latin American colonies production for export was based on the massive use of slave or forced labour, and the only voluntary party in the colonial trade was an elite of European descent. In any case, abstracting from local political arrangements, an element of voluntary exchange between the colony and the mother country was implanted very soon after the establishment of administrative control.

Typically, the patterns of trade saw the colonies exporting precious metals, agricultural commodities and minerals to Europe in exchange for manufactures of various types. Very often, colonial endowments were built up by European colonizers with a view to exploit natural resources in the most convenient way to European interests. This was carried out both through flows of private European investments and by public intervention.

The substance of colonial domination was the direct control of colonial policy by the government of the mother country. Even when a limited form of adminsitrative independence was conceded, however (as in the case of the British West Indies, who elected representative bodies empowered to influence policy in some domains), trade policy remained under the strict control of the mother country. This was because trade policy became one of the main tools through which Europeans sought to extract value from their colonies: through such arrangements as monopolies and tariffs, colonizers sistematically manipulated the terms of trade in their favour, leaving colonies with just a little share of what were the huge gains from the colonial trade. Monopolies in particular had a strong persistence over time: famous examples are the Spanish monopoly over South American trade, which lasted from XVI to early XIX century, or the British Navigation Laws, which lasted from 1651 to 1822. That such monopolies were important was very clear to the early economists. For example, Adam Smith wrote that:

"The maintenance of this monopoly has hitherto been the principal, or more properly perhaps, the sole end and purpose of the dominion which great Britain assumes over her colonies" from "The Wealth of Nations".

Besides trade policy, Europeans used several tools to extract gains from trade from the colonies. For example, in British settlers' colonies all unused land belonged to the Crown, and was normally offered for sale to those who wanted to implant some economic activity on it. Further, several land-related activities were subject to the disbursment of yearly licence fees. Land revenues were collected by the colonial government on behalf of the Crown, and considered as being "hold in trust by the Crown for the Empire as a whole" (Mc Minn, 1979). As the colonies' export developed, land revenues went up, transferring a large share of colonial revenues under control of the Crown. This was a major source of contrast between, for example, the British government and Australian settlers down to 1855, when control of land revenues by the Crown was surrendered upon the concession of Responsible Government.

In colonies which had a large indigenous population and a comparatively smally share of settlers[2], European powers favoured the establishment of extractive institutions: through these, and with some military assistance from Europe, an elite of settlers exploited the rest of the indigenous population. This was the case of several American colonies, among which Peru, Brasil, the British and Dutch West Indies and the US South. As mentioned above, trade in this cases was only partially voluntary; even in these cases, however, the policy tools described above (monopolies, tariffs) were used to make sure that a large share of gains from colonial trade were transferred from the colonial elite to the mother country.

The importance of trade in the colonial business is evident from the experience of countries or regions which never became real "colonies" but were at

[2] There are a few famous theories for why some colonies received a large number of settlers, and some didn't. For example, Engerman and Sokoloff (2000) argue that settlers were driven by market forces towards territories in which natural endowments (and the lack of a large indigenous population) made their activity more valuable; Acemoglu, Johnson and Robinson (2001) support the view according to which settlers' mortality was the key determinant of immigration flows.

some point put under the "protection" of some European power. This form of colonialism (which was practiced by all European countries but especially by the British) was favoured when outright conquer resulted too expensive because of the existence of powerful local polities. What "Protection" implied was the security of the existing local elite against the potential aggression of the protector or some other European power; in exchange for this, the protector normally imposed a policy of open trade and free capital movements at some very favourable conditions. Thus, the experience of protectorates reinforces the impression that the irrevocable ingredient of colonialism was indeed trade.

Throughout history, competition between colonizers was always very strong. It was especially strong, however, at times in which the convergence in the economic structure of European countries placed them in the need of similar colonial trading partners. This was particularly evident in the era of the "Scrumble for Africa", or New Imperialism (1880-1914). At that time, the Industrial Revolution had reached its maturity and France and Germany had caught up with Britain in terms of the capital intensity of their economies, and the strong demand for food and raw materials by these three European countries (and by Italy to a smalle extent) created the conditiong for the armed partition of Africa in three large areas of influence.

In the next section, I am presenting a simple Hecksher-Ohlin model of colonialism which builds on the observation made above. Through this, I seeks to address the question of why, at some point in time, the European powers lost their colonies. While the simplicity of the model is in no way sufficient to account for the many aspects of colonial trade, I believe it captures one key force at play at the time of decolonization.

3 The model

3.1 Economic model

3.1.1 Environment

There are three countries, H, F and E: H is the colony, F is the colonizer and E a third country external to the colonial relation [3]. Each country is inhabited by a mass 1 of agents. Endowments of labour (L) and capital (K) are

$$L^H = 1 \quad K^H = \overline{K}$$
$$L^E = 1 \quad K^E = \overline{K}(1+\delta)$$
$$L^F = 1 \quad K^F = \overline{K}(1+\kappa)$$

where $\kappa, \delta > 0$, and $\kappa > \delta$. In words, I am assuming that H is the labour inten-

[3] Notice that this simple framework is yet somewhat flexible: F can represent not only the the mother country, but the mother country and all her other colonies; and E can represent a single country as well as the rest of the world.

sive country, F is the capital intensive country, and E is somewhere between the two[4]. All citizens own exactly one unit of labour, and citizens in each country own an equal share of national capital.

Two goods are produced and consumed, x and y. Production technologies are equal across countries:

$$\begin{aligned} x &= L \\ y &= K \end{aligned} \tag{1}$$

Similarly, preferences are equal across countries and are described by the utility function

$$u^{iJ} = u\left(x^{iJ}, y^{iJ}\right) = \left(x^{iJ}\right)^{\frac{1}{2}}\left(y^{iJ}\right)^{\frac{1}{2}} \tag{2}$$

where x^{iJ} and y^{iJ} are the demand for goods x and y respectively, by citizen i in country J. Given that citizens within each country have homogeneous endowments, they will all have the same demand schedule: we can thus drop the upper script i from now on[5].

If p^J is the price ratio $(\frac{p_x^J}{p_y^J})$ faced by country J's citizens, their uncompensated demand schedules will be $x^J = \frac{1}{2} + \frac{K^J}{2p^J}$ and $y^J = \frac{p^J}{2} + \frac{K^J}{2}$. The indirect utility of a single citizen (as well as the total indirect utility) in country J is:

$$\begin{aligned} v^J\left(p^J\right) &= \left(\frac{1}{2} + \frac{K^J}{2p^J}\right)^{\frac{1}{2}}\left(\frac{p^J}{2} + \frac{K^J}{2}\right)^{\frac{1}{2}} \\ &= \frac{p^J + K^J}{2\left(p^J\right)^{\frac{1}{2}}} \end{aligned} \tag{3}$$

3.1.2 Autarchy equilibrium

The equilibrium autarchy price ratio in country J (from now onwards denoted by p_A^J) is found by equating domestic demand to domestic supply:

$$\begin{aligned} \frac{1}{2} + \frac{K^J}{2p_A^J} &= 1 \\ \frac{p_A^J}{2} + \frac{K^J}{2} &= K^J \end{aligned}$$

[4] A more general model in which δ is allowed to take any value can be simply worked out.
[5] This is equivalent to thinking that there is only one citizen in each country.

Solving either of these two equations yields:

$$p_A^J = K^J \tag{4}$$

Standard trade theory tells us that any movement of the price ratio away from p_A^J (both upwards and downwards) increases welfare in country J, and that the larger the change the larger the increase. More formally, $v^J(p) > v^J(p_A^J)$ $\forall p \neq p_A^J$, and $v^J(p') > v^J(p) > v^J(p_A^J)$ $\forall p, p' \neq p_A^J$ such that either $p' < p < p_A^J$ or $p' > p > p_A^J$.

3.1.3 Trade equilibrium

Let's now consider the situation in which countries can trade. Given that there are three countries in this world, we can have different sets of equilibrium price ratios depending on the countries involved in trade. I will list in parenthesis all countries that trade with at least one other country: thus, (H, F) will denote the case of countries H and F trading to each other, and country E remaining in autarchy. Analogously, the other two possible two-country cases will be denoted by (H, E) and (F, E); the notation (H, F, E), instead, represents different situations in which all countries trade to at least one other country, but not necessarily to all. Notice that due to the absence of transport costs, the equilibrium price ratio will be the same in all the (H, F, E) cases.

The assumption of linear production functions ensures that factor price equalization obtains (Dixit and Norman, 1980). Thus, we can find the equilibrium price ratios conveniently by solving for the integrated trade equilibria, i.e. by finding the equilibrium price ratio of a single country with endowments equal to the sum of the national endowments of countries who trade. For example, equilibrium prices in the (H, F) case are found by equating demand and supply in the integrated setting:

$$\begin{aligned} \frac{1}{2} + \frac{K^H}{2p} + \frac{1}{2} + \frac{K^J}{2p} &= 2 \\ \frac{p}{2} + \frac{K^H}{2} + \frac{p}{2} + \frac{K^F}{2} &= K^H + K^F \end{aligned}$$

Denote by $p^J(H, F)$ the price ratio faced by citizens in country J when only H and F trade. Solving either of the two above equations gives:

$$\begin{array}{l} p^H(H,F) = \overline{K}\left(1 + \frac{\kappa}{2}\right) \\ p^F(H,F) = \overline{K}\left(1 + \frac{\kappa}{2}\right) \\ p^E(H,F) = p_A^E \end{array} \tag{5}$$

Equilibrium price ratios in all other cases are found similarly:

$$\begin{array}{lll} (F,E) & (H,E) & (H,F,E) \\ p^H = p_A^H & p^H = \overline{K}\left(1+\frac{\delta}{2}\right) & p^H = \overline{K}\left(1+\frac{\kappa+\delta}{3}\right) \\ p^F = \overline{K}\left(1+\frac{\kappa+\delta}{2}\right) & p^F = p_A^F & p^F = \overline{K}\left(1+\frac{\kappa+\delta}{3}\right) \\ p^E = \overline{K}\left(1+\frac{\kappa+\delta}{2}\right) & p^E = \overline{K}\left(1+\frac{\delta}{2}\right) & p^E = \overline{K}\left(1+\frac{\kappa+\delta}{3}\right) \end{array} \tag{6}$$

Given that indirect utility in each country is monotonically increasing in a change of the price ratio, and considered that $1+\frac{\kappa+\delta}{3} > 1+\frac{\kappa}{2} \Leftrightarrow \delta \in \left(\frac{\kappa}{2}, \kappa\right]$, citizens in the three countries will have the following preferences over different trade equilibria (remember that citizens within each country have identical preferences). For H and F, if $\delta \in \left[0, \frac{\kappa}{2}\right)$ we have[6]:

$$\begin{array}{rl} (F,E) & \prec^H (H,E) \prec^H (H,F,E) \prec^H (H,F) \\ (H,E) & \prec^F (F,E) \prec^F (H,F) \prec^F (H,F,E) \end{array}$$

If instead $\delta \in \left(\frac{\kappa}{2}, \kappa\right]$:

$$\begin{array}{rl} (F,E) & \prec^H (H,E) \prec^H (H,F) \prec^H (H,F,E) \\ (H,E) & \prec^F (F,E) \prec^F (H,F,E) \prec^F (H,F) \end{array}$$

What's important in the above preference relations is that, when E is relatively labour intensive ($\delta \in \left[0, \frac{\kappa}{2}\right)$), H prefers to trade with F rather than with F and E together, while F prefers to trade with H and E together than with H alone; and that the opposite is true when E is relatively capital intensive ($\delta \in \left(\frac{\kappa}{2}, \kappa\right]$).

For country E, it is sufficient to notice that there exist a $\delta^*(\kappa)$ such that if $\delta \in [0, \delta^*(\kappa))$:

$$(H,F,E), (H,E) \prec^E (F,E)$$

if instead $\delta \in (\delta^*(\kappa), \kappa]$:

[6] To simplify the exposition, I am not considering the case in which $\delta = \frac{\kappa}{2}$.

$$(H, F, E), (F, E) \prec^{E} (H, E)$$

In words, if E is labour intensive ($\delta \in [0, \delta^{*}(\kappa))$) it prefers to have a capital intensive trading partner like F; if E is capital intensive ($\delta \in (\delta^{*}(\kappa), \kappa]$) it prefers to have a labour intensive partner like L. In no circumstance (as long as $0 < \delta < 1$) will E prefer to trade with both H and F together. In the appendix, I show that $\delta^{*}(\kappa) \in \left(0, \frac{\kappa}{2}\right)$ and $\frac{\partial \delta^{*}(\kappa)}{\partial \kappa} > 0$ for any κ.

3.2 Political Model

The political model is adapted from Acemoglu and Robinson (2000, 2006). The colonial condition of H is modelled in a very simple way: while policy in F and E is determined freely by their respective governments, policy in H is determined by the government of country F. The citizens of H can stage a successful revolution at a stochastic cost: when staged, the revolution is always successful and H becomes an independent country who is free to have its own government and to set its own policy. Under the threat of revolution, F can decide to concede independence to H. Throughout the paper, I assume that the "government" of a country is simply a citizen of that country selected at random to chose policy.

3.2.1 Policy

There are two policy instruments: the first, *trade policy*, is set in all countries; the second, a *transfer* from H to F, is specific to H. For simplicity, I will model trade policy as 0 or 1 decision specifiying whether a country is closed or open to each of the two other countries. Trade between two countries takes place if and only if both countries have decided to open up to each other. Trade policy is described by the following matrix

$$\mathbf{T} = \begin{bmatrix} \mathbf{T}^{H} & \mathbf{T}^{F} & \mathbf{T}^{E} \end{bmatrix} = \begin{bmatrix} T_{H}^{H} & T_{H}^{F} & T_{H}^{E} \\ T_{F}^{H} & T_{F}^{F} & T_{F}^{E} \\ T_{E}^{H} & T_{E}^{F} & T_{E}^{E} \end{bmatrix}$$

where T_{J}^{I} is 1 if country I is willing to trade with coutnry J, 0 otherwise (of course, $T_{J}^{J} = 1 \forall J$). Thus, trade between country I and country J takes place if and only if $T_{J}^{I} = T_{I}^{J} = 1$. Mapping from $\mathbf{T}$ to the corresponding trade equilibrium, and using the equations in 5 and 6, we can write p^{J} as a function of $\mathbf{T}$, κ and δ (denote this by $p^{J}(\mathbf{T}|\kappa, \delta)$). Also, we can define the gains from trade accruing to country J as a function of $\mathbf{T}$, κ and δ:

$$\Pi^{J}(\mathbf{T}|\kappa, \delta) = v^{J}\left[p^{J}(\mathbf{T}|\kappa, \delta)\right] - v^{J}\left[p_{A}^{J}\right]$$

The second policy tool in the model, a transfer from H to F, is specific to H. For convenience, I will normalize this transfer in terms of H's gains from trade: thus, a share τ of H's gains from trade will be transferred to F. The transfer τ is meant to capture in the simplest possible way the fact that gains from colonial trade were redistributed from colonies to colonizers.

What are the limits of τ? As for its upper limit I will assume that this is 1, so that the maximum that F can extract from H is exactly its gains from trade. This is equivalent to assuming that there is a minimum level of utility that F can leave H with, and this is equal to autarchy utility. Letting F the possibility to extract more would not have serious consequences for the result of the model (as long as the minimum level of utility does not depend on trade conditions). As for τ's lower limit, I will let this to be $-\infty$, to capture the fact that F is much richer than H and could decide to transfer (almost) any amount to H to induce it not to stage a revolution.

3.2.2 Timing

The political state (S) of the model is initially Colonialism, but the citizens of H can stage a successful Revolution at a stochastic cost $\mu v^H\left(\overline{K}\right)$, where $\mu \sim U[0,1]$ - to simplify the notation I have normalized the cost of revolution by H's autarchy utility. The timing of the game is the following:

1. Nature choses μ.

2. F choses whether to remain under Colonialism ($S = I$) or to grant Independence ($S = I$). If they receive Independence, the citizens of H have an exogenous (and non appropriable) benefit B. Under Colonialism, F can make *concessions*: that is it can promise that if H does not stage a revolution, it will set policies $\widehat{\mathbf{T}}^H$,$\widehat{\mathbf{T}}^F$and $\widehat{\tau}$.

3. If the political state is still Colonialism, citizens in H decide whether to do a Revolution ($S = R$) or not. If they do, they obtain independence at a cost $\mu v^H\left(\overline{K}\right)$ and become a fully independent country. This gives them the same exogenous benefit B as obtaining Independence in time 2. If F has granted Independence in time 2, nothing happens at this stage.

4. $\mathbf{T}$ and τ are simultaneously set. If the political state is Independence, H sets its own policy freely. If we are still under Colonialism, F must set $\mathbf{T}^H = \widehat{\mathbf{T}}^H$,$\mathbf{T}^F = \widehat{\mathbf{T}}^F$ and $\tau = \widehat{\tau}$ with probability π; with probability $1 - \pi$, it can renege on its promises and set policy freely. Finally, if the political state is Revolution H sets its own policy freely just like under Independence, but F sets $T_F^H = 0$.

5. Production, trade and consumption take place; all payoffs are realized.

The assumption that under revolution F must set $T_F^H = 0$ is crucial to the results of the model. While punishment is not *ex-post* optimal in this model, it could be easily rationalized by saying that F has to defend a reputation as a punisher of rebel colonies, in the attempt to preserve discipline in the rest of the empire. All this is exogenous at this stage. See the next section for a brief discussion of the plausibility of this assumption.

3.3 Equilibrium

Let us now proceed to find the equilibrium of the model. Solving backwards:

Time 5

Net (after redistribution) indirect utility, V^J, depends on the policy choices made in time 4, as well as on world factor endowments:

$$\begin{aligned} V^H(\mathbf{T}, \tau|\kappa, \delta) &= v^H\left(\overline{K}\right) + \\ &+ (1-\tau)\,\Pi^H(\mathbf{T}|\kappa, \delta) + B\phi \end{aligned} \tag{7}$$

$$\begin{aligned} V^F(\mathbf{T}, \tau|\kappa, \delta) &= v^F\left[\overline{K}(1+\kappa)\right] + \\ &+ \Pi^F(\mathbf{T}|\kappa, \delta) + \tau\Pi^H(\mathbf{T}|\kappa, \delta) \end{aligned} \tag{8}$$

$$\begin{aligned} V^E(\mathbf{T}, \tau|\kappa, \delta) &= v^E\left[\overline{K}(1+\delta)\right] + \\ &+ \Pi^E(\mathbf{T}|\kappa, \delta) \end{aligned} \tag{9}$$

Where ϕ is an indicator variable that is equal to 1 if H is free to set its own policy (if $S = I$ or $S = R$), and 0 otherwise[7].

Time 4

The equilibrium concept that I will use for the trade policy equilibrium is that of *coalition proof Nash equilibrium*. A coalition proof Nash equilibrium is a set of trade policies such that 1) no single country has an incentive to deviate to a different policy; and 2) no coalition of countries has an incentive to coordinate and deviate to a different policy. It can be shown[8] that:

[7] Of course, it is only thanks to the linearity of indirect utility in income that we can redistribute utility from one country to another.

[8] Proofs to all proposition are in Appendix.

Proposition 1 *Both under Colonialism if F can reset policy, and under Independence, all trade equilibria are of the type (H,F,E) independently on the endowment parameters. Thus, $p^J = \overline{K}\left(1+\frac{\kappa+\delta}{3}\right) \forall J$ and $\forall \delta,\kappa$. Under Revolution, instead, the type of trade equilibrium depends on κ and δ:*

- *If $\delta \in [0,\delta^*(\kappa))$, the trade equilibrium is (F,E) and $p^F = p^E = \overline{K}\left(1+\frac{\kappa+\delta}{2}\right)$, $p^H = p^H_A$;*
- *if $\delta \in (\delta^*(\kappa),\kappa]$, the trade equilibrium is (H,E) and $p^H = p^F = \overline{K}\left(1+\frac{\delta}{2}\right)$, $p^F = p$.*

Obviously, if under Colonialism F cannot reset policy, the resulting trade equilibrium will depend on the promises made in time 2 ($\widehat{\mathbf{T}}^H$,$\widehat{\mathbf{T}}^F$); for this see below.

As for the transfer τ, it is easy to see that:

Proposition 2 *When under Colonialism F can reset policy, $\tau = 1$; when instead it has to abide by its promises, $\tau = \widehat{\tau}$. Both under Independence and under Revolution, $\tau = 0$.*

Given the mapping between political states and policy, price ratios and gains from trade can now be written as functions of S, κ and δ only: $p^J(S,\kappa,\delta)$, $\Pi^J(S,\kappa,\delta)$.

Time 3

If F has conceded Independence at time 2, nothing happens at this stage. If, instead, we are still under Colonialism, the citizens of H finds it profitable to do a revolution if and only if

$$B + \Pi^H(R,\kappa,\delta) - \mu v^H\left(\overline{K}\right) > \pi(1-\widehat{\tau})\,\Pi^H(C,\kappa,\delta)$$

where the left-hand side is the sum of the exogenous benefit from being free to set policy, the gains from trade after revolution and the cost of revolution, and the right-hand side is the expected transfer made by F if revolution does not take place. The above expression can be re-written as:

$$\mu < \frac{B + \Pi^H(R,\kappa,\delta) - \pi(1-\widehat{\tau})\,\Pi^H(C,\kappa,\delta)}{v^H\left(\overline{K}\right)} \tag{10}$$

When 10 holds true, we will say that there is a *revolutionary threat.* Let's define

$$\overline{\mu} \equiv \frac{B + \Pi^H(R,\kappa,\delta)}{v^H\left(\overline{K}\right)} \tag{11}$$

which is the cost of revolution above which revolution never takes place (even if F makes no concessions). Notice that $\overline{\mu}$ can be greater than 1.

Time 2

In time 2, F decides whether to grant Independence to H or not. If it doesn't, it can make concessions $\widehat{\mathbf{T}}^H$,$\widehat{\mathbf{T}}^F$ and $\widehat{\tau}$. What determines this decision? Before answering this question it is useful to notice that, under all circumstances, F will chose $\widehat{\mathbf{T}}^H$,$\widehat{\mathbf{T}}^F$ in such a way that that the trade equilibrium is of the type (H, F, E). This is because being the residual claimant of the gains from trade of H (which is true independently on the size of $\widehat{\tau}$), F is always interested in maximising the joint gains of H and F. This can be stated in the following Proposition:

Proposition 3 *Under colonialism, it is always optimal for F to chose $\widehat{\mathbf{T}}^H$ and $\widehat{\mathbf{T}}^F$ in such a way that the trade equilibrium is of the type (H, F, E), i.e. the three countries are fully integrated.*

Proposition 1 and 3 together imply that the trade equilibrium is the same under Colonialism and under Independence, and that it is the welfare maximising equilibrium.

In chosing whether to grant Independence or not, and if not, what $\widehat{\tau}$ to concede, F maximises its payoff as indicated in equation 8. Clearly, if there is no revolutionary threat ($\mu < \overline{\mu}$) there Independence will not be granted and there will be no concessions. Whenever $\mu < \overline{\mu}$, instead, F will need to make concessions if it wants to avoid Revolution. The minimum concession needed to stave off Revolution, or the maximum tax that F can say it will charge ($\widehat{\tau}_{\max}(\mu)$), is found by imposing an equality in 10 and solving for $\widehat{\tau}$:

$$\widehat{\tau}_{\max}(\mu) = 1 - \frac{B + \Pi^H(R, \kappa, \delta) - \mu v^H\left(\overline{K}\right)}{\pi \Pi^H(C, \kappa, \delta)} \tag{12}$$

Obviously, $\widehat{\tau}_{\max}(\mu)$ is decreasing in μ.

Is it always optimal for F to promise $\widehat{\tau}_{\max}$? No: F prefers to make concessions rather than to concede Independence only as long as:

$$\Pi^F(C, \kappa, \delta) + [1 - \pi(1 - \widehat{\tau})]\, \Pi^H(C, \kappa, \delta) > \Pi^F(I, \kappa, \delta) \tag{13}$$

Proposition 1 and 3 together tell us that $\Pi^F(C, \kappa, \delta) = \Pi^F(I, \kappa, \delta)$. But then 13 can be solved to find the minimum level of taxation ($\widehat{\tau}_{\min}$) below which F prefers Independence to Colonialism:

$$\widehat{\tau} > -\frac{1 - \pi}{\pi} = \widehat{\tau}_{\min} \tag{14}$$

Setting $\widehat{\tau}_{\max}(\mu) = \widehat{\tau}_{\min}$ yields the cutoff level for the cost of revolution below which it is optimal for F to grant Independence:

$$\mu^* = \frac{B + \Pi^H(R,\kappa,\delta) - \Pi^H(C,k,\delta)}{v^H\left(\overline{K}\right)} \tag{15}$$

Thus, whenever $\mu < \mu^*$, F choses to stave off revolution by conceding independence. The crucial point is now to understand how $\Pi^H(R,\kappa,\delta)$ and $\Pi^H(R,\kappa,\delta) - \Pi^H(C,k,\delta)$ (and thus $\overline{\mu}$ and μ^*) depend on δ. Before proceding, I will make the following parametric assumption:

Assumption 1: $\Pi^F(C,\kappa,\delta^*) - \Pi^F(R,\kappa,\delta^*) < B < \Pi^F(C,\kappa,\delta^*)$

The reason why I am introducing Assumption 1 is that it allows us to focus on the most interesting case, and to highlights the full effects that the evolution of world endowments can have on colonialism under some conditions. Let's now analyse how the political state of the model depends on δ.

If $\delta \in [0, \delta^*(\kappa))$, there are no gains from trade to be made after staging a revolution ($\Pi^H(R,\kappa,\delta) = 0$). In this case $\overline{\mu} = \frac{B}{v^H(\overline{K})}$ and under parametric Assumption 1, $\mu^* = \frac{B - \Pi^H(C,k,\delta)}{v^H(\overline{K})} < 0$. Thus, concessions are made as soon as $\mu < \min\left[\frac{B}{v^H(\overline{K})}, 1\right]$ but independence is never granted.

If $\delta \in (\delta^*(\kappa), \kappa]$, H can trade with E and there are positive gains from trade to be made after revolution ($\Pi^H(R,\kappa,\delta) > 0$). In this case $\overline{\mu} = \frac{B + \Pi^H(R,\kappa,\delta)}{v^H(\overline{K})}$, and under Assumption 1 $\mu^* = \frac{B + \Pi^H(R,\kappa,\delta) - \Pi^H(C,k,\delta)}{v^H(\overline{K})} > 0$. Thus, concessions are made as soon as $\mu < \min\left[\frac{B + \Pi^H(R,\kappa,\delta)}{v^H(\overline{K})}, 1\right]$, and Independence is granted when $\mu < \mu^*$.

It is important to notice that (independently on Assumption 1) both $\overline{\mu}$ and μ^* are increasing in δ: they jump up at $\delta = \delta^*$, and increase continuously as δ increases above δ^* (see the Appendix for a proof).

Time 1

In time 1, Nature choses μ and determines the political state of the model given B, κ and δ. Proposition 4 gives the main result of the paper:

Proposition 4 *The political state of the model depends on the cost of revolution μ in the following way:*

- *If $\mu \in [\min(\overline{\mu}, 1), 1]$, there is no depart from Colonialism and F does not make any concessions;*

- *If* $\mu \in [\max(0, \mu^*), \min(\overline{\mu}, 1)]$*, there is no depart from Colonialism but* F *must make concessions: it must promise to leave* H *with at least* $1 - \tau_{\max}$ *of its gains from trade;*

- *If* $\mu^* > 0$ *and* $\mu \in [0, \mu^*]$*,* F *cannot stave off Revolution with concessions: the model predicts a switch from Colonialism to Independence.*

Given that both $\overline{\mu}$ *and* μ^* *are increasing in* δ*, the probability of concessions under Colonialism and the probability of a switch from Colonialism to Independence are non decreasing in* δ*. Under parametric Assumption 1, the probability of Independence is zero if* $\delta \in [0, \delta^*(\kappa))$*, and positive and strictly increasing in* δ *if* $\delta \in (\delta^*(\kappa), \kappa]$*.*

4 Discussion

A number of features of this preliminary work deserve some discussion. As I mentioned above, the political model is inspired by Acemoglu and Robinson (2000, 2006). Apart from the different economic framework in which it is embedded, my model differs from theirs in one key aspect: the colonizer can always promise to redistribute enough to avoid Revolution, but does not always find it optimal to do it. There are two reasons why Revolution is always avoidable in my framework: on one hand, Revolution does not allow H to appropriate resources which are localized in F, but that F can promise to redistribute if Revolution does not take place (foreign aid). On the other hand part of the value of H's domestic product comes from having peaceful trade relation with F, but F can promise to break this down if Revolution takes place. These two factors imply that even a Revolution that can be staged at no cost can be unattractive.

The problem with revolution being always avoidable is that, in order to make independence possible in equilibrium, one needs to introduce an additional benefit from revolution (B in the model), which needs to be non appropriable by F (or F would be willing to offer just as much to prevent a Revolution). In other words, the mechanism described by the model *per se* is not sufficient to justify decolonization. However as long as one is willing to accept that there are benefit from having a national identity, and that these do not depend on world factor endowments, the model can predict decolonization. In any case, the usefulness of this class of models does not come from taking them literally but rather from understanding the mechanism that they highlight. What my model highlights is how changing trade conditions make decolonization potentially more likely.

The fact that trade gets disrupted after revolution is crucial to the result of the paper. In fact, one contribution of this paper is to formalize in a rather simple and flexible way the idea according to which trade dependence creates political dependence[9]. In the model, H is more likely to be subjogated to F as long as the latter represent the only viable trade opportunity. Were F unable to credibly threaten trade disruption after Revolution, this mechanism would

[9] Notice that the issue of how trade dependence creates political dependence is much wider than it is presented in this model. However, there has been little formal work on this issue.

break down. In other words, trade dependence can create political dependence, but only as long as sanctions are credible. While punishment is not *ex-post* optimal in this model, it could be rationalized by arguing that F has to defend a reputation as a punisher of rebel colonies: this has some empirical support. In fact, it is true that colonies who revolted against their masters were often punished through some sort of (at least temporary) trade sanctions: for example, this was the case of the US in the 30 years after 1776.

5 Conclusions

I have built a simple trade model of colonialism, linking decolonization to the evolution of world's factor endowments. The key feature of colonialism in this model is that it is an instrument through which colonisers can appropriate part of the gains from colonial trade accruing to colonies. As long as the rest of the world is more similar to the colony than to the colonizer in terms of factor endowments (at least for what concerns the main exports of the colony) Revolution is very unlikely. This is because the colonizer can credibly threaten not to trade with the colony anymore, posing a formidable threat to the colony's national income. If the rest of the world is more similar to the colonizer, however, trade sanctions represent a much less formidable deterrent, and private incentives to insurgence go up. This makes decolonization more likely.

The model presented in this paper is still very preliminary, but provides a basic theoretical framework which can be used to usefully think about possible theoretical extensions, and to carry out some anecdotic empirical work. On the side of extending the model, I am mainly interested in modelling the colonial society as divided into an elite and a mass of citizens. As explained in Section 2, this captures well the structure of most colonial societies, except perhaps for British settlers' colonies and a few others. I am interested in understanding how the existence of a colonial elite influenced the pace and modes of decolonization, and how this mapped into post-colonial institutional development. In perspective, this could provide an additional theoretical explanation for the relation between the share of settlers in the population and institutional development (Engerman and Sokoloff, 2000; Acemoglu, Johnson and Robinson, 2001).

On the empirical side, I am working at a number of case studies on British settlers' colonies: for the homogeneity of their society, these seem to resemble most the simple world described in my model. Several such colonies (Canada, Australia, New Zealand) have received early independence by "voluntary" decision of Great Britain. A first-cut analysis seems to confirm that independence came about at a time of large changes in colonial trade patterns, ones that made the colonies less dependent on the British market.

Finally, I am finding that a huge amount of data on colonial finance and trade patterns is available at the British Public Record Office: this hints at the possibility of testing a richer model of trade and decolonization in a rigorous manner, at least for the case of British colonialism.

6 Appendix

Properties of $\delta^*(\kappa)$ - Using 3 and 6, $\delta^*(\kappa)$ is found by solving:

$$\begin{aligned}
\delta^*(\kappa) &= \arg\left\{\frac{\left[\overline{K}\left(1+\frac{\delta}{2}\right)+\overline{K}\left(1+\delta\right)\right]}{2\overline{K}\left(1+\frac{\delta}{2}\right)^{\frac{1}{2}}}=\frac{\left[\overline{K}\left(1+\frac{\delta+\kappa}{2}\right)+\overline{K}\left(1+\delta\right)\right]}{2\overline{K}\left(1+\frac{\delta+\kappa}{2}\right)^{\frac{1}{2}}}\right\} \\
&= \arg\left\{3\kappa\delta^2+\left(4\kappa-\kappa^2\right)\delta-2\kappa^2=0\right\} \\
&= \frac{1}{6}\kappa+\frac{1}{6}\sqrt{16\kappa+\kappa^2+16}-\frac{2}{3}
\end{aligned}$$

It is easy to see that $\frac{\partial\delta^*(\kappa)}{\partial\kappa}>0$; let us now study the properties of $\frac{\delta^*(\kappa)}{\kappa}$:

$$\frac{\delta^*(\kappa)}{\kappa}=\frac{1}{6\kappa}\left(\kappa+\sqrt{\kappa^2+16\kappa+16}-4\right)$$

It is easy to check that $\frac{\delta^*(\kappa)}{\kappa}=\frac{1}{2}$ when $\kappa=0$; further, it is possible to check that $\partial\frac{\delta^*(\kappa)}{\kappa}/\partial\kappa$ is negative $\forall\kappa>0$. ■

Proofs of proposition 1 - In order to keep things simple and meaningful, I am only focusing on equilibria in which countries do not make unilateral trade attempts. For convenience, I am reporting the preferences of countries over alternative trade equilibria. For H and F, if $\delta\in\left[0,\frac{\kappa}{2}\right)$,

$$\begin{aligned}
(F,E) &\prec^H (H,E)\prec^H (H,F,E)\prec^H (H,F) \\
(H,E) &\prec^F (F,E)\prec^F (H,F)\prec^F (H,F,E)
\end{aligned}$$

If instead $\delta\in\left(\frac{\kappa}{2},\kappa\right]$,

$$\begin{aligned}
(F,E) &\prec^H (H,E)\prec^H (H,F)\prec^H (H,F,E) \\
(H,E) &\prec^F (F,E)\prec^F (H,F,E)\prec^F (H,F)
\end{aligned}$$

For country E, if $\delta\in[0,\delta^*(\kappa))$,

$$(H,F,E),(H,E)\prec^E (F,E)$$

if $\delta\in(\delta^*(\kappa),\kappa]$,

$$(H,F,E),(F,E)\prec^E (H,E)$$

Let us first focus on the case of unconstrained colonialism. Given that F sets the trade policy for H, there are only two players in the trade game under Colonialism (F and E). Given that $\tau=1$ when F can reset policy, F will fully internalize the effect that any trade policy on H's indirecty utility. Thus, the objective function of F will be:

$$\Psi = v^H \left[p^H \left(\mathbf{T}|\kappa, \delta\right)\right] + v^F \left[p^F \left(\mathbf{T}|\kappa, \delta\right)\right]$$

To proof that the no equilibrium exists outside of the class (H, F, E), notice that no equilibrium can leave either H or F in autarchy, as F can decide to open up trade between H and F and this would always increase both $v^H \left[p^H \left(\mathbf{T}|\kappa, \delta\right)\right]$ and $v^F \left[p^F \left(\mathbf{T}|\kappa, \delta\right)\right]$ and therefore Ψ. Further, (H, F) is not an equilibrium as opening up to E is always welfare maximising for F. To see this, use 3 to write Ψ as a function of a common price in (H, F):

$$\begin{aligned} \Psi(p) &= \frac{p + \overline{K}}{2p^{\frac{1}{2}}} + \frac{p + \overline{K}(1+\kappa)}{2p^{\frac{1}{2}}} \\ &= p^{\frac{1}{2}} + \overline{K}\left(1 + \frac{\kappa}{2}\right) p^{-\frac{1}{2}} \end{aligned}$$

The first derivative of $\Psi(p)$ is:

$$\frac{\partial \Psi(p)}{\partial p} = \frac{1}{2} p^{-\frac{1}{2}} \left[1 - \frac{\overline{K}\left(1 + \frac{\kappa}{2}\right)}{p}\right]$$

A visual analysis of $\frac{\partial \Psi(p)}{\partial p}$ immediately shows that $\Psi(p)$ achieves a minimum at $p = \overline{K}\left(1 + \frac{\kappa}{2}\right)$. Thus, opening up to E is always profitable.

Within the class (H, F, E), it is easy to see that all countries trading to all countries is an equilibrium. This is because the only way E can change the equilibrium price is by retreaing into autarchy, and no alternative trade outcome is strictly better from F's point of view.

Case of Independence. To proof that no equilibrium must lie in the class (H, F, E), notice that no equilibrium can leave either H or F in autarchy: this is because the two would always agree to trade to each other, since this would make them both better off. But notice also that H and F cannot be trading alone: is this was the case, either F (if $\delta \in \left[0, \frac{\kappa}{2}\right]$) or H (if $\delta \in \left[\frac{\kappa}{2}, \kappa\right]$) would reach a mutual agreement with E to allow it into trade.

Next, I will show that it is always an equilibrium that all countries trade to all countries. The only price-changing deviation available to individual countries is to retire into autarchy, which is never optimal to chose. For the same reason, no three country coalition can deviate without damaging at least one of its members. As for two-country coalition, notice that H and F cannot agree to exclude E, as this would always damage one of the two; further, H would always oppose to exclude F and F to exclude H.

Case of revolution. Given that T_H^F is bound to be set at 0, the fact that I am not considering equilibria in which countries make unilateral trade attempts implies that T_F^H is also bound to be 0. Further, $T_E^H = 1$ and $T_E^F = 1$ are strictly dominant strategies, and therefore bound to be always used in a Nash equilibrium. Thus, the structure of the equilibrium will depend entirely on the trade policy chosen by E; from preferences, we know that this will be $T_H^E = 0$ and $T_F^E = 1$ if $\delta \in [0, \delta^*(\kappa)]$, $T_H^E = 1$ and $T_F^E = 0$ if $\delta \in [\delta^*(\kappa), \kappa]$.■

Proof of Proposition 3 - It is sufficient to realize that F is the residual claimant to Ψ, and invoke the proof of Proposition 1. ■

Properties of μ^* - The crucial requirement is that $\frac{\partial \mu^*}{\partial \delta} > 0$ for $\delta > \delta^*$ In order to prove this, it is sufficient to prove that $\frac{\partial\left[\Pi^H(R,\kappa,\delta)-\Pi^H(C,k,\delta)\right]}{\partial \delta} > 0$:

$$\frac{\partial\left[\Pi^H(R,\kappa,\delta)-\Pi^H(C,k,\delta)\right]}{\partial \delta}=\frac{\partial\left[v^H\left[\overline{K}\left(1+\frac{\delta}{2}\right)\right]-v^H\left[\overline{K}\left(1+\frac{\kappa+\delta}{3}\right)\right]\right]}{\partial \delta}$$

It is possible to show numerically that, while this is negative for low values of δ, it is positive for all $\delta > \delta^*$, and all $\kappa > \frac{1}{4}$. ■

References

[1] Acemoglu, Daron, Simon Johnson and James Robinson (2001). “Colonial Origins of Comparative Development: an Empirical Investigation”, *American Economic Review*, Vol. 91, pp. 1369-1401.

[2] Acemoglu, Daron and James Robinson (2001). "A Theory of Political Transition", *American Economic Review*, Vol. 31, 938-963.

[3] Acemoglu, Daron and James Robinson (2006). *Economic Origins of Dictatorship and Democracy*, Cambridge University Press.

[4] Alam (1994). "Colonialism, Decolonization and Growth Rates: Theory and Empirical Evidence", *Cambridge Journal of Economics*, Vol. 18, pp. 235-257.

[5] Bertocchi, Graziella and Fabio Canova (2002). "Did Colonization Matter for Growth? An Empirical Exploration into the Historical Causes of Africa’s Underdevelopment", *European Economic Review*, Vol. 46, pp. 1851-1871.

[6] Dixit, Avinash and Victor Norman (1980). *Theory of International Trade*, Cambridge University Press.

[7] Engerman, Stanley L. and Kenneth L. Sokoloff (2000). “History Lessons: Institutions, Factor Endowments and Path of Development in the New World”, in *Journal of Economic Perspectives*, Vol. 14, No. 3, pp. 217-232.

[8] Fielding, David and Sebastian Torres (2005). “Cows and Conquistadores: A Comment on the Colonial Origins of Comparative Development”, *University of Otago Economics Discussion Papers*, No. 0504.

[9] Grier, Robin M. (1999). "Colonial legacies and economic growth", *Public Choice*, Vol. 98, pp. 317-335.

[10] Grossman, Herschel I. (1991). “A General Equilibrium Model of Insurrections”, *American Economic Review*, Vol. 81, No. 4, pp. 912-921.

[11] Grossman, Herschel I. and Murat Iyigun (1993). "Population Increase and the End of Colonialism," *Economica*, Vol. 64 (3), pp. 483-493.

[12] Grossman, Herschel I. and Murat F. Iyigun (1995). “Extralegal Appropriation and the Profitability of Colonial Investment”, *Economics and Politics*, Vol. 7, pp. 229-241.

[13] Jack, William and Roger Lagunoff (2006). "Dynamic Enfranchisement", forthcoming in the *Journal of Public Economics*.

[14] La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R.W. Vishny (1999) "The Quality of Government", *Journal of Law, Economics and Organization*, Vol. 15, pp. 222-279.

[15] Padro i Miquel, Gerard (2006). "The Control of Politicians in Divided Societies: the Politics of Fear", *NBER Working Paper Series*, October, No. 12573.

[16] Roemer, John E. (1985). "Rationalizing Revolutionary Ideology", *Econometrica*, Vol. 53, pp. 85-108.