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FOREIGN INFLUENCE AND THE CHINA-AFRICA TRADE IN NATURAL RESOURCES

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Foreign Influence and the China-Africa Trade in Natural Resources

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Abstract

The recent boom in the China-Africa natural resource trade has been accompanied by an upsurge in Chinese development assistance and diplomatic support to African governments. This prompts two questions: first, can we expect the latter to have a causal effect on the former? And second, what are the consequences of this for development? I construct a model of the resource trade that addresses these questions. In the model, two resource-scarce countries compete for buying a natural resource from a resource-rich country. Competition is both at the market level and at the government level, with conditional transfer offers being made to the resource-rich country. If the consequences of trade policy decisions are partly in the future, governments whose tenure in power is uncertain may give a disproportionate weight to transfers. My key result is that, in this environment, preferential trade may be optimal even if all buyers are equal, and equally good at exerting foreign influence. Furthermore, both unaccountable and accountable governments may be willing to concede preferential trade, but with opposite consequences for development. The model delivers a novel set of testable predictions for the pattern of trade in natural resources, and for the relation beween aid and trade.

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1 Introduction

The spectacular growth of the Chinese economy has resulted in a massive increase in the import of natural resources to China over the recent years: a country that just 20 years ago was the largest exporter of oil in South East Asia, is now the second largest importer in the world. Similarly, Chinese companies are increasingly important in the major centres of production of aluminium, copper, nickel and cobaltum.

In Africa, this large increase in Chinese demand is intimately linked with the hyperactivity of the Chinese government in providing development assistance and diplomatic support to resource-rich African governments. In a typical deal, upfront financial assistance (in the form of bilateral aid or loans; mostly paid in infrastracture, but also in cash or through debt relief) is exchanged for long term contracts in which the African governments allocate exclusive rights to Chinese extracting companies, and commit to a minimum level of export for a certain amount of time. At the same time, governments who conclude such agreements are able to obtain a great deal of diplomatic support, as the case of the "rogue" governments of Sudan or Zimbabwe well illustrates.

The consequences of this for African development are not entirely clear. On one hand, the Chinese government seems to have found a particularly successful way to development assistance: by giving infrastructure rather than cash, it seems to be able to to ensure that more of the provents from aid and natural resources are spent on development, rather than fuel the moral hazard of governments or corruption. In a recent paper, Meyersson, Padro and Qian (2009) find that, indeed, those African countries who export more of their natural resources to China display higher rates of investment and growth. On the other hand, there seems to be an element of monopoly in these deals with China (Collier and Venables, 2008) that casts a doubt on whether African resources are being sold at a fair price, and the current boost comes only at a very high cost in terms of future income. This doubt is particularly serious, considered that not everywhere has the expansion of China resulted in low levels of corruption: for example, international agencies have estimated that more than US$ 4bn of oil money have been lost to corruption in Angola in 1999-2004 (Taylor, 2005). Finally, there is a concern that Chinese natural resource diplomacy, which has explicitly adopted the principle of non interference with the domestic affairs of trading partners, may in fact be unravelling some efforts by the international community to improve the human rights record of many resource rich African countries.

In this paper, I address the worry that Chinese aid and diplomatic support may result in a distortion of the pattern of trade in China's favour. I am interested in understanding under what conditions, if any, can foreign influence (in the form of conditional transfer offers) induce a resource-rich country to "sell off" its resources to a particular buyer, in a world where all buyers have, in principle, equal access to this tool. Furthermore, I am interested in understanding the consequences of this for development.

I build a three-country trade model where two resource-scarce countries (M and H) compete for buying a natural resource from a resource-rich country (L). Besides normal market competition between private agents, M and H compete at the government level by using conditional transfer offers to try and distort L's trade policy in their favour. As customary in the trade literature on lobbying, I model this "foreign influence" game as a menu auction, and use Bernheim and Whinston (1986) to restrict my attention to the important class of Truthful Nash Equilibria (TNE). Furthermore, I dispense with any optimal tariff consideration by assuming that trade policy is a simple open-or-closed decision.

I then model the government of L as a self-interested, credit-contrained government who can fix the country's trade policy for some time in the future. This captures a distinctive feature of the trade in natural resources, namely that it requires the development of considerable field-specific expertise by nationally integrated foreign companies: if not easily appropriable, such expertise can underpin the commitment not to renege on trade policy. When fixing trade policy under foreign influence, the incentives of the ruler are fundamentally shaped by the fact that periods of no domestic political competition (where he is "unaccountable" to citizens) alternate to periods where he and a challenger must compete for the citizens' support (and is, therefore, "accountable"). When uncertainty on the future political state is high, foreign offers become appealing: this is because they allow to exchange policy favours whose consequences are in the uncertain future for current transfers.

This model allows me to make two fundamental points. First, when the future political state is uncertain enough, it may be optimal for the ruler to concede "exclusive trade" to one buyer *even if all buyers are equal, and all try to influence him.* The explanation for this surprising result is that exclusive trade commits the country to a worse future terms of trade, therefore allowing the ruler to better serve the (aggregate) interests of foreign donors.

Second, rulers both unaccountable (who spends transfers on corruption) and accountable (who spend transfers on development) may want to conclude such exclusive trade deals, depending only on how uncertain their tenure in power in. Clearly, therefore, the consequences of such deals for development can be expected to be very different in different cases.

I am also able to offer a novel set of testable predictions on the pattern of trade in natural resources, and on the link between aid and this type of trade.

The paper is related to a the literature on foreign influence. Part of this has focused on the politics of foreign influence and on foreign direct investments. Bueno de Mesquita and Smith (2007) model an aid-for-policy exchange between a rich donor and a poor recipient as a function of the political institutions in the two countries. Aidt and Albornoz (2008) extend the democratization model by Acemoglu and Robinson (2005) to account for the fact that foreign direct investments are treated differently under different political regimes, and foreign governments sometimes intervene to twist regime change in their favour. My model departs from this previous work in that it explicitly models the interaction between foreign influence and trade. A second strand of literature has focused specifically on trade policy. In the Appendix to their paper on the politics of free trade agreements, Grossman and Helpman (1995) study whether the possibility of cross-border campaign contributions increases or decreases the probability that an agreement is reached. Endoh (2005) studies equilibrium tariffs in two large countries when lobbies can make cross border campaign contribution. Finally, Antras and Padro-i-Miquel (2008) build a two-country electoral model where incumbent parties can influence electoral results abroad, and apply it to the study of optimal trade policy. My paper share elements with each of these papers, however it fundamentally departs from them in that it considers a three country setting.

Finally, the paper is also related to the literature on the political economy of the resource curse (see, for example, Caselli, 2006) but departs from that literature significantly in that it model the value of natural resources as endogenous in the presence of foreign influence.

The paper is organized as follows: Sections 2 and 3 present, respectively, the economic model and the political model. Section 4 puts them together and investigate the equilibrium. Section 5 performs some comparative statics, and present a set of testable predictions. Section 6 concludes.

2 Economic model

2.1 Environment

There are three countries, called L, M and H. Everywhere, citizens' utility is linear in the consumption of a final good, z. This is produced out of two tradeable factors, a natural resource (x) and an intermediate good (y), using technology:

$$z = x^{\frac{1}{2}} y^{\frac{1}{2}} \tag{1}$$

All countries are endowed with an equal amount of x, which I normalize to be 1. Endowments of y, on the contrary, vary from country to country, Withouth loss of generality, I assume that $y^L \leq y^M \leq y^H$.[1]. Thus, L is resource-rich, H resource-poor, and M somewhere between the two.

I use y as the numeraire and denote the price of x by p. It is easy to show that when factors are freely traded within a set S of countries, the equilibrium price in S is:

$$p_S = \frac{\sum_{J \in S} y^J}{n_S} \tag{2}$$

Where $n_S \in \{1, 2, 3\}$ is the number of countries belonging to S. Notice that the autarchy price of country J ($p_{\{J\}}$) is simply y^J.

Suppose country J belongs to a trade set where the price p realizes. Its net imports of the two factors are given by:

$$m_x^J(p) = \frac{y^J - p}{2p} \tag{3}$$

$$m_y^J(p) = \frac{p - y^J}{2p} \tag{4}$$

while its total production can be no greater than:

[1] The assumption that all countries have an equal endowment of x is, instead, implying a loss of generality.

$$z^J(p) = \frac{p + y^J}{2(p)^{\frac{1}{2}}} \tag{5}$$

Not surprisingly, country J is a net importer of the natural resource when p is lower than y^J (its autarchy price), a net exporter when it is higher. Also, z^J achieves a global minimum at $\sqrt{y^J}$ when $p = y^J$ (J is in autarchy) and is monotonically decreasing (increasing) in p when $p < y^J$ ($p > y^J$): a net importer (exporter) of the natural resource benefits from a lower (higher) price paid for it [2]. For future use, I define the maximum production affordable to country J in set S as:

$$z^J_S \equiv \frac{p_S + y^J}{2(p_S)^{\frac{1}{2}}}$$

With three countries, there are four possible sets within which *international* trade takes place: three sets containing two countries, and one containing three. Because no more than one of these can realize simultaneously, they correspond to an equal number of "trade scenarios". Prices in each of these are quickly worked out using 2:

	p^L	p^M	p^H
$\{L, M\}$	$\frac{y^L+y^M}{2}$	$\frac{y^L+y^M}{2}$	y^H
$\{L, H\}$	$\frac{y^L+y^H}{2}$	y^M	$\frac{y^L+y^H}{2}$
$\{M, H\}$	y^L	$\frac{y^M+y^H}{2}$	$\frac{y^M+y^H}{2}$
$\{L, M, H\}$	$\frac{y^L+y^M+y^H}{3}$	$\frac{y^L+y^M+y^H}{3}$	$\frac{y^L+y^M+y^H}{3}$

Having assumed that $y^L \leq y^M \leq y^H$, the prices reported above can be ranked in *value*[3]; using this ranking and the monotonicity of $z^J(p)$, they can

[2] The properties of z^J_S are derived in the Appendix.

[3] In particular, if $y^M > \frac{y^L+y^H}{2}$:

$$y^L < \frac{y^L + y^M}{2} < \frac{y^L + y^H}{2} < \frac{y^L + y^M + y^H}{3} < y^M < \frac{y^M + y^H}{2} < y^H$$

also be easily ranked in the *preferences* of each country. Such latter ranking is conveniently described by:

Lemma 1 *For any y such that $y^M \neq \frac{y^L+y^H}{2}$, there is exactly one country whose first best is to trade with both other countries: this country is H when $y^M < \frac{y^L+y^H}{2}$, L when $y^M > \frac{y^L+y^H}{2}$. As for the other two countries, their first best is to trade with one country only, which is L when $y^M > \frac{y^L+y^H}{2}$.*

Lemma 1 distinguishes two alternative cases. When $y^M > \frac{y^L+y^H}{2}$, there are two net importers of the natural resource (M and H) which compete with each other to trade with a net exporter (L). In this case, both M and H benefit from being able to trade with L alone (as they obtain a lower price for their import), while L benefits most from trading with both (as it obtains a higher price for its export). On the contrary, when $y^M < \frac{y^L+y^H}{2}$ there is one net importer of the natural resource (H) and two net exporters (L and M), and a somewhat similar logic applies: however in this case it is not always true that M's first best is to trade with H only[4]. In the rest of the paper, I will concentrate on the case where $y^M > \frac{y^L+y^H}{2}$, and M and H compete for buying the natural resource from L.

2.2 Policy

There are two policy tools: trade policy and international transfers. Trade policy is a simple "open or closed" decision that each country makes with respect to trade with each of the other two countries. These decisions are described by a 3×3 matrix $\mathbf{\Phi}$ whose element ϕ_I^J is equal to 1 if country J is open to trade with country I, 0 otherwise. For trade to occur between I and J, it must be $\phi_I^J = \phi_J^I = 1$. Clearly, it is possible to define a mapping

If, on the contrary, $y^M > \frac{y^L+y^H}{2}$:

$$y^L < \frac{y^L + y^M}{2} < y^M < \frac{y^L + y^M + y^H}{3} < \frac{y^L + y^H}{2} < \frac{y^M + y^H}{2} < y^H$$

[4]It is possible to derive a thresholds $\widetilde{y}^M \in \left(0, \frac{y^L+y^H}{2}\right)$ such that M's first best is to trade with L only if $y^M \in \left(\widetilde{y}^M, \frac{y^L+y^H}{2}\right)$, with H only if $y^M \in \left(0, \widetilde{y}^M\right)$. I omit this derivations here, as I concentrate on the case $y^M > \frac{y^L+y^H}{2}$.

$p^J(\mathbf{\Phi})$ from trade policy into the equilibrium price in each country. Before moving on, I make the following assumption:

Assumption 1: *trade policy is set one period in advance.*

International transfers are lump sum payments of the final good. They are represented by a 3×3 matrix $\mathbf{T}$, whose element T_I^J denotes the *gross* transfer from the government of country J to the government of country I.

3 Political Model

There are two periods, and trade policy is set in period 1 for period 2[5]. At the beginning of period 1, countries also announce a set of transfer schedules conditional on trade policy, which are then paid at the end of period 1.

Countries M and H (the net importers of the natural resource) are ruled by a utilitarian government in both periods. Country L (the net exporter of the natural resource), on the contrary, is ruled by a self-interested ruler who maximises the amount of national wealth that he is able to appropriate for his own consumption (A_t), and who is subject to re-appointment according the the rules described below.

Before continuing, I make the following:

Assumption 2: *L cannot borrow on international financial markets.*

This assumption restrict the ruler of L to not using financial markets to transfers consumption from one period to the other. Thus, his budget constraints in the two periods are:

$$A_1 \leq \sum_{J \neq L} \left[T_L^J(\mathbf{\Phi}) - T_J^L(\mathbf{\Phi})\right]$$
$$A_2 \leq z^L \left[p^L(\mathbf{\Phi})\right]$$

That is, the ruler can appropriate up to the net value of transfers in period

[5]They key assumption here is that current trade policy decision influence future production: all results would go through if trade policy affected production already in period 1.

1, and up to the entire national production in period 2[6].

In both period, the citizens of L own an equal share of total production, and the ruler's budget is distributed homogeneously among them. Thus, assuming no intertemporal discounting to simplify the notation, the citizens have intertemporal utility:

$$U = \sum_{J \neq L} \left[T_L^J (\mathbf{\Phi}) - T_J^L (\mathbf{\Phi}) \right] - A_1 + z^L \left[p^L (\mathbf{\Phi}) \right] - A_2^J$$

The political system of L works as follows. The model starts with an incumbent in power. At the beginning of both periods, Nature decides whether the political state is "good" ($S_t = 1$) or bad ($S_t = 0$). The probability that $S_t = 1$ is q in both periods. In period 1, if the state is bad the incumbent remains in power with probability 1. If the state is good, a challenger emerges who proposes a policy vector $\left[A_1, \boldsymbol{\phi}^L, \mathbf{T}^L (\cdot) \right]$, alternative to that chosen by the ruler. Then, citizens compare the policy of the ruler to the proposal of the challenger, and bring the challenger in power if his proposal makes them strictly better off. Finally, the ruler's policy or the challenger's proposal are implemented. Period 2 opens with the ruler appointed in 1 as the incumbent. Again, if the state is bad, the incumbent remains in power uncontested. If the state is good, a challenger emerges who proposes a policy A_2, alternative to that of the ruler; then citizens decides whether to replace the ruler, and the relevant policy is implemented. I assume that when indifferent between staying in power and being replaced, the incumbent ruler chooses to stay in power[7].

This simple political system switches from an extreme in which the citizens have no control over government, to an extreme where they have full control. To see the latter point, notice that the ruler will always want to do at least as well as the challenger proposes when $S_t = 1$, and because the ultimate choice rests with the citizens, the two will need to converge to the citizens' preferred policy in a Nash equilibrium. Clearly, this does not describe reality well: among many other things, challengers do not always

[6] To recognise that only a share of national production can be appropriated by the ruler would not compromise the results of the model.

[7] This could be easily rationalized by imaging that there is an exogenous benefit from holding office.

need to appeal to the general population to be successful. Still, I choose to stick to this simple model in that it allows to convey a fundamental point in a very simple way.

Before moving on, we simplify the political model by getting rid of appropriation: because this has an independent effect on the payoffs, it can be optimized and incorporated in the objective functions. Consider first the case where $S_t = 0$. Clearly, beause the goal of the ruler is to maximise his own consumption, appropriation will be set to a maximum in this case. When $S_t = 1$, on the contrary, political competition will induces the two candidates to commit to the citizens' preferred policy by leading extraction down to zero. Thus:

$$
\begin{aligned}
&A_1 (S_1 = 0) = \sum_{J \neq L} \left[T_L^J (\mathbf{\Phi}) - T_J^L (\mathbf{\Phi}) \right] \\
&A_2 (S_2 = 0) = z^L \left[p^L (\mathbf{\Phi}) \right] \\
&A_1 (S_1 = 1) = 0 \\
&A_2 (S_2 = 1) = 0
\end{aligned}
$$

The objective of the ruler when choosing $\boldsymbol{\phi}^L$ and $\mathbf{T}^L (\cdot)$ in period 1 can now be derived in a convenient form. When $S_1 = 0$, the ruler can appropriate any net transfer received by his country. At the same time, he knows that the future value of production will be his only with probability $1 - q$, because with probability q he will be disciplined by political competition to extract nothing. Similarly, when $S_1 = 1$ citizens can fully appropriate net transfers, but know that they will only own future production with probability q; but because of political competition, their perspective will be adopted by the government when choosing policy. The objective function of the ruler of L when choosing $\boldsymbol{\phi}^L$ and $\mathbf{T}^L (\cdot)$ can then be concisely written as:

$$
\begin{aligned}
G^L \left[\boldsymbol{\phi}^L, \mathbf{T}^L (\cdot) \right] \quad = \quad & \sum_{J \neq L} \left[T_L^J \left(\boldsymbol{\phi}^L \mid \mathbf{\Phi}^{-L} \right) - T_J^L \left(\boldsymbol{\phi}^L \mid \mathbf{\Phi}^{-L} \right) \right] + \\
& + \alpha z^L \left[p^L \left(\boldsymbol{\phi}^L \mid \mathbf{\Phi}^{-L} \right) \right]
\end{aligned} \tag{6}
$$

where:

$$\alpha = \begin{cases} q & \text{if } S_1 = 1 \\ 1-q & \text{if } S_1 = 0 \end{cases}$$

As for the objective function of the utilitarian governments of M and H, these are:

$$G^I\left[\boldsymbol{\phi}^I, \mathbf{T}^I(\cdot)\right] = \sum_{J \neq I}\left[T_L^I\left(\boldsymbol{\phi}^I \mid \boldsymbol{\Phi}^{-I}\right) - T_J^I\left(\boldsymbol{\phi}^I \mid \boldsymbol{\Phi}^{-I}\right)\right] + \\ + z^I\left[p^I\left(\boldsymbol{\phi}^I \mid \boldsymbol{\Phi}^{-I}\right)\right] \tag{7}$$

with $I = M, H$.

The main point of the political model is easily grasped by pausing on equation 6. When (at least part of) the consequences of trade policy are in the future, a ruler whose tenure in power is uncertain may attach a disproportionally high weight to current transfers. This rational myopia, however, can have two opposite origins. On one hand, a fully unaccountable government ($S_1 = 0$) can privilege transfers because these are appropriable for sure, while appropriation of future production is uncertain. On the other hand, even a fully accountable government ($S_1 = 1$) can attach a disproportionate weight to current transfers: this is because future production will only belong to the citizens with probability q, while current transfers can be fully redistribute to them with certainty.

Thus, the model allows to distinguish between three different types of resource-rich members by appropriately choosing the value of S_1 and q. Members of the first group have either a stable and accountable polity where political competition takes place in every period (thus, $S_1 = 1$ and $q = 1$; e.g. Norway), or a stable and unaccountable polity where political competition never takes place ($S_1 = 0$ and $q = 0$, e.g. Saudi Arabia). Countries in this group are similar in that they both attach the same weight to current transfers and to any future effect of trade policy decisions. In a second group are countries whose government is currently little or no accountable to the citizens, but face a positive probability of facing more political competition (or be overthrown) in the future ($S = 0$, $q \in (0, 1)$; e.g. Angola). Countries in the third group have a currently accountable government, but are characterised by a widespread belief within the population that the future value of production will, with some positive probability, be stolen to corruption ($S = 1$, $q \in (0, 1)$). Countries in the second and third groups are both inclined to attach a higher weight to current transfers than to the future value of production, but the benefit of any transfer received are used very differently in the two cases. I will return to this last point towards the end of the paper.

Having proposed a set of alternative motivations why the government of L may care more or less about foreign transfers, I move to studying, in the next section, whether any positive transfer can be obtained in equilibrium, and exactly in exchange for what.

4 Equilibrium

I have set up a model of the natural resource trade where countries can use international transfers to try and influence the trade policy decisions of their counterparts. I have then proposed a political model that introduces an significant asymmetry between countries: while the two resource-scarce countries are ruled by a utilitarian government, I allow for the possibility that the resource-rich country's ruler care more or less about international transfers, relative to the value of domestic production. I am just about to simplify the model further by introducing a second asymmetry: namely, I will restrict foreign influence to be a tool of resource-scarce country, and usable only to influence the behaviour of the resource-rich country. Before moving on, however, I briefly consider the equilibrium of the trade policy game without foreign influence: this not only provides a benchmark for the equilibrium with foreign influence, but provides also a theoretical foundation for simplifying the game as suggested.

4.1 No foreign influence

If countries are not allowed to make international transfers, the timing of the game is as follows:

- 1.a Nature chooses the political state in L (S_1);
- 1.b Trade policy ($\mathbf{\Phi}$) is set simultaneously in all countries; if $S_1 = 1$, a challenger emerges in L with an alternative proposal for trade policy;
- 1.c If $S_1 = 1$ and the challenger's proposal makes the citizens of L strictly better off, the incumbent is replaced and the challenger's proposal is adopted;

2.a Trade policy is implemented and the z^J realize in all countries.

2.b Nature chooses S_2;

2.c The level of appropriation in L (A_2) is set. If $S_2 = 1$, a challenger emerges with an alternative proposal for the level of appropriation;

2.d If $S_2 = 1$ and the challenger's proposal makes the citizens of L strictly better off, the incumbent is replaced and the challenger's proposal is implemented. Otherwise, the incumbent policy is implemented.

Notice that, because there are no international transfers, A_1 is bound to be zero: thus, I have simplified the timing of the game by omitting the decision on appropriation in period 1.

As explained in the previous section, the value of period 2 production is entirely owned by the ruler if $S_2 = 0$, entirely owned by the citizens if $S_2 = 1$. This influences the decisions made in period 1: if $S_1 = 0$, the ruler knows that it will only reap any benefit on future production with probability $1 - q$; if $S_1 = 1$, the citizens (in whose interest policy is set) know that they will only reap the benefit with probability q. A shorter version of 6 describes the objective of the government of L when there are no transfers. I present this alongside the objectives of the (utilitarian) governments of M and H:

$$G^L\left(\boldsymbol{\phi}^L\right) = \alpha z^L\left[p^L\left(\boldsymbol{\phi}^L \mid \boldsymbol{\Phi}^{-L}\right)\right]$$

$$G^M\left(\boldsymbol{\phi}^M\right) = z^M\left[p^M\left(\boldsymbol{\phi}^M \mid \boldsymbol{\Phi}^{-M}\right)\right]$$

$$G^H\left(\boldsymbol{\phi}^H\right) = z^H\left[p^H\left(\boldsymbol{\phi}^H \mid \boldsymbol{\Phi}^{-H}\right)\right]$$

with $\alpha \in [0, 1]$.

I look at the coalition proof Nash equilibrium of the game in $1.b$. In any such equilibrium, each player must be at a best rissponse given the strategies of the other players, and it must be impossible for a coalition of players to obtain a within-coalition Pareto improvement by a simultaneous change of strategy[8]. It is shown in the Appendix that:

[8] This refinement is needed in this context to eliminate uninteresting equilibria that are purely due to the "on/off" nature of trade policy. For example, it is a Nash equilibrium that all countries are closed to any exchange, as trade requires not only willingness to trade on one side but a coordinated willingness on both sides. For the theory of subgame perfect Nash equilibria, please refer to Bernheim, Peleg and Whinston (1987).

Lemma 2 *With no foreign influence, for all y and α L trades directly with both M and H in any coalition-proof Nash equilibrium, and $p^J = p_{LMH}$ $\forall J$.*

Lemma 2 contains two results. The first is that that, independently on the distribution of endowments and on political conditions in L, the world must be fully trade-integrated in any coalition-proof Nash equilibrium: all countries will face the same price for the natural resource. The second result is that L (the resource-rich country) must act as a "hub" for international trade in any coalition-proof Nash equilibrium: while trade between M and H (the resource-scarce countries) may or may not take place, trade between L and M and L and H *must* take place. Intuitively, this makes sense: if L exported the natural resource to one country only, that country would have an incentive to keep demand low by not trading with the third country; but this cannot be optimal for L[9].

The asymmetry pointed out by Lemma 2 is useful to simplify the game with transfers: because L is at its first best before any transfer, and because of its role as a hub, I will assume that only M and H make transfer offers, and only to L. Thus, Lemma 2 provides a theoretical underpinning for configuring the foreign influence game in a rather intuitive way.

4.2 Foreign influence

In the game with transfers, the government of L (the resource-rich country) receives transfer offers from the governments of M and H (the resource-scarce countries) that are conditional on its choice of trade policy. In this foreign influence game, M and H have the goal of inducing L to not selling the natural resource to the other, therefore obtaining it at a better price for themselves. The question of interest is under what conditions, if any, can foreign influence induce L to distort the pattern of trade in favour of one counterpart, and what are the welfare consequences of this.

The events of period 2 are exactly the same as in the previous subsection. In period 1, instead:

1.a Nature chooses the political state in L (S_1);

[9] There is a richer structure of the game in which the condition of an equilibrium becomes that L is just *willing to* trade with both M and H. The insight we obtain from Lemma 2 would however be exactly the same.

1.b M and H make transfer offers $T_L^M\left(\boldsymbol{\phi}^L\right)$ and $T_L^H\left(\boldsymbol{\phi}^L\right)$;

1.c The government of L sets $\boldsymbol{\phi}^L$ and A; if $S_1 = 1$, a challenger emerges with an alternative policy proposal;

1.d If $S_1 = 1$ and the challenger's proposal makes the citizens of L strictly better off, the incumbent is replaced and the challenger's proposal is adopted;

1.e $\boldsymbol{\phi}^M, \boldsymbol{\phi}^H$ are set and T_L^M, T_L^H are paid; appropriation is implemented.

We begin to search for an equilibrium by considering the choice of trade policy by M and H in period 1.e. Because these two countries' first best is to trade with L alone, their optimal trade policy must be such that they are not trading with each other when L has opened up to only one of them, and that they are trading with L directly when this has opened up to both. Furthermore, they must be trading with each other when L remains closed. Using this, we can define a mapping $\mathbf{z}\left(\boldsymbol{\phi}^L\right)$ from L's trade policy and production in period 2:

$$\begin{array}{ccccc} \boldsymbol{\phi}^L & & z^L\left(\boldsymbol{\phi}^L\right) & z^M\left(\boldsymbol{\phi}^L\right) & z^H\left(\boldsymbol{\phi}^L\right) \\ \\ 1 & 0 & 0 & z^L_{\{L\}} & z^M_{\{M,H\}} & z^H_{\{M,H\}} \\ 1 & 1 & 0 & z^L_{\{L,M\}} & z^M_{\{L,M\}} & z^H_{\{H\}} \\ 1 & 0 & 1 & z^L_{\{L,H\}} & z^M_{\{M\}} & z^H_{\{L,H\}} \\ 1 & 1 & 1 & z^L_{\{L,M,H\}} & z^M_{\{L,M,H\}} & z^H_{\{L,M,H\}} \end{array} \tag{8}$$

where the second and third lines refer to the case in which L chooses to trade with M only or H only.

Next, because of its independent effect on the payoff appropriation can be got rid off through optimization (see Section 3). After doing this, production in period 2 is entirely owned by the ruler if $S_2 = 0$, entirely owned by the citizens if $S_2 = 1$. Similarly, transfers in period 1 are owned by the ruler if $S_1 = 0$, by the citizens if $S_1 = 1$.

The game played in period 1.b and 1.c (the foreign influence game) can now be seen as a menu auction where M and H bid over the trade policy "menu" chosen by L (the auctioneer), and final payoffs are calculated using 6 and 7 together with 8. In any Nash equilibrium of this auction, L observes $T_L^M\left(\boldsymbol{\phi}^L\right)$ and $T_L^H\left(\boldsymbol{\phi}^L\right)$ and sets trade policy policy at:

$$\widehat{\boldsymbol{\phi}}^L = \arg\max_{\boldsymbol{\phi}^L}\left[T_L^M\left(\boldsymbol{\phi}^L\right) + T_L^H\left(\boldsymbol{\phi}^L\right) + \alpha z^L\left(\boldsymbol{\phi}^L\right)\right]$$

Anticipating this, M and H make offers:

$$\begin{aligned}
\widehat{T}_L^M(\cdot) &= \arg\max_{T_L^M(\cdot)}\left[-T_L^M\left(\widehat{\boldsymbol{\phi}}^L\right) + z^M\left(\widehat{\boldsymbol{\phi}}^L\right)\right] \\
\widehat{T}_L^H(\cdot) &= \arg\max_{T_L^H(\cdot)}\left[-T_L^H\left(\widehat{\boldsymbol{\phi}}^L\right) + z^H\left(\widehat{\boldsymbol{\phi}}^L\right)\right]
\end{aligned}$$

I use the concept of "Truthful Nash Equilibria" introduced by Bernheim and Winston (1986) to refine the set of equilibrium described above in a appealing and convenient way.

4.2.1 Truthful Nash Equilibria

Suppose L chooses policy $\widehat{\boldsymbol{\phi}}^L$ in equilibrium. Then, the equilibrium is said to be truthful if the bids by M and H are such that, $\forall \boldsymbol{\phi}^L$:

$$\begin{aligned}
&z^J\left(\boldsymbol{\phi}^L\right) - T_L^J\left(\boldsymbol{\phi}^L\right) = z^J\left(\widehat{\boldsymbol{\phi}}^L\right) - T_L^J\left(\widehat{\boldsymbol{\phi}}^L\right) \quad \text{or} \\
&z^J\left(\boldsymbol{\phi}^L\right) - T_L^J\left(\boldsymbol{\phi}^L\right) < z^J\left(\widehat{\boldsymbol{\phi}}^L\right) - T_L^J\left(\widehat{\boldsymbol{\phi}}^L\right) \quad \text{and } T_L^J\left(\boldsymbol{\phi}^L\right) = 0
\end{aligned}$$

For $J = M, H$. In words, the equilibrium is truthful if and only if the bids reflect the bidders' true relative evaluation of the various outcomes of the auction, up to a constant and subject to a non-negativity constraint.

Bernheim and Whinston (1986) have shown that truthful Nash equilibria are an attractive refinement for two reasons. On one hand, they are essentially[10] the only coalition-proof Nash equilibria of the game. On the other,

[10] By this, it is meant that the only SPNE that are not truthful differ from truthful Nash equilibria in an irrelevant way off the equilibrium path (BW, footnote 12).

they can be characterize using a relatively simple procedure: first, in all such equilibria the auctioneer chooses policy so as to maximise the joint welfare of all players (the welfare of the bidders being weighted by the relative importance that the auctioneer attaches to transfers):

$$\widehat{\boldsymbol{\phi}}^L = \arg\max \left[z^M \left(\boldsymbol{\phi}^L \right) + z^H \left(\boldsymbol{\phi}^L \right) + \alpha z^L \left(\boldsymbol{\phi}^L \right) \right]$$

Second, equilibrium transfers lie in a easily identifiable set, which in our case is exactly identifiable as[11]:

$$T_L^M \left(\widehat{\boldsymbol{\phi}}^L \right) = \arg\max_{\boldsymbol{\phi}^L} \left[\alpha z^L \left(\boldsymbol{\phi}^L \right) + z^M \left(\boldsymbol{\phi}^L \right) \right] - \alpha z^L \left(\widehat{\boldsymbol{\phi}}^L \right) - z^M \left(\widehat{\boldsymbol{\phi}}^L \right) \quad (9)$$

$$T_L^H \left(\widehat{\boldsymbol{\phi}}^L \right) = \arg\max_{\boldsymbol{\phi}^L} \left[\alpha z^L \left(\boldsymbol{\phi}^L \right) + z^H \left(\boldsymbol{\phi}^L \right) \right] - \alpha z^L \left(\widehat{\boldsymbol{\phi}}^L \right) - z^H \left(\widehat{\boldsymbol{\phi}}^L \right) \quad (10)$$

In words, country J must pay a transfer in equilibrium that is equal to the increase in joint welfare of the other two countries if $\boldsymbol{\phi}^L$ was to be chosen without taking J's welfare into account.

Having described how to find a truthful Nash equilibrium of the foreign influence game, I now move to fully characterize such equilibrium.

4.2.2 Equilibrium trade policy

The main result of the paper is stated in the following proposition:

Proposition 1 *With foreign influence, $\exists \overline{\alpha} \in (0, 1)$ such that, in any truthful Nash equilibrium:*

- *If $y^M \in \left(\frac{y^L + y^H}{2}, y^H \right)$, L trades with both M and H if $\alpha > \overline{\alpha}$, trades with H only (and M remains in autarchy) if $\alpha < \overline{\alpha}$.*

[11] Clearly, the complete bid function can also be derived, using the definition of truthul Nash equilibrium provided above. The fact that equilibrium transfers are uniquely defined for this auction is shown in the proofs to Propositions 1 and 2.

- *If $y^M = y^H$, L trades with both M and H if $\alpha > \overline{\alpha}$, trades with only one of them (and the other remains in autarchy) if $\alpha < \overline{\alpha}$.*

Proposition 1 states that, when trade policy is chosen under foreign influence, L may decide to trade only with the country that has the highest demand for natural resources. This happens when the government of L is myopic, and therefore attaches a higher weight to current tranfers than to the future consequences of trade. This exclusive trade may realize even when M and H are identical: in this case, whether L trades only with M or only with H when $\alpha < \overline{\alpha}$ is indeterminate.

This result is somewhat surprising. Because both M and H are active in the foreign influence game, L takes the welfare of both into account when choosing policy (together with his own, weighted for its importance relative to transfers). Consider the extreme case where L only cares about transfers ($\alpha = 0$), and trade policy is chosen so as to maximise the joint welfare of M and H only. Allocative efficiency would require that both countries are granted access to the natural resource. Yet in this case Proposition 1 implies that the joint welfare of M and H is maximum when L trades with H only ($\overline{\alpha} > 0$). To understand why, notice that the price of the natural resource is higher when both M and H trade: in other words, L enjoys better terms of trade in this case. Thus, there are two effects of a switch from free trade to exclusive trade. On one hand, allocative efficiency is lost, and this decreases the joint welfare of M and H. On the other hand, the worsening of L's terms of trade imply that the imports of the natural resource are cheaper, and this increases the joint welfare of M and H. With these functional forms, the second effect always dominate the first, and exclusive trade is optimal in equilibrium whenever the weight attached to L's terms of trade (α) is low enough.

4.2.3 Equilibrium transfers

By looking at 9 and 10, it is clear that the equilibrium transfers will depend on whether $\alpha > \overline{\alpha}$ or $\alpha < \overline{\alpha}$. The following proposition clarifies exactly how much transfers can L obtain in equilibrium[12]:

[12] To simplify the exposition, I am assuming that L always chooses H as an exclusive partner - which does not need to be the case when $y^M = y^H$.

Proposition 2 $\exists\alpha^M, \alpha^H \in (0,1)$ *such that any Truthful Nash Equilibrium falls in one of the following two cases:*

- $1 > \alpha^M > \alpha^H > \overline{\alpha} > 0$, *and equilibrium transfers are:*

	T_L^M	T_L^H
$\alpha > \alpha^M$	0	0
$\alpha^M > \alpha > \alpha^H$	$Z_{\{L,H\}}^{\{L,H\}} - Z_{\{L,M,H\}}^{\{L,H\}}$	0
$\alpha^H > \alpha > \overline{\alpha}$	$Z_{\{L,H\}}^{\{L,H\}} - Z_{\{L,M,H\}}^{\{L,H\}}$	$Z_{\{L,M\}}^{\{L,M\}} - Z_{\{L,M,H\}}^{\{L,M\}}$
$\overline{\alpha} > \alpha$	0	$Z_{\{L,M\}}^{\{L,M\}} - Z_{\{L,H\}}^{\{L,M\}}$

- $1 > \alpha^M > \overline{\alpha} > \alpha^H > 0$, *and equilibrium transfers are:*

	T_L^M	T_L^H
$\alpha > \alpha^M$	0	0
$\alpha^M > \alpha > \overline{\alpha}$	$Z_{\{L,H\}}^{\{L,H\}} - Z_{\{L,M,H\}}^{\{L,H\}}$	0
$\overline{\alpha} > \alpha > \alpha^H$	0	$Z_{\{L,M,H\}}^{\{L,M\}} - Z_{\{L,H\}}^{\{L,M\}}$
$\overline{\alpha} > \alpha$	0	$Z_{\{L,M\}}^{\{L,M\}} - Z_{\{L,H\}}^{\{L,M\}}$

where $Z_S^F \equiv \sum_{J\in F} [I(J \neq L) + \alpha I(J = L)]\, z_S^J$ *and* $F \subseteq S$.

Proposition 2 states that there are two additional thresholds for α that are relevant to determine the equilibrium transfers. This has an intuitive explanation. We know from 9 and 10 that the transfer paid by M (H) must be equal to the increase in joint welfare of H (M) and L (the latter weighted by α) when this is maximised without taking M (H) into account. Consider the joint welfare of H (M) and L. Because H (M) is at his first best when trading with L alone, there must be a threshold for α below which their joint welfare is maximum under exclusive trade. The threshold α^M (α^H) identifies just that. As it turns out, it is always $\alpha^M > \alpha^H, \overline{\alpha}$, while we may have $\alpha^H > \overline{\alpha}$ or $\alpha^H < \overline{\alpha}$.

Thus, Proposition 2 identifies three relevant ranges of α. First, for $\alpha > \alpha^M$ no transfers are paid in equilibrium. This is because there is no joint gain that either M and L or H and L can realize by switching to exclusive trade, since L cares substantially about future production. Anticipating this, M and H choose to pay no transfer in equilibrium, and free trade realizes. Next , if $\alpha^M > \alpha > \overline{\alpha}$ the importance attached by L to future production is low enough to make an exclusive trade deal with H attractive (with M as well, if $\alpha^H > \overline{\alpha}$ and $\alpha^M > \alpha^H > \alpha > \overline{\alpha}$), unless M (H) makes a counteroffer. For this intermediate range of α the counteroffer is always enough to induce L not to grant exclusive trade. Thus, M (H) must pay positive transfers in equilibrium, and free trade remains in place. Finally, if $\overline{\alpha} > \alpha$ cares so little about future production that it chooses to grant H exclusive trade even in the presence of a counteroffer by M. Thus, M ends up paying nothing in this case (and remains in autarchy), while H compensates L for his lower welfare under exclusive trade, plus any transfer he would have received from M under free trade (or under exclusive trade with M, if $\overline{\alpha} > \alpha^H$ and $\alpha^H > \alpha > \overline{\alpha}$).

5 Discussion

The value of the thresholds α^M, α^H and $\overline{\alpha}$ is a function of the the distribution of endowments ($\mathbf{y}$). I therefore begin this section by studying the comparative statics in detail.

5.1 Comparative statics and testable predictions (to be completed)

To facilitate the exposition, I introduce some further restrictions on the value of the endowments (remember we have already assumed that $x^J = 1\ \forall J$). Specifically, I fix $y^L = 1$ and $y^M + y^H = 3.5$, and consider how the patterns of trade and transfers change as y^H ranges between 1.75 and 2. Notice two things: first, because $y^L + y^M + y^H$ is constant, so is the volume of trade and the value of the natural resource when all countries trade. Second, as y^H ranges betwen 1.75 and 2, y^M ranges from 1.75 to 1.5; thus, we are ranging from the case in which M and H are equally important resource importing countries, to the case in which M is self-sufficient in natural resources (if L and H trade).

I begin by studying the value of the three thresholds. Because y^H is the only parameter that is allowed to change, the three thresholds are functions of y^H only. The functions $\overline{\alpha}\left(y^H\right)$, $\alpha^M\left(y^H\right)$ and $\alpha^H\left(y^H\right)$ are represented in Figure 1.

As expected, all thresholds take values between 0 and 1; furthermore, $\alpha^M(\cdot) \geq \alpha^H(\cdot), \overline{\alpha}(\cdot)$, while $\alpha^H(\cdot)$ can be both above and below $\overline{\alpha}(\cdot)$. Notice that $\overline{\alpha}(1.75)$ is strictly positive: this, as suggested above, implies that foreign influence can induce a very myopic government to distort the pattern of trade and receive aid from one country only even if the competitors for the natural resource are identical, and identically active in foreign influence. Notice also that $\alpha^M(1.75)$, $\alpha^H(1.75)$ are equal, and greater than y^H: this implies that there is a intermediate range of values for myopia for which the government of L continues to trade with both other countries, but receives aid from both in that it can credibly threat each of them to switch to exclusive trade with the other. While $\overline{\alpha}(1.75) > 0$ may or may not true depending on functional forms (that is, depending on whether the "terms of trade effect" dominates the "misallocation effect"), $\alpha^M(\cdot) = \alpha^H(\cdot) > \overline{\alpha}(1.75)$ is a general result.

As y^H increases, $\overline{\alpha}(\cdot)$ increases. This implies that the range of α for which foreign influence has a distortive effect on the pattern of trade becomes larger as demand for natural resources is more concentrated in one country. This sounds quite intuitive: as H becomes more important as a natural resource importer, it becomes more "influential" in the resource-rich country, or more likely to secure exclusive trade deals. It should be stressed that even if it increases the range of α for which a distortion in trade occurs, an increase in y^H has unclear consequences on total welfare: this is because the cost of admitting only H to trade converges to zero as y^H increases.

As for $\alpha^M(\cdot)$ and $\alpha^H(\cdot)$, they diverge as y^H increase, with $\alpha^M(\cdot)$ increasing and $\alpha^H(\cdot)$ decreasing. This suggests that, even if foreign influence does not lead to a distortion in trade, it does have different implications for different countries.

The impact of foreign influence on the pattern of trade is the focus of Figures 2-5, which plot the imports of x by the three countries (see equation 3) as a function of y^H, and for different value of α. Clearly, when $\alpha = 1$ (Figure 1), $\alpha > \overline{\alpha}\left(y^H\right)$ and foreign influence can never distort the pattern of trade. In this case, imports by M and H are smooth function of their relative demand, with m_x^H increasing in y^H and m_x^M decreasing. Notice that L's exports of x, $-m_x^L$ is constant by construction.

< *Figure 2 here* >

When $\alpha < 1$ (Figure 3-5), L chooses to trade with H only when y^H is high enough (remember $\overline{\alpha}(\cdot)$ is an increasing function of y^H, and $\overline{\alpha}(2) = 1$): thus, m_x^H jumps to equate $-m_x^L$, and m_x^M drops to zero. Notice that the value of $-m_x^L$ drops when exclusive trading kicks in, and returns the previous value only for $y^H = 2$. Clearly, part of the cost of exclusive trade is captured by a lower price obtained on natural resources, but this cost decreases as H gets closer to being the only trading partner L would have anyway. Comparing figures 3-5, it is clear that as α decreases, exclusive trading realizes for increasingly low levels of y^H; this implies that foreign influence is distortive for a larger set of endowments when the government of L is more myopic, and its cost is potentially bigger.

< *Figures 3-5 here* >

Figures 6-9 plot the transfers received by L, for the same values of α. When $\alpha = 1$, total transfers are zero for all values of y^H. For lower values of α, instead, positive transfers are always paid. The main insight provided by Figure 6-9 is that total transfer jump up if L switches from free trade to exclusive trade due to a small increase in y^H (for example, if it increases slightly above 1.8 in Figure 8): this is to compensate L for the loss associated with exclusive trade.

< *Figures 6-9 here* >

Finally, let us consider the impact of foreign influence and exclusive trade on welfare in L. By welfare, it is meant the sum of $T_L^M + T_L^H$ and z_2^L, corresponding to total consumption of the final good over the two periods (not considering z_1^L, a constant). Because L may be able to obtain transfers even without distorting the pattern of trade, there must be a range of parameters for which foreign influence *increases* total welfare in L. On the other hand, total welfare must be *decreased* by exclusive trade, because any transfer received cannot be enough to compensate for the loss in gains from trade. These points are illustrated in Figure 10 for the case $\alpha = 0.65$. Total welfare without foreign influence (z_2^L) is flat by construction. With foreign influence, on the contrary, total welfare depend on y^H: it is higher than before for low values of y^H (when $\alpha < \overline{\alpha}$ and exclusive trade is not conceded) while it is lower for high value of y^H (exclusive trade is conceded).

< *Figure 10 here* >

As for citizens welfare (the portion of $T_L^M + T_L^H + z_2^L$ that is not appropriated by the government), this turns out the be *always* increased by foreign influence, at least in expected value, if $S_1^J = 1$, that is if the government that sets trade policy for period 2 is accountable to them. This follows immediately from the fact that trade policy is set to maximise the expected welfare of the citizens ($T_L^M + T_L^H + \alpha z_2^L$ when $S_1^J = 1$) and foreign influence expands the set of possible choices available to the governments. Intuitively, citizens benefit from foreign influence in that it allows them to transfer part of the natural resources from an uncertain future to a certain present. On the contrary, citizens' welfare *can*, but does not *have to*, be decreased by foreign influence when $S_1^J = 0$. As we have seen above, foreign influence can give the government of L transfers at no cost for the domestic economy: in this case, those who bear the cost of additional corruption in L are the citizens of M and H. These points are made clear in Figure 11. Expected citizens' welfare without foreign influence is flat at $0.65 * z_2^L$. With foreign influence, citizens have a higher welfare with both free and exclusive trade when $S_1^J = 1$; when $S_1^J = 0$ their welfare is only affected when exclusive trade is granted.

$<$ *Figure 11 here* $>$

5.2 The China-Africa trade in natural resources

The model presented above provides a simple theoretical foundation for believing that Chinese aid and natural resource diplomacy could be leading to a distortion the African pattern of trade to China's advantage. If trade policy can be committed to in advance (because, for example, it is costly to renege on a given allocation of extraction rights to nationally integrated foreign companies) myopic and credit constrained African governments may want to put preferential concessions on offer, in exchange for current transfers. Even if this leads to competitive bids by all major importers of the natural resource (which, in principle, could be equally good at the foreign influence game), such bids do not need to simply neutralize one another: to give preferential access to one country (in this case, China) and ignore the offers of others (for example, the US or France) may be an attractive way for a very myopic government to commit to a worse future terms of trade, therefore increasing the value of today's offer.

As for the welfare consequences of this foreign influence game, we can hypothesise several alternative scenarios. On one hand, there could be countries where foreign influence does not have a distortionary effect at all: this is the case when the government is not too myopic, and foreign bids are successful in offsetting one another. In these countries, foreign influence is a pure gain, in that the government receives positive transfers at no real cost. Thus, where transfers fuel domestic corruption they do so at the expenses of the the citizens of donor countries; where they are spent on development, they come at no extra cost and should therefore be beneficial. On the other hand, we can imagine two alternative scenarios where foreign influence does imply a distortion. In the first scenario, a largely unaccountable but fragile elite sees foreign transfers as a way to increase its own consumption, or fund self-preserving activities. Here, the welfare of citizens is clearly decreased, as they bear at least part of the cost of the distortion without obtaining any benefit. In the second scenario, an accountable government sees foreign transfers as a way to increase its popularity: even fully rational citizens should attach a much higher importance to current consumption or visible investment than to the future value natural resources, when the political system is highly unstable. In this latter case, foreign influence should have a positive impact on citizens' welfare.

The empirical finding that African countries that trade more with China enjoy better growth and investment (Meyersson, Padro and Qian, 2008) may seem puzzling. If the link between aid and trade described above really exists, however, trade with China could be a proxy for the amount of transfers a country is able to receive, and the result could be driven by the fact that many of these countries have now rather accountable governments, at least relative to their recent history. This is not to deny, of course, that the Chinese may also be very good at transforming aid into development: but this is clearly orthogonal to the main interest of the paper.

Notice however that even concessions that entail a welfare increase for the citizens have drawbacks. In particular, while ex-ante optimal, these concessions could well be ex-post suboptimal. Moreover, it can be expected that, should government accountability consolidate - and therefore citizens come to consider natural resources as a national wealth - the inheritance of preferential concessions could lead to tensions with Chinese investors and anti-Chinese sentiment. Anticipating this, China could try to block these positive political evolutions in Africa. Overall, this could lead to a "neo-colonial" type of relation between China and Africa.

6 Conclusions

This paper has addressed two questions: first, under what conditions can foreign influence induce a resource-rich country to sell off its resources to a particular buyer, when all buyers have, in principle, equal access to this tool? And second, what are the consequences of this for development? I have built a model of the natural resource trade where two countries compete for buying a natural resource from a third, and are equally active in trying to influence the latter's trade policy to their favour. Not surprisingly, if the government of the resource-rich country attaches the same weight to transfers as to the value of national production, foreign influence is always ineffective at an optimum. If, instead, the consequences of trade policy decisions are partly in the future (as it seems to be the case for the natural resource trade) and the government's tenure in power is very uncertain, it may be optimal for it to trade with one country only: through this exclusive trade decision, the ruler can extract part of the country's future gains from trade, and sell this to its foreign donors in exchange for current transfers. As for the consequences of this for development, these need not be negative. On one hand, when the weight attached to transfers is intermediate foreign influence can result in positive transfers being paid to the country at no cost in terms of trade distortions. On the other hand, to exchange future gains from trade for current transfers may be a way for the citizens to cash in on the value of natural resources, substracting it from an uncertain future.

Considered the fragility of current African political institutions, one should then expect that Chinese development assistance *could* lead to a distortion in the African pattern of trade, even if other major importers of natural resources were playing an identical game. While unaccountable governments may exploit this foreign influence link to extract even more of the country's wealth, more accountable governments may use it to foster current development. If the latter group of countries is more numerous, this could explain the finding that countries who trade more with China have higher current investment and growth. Preferential concessions are however likely to be a source of tension in the future, particularly where citizens' ownership of resources is bound to consolidate.

The model presented in this paper can be made more general by considering a variety of alternative reasons why a government may care about foreign aid more than about domestic welfare. For example, a credit constrained government may be willing to pay a very high interest rate (in terms of forgone future value of resource) to borrow when faced with an emergency; or a government that is under threat of a coup may need military assistance to survive, and be therefore willing to sacrifice future welfare to that purpose. At the same time, while I argued that the capacity to commit to a given trade policy may be particularly strong in the context of natural resources, the mechanism highlighted in this paper may apply to other contexts as well. I keep these generalizations for future research.

7 Appendix

Properties of $z^J(p)$

The first and second derivatives of $z^J(p)$ are:

$$\frac{\partial z^J(p)}{\partial p} = \frac{p - y^J}{4p^{\frac{3}{2}}}$$
$$\frac{\partial^2 z^J(p)}{\partial p^2} = \frac{3y^J - p}{8p^{\frac{3}{2}}}$$

It is easy to see that $z^J(p)$ reaches a global minimum at $p = y^J$, and that it is monotonically increasing (decreasing) in p when $p > y^J$ $(p < y^J)$. ■

Proof of Lemma 1

Because we have imposed $y^L \leq y^M \leq y^H$ L is never a net importer of the natural resource, while H is never a net exporter. If $y^M < \frac{y^L+y^H}{2}$, $p_{\{L,M,H\}} < p_{\{L,H\}} < p_{\{M,H\}}$, and H's first best is to trade with both M and H, while L's first best is to trade with H only. On the contrary if $y^M \geq \frac{y^L+y^H}{2}$, $p_{\{M,H\}} > p_{\{L,M,H\}} \geq p_{\{L,H\}}$ and H's first best is to trade with L only, L's first best to trade with both M and H. As for M, it is clear that his first best is always to trade with one country only. To see this, suppose that it belongs to the $\{L, M, H\}$ trading block: then, if it is an importer it would be strictly better off by trading with L only $(p_{\{L,M\}} < p_{\{L,M,H\}})$, if it is an exporter by trading with H only $(p_{\{M,H\}} > p_{\{L,M,H\}})$.

$<$ *missing bit: show that M's first best is always to trade with L only when* $y^M \geq \frac{y^L+y^H}{2}$ $>$

Proof of Lemma 2

By looking at the objective functions of government when there is no foreign influence, it is clear that all rulers act so as to maximise national production. Then, we cannot have a CPNE where all countries remain in autarchy - for any $\mathbf{y}$, it is a Pareto improvement that any two countries begin to trade. To show that no CPNE exists in which only two countries trade, it is sufficient to realize that no such equilibrium could include L (as this would always benefit from forming a coalition with the excluded country, and start trading with it as well) but could not include M and H either (by Lemma 1, they would both profit from forming a coalition with L and start trading with it as well). Next, it is easy to see that L trading to both M and H is a CPNE: by Lemma 1, no deviating coalition could ever include L (which is at its first best) nor, as a consequence, H (as $p_{\{M,H\}} > p_{\{L,M,H\}}$). Finally, any outcome where L does not trade with both M and H cannot be an equilibrium: in such outcome, either M or H should be trading directly to both other countries, which is not optimal (it could stop trading with one and be strictly better off). ■

Proof of Proposition 1 (to be added)

Proof of Proposition 2 (to be completed)

We begin by showing that $\exists \alpha^M$ (α^H) $\in [0,1]$ such that if $\alpha < \alpha^M$ ($\alpha < \alpha^H$), $\alpha z^L + z^H$ ($\alpha z^L + z^M$) is maximised by $\boldsymbol{\phi}^L = [1,0,1]$ ($\boldsymbol{\phi}^L = [1,1,0]$), by $\boldsymbol{\phi}^L = [1,1,1]$ otherwise. Starting with α^M because $z^L_{\{L,H\}}, z^L_{\{L,M\}} < z^L_{\{L,M,H\}}$ it is sufficient to show that:

$$\alpha^M \equiv \arg_\alpha \left\{ \alpha z^L_{\{L,H\}} + z^H_{\{L,H\}} = \alpha z^L_{\{L,M,H\}} + z^H_{\{L,M,H\}} \right\} \in [0,1]$$
$$\alpha^H \equiv \arg_\alpha \left\{ \alpha z^L_{\{L,M\}} + z^M_{\{L,M\}} = \alpha z^L_{\{L,M,H\}} + z^H_{\{L,M,H\}} \right\} \in [0,1]$$

Using $z^J_S = \frac{p_S + y^J}{2(p_S)^{\frac{1}{2}}}$, we find after some algebra:

$$\alpha^M = \frac{p_{\{H\}} - \sqrt{p_{\{L,M,H\}} p_{\{L,H\}}}}{\sqrt{p_{\{L,M,H\}} p_{\{L,H\}}} - p_{\{L\}}}$$
$$\alpha^H = \frac{p_{\{M\}} - \sqrt{p_{\{L,M,H\}} p_{\{L,M\}}}}{\sqrt{p_{\{L,M,H\}} p_{\{L,M\}}} - p_{\{L\}}}$$

Using the fact that, under the current assumption on $\mathbf{y}$, prices are ordered as follows:

$$p_{\{L\}} < p_{\{L,M\}} \leq p_{\{L,H\}} \leq p_{\{L,M,H\}} \leq p_{\{M\}} \leq p_{\{H\}}$$

it is easy to show that $\alpha^M \in [0,1]$ and $\alpha^H \in [0,1]$.

$<$ *missing bit: show that* $\alpha^M > \alpha^H$, $\overline{\alpha}$ *while* α^H *can go below* $\overline{\alpha}$ $>$

Next, we show that, as before, the transfers paid by M and H are uniquely identified. To this purpose, we show that the third contraint that defines Π_Γ is satisfied when the first two contraints hold with equality. Depending on the value of α, there are three possible cases. If $\alpha > \overline{\alpha}$:

$$
\begin{aligned}
n^M + n^H &= Z_{\{L,M,H\}}^{\{L,M,H\}} - \max_{\boldsymbol{\phi}^L} \left\{ \alpha z_2^L \left(\boldsymbol{\phi}^L \right) + z_2^H \left(\boldsymbol{\phi}^L \right) \right\} \\
&+ Z_{\{L,M,H\}}^{\{L,M,H\}} - \max_{\boldsymbol{\phi}^L} \left\{ \alpha z_2^L \left(\boldsymbol{\phi}^L \right) + z_2^M \left(\boldsymbol{\phi}^L \right) \right\} \\
&\leq z_{\{L,M,H\}}^M + z_{\{L,M,H\}}^H \\
&= Z_{\{L,M,H\}}^{\{L,M,H\}} - \alpha z_{\{L,M,H\}}^L \\
&= Z_{\{L,M,H\}}^{\{L,M,H\}} - \max_{\boldsymbol{\phi}^L} \left\{ \alpha z_2^L \left(\boldsymbol{\phi}^L \right) \right\}
\end{aligned}
$$

When $\overline{\alpha}, \alpha^H > \alpha$:

$$
\begin{aligned}
n^M + n^H &= Z_{\{L,H\}}^{\{L,M,H\}} - \max_{\boldsymbol{\phi}^L} \left\{ \alpha z_2^L \left(\boldsymbol{\phi}^L \right) + z_2^H \left(\boldsymbol{\phi}^L \right) \right\} \\
&+ Z_{\{L,H\}}^{\{L,M,H\}} - \max_{\boldsymbol{\phi}^L} \left\{ \alpha z_2^L \left(\boldsymbol{\phi}^L \right) + z_2^M \left(\boldsymbol{\phi}^L \right) \right\} \\
&= z_{\{L,H\}}^M + Z_{\{L,H\}}^{\{L,M,H\}} - \left(\alpha z_{\{L,M\}}^L + z_{\{L,M\}}^M \right) \\
&\leq z_{\{L,H\}}^M + Z_{\{L,H\}}^{\{L,M,H\}} - \left(\alpha z_{\{L,M,H\}}^L + z_{\{L,M,H\}}^M \right) \\
&\leq Z_{\{L,H\}}^{\{L,M,H\}} - \alpha z_{\{L,M,H\}}^L \\
&= Z_{\{L,H\}}^{\{L,M,H\}} - \max_{\boldsymbol{\phi}^L} \left\{ \alpha z_2^L \left(\boldsymbol{\phi}^L \right) \right\}
\end{aligned}
$$

where the first inequality comes from the fact that $\alpha < \alpha^M$, as $\alpha^M > \overline{\alpha}$.

Finally, if $\overline{\alpha} > \alpha > \alpha^H$:

$$\begin{aligned} n^M + n^H &= Z_{\{L,H\}}^{\{L,M,H\}} - \max_{\phi^L} \left\{ \alpha z_2^L \left(\boldsymbol{\phi}^L \right) + z_2^H \left(\boldsymbol{\phi}^L \right) \right\} \\ &+ Z_{\{L,H\}}^{\{L,M,H\}} - \max_{\phi^L} \left\{ \alpha z_2^L \left(\boldsymbol{\phi}^L \right) + z_2^M \left(\boldsymbol{\phi}^L \right) \right\} \\ &= z_{\{L,H\}}^M + Z_{\{L,H\}}^{\{L,M,H\}} - \left(\alpha z_{\{L,M,H\}}^L + z_{\{L,M,H\}}^M \right) \\ &\leq Z_{\{L,H\}}^{\{L,M,H\}} - \alpha z_{\{L,M,H\}}^L \\ &= Z_{\{L,H\}}^{\{L,M,H\}} - \max_{\phi^L} \left\{ \alpha z_2^L \left(\boldsymbol{\phi}^L \right) \right\} \end{aligned}$$

Because the net payoffs of M and H are uniquely defined, so are their transfers ($T_L^M = z_2^M - n^M$ and $T_L^H = z_2^H - n^H$). For $\alpha > \overline{\alpha}$:

$$\begin{aligned} T_L^M &= \max_{\phi^L} \left\{ \alpha z_2^L \left(\boldsymbol{\phi}^L \right) + z_2^H \left(\boldsymbol{\phi}^L \right) \right\} - \left(z_{\{L,M,H\}}^L + z_{\{L,M,H\}}^H \right) \\ T_L^H &= \max_{\phi^L} \left\{ \alpha z_2^M \left(\boldsymbol{\phi}^L \right) + z_2^H \left(\boldsymbol{\phi}^L \right) \right\} - \left(z_{\{L,M,H\}}^M + z_{\{L,M,H\}}^H \right) \end{aligned}$$

and for $\alpha > \overline{\alpha}$:

$$\begin{aligned} T_L^M &= \max_{\phi^L} \left\{ \alpha z_2^L \left(\boldsymbol{\phi}^L \right) + z_2^H \left(\boldsymbol{\phi}^L \right) \right\} - \left(z_{\{L,H\}}^L + z_{\{L,H\}}^H \right) \\ T_L^H &= \max_{\phi^L} \left\{ \alpha z_2^M \left(\boldsymbol{\phi}^L \right) + z_2^H \left(\boldsymbol{\phi}^L \right) \right\} - \left(z_{\{L,H\}}^M + z_{\{L,H\}}^H \right) \end{aligned}$$

Using these equations, and the definitions of α^M and α^H, it is immediate to find the transfers described by Proposition 4.

Figures

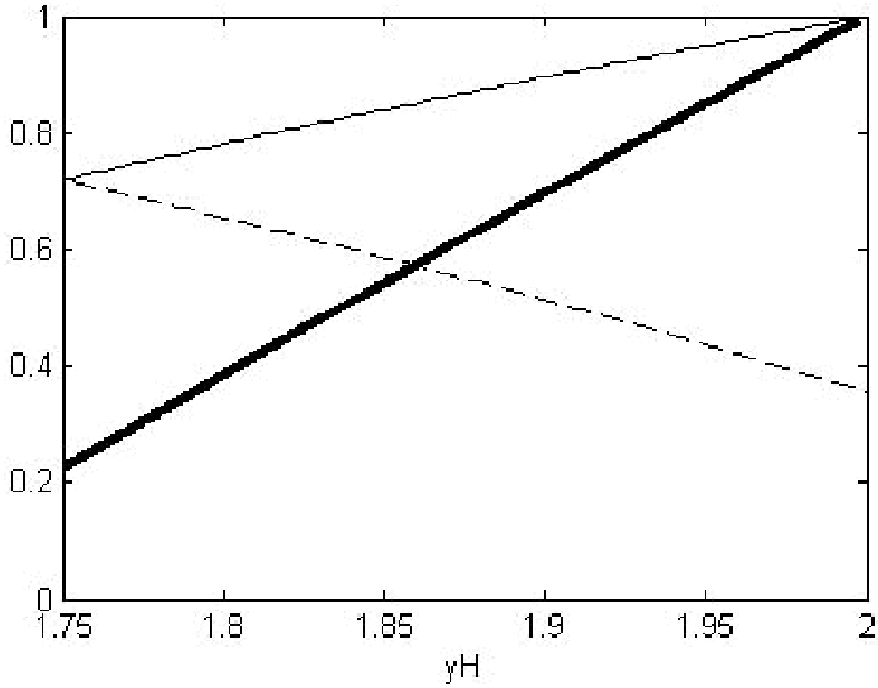

Figure 1. Thick line: $\overline{\alpha}$. Continuous line: α^M. Dashed line: α^H.

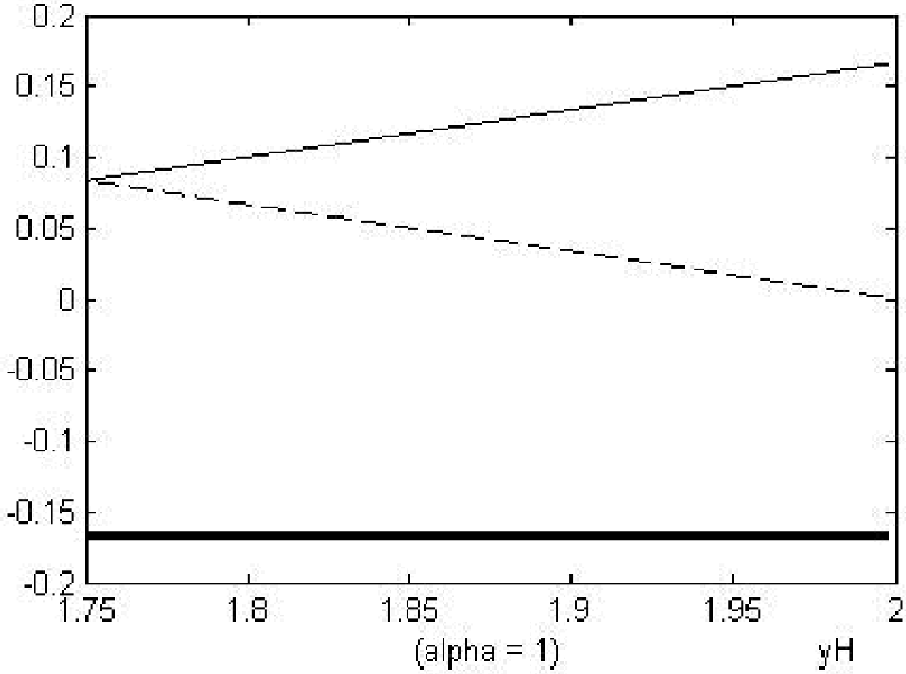

Figure 2. Thick line: m_x^L. Continuous line: m_x^H. Dashed line: m_x^M.

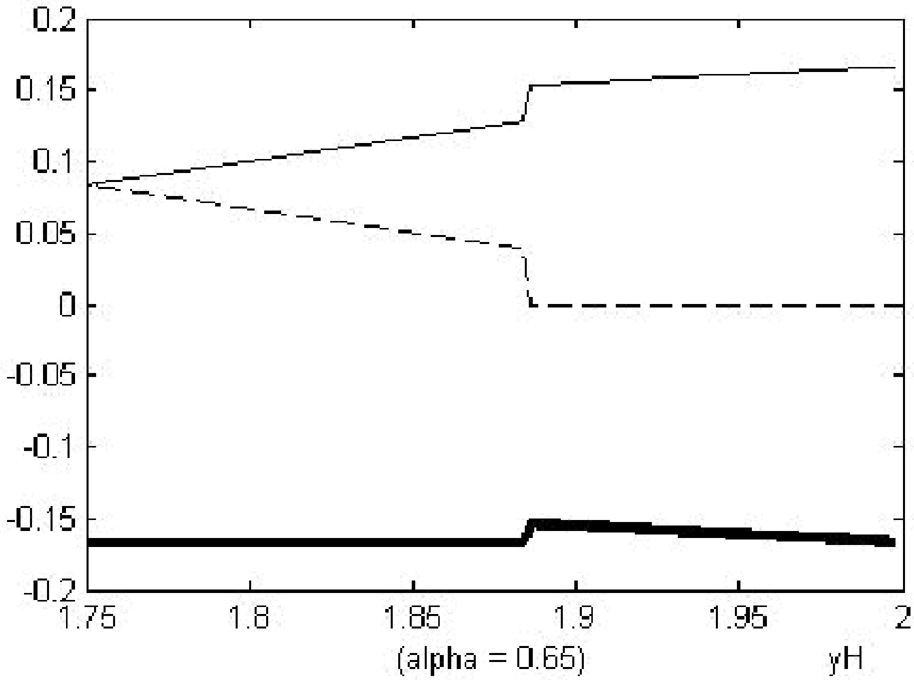

Figure 3. Thick line: m_x^L. Continuous line: m_x^H. Dashed line: m_x^M.

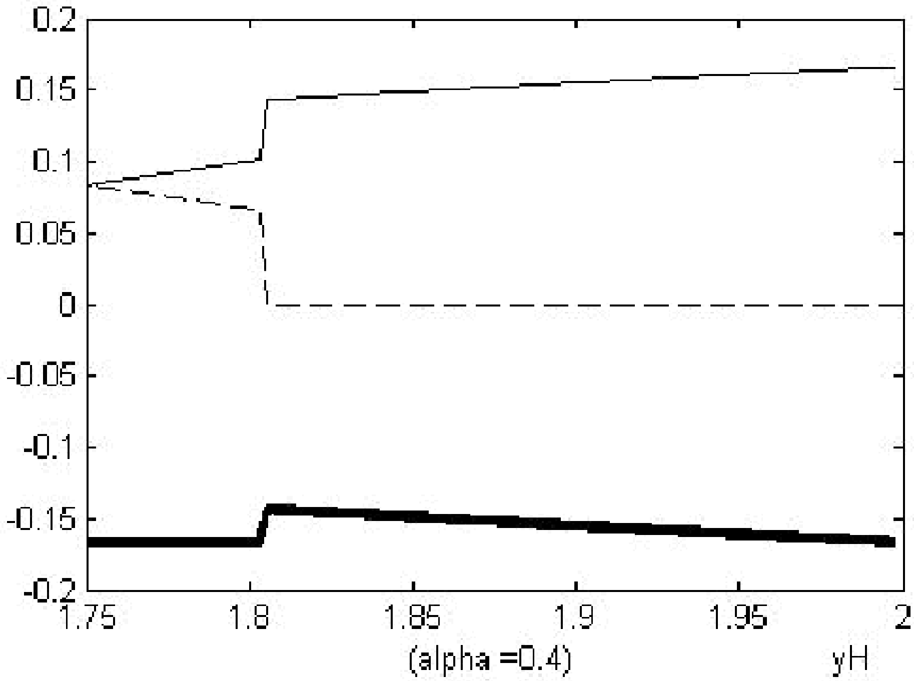

Figure 4. Thick line: m_x^L. Continuous line: m_x^H. Dashed line: m_x^M.

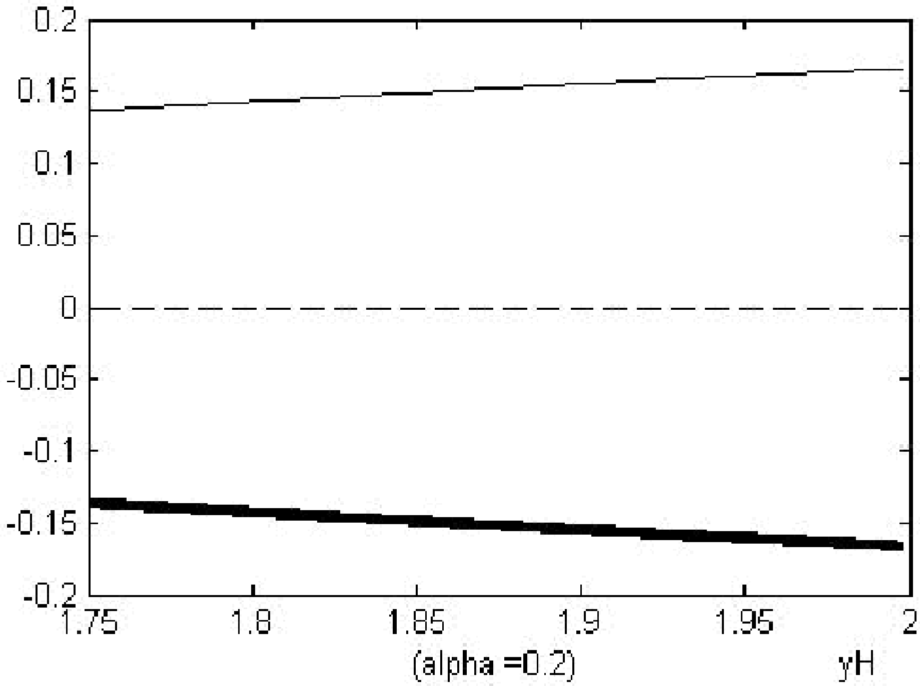

Figure 5. Thick line: m_x^L. Continuous line: m_x^H. Dashed line: m_x^M.

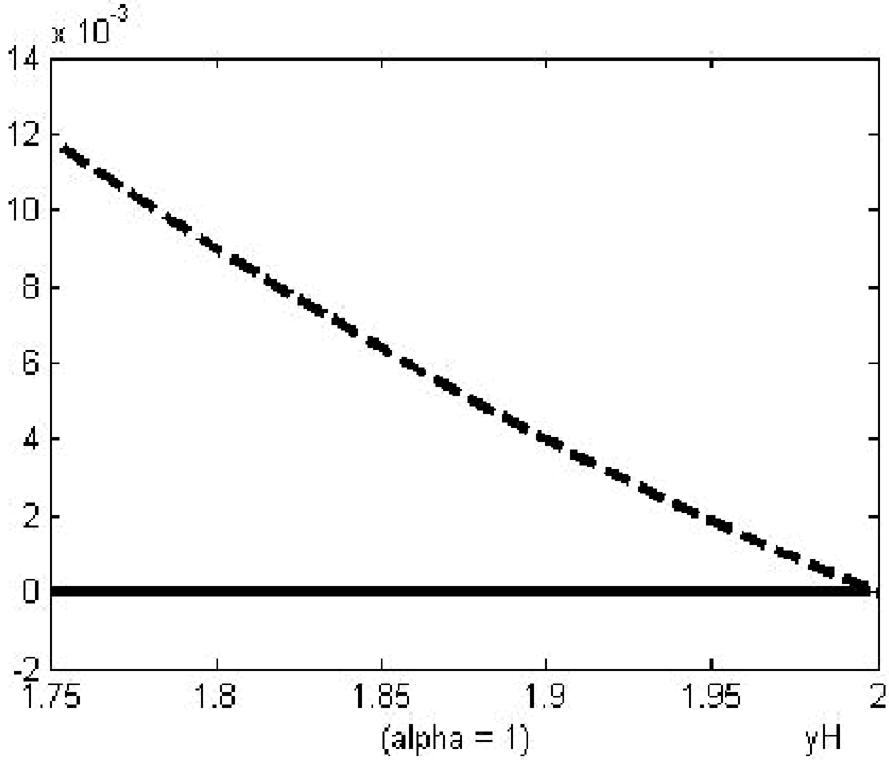

Figure 6. Thick, continuous line: $\left(T_L^M\right)^* + \left(T_L^H\right)^*$. Thick, dashed line: $T_L^H\left[(1,0,1)\right]$. Continuous line: $T_L^H\left[(1,1,1)\right]$. Dashed line: $T_L^M\left[(1,1,1)\right]$.

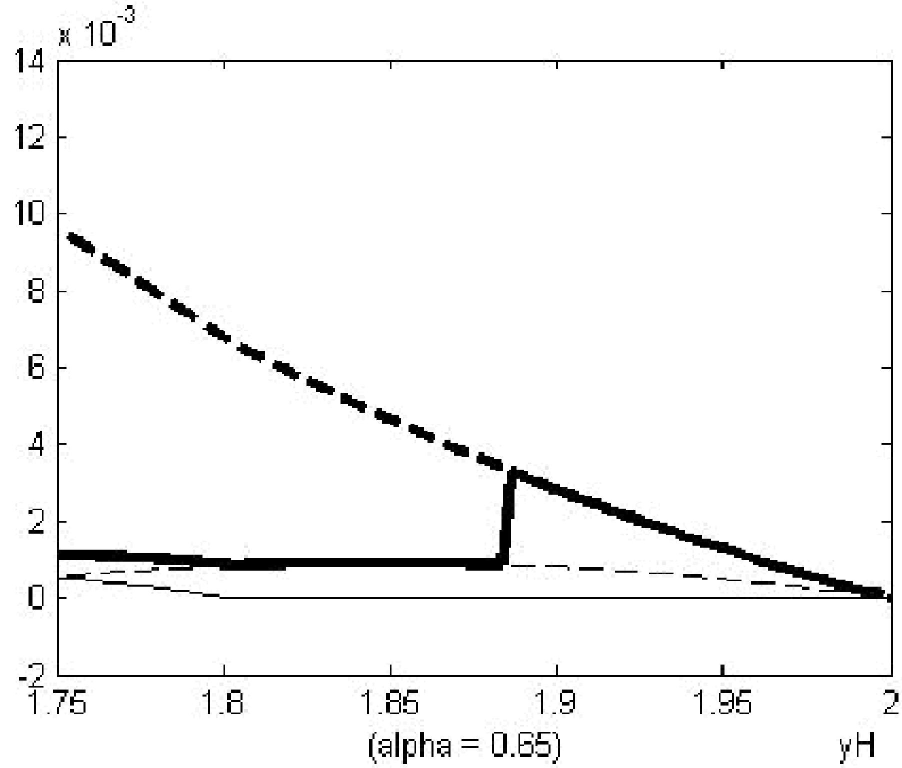

Figure 7. Thick, continuous line: $\left(T_L^M\right)^* + \left(T_L^H\right)^*$. Thick, dashed line: $T_L^H\left[(1,0,1)\right]$. Continuous line: $T_L^H\left[(1,1,1)\right]$. Dashed line: $T_L^M\left[(1,1,1)\right]$.

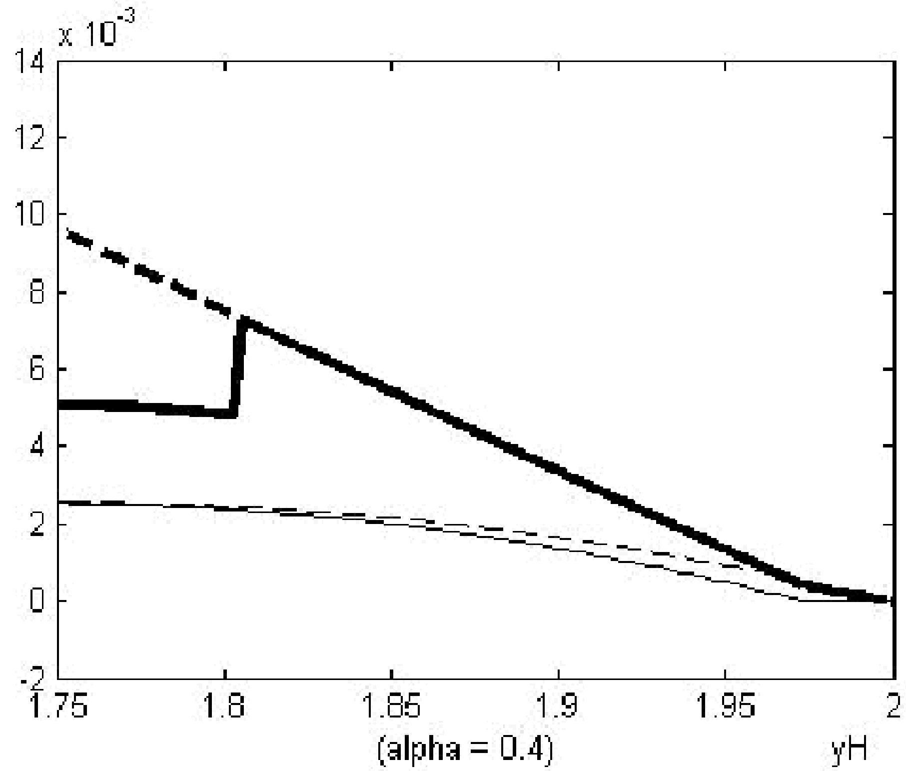

Figure 8. Thick, continuous line: $\left(T_L^M\right)^* + \left(T_L^H\right)^*$. Thick, dashed line: $T_L^H\left[(1,0,1)\right]$. Continuous line: $T_L^H\left[(1,1,1)\right]$. Dashed line: $T_L^M\left[(1,1,1)\right]$.

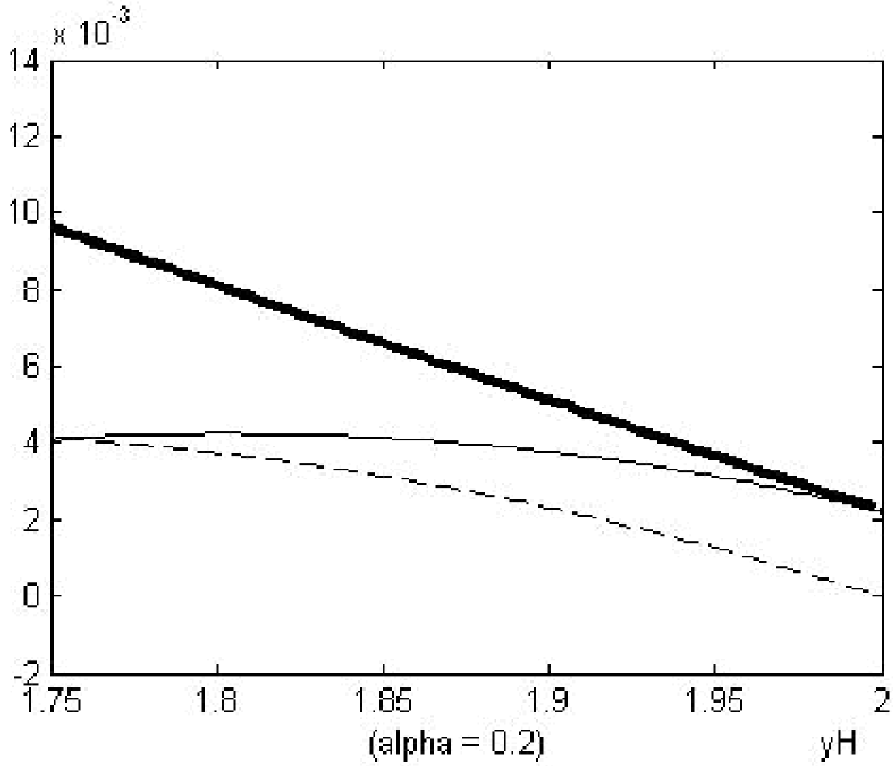

Figure 9. Thick, continuous line: $\left(T_L^M\right)^* + \left(T_L^H\right)^*$. Thick, dashed line: $T_L^H\left[(1,0,1)\right]$. Continuous line: $T_L^H\left[(1,1,1)\right]$. Dashed line: $T_L^M\left[(1,1,1)\right]$.

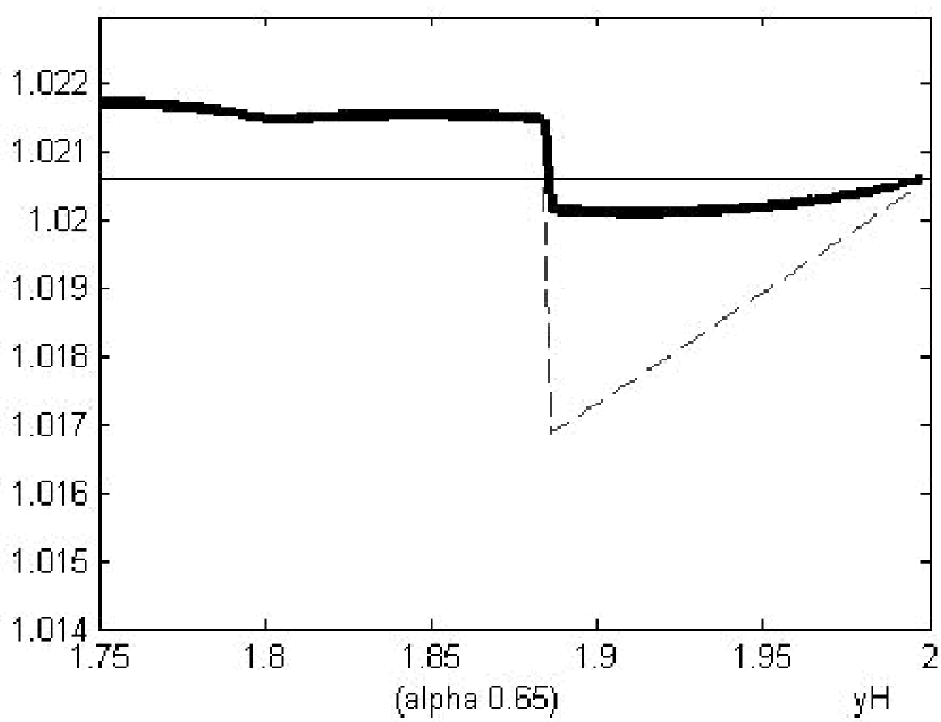

Figure 10. Thick line: $\left(T_L^M\right)^* + \left(T_L^H\right)^* + z^L\left[\left(\boldsymbol{\phi}^L\right)^*\right]$. Continuous line: $z^L\left[(1,1,1)\right]$. Dashed line: $z^L\left[\left(\boldsymbol{\phi}^L\right)^*\right]$. Here α is kept constant at 0.65.

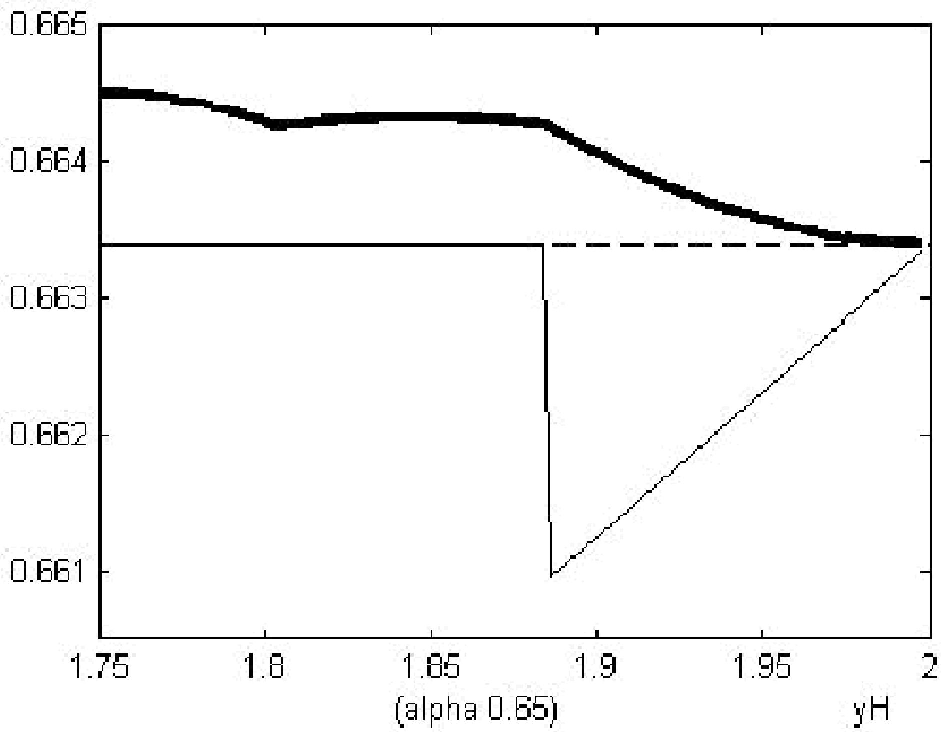

Figure 11. Thick line: $\left(T_L^M\right)^* + \left(T_L^H\right)^* + \alpha z^L\left[\left(\boldsymbol{\phi}^L\right)^*\right]$. Continuous line:$\alpha z^L\left[\left(\boldsymbol{\phi}^L\right)^*\right]$.. Dashed line: $\alpha z^L\left[(1,1,1)\right]$. Here α is kept constant at 0.65.

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