INEFFICIENT POLICIES, INEFFICIENT INSTITUTIONS AND TRADE

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Abstract

Despite the general belief among economists on the growth-enhancing role of international trade and significant trade opening over the past 25 years, the growth performance of many developing economies, especially of those in Latin America and Africa, has been disappointing. While this poor growth performance has many potential causes, in this paper I argue that part of the reason may be related to the interaction between weak institutions and trade. In particular, I construct a model in which trade opening in societies with weak institutions (in particular autocratic and elite-controlled political systems) may lead to worse economic policies. The reason is that general equilibrium price effects of taxation and expropriation in closed economies also hurt the elites, and this puts a natural barrier against inefficient policies. Trade openness removes this barrier and enables groups with political power to exercise this power in more inefficient ways.

1 Introduction

Increasing globalization has been a defining feature of the postwar era. There is some consensus that this has been beneficial for economic performance: trade brings about a more efficient allocation of resources through technology or factor endowment driven comparative advantage, or through better exploitation of increasing returns to scale. Figure 1 gives a sense of this. Countries that traded more between 1960 and 1995 appear to have larger per capita incomes today.[1]

At the same time, some less-developed economies have seen little improvement in economic performance since the 1960's. Figure 2 splits Figure 1 in two. On the top are countries that, from 1960 to 2000, had on average limited or no constraints on executive power (non-democratic regimes). The bottom section shows countries with strong checks on the executive power over the same period (more democratic regimes). A positive correlation between trade and income holds for more democratic countries, but for less democratic regimes there is no positive correlation. It could be argued that this is unrelated to globalization, or that these countries have not opened to trade enough to benefit from it. However, trade as a share of GDP in those countries has increased from an average of 33% in 1960, to an average of almost 60% in 2000.[2] Although most trade takes place between developed nations, it is still true that less-developed economies today trade much more than they did 40 years ago.

The alternative view developed in this paper is that our standard trade models are missing an important ingredient. If we are to look for a fundamental difference between countries in the North and countries in the South that might affect trade predictions, institutions stand out as a clear candidate. How do institutions in the North differ from those in the South? The answer is straightforward: institutions in the South tend to be less efficient, their economies are characterized by corruption, expropriation, or weak property rights protection.

Do countries with inefficient institutions, then, benefit from trade in the way our standard models would predict? Trade theories typically formalize differences in institutions as differences in exogenous parameters or differences in productivity. But institutions in the South are inefficient in a distorting way: groups with political power tend to extract rents from other groups in society, which affects the incentives in these economies. Such inefficiencies can alter standard trade predictions in two ways. First, they can have distributive consequences: winners and losers from the process of trade integration may differ from those predicted by standard theories.[3] Second, trade might affect the inefficiency of institutions

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[1]We are aware of the standard omitted variable and reverse causality problems. We are just describing correlations.

[2]The measure we are using is exports plus imports as a share of GDP from the Penn World Tables.

[3]Levchenko (2004) is an example of this.

itself. Exogenous differences in productivity parameters are not likely to capture the effects of institutional variance.

The main contribution of this paper is to answer this question, endogenizing the efficiency of institutions and analyzing how this efficiency changes when economies open to international trade. I argue that part of the reason why less-developed economies may not have benefited from international trade is that, in countries with weak or non-democratic political institutions, trade liberalization may lead to worse policies and economic institutions. The reasoning is simple: in a closed economy, groups that hold political power are restrained in the degree to which they may indulge inefficient redistributive policies, such as corruption or expropriation, because of the general equilibrium price effects such policies create. Increased international trade removes these price effects, and may increase the intensity of rent-extracting policies to the point where it more than outweighs for standard trade gains. In such situations, trade may not be welfare enhancing.

To examine this issue, I build on Acemoglu (2006), which provides a framework to help understand why inefficient institutions emerge. The starting point of my paper is a society that already has an elite with a preference for inefficient policies in place. In particular, I start with a set of political institutions that give all political power to an elite minority. This power allows the elite to benefit from its policies regardless of how they affect the rest of society. Throughout this paper, this state is the definition of the term "dictatorship." The key policies in this model are group specific tax rates, which are distortionary. In this model there are no other means to extract resources from non-elite groups. The definition of taxation in this discussion is broad: it is any policy that leads to investment distortions in the economy (such as expropriation or corruption).

I focus on two sources of inefficiency in policies, both arising from the desire and ability of the elite to extract resources from other groups. First, the elite might set distortionary taxes to extract revenue from other groups. We refer to this as Revenue Extraction. Second, because they participate in production activities, the elite producers can also benefit through an indirect channel. By taxing other groups with production activities, they reduce the demand for factors of these groups. This benefits them through lower factor prices and higher profits. We refer to this second source of inefficiency as Factor Price Manipulation. The degree of expropriation in the economy and its effect will depend on the strength of these two sources of inefficiencies.

I first analyze the closed economy. In Acemoglu (2006), elite and non-elite producers compete in the same sector; i.e., products of both groups are perfect substitutes.[4] I depart from that assumption by allowing elite and non-elite producers to produce in different sectors

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[4] Additionally, Acemoglu (2006) only analyzes a closed economy.

and assuming that these sectors have certain complementarity. This immediately implies a natural restriction on the extent to which the elite can either extract resources from the middle class or modify factor prices. Any taxes the elite place on the middle class will come back to affect them. Higher taxes will imply a higher cost for the consumption bundle, which will reduce the real value of the elites' income. And this is true for both sources of inefficiency, Revenue Extraction and Factor Price Manipulation. Taxing these non-elite groups will not only directly reduce non-elite producers investment (the standard Laffer Curve effect) but also, because goods produced by these non-elite producers will become more expensive, reduce the value of the elite's profits. In other words, as long as the elite consumes what non-elite groups produce, the elite will find expropriation and excessive taxation less desirable because these policies will make consumption more expensive.

The key assumption in this analysis is that elite producers care, not only about tax revenues, but also about profits. This encourages them to tax both sectors asymmetrically, since taxing themselves hurts profits. But taxing sectors differently distorts the relative price and allocation of resources in the economy. And this also reduces profits through the general equilibrium: a tax on the middle class decreases the relative price of the goods produced by the elite, which decreases profits. This is what limits the elite from taxing other groups as much as they would like.

Opening the economy to trade will increase competition, which will increase the substitutability between goods produced by elite and non-elite producers. In other words, trade will reduce the negative general equilibrium effect (on the elites' income) of taxing these other groups; now, the elite can find most goods in world markets. This frees the elite to take full advantage of their policy control, translating into greater inefficiency as taxes rise aggressively on all other groups. The welfare implications of opening to trade will depend on whether the increase in expropriation more than outweighs for the standard gains from trade. The most important result of this paper is its assertion that, in dictatorial states, international trade is not necessarily welfare improving for the whole economy.

I then repeat the analysis for a democracy, which we define as political institutions that give all political power to the majority. A democracy with a closed economy will be inefficient to some extent, although generally less inefficient than a dictatorship. The surprising result is that once we open to trade, policies do not necessarily become more efficient; instead, they remain constant. A look at the nature of our democratic model explains this. A democracy gives the political power to the majority, and in our model that majority is comprised of workers. Since workers participate in both sectors of the economy, they will try not to distort resource allocation across sectors. Also, workers care about wages (not profits), which implies that the general equilibrium effect will not restrain them from achieving their desired tax

rates. When the country opens to trade, workers will set the same tax rates as in the closed economy, and opening to trade will not have a negative effect on the efficiency of policies. Trade is always welfare enhancing under a democracy.

The main contribution of this paper is to emphasize the negative impact that trade has on expropriation and income of countries with weak political institutions, by making non-elite and elite sectors more substitutable. The literature has emphasized how globalization, by allowing capital mobility, leads to lower taxation. I abstract from this mechanism by assuming that there is no international factor mobility.[5] The paper most closely related to this one, in spirit, is Bourguignon and Verdier (2000).[6] In their model, an oligarchy of capitalists, operating in an economy with missing financial markets for the financing of human and physical capital investments, might find it in their interest to subsidize the education of the poor because both types of capital are complementary. Political participation in this model is linked to education, which means that the elite are willing to subsidize education despite the cost in terms of political power. With international financial integration, the return on investments of the capitalist is given by the international rate of interest, which breaks the complementarity between human capital and capital accumulation. The elite may stop subsidizing the education of the poor, which implies a reinforcement of their political power.[7] Notice the differences between their approach and mine. Their paper looks at how, for a given degree of inefficiency, political institutions change with trade.[8] My paper instead takes institutions as given and analyzes the change in their inefficiency. Also their paper is about whether trade delays or not democratization, not about the effects on Welfare.[9]

This paper is of course related to Segura-Cayuela (2006a), which shows empirical evidence on the relevance of the forces at play in the current paper.[10] This paper is also related to Epifani and Gancia (2005), who analyze the size of governments in the context of benevolent rulers that provide a public good. Because trade shifts part of the tax burden away, trade integration in such situations leads to higher taxation and bigger government. But the mechanics of their model are very different to mine. First, there is no distinction between

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[5]It is not obvious how this might affect the results of the paper. To add this mechanism, we would have to think carefully about who owns the capital in the economy. It seems safe to assume, for present purposes, that in underdeveloped economies capital is in the elite's hands.

[6]In Bourguignon and Verdier (2005), the authors make a similar argument in the context of trade integration and factor mobility.

[7]Verdier (2005) provides a good discussion on how trade might affect domestic policy.

[8]By inefficiency in their model I mean the lack of financial markets.

[9]Of course democratization can have effects on Welfare. But there is no explicit discussion of the consequences in the context of their model. In their model, liberalizing financial markets slows human capital accumulation, but increases physical capital accumulation.

[10]In that paper I show evidence that expropriation increases with trade opening for non-democratic countries, while it is reduced for democratic ones, consistent with the main theoretical prediction of this paper.

good/bad political institution. Their analysis is about benevolent governments providing public goods. Also, taxation at home increases because foreigners pay some of it, through prices of imports. In my model taxation increases irrespective of who exports or imports. All it matters is that goods produced by the middle class can be found somewhere else. Finally, this paper is related also to the recent literature on the effect of trade on institutions, Levchenko (2004), Segura Cayuela (2006b), Do and Levchenko (2005), Galor and Mountford (2006), and chapter 10 on Acemoglu and Robinson (2005), among others.[11]

The rest of the paper is organized as follows. Section 2 presents the basic economic model and characterizes the economic and political equilibrium in a closed economy under a dictatorship of the elite. Section 3 repeats the exercises in Section 2, but for an open economy. Section 4 analyzes the welfare implications of opening to trade. Section 5 discusses how the analysis changes under a democracy. Finally Section 6 concludes.

2 The General Model with a Closed Economy

This section develops the basic economic model in a closed economy, where inefficiencies will arise due to limited checks on the executive power and the desire of the minority elite to extract rents from other groups in society. I will first solve for the economic equilibrium for a given set of policies, and then I will characterize the political equilibrium. I start by describing the general environment.

2.1 Environment

Consider an economy, closed to international trade for the time being, populated by a continuum of agents $1 + \theta^e + \theta^m$ that consume a single final good, y. Preferences of the agents are defined as

$$U = y.$$

The final good is produced by combining two intermediate inputs, y^e and y^m, according to technology

$$y = \beta^{-\beta}(1 - \beta)^{-(1-\beta)} (y^e)^\beta (y^m)^{1-\beta}, \tag{1}$$

where I define $\chi \equiv \beta^{-\beta}(1 - \beta)^{-(1-\beta)}$. There are three groups of agents. First, a mass 1 of workers, endowed with 1 unit of labor each, which they supply inelastically. Second, the middle class producers, denoted by m, who have access to production opportunities in sector

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[11] For the effects of institutions in trade/FDI, see for instance Levchenko(2004), Antràs (2003, 2005), or Antràs and Helpman (2005).

m. Finally, the elite producers, e, who also have access to production opportunities in sector e and hold the political power.[12]

Technology is identical in both sectors,

$$y_i^j = \frac{1}{1-\alpha} \left(k_i^j\right)^{1-\alpha} \left(l_i^j\right)^{\alpha}, \tag{2}$$

where y_i^j stands for production of individual i of group j, k denotes capital and l labor. Capital is assumed to fully depreciate after use.[13] In what follows, total variables for a group will simply be the value of that variable for an individual of that group, times the size of that group, j, θ^j.

The political power in this model will be in the hands of the elite.[14] They have the ability to decide policies and choose those that benefit them the most. The only policies in this model consist of the ability to tax the activity of both intermediate sectors with a rate τ^j. Again, we should interpret the concept of taxation in a broader sense: it could correspond to expropriation, or corruption, or any policy used by the elite to repress the middle class that translates into distortions in the economy.

Let us assume the following timing of events: first, taxes are set, then, investments are made. This way, we can abstract from inefficiencies due to hold-up problems, which could be interesting to analyze but are not the scope of this paper. Revenue from taxation can be distributed across groups with targeted lump-sum transfers towards each group, $T^j \geq 0$. The government budget constraint is

$$T^w + \theta^m T^m + \theta^e T^e \leq \phi \int_{j,i} \tau^j p^j y_i^j d_i d_j, \tag{3}$$

where p^j denotes the price of good j and ϕ is a parameter that measures the ability of the elite to collect and redistribute taxes, state capacity. In less-developed economies, fiscal systems are typically inefficient; this is due to large informal economies or corruption in the collection of taxes, for instance. So it should be natural to think that $\phi < 1$ for this type of economy: what the government redistributes is less than what it collects. For most of the analysis in this paper I will assume that this is the case, although I will discuss the results for $\phi = 1$ too. Notice that there are no other fiscal instruments, only distortionary taxes,

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[12]Most of the analysis in this paper would stand if I allowed both groups to produce in both sectors with different productivities. The assumption that they each produce in only one of the sectors reduces the taxonomy of cases to analyze.

[13]A discussion of this assumption is found in Segura Cayuela (2006b).

[14]I assume that the elite producers hold the political power until I analyze the model in the context of a democracy. But for the analysis in this section, the economic equilibrium, who holds the political power will be irrelevant.

which will be the root for the inefficiency of policies.

There is a maximum scale, $l^j \leq \lambda$, for each firm. And each member of a group can just set up one firm. The role of this assumption is to generate profits in equilibrium: if a group of producers reach their maximum scale, they will make profits. Notice that if

$$\lambda \theta^e + \lambda \theta^m < 1, \tag{4}$$

there is going to be excess labor supply in this economy, the total amount of labor that both groups demand is smaller than the supply of labor, 1. When Condition (4) holds, the wage rate will drop to 0. When it does not hold, we have excess demand for labor, which will give us a positive wage rate in equilibrium. Thus we can write labor market clearing as

$$\theta^m l_i^m + \theta^e l_i^e \leq 1, \tag{5}$$

where l_i^j will be the labor demand of an individual i of group j, and (5) is satisfied with equality when Condition (4) does not hold. Throughout the paper we analyze the results both when Condition (4) holds and when it does not, because that will allow me to separate the two sources of inefficiency.[15]

2.2 Economic Equilibrium in the Closed Economy

An economic equilibrium is a set of intermediate and final good prices, p, p^e, p^m, wage w, investment levels and employment levels for all producers $\{k^j, l^j\}_{j=e,m}$, such that given a set of taxes, τ^e, τ^m, and p, p^e, p^m, w, all producers choose investment and employment optimally, good markets clear, and labor market clears.

The problem for the final good producers is given by,

$$\underset{y^e, y^m}{Min} \; p^e y^e + p^m y^m \; s.t.$$
$$y \leq \chi \left(y^e\right)^\beta \left(y^m\right)^{1-\beta}.$$

This minimization yields

$$\frac{y^e}{y^m} = \frac{\beta}{1-\beta} \frac{p^m}{p^e}, \tag{6}$$

Let us normalize $p = (p^e)^\beta (p^m)^{1-\beta} = 1$. Intermediate goods producers maximize profits taking the price and wage rate as given, which can be written as

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[15]This will become clearer when we analyze the political equilibrium.

$$\max \frac{(1 - \tau^j)}{1 - \alpha} p^j \left(k_i^j\right)^{1-\alpha} \left(l_i^j\right)^{\alpha} - w l_i^j - k_i^j, \tag{7}$$

where $j = e, m$. As there is no initial or final stock of capital, we are basically assuming that intermediate goods producers in each sector use units of final output to produce their goods. This implies that the price of capital is one, as it can be seen in (7). This problem yields

$$k_i^j = \left(p^j \left(1 - \tau^j\right)\right)^{\frac{1}{\alpha}} l_i^j \tag{8}$$

$$l_i^j = \begin{cases} = 0 & \text{if } w > \frac{\alpha}{1-\alpha} \left((1 - \tau^j) p^j\right)^{1/\alpha} \\ \in [0, \lambda] & \text{if } w = \frac{\alpha}{1-\alpha} \left((1 - \tau^j) p^j\right)^{1/\alpha} \\ = \lambda & \text{if } w < \frac{\alpha}{1-\alpha} \left((1 - \tau^j) p^j\right)^{1/\alpha} \end{cases} \tag{9}$$

Notice first in (9) that, whenever the marginal product of labor is smaller than the wage, the producer does not hire any workers. When the marginal product is bigger than the wage rate, a producer i of group j hires labor until reaching the maximum scale λ. It is also worth discussing the source of inefficiency in this economy. Looking at (8) we see that taxes discourage investment. This is because producers are only able to recover a fraction of what they invest.

We can replace (8) in (2) to find output for each individual of a group as a function of their labor demand,

$$y_i^j = \frac{1}{1 - \alpha} \left(p^j \left(1 - \tau^j\right)\right)^{\frac{1-\alpha}{\alpha}} l_i^j \tag{10}$$

and, using (10) together with (8), we can solve for the profits of each individual as a function of the price of that sector and the wage rate,

$$\pi_i^j = \left(\frac{\alpha}{1 - \alpha} \left(p^j \left(1 - \tau^j\right)\right)^{\frac{1}{\alpha}} - w\right) l_i^j. \tag{11}$$

For a given wage rate and employment, both output and profits will decrease with taxation because investment decreases. It will be useful to combine (10) with (6) to solve for the relative price of the two sectors (where recall that $y^j = \theta^j y_i^j$),

$$\frac{p^e}{p^m} = \left(\frac{1 - \tau^m}{1 - \tau^e}\right)^{1-\alpha} \left(\frac{\beta}{(1 - \beta)} \frac{\theta^m l_i^m}{\theta^e l_i^e}\right)^{\alpha}. \tag{12}$$

Most of the economic equilibrium has been already characterized. Because the implications for prices and wages of the model will differ, depending on whether there is full employment or not, we will analyze these two cases separately in the next subsections. I first analyze the equilibrium with excess labor supply and, in this case in which the wage rate drops to 0, firms will always make positive profits. When I analyze the equilibrium when

the labor market clears we will describe two types of equilibria. First, one in which nobody makes profits because they do not reach the capacity constraint, and second, one in which one of the groups reaches the capacity constraint and makes profits. Who makes the profits, and when, will be a crucial question for the characterization of the political equilibrium.

2.2.1 The Economic Equilibrium with Excess Labor Supply

When Condition (4) holds, there is excess supply of labor in equilibrium and $w = 0$. Equation (11) reveals that producers in both sectors always have positive profits, leading them to hire the maximum amount of labor possible: $l^e = \lambda \theta^e$ and $l^m = \lambda \theta^m$. It is clear then that taxes do not affect relative labor demands by each group. This is the main difference with the full employment case, and we will discuss the role it plays for the political equilibrium in the following sections.

With relative labor demands constant, the only way taxes affect output and profits is through investment and prices. Once we take into account the equilibrium levels of employment, (12) translates into

$$\frac{p^e}{p^m} = \left(\frac{1 - \tau^m}{1 - \tau^e} \right)^{1-\alpha} \left(\frac{\beta}{(1-\beta)} \frac{\lambda \theta^m}{\lambda \theta^e} \right)^{\alpha} .$$

The interpretation of this relative price equation is straightforward. For given tax rates, when the ratio of the middle class' size relative to the size of the sector in which they produce, $\lambda \theta^m / (1-\beta)$, is larger than the same ratio for the elite, the relative price of the good produced by the elite increases. For given relative sizes, increased tax rates in the middle class sector lead to smaller investment, which translates into lower production and a higher relative price for that good.

We can combine (12) with the price normalization to solve for the price levels as

$$p^e = \left(\frac{1 - \tau^m}{1 - \tau^e} \right)^{(1-\beta)(1-\alpha)} \left(\frac{\beta}{(1-\beta)} \frac{\lambda \theta^m}{\lambda \theta^e} \right)^{(1-\beta)\alpha} \tag{13}$$

$$p^m = \left(\frac{1 - \tau^m}{1 - \tau^e} \right)^{-\beta(1-\alpha)} \left(\frac{\beta}{(1-\beta)} \frac{\lambda \theta^m}{\lambda \theta^e} \right)^{-\beta\alpha} . \tag{14}$$

The next proposition summarizes the economic equilibrium when there is excess supply (proof in text):

Proposition 1 *When Condition (4) holds, for given taxes τ^e and τ^m, the economic equilibrium takes the following form: there is excess supply of labor, $w = 0$, and prices are given*

by (13) *and* (14)*. Given prices and wage rates, investment, employment, and output in each sector are given by* (8)*,* (9) *and* (10)*, respectively.*

It is useful to derive profits for each group and total output in the economy for future reference. Replace (13) and (14) in (10), and then replace the resulting equation in (1) to find total output in the economy as

$$y = \frac{\chi \left(\lambda \theta^e\right)^\beta \left(\lambda \theta^m\right)^{1-\beta}}{1-\alpha} \left((1-\tau^e)^\beta (1-\tau^m)^{(1-\beta)}\right)^{(1-\alpha)/\alpha}. \tag{15}$$

Again, it is clear that taxation in each sector reduces investment in that sector, which translates into a reduction of total output. Profits for each group are derived by replacing (13) and (14) into (11), and taking into account that all producers reach the maximum scale,

$$\pi^e = \frac{\alpha \left(\lambda \theta^e\right)^\beta \left(\lambda \theta^m\right)^{1-\beta}}{1-\alpha} \left(\frac{\beta}{1-\beta}\right)^{(1-\beta)} (1-\tau^e)^{1/\alpha} \left(\frac{(1-\tau^m)}{(1-\tau^e)}\right)^{(1-\beta)(1-\alpha)/\alpha} \tag{16}$$

$$\pi^m = \frac{\alpha \left(\lambda \theta^e\right)^\beta \left(\lambda \theta^m\right)^{1-\beta}}{1-\alpha} \left(\frac{\beta}{1-\beta}\right)^{-\beta} \left(\frac{(1-\tau^e)}{(1-\tau^m)}\right)^{\beta(1-\alpha)/\alpha} (1-\tau^m)^{1/\alpha}. \tag{17}$$

A number of points are worth mentioning. First, because the wage rate drops to 0, both groups make profits. Second, as mentioned before, taxing a sector reduces profits of the producers in that sector. Finally, for any of the groups, a tax in the other group's sector reduces their profits through its effect on the price. Taxing sector m makes the unit price of the consumption good more expensive, which decreases the real value of profits for the elite. As we have normalized the unit price to 1, this increase in the unit price translates into the price of sector e going down.

2.2.2 The Economic Equilibrium with Labor Market Clearing

The main difference in the case discussed in this section is that, as the labor market clears, differential tax rates across various sectors will affect the relative demand for labor in those sectors. To make profits, producers need to reach their maximum scale. Thus, the group that controls taxation -in this section the elite- can use taxes to modify relative demands and make profits in equilibrium. The more they turn relative demand in their favor, the less labor the other groups demand, which translates into lower factor prices and higher profits for the elite.

When Condition (4) does not hold, we can have two types of equilibria: one in which demand for goods produced by each group never exceeds what they can produce, and another

in which one group reaches the maximum scale.[16] The type of equilibrium we have will depend, for given taxes, on the size of both groups. It will be important to understand when any of the groups reach their maximum scale, because that is what determines profits and what will determine taxation once we analyze the political equilibrium. For this reason, we first characterize the equilibrium when none of the producers reach the maximum scale.

In this case, given that producers are price-takers, they make no profits in equilibrium, which looking at (11) pins down price levels,

$$p^j = w^\alpha \left(\frac{1-\alpha}{\alpha} \right)^\alpha \frac{1}{(1-\tau^j)}, \tag{18}$$

and using this together with the price normalization we get the following expression for the wage rate,

$$w = \frac{\alpha}{1-\alpha} \left((1-\tau^e)^\beta (1-\tau^m)^{(1-\beta)} \right)^{1/\alpha}. \tag{19}$$

From (19) we see that the wage rate will depend on both tax rates. When the labor market clears, because both sectors are not perfect substitutes for each other, labor demands for each sector will depend on tax rates, and this feeds back into the wage rate. We can now combine the relative price equation (12) with the price levels (18) and the wage rate (19) to derive the equilibrium levels of employment in each sector, $l^j = \theta^j l_i^j$,

$$l^e = \frac{1}{1 + \frac{(1-\beta)(1-\tau^m)}{\beta(1-\tau^e)}}, \quad l^m = \frac{1}{1 + \frac{\beta(1-\tau^e)}{(1-\beta)(1-\tau^m)}}. \tag{20}$$

We can see from (20) how taxes distort the relative allocation of resources between sectors. An increase in τ^e increases the relative price of good e, which decreases the relative demand for that good. In equilibrium, less labor will be allocated to that sector (and consequently less investment, as investment is proportional to labor), and more to sector m.

The equilibrium just derived holds as long as none of the groups reach their capacity constraint on labor. In particular, for this to be an equilibrium we need the equilibrium levels of employment to be smaller than the maximum scale for each group, $l^e \leq \lambda\theta^e$ and $l^m \leq \lambda\theta^m$. Combining these conditions with (20) we can express them as

$$\frac{1-\tau^m}{1-\tau^e} \geq \frac{\beta}{1-\beta} \frac{1-\lambda\theta^e}{\lambda\theta^e} \equiv \sigma(\beta, \theta^e) \tag{21}$$

$$\frac{1-\tau^m}{1-\tau^e} \leq \frac{\beta}{1-\beta} \frac{\lambda\theta^m}{1-\lambda\theta^m} \equiv \sigma(\beta, \theta^m) \tag{22}$$

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[16]Notice that because Condition (4) does not hold, we can never have both groups reaching the maximum scale at the same time.

where $\sigma(\beta, \theta^e) < \sigma(\beta, \theta^m)$ because Condition (4) does not hold. Notice that without taxation in this model the equilibrium level of employment in sectors e and m would be β and $(1 - \beta)$ respectively. As long as $\lambda\theta^e \geq \beta$ and $\lambda\theta^m \geq (1 - \beta)$, none of the groups would reach the maximum scale. With taxation, we have to take into account the distortion that taxation introduces in the allocation of resources across sectors. Equation (21) states that for the elite not to reach the maximum capacity, the equilibrium level of employment in sector e once we take into account the effect of taxation, has to be smaller than that capacity constrain. In other words, relative taxation has to more than compensate for the small capacity of the elite without taxation $(\beta/\lambda\theta^e)$. The second condition states the same for the middle class.

Whenever (21) does not hold and (22) holds, the elite producers hit the capacity constraint and thus they make profits in equilibrium. When (22) does not hold and (21) is satisfied, the opposite occurs. Notice that $\sigma(\beta, \theta^j)$ is just a measure of the size of the group relative to the size of the sector where they produce. If $\sigma(\beta, \theta^e) > 1$, that means that the elite producers are small relative to the size of their sector, and without taxation they would be constrained and make profits. If $\sigma(\beta, \theta^e) < 1$, they would not make profits unless taxation more than compensates for them being larger than the the sector in which they produce. We can summarize this result in the following Lemma (proof in text):

Lemma 1 *Assume Condition* (4) *does not hold. For given* $\sigma(\beta, \theta^e)$ *and* $\sigma(\beta, \theta^m)$, *where* $\sigma(\beta, \theta^e) < \sigma(\beta, \theta^m)$ *are defined in* (21) *and* (22), *if* $\sigma(\beta, \theta^e) < (1-\tau^m)/(1-\tau^e) < \sigma(\beta, \theta^m)$, *we have an equilibrium where no group reaches the maximum scale. Whenever* $(1-\tau^m)/(1-\tau^e) < \sigma(\beta, \theta^e)$, *then the elite producers are capacity constrained and make profits in equilibrium, and the middle class producers do not, as they do not reach the maximum scale. Finally, when* $\sigma(\beta, \theta^m) < (1 - \tau^m)/(1 - \tau^e)$, *the middle class producers are capacity constrained and make profits in equilibrium, while the elite do not.*

We proceed now to analyze the determination of prices and wages when a group reaches its maximum scale. To avoid repetition because of the symmetric structure, let us analyze the case in which the elite producers are constrained, and summarize the results for the other case at the end of this section.

If Condition (4) does not hold, then for the labor market to clear it has to be the case that

$$w = \min_j \left[\frac{\alpha}{1 - \alpha} \left((1 - \tau^j)p^j \right)^{1/\alpha} \right]. \tag{23}$$

The reason is that if both producers are making profits, total labor demand would be $\lambda\theta^e + \lambda\theta^m > 1$, and we would have excess demand for labor which pushes the wage level up, until

one of the groups is making no profits in equilibrium. Equation (23) automatically pins down the price level for the producer with no profits. Denote as $p^{j'}$ the price of the good in the sector where producers make no profits. Then

$$p^{j'} = \left(w\frac{1-\alpha}{\alpha} \right)^\alpha \frac{1}{1-\tau^{j'}}.$$

(24)

Equation (24) determines the price in sector m,

$$p^m = w^\alpha \left(\frac{1-\alpha}{\alpha} \right)^\alpha \frac{1}{(1-\tau^m)}.$$

(25)

The elite producers, because marginal product of labor is above the wage rate, hire as much labor as they can, which leaves the rest of the labor force for the middle class to produce in sector m, $l^e = \lambda\theta^e$ and $l^m = 1 - l^e = 1 - \lambda\theta^e$. We can combine this together with the expression for the relative price, (12), and the price level in sector m, (25), to solve for the price of sector e as

$$p^e = \left(\sigma(\beta,\theta^e)\frac{(1-\tau^e)}{(1-\tau^m)} \right)^\alpha w^\alpha \left(\frac{1-\alpha}{\alpha} \right)^\alpha \frac{1}{(1-\tau^e)}.$$

(26)

The equilibrium wage rate can be found again by combining (25), (26), and the price normalization ,

$$w = \frac{\alpha}{1-\alpha} \left((1-\tau^e)^\beta (1-\tau^m)^{(1-\beta)} \right)^{1/\alpha} \left(\sigma(\beta,\theta^e)\frac{(1-\tau^e)}{(1-\tau^m)} \right)^{-\beta}$$

(27)

Whenever the middle class producers are constrained and the elite producers are not, we are going to have $l^e = 1 - \lambda\theta^m$ and $l^m = \lambda\theta^m$, and the derivation of the prices and the wage rate is symmetrical to the case just analyzed. The solution is given by

$$p^e = w^\alpha \left(\frac{1-\alpha}{\alpha} \right)^\alpha$$

$$p^m = \left(\frac{1-\tau^m}{1-\tau^e}\frac{1}{\sigma(\beta,\theta^m)} \right)^\alpha w^\alpha \left(\frac{1-\alpha}{\alpha} \right)^\alpha \frac{1}{(1-\tau^m)}$$

(28)

$$w = \frac{\alpha}{1-\alpha} \left((1-\tau^e)^\beta (1-\tau^m)^{(1-\beta)} \right)^{1/\alpha} \left(\sigma(\beta,\theta^m)\frac{(1-\tau^e)}{(1-\tau^m)} \right)^{1-\beta}$$

We can see how the general equilibrium makes the price in a sector depend on the tax in the other sector. When none of the groups reach the maximum scale, the effect is only through labor market clearance, as described before. When a group is constrained, any taxation in

the other group also feeds back into the price through another channel; a tax in the other group increases the constrained group's relative demand and because they are constrained, quantity does not adjust. So for the intermediate goods market to clear the price of their good has to increase. We are ready now to summarize the results in Proposition 2 (proof in text):

Proposition 2 *For given taxes τ^e and τ^m, when Condition (4) does not hold, the economic equilibrium takes the following form: For $\sigma(\beta, \theta^e) < (1 - \tau^m)/(1 - \tau^e) < \sigma(\beta, \theta^m)$ none of the groups are constrained by the maximum scale and the wage rate and prices are given by (19) and (18). For $\sigma(\beta, \theta^e) < (1-\tau^m)/(1-\tau^e)$, the elite producers reach the maximum scale, and the wage rate and prices are given by (25) (26) and (27). Finally for $(1-\tau^m)/(1-\tau^e) > \sigma(\beta, \theta^m)$, the middle class producers reach the capacity constraint, and the wage rate and prices are given by (28). Given prices and wage rates, investment employment and output in each sector are given by (8), (9) and (10).*

Again, it will be useful to derive total output and profits for each group for future reference. Proceeding as before we have

$$y = \frac{\chi\left(\lambda\theta^{e\beta}\right)(1 - \lambda\theta^e)^{1-\beta}}{1 - \alpha}\left((1 - \tau^e)^\beta(1 - \tau^m)^{(1-\beta)}\right)^{(1-\alpha)/\alpha} \text{ for } \frac{(1 - \tau^m)}{(1 - \tau^e)} < \sigma(\beta, \theta^e) \quad (29)$$

$$y = \frac{1}{1 - \alpha}\frac{\left((1 - \tau^e)^\beta(1 - \tau^m)^{(1-\beta)}\right)^{1/\alpha}}{(1 - \tau^e)^\beta\beta + (1 - \tau^m)(1 - \beta)} \qquad \text{for } \sigma(\beta, \theta^e) < \frac{(1 - \tau^m)}{(1 - \tau^e)} < \sigma(\beta, \theta^m) \quad (30)$$

$$y = \frac{\chi(1 - \lambda\theta^m)^\beta\left(\lambda\theta^m\right)^{1-\beta}}{1 - \alpha}\left((1 - \tau^e)^\beta(1 - \tau^m)^{1-\beta}\right)^{(1-\alpha)/\alpha} \text{ for } \sigma(\beta, \theta^m) < \frac{(1 - \tau^m)}{(1 - \tau^e)}$$

The elite producers only make profits whenever they reach the maximum scale, so profits are

$$\pi^e = \frac{\theta^e\lambda}{\sigma(\beta, \theta^e)^\beta}\frac{\alpha}{1 - \alpha}\left[\sigma(\beta, \theta^e)(1 - \tau^e) - (1 - \tau^m)\right] \times \quad (31)$$

$$\left((1 - \tau^e)^\beta(1 - \tau^m)^{(1-\beta)}\right)^{(1-\alpha)/\alpha} \text{ for } \frac{(1 - \tau^m)}{(1 - \tau^e)} < \sigma(\beta, \theta^e)$$

In this section we have characterized the economic equilibrium. With excess labor supply, both groups make profits in equilibrium, but when the labor market clears the relative taxation on both sectors will determine who makes the profits. This immediately implies that groups with political power, by setting relative taxation, will be able to manipulate the relative allocation of resources in order to increase their profits. This will be important when discussing the political equilibrium.

2.3 Political Equilibrium under the Dictatorship of the Elite

I will now characterize the political equilibrium of this economy. I assume that political institutions correspond to a dictatorship of the elite, and the elite producers can choose those policies that benefit them the most. The only variables of choice for the government are the tax rates. As discussed previously, this can be interpreted in a broader sense. We may think of taxes also as expropriation, corruption, or other inefficient policies that translate into less investment and/or higher prices. Taxation is distortionary and there are no other means (in particular, no lump-sum taxes) to extract resources from the other producers. The existence of these policies does not imply that the elite will, necessarily, take advantage of them. But, in our model, the elite will want to tax other producers for two reasons: first, they may tax the middle class to extract revenues from them (Revenue Extraction), which is a direct benefit from taxation. Second, they may seek to benefit through an indirect channel: by taxing other groups with production activities, they reduce the demand for factors of these groups and benefit themselves through lower factor prices and higher profits (Factor Price Manipulation).

A political equilibrium is a set of policies $\{\tau^e, \tau^m, T^w, T^m, T^e\}$ that satisfies the budget constraint for the government, (3), and maximizes the elite's utility. Given the linear preferences, this translates into maximizing total income, where income of the elite is defined as the sum of profits and the transfer,

$$I^e = \pi^e + T^e, \tag{32}$$

It is straightforward to see that the elite will redistribute all of the revenues from taxation to themselves, so $T^w = T^m = 0$. Using this together with the government budget constraint, (3), the problem for the elite reduces to

$$\underset{\tau^e, \tau^m}{Max} \ \phi(\tau^e p^e y^e + \tau^m p^m y^m) + \pi^e$$

and combining this with the relative demands, (6), it translates into

$$\underset{\tau^e, \tau^m}{Max} \ \phi y(\beta \tau^e + (1-\beta)\tau^m) + \pi^e. \tag{33}$$

To make the analysis as clear as possible and to emphasize the different sources of inefficiency, I analyze each of these sources separately by restricting the set of parameters.[17]

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[17]The general case with both forces at play at the same time does not provide more insights than those in here and it complicates the analysis.

2.4 Revenue Extraction

In this section, let us assume there is excess labor supply; i.e., Condition (4) holds. With this assumption, we remove Factor Price Manipulation as a possible source of taxation-induced inefficiency. Wages are now 0 and unaffected by taxation, so the elite rulers do not have an incentive to tax to increase profits. But this by itself will not remove all the effect of taxation on profits, as profits will depend on both levels of taxation through the price levels and the general equilibrium. Assume also that $\phi > 0$: the elite has enough state capacity to redistribute taxation to themselves.

We can combine equations (33), (15), and (16) to write the elite's problem as

$$\underset{\tau^m, \tau^e}{Max} \frac{\chi (\lambda \theta^e)^\beta (\lambda \theta^m)^{1-\beta}}{1 - \alpha} \left((1 - \tau^e)^\beta (1 - \tau^m)^{(1-\beta)} \right)^{(1-\alpha)/\alpha} \times$$
$$\left(\phi \left(\beta \tau^e + (1 - \beta)\tau^m \right) + \alpha \beta (1 - \tau^e) \right).$$

The solution to this problem (see the appendix for the details) is

$$\tau_{RE}^e = 0$$
$$\tau_{RE}^m = Max \left[0, \frac{\alpha (\phi - \beta(1 - \alpha))}{\phi(1 - \beta(1 - \alpha))} \right],$$

where RE stands for Revenue Extraction. This is straightforward to interpret. The elite producers never want to tax themselves. Taxing themselves has two opposite effects. First, the only benefit is that elite producers get all the revenues from taxation. But this increases the price of the goods they produce, and it reduces their profits. Without considering profits, the elite would want to tax themselves, as they get all the revenue and they only suffer part of the price increase (they only consume a fraction of what they produce). But the additional effect of a reduction in profits dominates and, therefore, they never tax themselves in equilibrium.

Notice the impact of taxing the middle class on the elite's profits through the general equilibrium effect. Taxing the middle class makes their goods more expensive, which reduces the real value of the elite's profits. When the elite's motivation to tax comes from Revenue Extraction they would like to set a tax rate on the middle class that places them at the peak of the Laffer Curve, $\tau^m = \alpha$. But this must be weighed against the commensurate reduction in the elite's profits through the general equilibrium. Only when the Resource Extraction motive for taxing is strong enough to compensate for the general equilibrium effect will we have $\tau_{RE}^m > 0$. Thus, the general equilibrium limits the extent to which the

elite can expropriate the middle class.

Also, notice that taxation in the middle class sector increases as ϕ increases, and in particular, when the Resource Extraction motive has its biggest importance, $\phi = 1$, $\tau_{ES}^m = \alpha$. Larger state capacity helps overcome the general equilibrium effect, and when state capacity is at its maximum level, the elite are able to set their most desired tax rate. Taxation is also increasing with α. The larger α is, the less distortion taxation creates, which leads to a bigger tax rate. Additionally, the larger the size of the sector where the elite produce, β, the smaller taxation on the middle class sector is. This is because a larger β makes profits more important as a source of income for the elite, exacerbating the general equilibrium effect.

The following Proposition summarizes these findings,

Proposition 3 *When Condition* (4) *holds and* $\phi > 0$, *the unique political equilibrium features* $\tau_{RE}^e = 0$ *and* $\tau_{RE}^m = Max \left[0, \frac{\alpha(\phi - \beta(1-a))}{\phi(1-\beta(1-\alpha))} \right]$ *and the equilibrium tax rate for sector* m *increases with* α *and* ϕ, *and decreases with* β.

Proof. See Appendix ∎

2.5 Factor Price Manipulation

So far, we have analyzed the political equilibrium when the only source of inefficiency was Revenue Extraction. Let us develop the opposite scenario. In this section we assume that $\phi = 0$. Remember, ϕ reflects the ability of the elite to collect and redistribute taxes. When $\phi = 0$, everything that is collected is lost: the elite receive no direct benefit from taxation. Their only profit, then, comes from production activities. The elite thus need to be reaching their maximum scale in the production of good e. From Proposition 1 we know that this is going to be the case as long as $(1 - \tau^m)/(1 - \tau^e) < \sigma(\beta, \theta^e)$.

When the elite producers are capacity constrained, profits are going to be given by (31). In this case it is clear that the elite will never tax themselves, as taxing themselves has only the negative effect on profits, directly and through the wage rate. The problem for the elite can then be written as

$$\underset{\tau^m}{Max} \frac{\theta^e \lambda}{\sigma(\beta, \theta^e)^\beta} \frac{\alpha}{1-\alpha} \left[\sigma(\beta, \theta^e) - (1 - \tau^m) \right] (1 - \tau^m)^{(1-\beta)(1-\alpha)/\alpha}$$

$$s.t. \ (1 - \tau^m) < \sigma(\beta, \theta^e).$$

Notice first that the profit margin now depends on the tax rate on the middle class. The reason is that in this type of equilibrium, demand for labor in sector e (and supply of good e) is totally inelastic because the elite producers are reaching their capacity constraint. Any

decrease in $(1 - \tau^m)$, which leads to an increase in relative demand of good e, translates into an increase in the price of good e. From this point of view, the elite would want to tax sector m as much as possible. But the general equilibrium effect will stop them from doing so. The restriction just captures the fact that the elites need to be in the region where they have positive profits to have income.

The *F.O.C.* of this problem is

$$-\frac{(1-\beta)(1-\alpha)}{\alpha}\frac{\pi^e}{(1-\tau^m)} + \frac{\pi^e}{[\sigma(\beta,\theta^e) - (1-\tau^m)]} = 0,$$

and we can rewrite this as

$$(1-\tau^m) = \sigma(\beta,\theta^e)\frac{(1-\beta)(1-\alpha)}{\alpha + (1-\beta)(1-\alpha)}$$

We will have positive taxation as long as $\sigma(\beta,\theta^e) < ((1-\beta)(1-\alpha) + \alpha)/(1-\beta)(1-\alpha)$: if the size of the elite relative to the size of the sector where they produce is small ($\sigma(\beta,\theta^e)$ large), the elite producers will make profits even without taxation. There is no need for the elite to tax the middle class, and they will choose not to do so because taxing reduces profits through the general equilibrium effect. For the elite to tax the middle class, the elite producers have to be large enough relative to the size of the sector where they produce.

When this is the case, τ^m depends positively both on α and $\lambda\theta^e$. A big $\lambda\theta^e$ means that the elite will have excess capacity without taxation. The bigger $\lambda\theta^e$ is, the higher is the required tax on the middle class for the elite to make profits. A higher α implies that the distortion in investment is going to have a small effect because the weight of capital in the production of goods is small, which allows the elite to set higher taxes. Finally, the effect of β is also negative. An increase in β decreases the weight of sector m in the price level and consequently in the wage rate. Distorting p^m is going to have a smaller effect in the wage rate in equilibrium which tends to increase the desired tax rate on the middle class. Increasing β, however, reduces the necessity of taxing in order to make profits through $\sigma(\beta,\theta^e)$, and this effect dominates the first one. We summarize the results in the next Proposition (proof in text):

Proposition 4 *When Condition* (4) *does not hold and* $\phi = 0$, *the unique political equilibrium features* $\tau^e_{FPM} = 0$ *and* $\tau^m_{FPM} = Max\left[0, 1 - \sigma(\beta,\theta^e)\frac{(1-\beta)(1-\alpha)}{\alpha+(1-\beta)(1-\alpha)}\right]$ *and the equilibrium tax rate for sector* m *increases with* α *and* $\lambda\theta^e$ *and decreases with* β.

Again we see how the general equilibrium effect works as a limit on the extent to which the elite can expropriate the middle class. Without it, the elite would want to tax as much

as possible. And notice that without tax revenues there is no Laffer Curve. Without general equilibrium effect the elite would want to fully expropriate the middle class. But because the real value of their profits decreases with taxation in the other sector, they will only tax whenever it is strictly necessary; that is, when they have excess capacity.

Which source of inefficiency, Revenue Extraction or Factor Price Manipulation, leads to higher taxes depends on the size of the elite as a group. When the source of inefficiency is Revenue Extraction, the tax rate is the same no matter what the size of the elite is. For Factor Price Manipulation, Proposition 4 states that the tax rate increases with the size of the elite. In particular, notice that when $\lambda\theta^e = \beta$ $(\sigma(\beta, \theta^e) = 1)$, $\tau_{FPM}^m = \alpha/(\alpha + (1-\beta)(1-\alpha)) > \alpha \geq \tau_{RE}^m$. Also, we discussed earlier that for $\lambda\theta^e << \beta$ $(\sigma(\beta, \theta^e) >> 1)$, $\tau_{FPM}^m = 0 \leq \tau_{RE}^m$. Thus Factor Price Manipulation will generate higher taxation when the elite producers are big as a group because they would have excess capacity without taxation, and the bigger the excess capacity they have, the more they need to tax to distort demands in order to make profits.

The key for the results in the political equilibrium is that the elite producers not only set policies but also take part in production activities, which allow them to make profits. Because they make profits, they want to tax the middle class more than themselves. But taxing asymmetrically distorts the allocation of resources across sectors and, as a consequence, taxing the middle class not only reduces total tax revenues (the Laffer Curve effect) but also reduces the elite's profits as the relative price of their goods decreases fast with taxation. This restrains the elite from taxing the middle class too much.

3 Opening the Economy to International Trade

This section modifies the previous framework by allowing international trade in intermediate goods. The main result will be that, as trade removes the general equilibrium effect that distorting the relative price has on the elite's profits, expropriation/taxation will increase with increased trade integration.

I assume a small open economy that has access to world markets for goods m and e. These goods sell at prices p^{e*} and p^{m*}, and are produced with the same technologies in the rest of the world. We assume the forces relevant in the small open economy do not apply for the rest of the world: with both sectors using the same technology and no scarce "factors" it is clear that both intermediate goods will sell at the same price in world markets. And because we have normalized the unit price for the consumption bundle to one, this immediately implies that the price for both intermediate goods will be one and employment in each sector will

be β and $1 - \beta$.[18]

It will be useful to discuss the source for gains derived from trade in the context of this model without expropriation. If one group of producers is small relative to the size of the other, the goods they produce are very expensive in the closed economy: the relative price for that good is greater than one, and opening to trade will allow others to buy those goods at lower prices. Benefits from trade for this economy derive from the relative scarcity of the groups, or, in other words, the relative abundance of a group in our economy provides them with comparative advantage in the production of that good. This is a simplification, as we could think of the size of both groups as incorporating differences in productivity as well, and then talk about comparative advantage in terms of effective endowments of social groups.[19]

Let us proceed by first solving for the economic equilibrium for a given set of policies, and then move on to characterizing the political equilibrium.

3.1 Economic Equilibrium with Trade

Most of the derivations from Section 2 are valid in this Section; to avoid repetition, we will simply emphasize what is new. For clarity of exposition, I will derive the equilibrium for p^{e*} and p^{m*} and simply replace them with one whenever is needed to discuss results.

When Condition (4) holds we have an excess supply of labor at home and wages will again drop to 0, which means that for any price level in the world market and any domestic tax level both groups produce and make profits. Given that the wage rate drops to 0 all producers hire labor until reaching the maximum scale. Replacing the price levels in (10), the levels of output in each sector are

$$y^e = \frac{1}{1 - \alpha} \left(p^{e*} \left(1 - \tau^e \right) \right)^{\frac{1-\alpha}{\alpha}} \lambda \theta^e \tag{34}$$

$$y^m = \frac{1}{1 - \alpha} \left(p^{m*} \left(1 - \tau^m \right) \right)^{\frac{1-\alpha}{\alpha}} \lambda \theta^m. \tag{35}$$

where we already have replaced for the employment levels. Notice that output in sector j only depends on taxation in sector j. This is the result of two things. First, excess supply of labor removes any effect of taxation on the wage rate. Second, because prices are set outside the domestic economy, relative taxation does not affect relative prices.

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[18] By normalizing the relative price of intermediate sectors to 1 for the rest of the world I abstract from any source of comparative advantage, other that the difference on tax rates. This allows for a cleaner discussion of the main result of the paper.

[19] This assumption implies that the elites will only control the exporting sector if they are a large group. This may seem counterfactual in some historical cases, but it is just the consequence of assuming no productivity differences across groups and it does not affect the analysis.

For future reference and proceeding as in the closed economy, total profits for each group are

$$\pi^e = \left(\frac{\alpha}{1-\alpha} \left(p^{e*} \left(1 - \tau^e \right) \right)^{\frac{1}{\alpha}} \right) \lambda \theta^e \tag{36}$$

$$\pi^m = \left(\frac{\alpha}{1-\alpha} \left(p^{m*} \left(1 - \tau^m \right) \right)^{\frac{1}{\alpha}} \right) \lambda \theta^m, \tag{37}$$

where again, profits in sector j only depend on taxation in sector j.

If Condition (4) does not hold, it will still be the case that prices will not depend on taxation, but wages will. In particular for given prices and taxes, the wage rate has to clear the labor market, and will be given by (23). If we denote with j' the group with the minimum $(1 - \tau^j)p^{*j}$, that is, the group with no profits in equilibrium, the economic equilibrium with trade is as follows: the other group, j, has profits in equilibrium and reaches the maximum scale, $l^j = \lambda \theta^j$, while group j' hires the rest of the labor, $l^{j'} = 1 - \lambda \theta^j$, so levels of output in each sector are

$$y^j = \frac{1}{1-\alpha} \left(p^{j*} \left(1 - \tau^j \right) \right)^{\frac{1-\alpha}{\alpha}} \lambda \theta^j \tag{38}$$

$$y^{j'} = \frac{1}{1-\alpha} \left(p^{j'*} \left(1 - \tau^{j'} \right) \right)^{\frac{1-\alpha}{\alpha}} \left(1 - \lambda \theta^j \right). \tag{39}$$

and total profits for each group are

$$\pi^j = \left(\frac{\alpha}{1-\alpha} \left(p^{j*} \left(1 - \tau^j \right) \right)^{\frac{1}{\alpha}} - w \right) \lambda \theta^j$$

$$\pi^{j'} = 0 \tag{40}$$

Let us describe the pattern of export/imports in this model. Total domestic consumption of each intermediate good is given by

$$p^{e*}c^e = \beta(p^{e*}y^e + p^{m*}y^m) \tag{41}$$

$$p^{m*}c^m = (1 - \beta)(p^{e*}y^e + p^{m*}y^m, \tag{42}$$

where we use c^j to differentiate aggregate consumption of good j from aggregate production of that good. A country is a net exporter of good j if $p^{j*}c^j < p^{j*}y^j$, which implies that the domestic economy is a net exporter of good e (importer of good m) if $(1-\beta)p^{e*}y^e > \beta p^{m*}y^m$.

In the case of excess labor supply this translates into

$$\frac{p^{e*}}{p^{m*}} > \left(\frac{1-\tau^m}{1-\tau^e}\right)^{1-\alpha} \left(\frac{\beta}{(1-\beta)}\frac{\lambda\theta^m}{\lambda\theta^e}\right)^{\alpha},$$

and, with full employment and assuming that the elite producers are the ones with profits (which will be the case in equilibrium), this translates into

$$\frac{p^{e*}}{p^{m*}} > \left(\frac{1-\tau^m}{1-\tau^e}\right)^{1-\alpha} \left(\frac{\beta}{(1-\beta)}\frac{1-\lambda\theta^e}{\lambda\theta^e}\right)^{\alpha}.$$

Notice that in both cases the right-hand side of the equation corresponds to a measure of relative employment in each sector adjusted by the distortions that taxation creates on relative productivity. If the middle class is larger relative to the size of their sector compared with the elite (and adjusted by relative taxation), the country has a comparative advantage in the production of that good and consequently it will be a net exporter of that good. If we did not have either taxation or capacity constraints in this model, the relative price of the two sectors in equilibrium would be one because both sectors use the same technology. But because there are capacity constraints, the size of the groups determines comparative advantage. The next Proposition summarizes the results (proof in text):

Proposition 5 *For a small open economy, for given taxes τ^e and τ^m, and world prices for intermediate goods, p^{e*} and p^{m*}, the economic equilibrium takes the following form: When Condition (4) holds, there is excess supply of labor and wages drop to 0. When Condition (4) does not hold, the wage rate is given by (23). Given prices and wage rates, investment employment and output in each sector are given by (8), (9) and (10).*

Notice that an increase in the taxation on the middle class will reduce their investment and production but it will not affect the prices in the elite's sector, and thus it will not affect their production. Now that the country has access to these goods in foreign markets, taxation policy will not affect the real value of the elite's profits. The distortion will affect exports and imports: first, production by the middle class decreases, and second, consumption in the domestic economy decreases as a consequence of the decrease in total income. If the elite are exporting their good, they can compensate for the decrease in the middle class' demand by exporting more abroad and importing more of the other goods. If the economy is a net importer for the elite's good, an increase in taxation on the middle class will induce fewer exports of good m and less imports of good e.

3.2 Political Equilibrium with Trade

We have seen how the general equilibrium effect was limiting the elite from taking full advantage from taxation on the middle class sector. When the economy is open to trade this will not necessarily be the case. As discussed in the Introduction, the key difference between a closed and an open economy is that, in the latter, taxation in both sectors is no longer linked through the general equilibrium (other than through the wage rate). Prices in one sector do not depend on taxation in the other. This observation drives the principal finding of this paper: trade increases the inefficiency of political institutions with limited checks on the executive power because it removes the general equilibrium effects that prevent the elite from extracting too much rents in a closed economy.

We proceed now to describe the political equilibrium as in the closed economy, by analyzing each source of inefficiency separately.

3.2.1 Revenue Extraction

Proceeding as before, assume that Condition (4) holds so that we isolate the Revenue Extraction source of inefficiency. Assume also that $\phi > 0$. The elite's problem is now

$$\underset{\tau^m, \tau^e}{Max} \phi \; \frac{\tau^e}{1-\alpha} \left(p^{e*}\right)^{\frac{1}{\alpha}} \left(1 - \tau^e\right)^{\frac{1-\alpha}{\alpha}} \lambda\theta^e + \left(\frac{\alpha}{1-\alpha} \left(p^{e*} \left(1-\tau^e\right)\right)^{\frac{1}{\alpha}}\right) \lambda\theta^e +$$
$$\phi \frac{\tau^m}{1-\alpha} \left(p^{m*}\right)^{\frac{1}{\alpha}} \left(1 - \tau^m\right)^{\frac{1-\alpha}{\alpha}} \lambda\theta^m.$$

This returns to the main point. The elite's profits no longer depend on taxation in sector m, because opening to trade removes the general equilibrium effect. The first order condition with respect to τ^e is always negative: the elite producers never want to tax themselves. Given that the solution to this problem is straightforward, income of the elite is maximized when $\tau^m_{RE,T} = \alpha$ where T stands for trade. The elite tax the middle class at the peak of the Laffer Curve, because taxing sector m does not affect the value of their profits. In the closed economy, this was not the case. The elite could not tax the middle class too much because good m was produced exclusively by the middle class, and excessive taxation meant increasing the price of the consumption good, which meant a reduction in the real value of the elite's profits. With trade, taxation affects trade volumes instead of relative prices, since the domestic economy now can find those goods in the world's markets. Opening to trade increases inefficiency by increasing substitutability between the elite's and the middle class' sectors.

The only case in which this is not true is when the rulers have maximum state capacity; i.e., $\phi = 1$. In the closed economy, the elite behaves as if there was no general equilibrium

effect when $\phi = 1$, because the gains of taxing at the peak of the Laffer Curve more than outweigh the losses of the general equilibrium effect. The following Proposition summarizes this result (proof in text):

Proposition 6 *For a small open economy, given world prices for intermediate goods, p^{e*} and p^{m*}, the unique political equilibrium when the source of inefficiency is Revenue Extraction features $\tau^m_{RE,T} = \alpha$. Trade weakly increases taxation/inefficiency.*[20]

3.2.2 Factor Price Manipulation

Assume now that there is no Revenue Extraction motive for taxation, $\phi = 0$ and Condition (4) does not hold. Then the elite producers only care about profits and their problem becomes

$$\underset{\tau^m}{Max}\ \pi^e = \left(\frac{\alpha}{1-\alpha} p^{e*\frac{1}{\alpha}} \left(1 - \tau^e\right)^{\frac{1-\alpha}{\alpha}} - w \right) \lambda \theta^e,$$

with the wage rate defined as in (23). Notice from the wage equation (23) that the elite will only make profits if $(p^{e*}(1 - \tau^e))^{\frac{1}{\alpha}} < (p^{m*}(1 - \tau^m))^{\frac{1}{\alpha}}$. In other words, the elite has to tax middle class enough to make the value of their labor productivity greater than that of the middle class. If the elite tax themselves, it becomes harder for them to make profits and it reduces profits when they have them. So, they forego doing so. The elite will tax the middle class in order to reduce the middle class' labor productivity to less than their own. But now there is no general equilibrium effect stopping the elite from pushing taxation even higher. So, it is clear that in this case the elite is going to tax the middle class as much as they can, dropping the wage rate to 0, $\tau^m_{FPM,T} = 1$.[21] Again, opening to trade exacerbates policy inefficiencies by removing the moderating power of the general equilibrium effect. The results for the political equilibrium are summarized in this Proposition (proof in text):

Proposition 7 *For a small open economy, given world prices for intermediate goods, p^{e*} and p^{m*}, the unique political equilibrium when the source of inefficiency is Factor Price Manipulation features $\tau^m_{FPM,T} = 1$. Trade increases taxation/inefficiency*

The intuition behind this increased inefficiency is the same than before: access to foreign markets allows the elite to find what the middle class produces somewhere else. Because of this, taxing the middle class does not affect the real value of the elite's profits and they are free to extract as much rent as they desire. With trade, inefficiency increases through

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[20] "Weakly" just reflects that in the case with $\phi = 1$ inefficiency does not change.

[21] Taxing the middle class at the highest rate is highly inefficient, and this result comes directly from assuming $\phi = 0$. As long as $\phi > 0$, since labor demand will shift from one sector to the other, the tax rate on the middle class will never go to 1.

an increase in expropriation and the distortions that this increased expropriation creates on investment.

That the effects of taxation on prices disappear with trade is specific to the small open economy case. But the main result would remain consistent. Trade increases competition and, through that, it increases the substitutability between domestic sectors, which increases the incentives of the group in power to extract rents from other groups.[22]

4 Welfare Analysis

In this section, I analyze the winners and losers in this process of trade integration. The results will be a balance between two effects. First, as shown in Propositions 6 and 7, trade increases expropriation and this will benefit the group in power, while damaging everyone else. Second, trade benefits the group that is relatively abundant in the economy, as it increases the price of that good with respect to the closed economy. I will characterize when it is the case that one effect dominates the other for each group. Finally, for the country to win with trade, winners have to win more than losers lose; in this context, due to the increased expropriation after trade, this is not necessarily the case. The conditions for when this is the case will be derived in this section.

For the rest of the paper, let us replace $p^{e*} = p^{m*} = 1$. Comparing welfare will be reduced to comparing income levels, because preferences are linear. Total income in the economy is given by

$$W = w + \pi^e + \pi^m + T^e,$$

that is, total profits for each group, transfers, and the wage from the workers. Let me again proceed by separating the analysis in two parts, one for each source of inefficiency.[23]

4.1 Revenue Extraction

The first thing to point out is that when Revenue Extraction is the only source of inefficiency workers will not be affected by trade opening, as in both cases wages will be 0.

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[22]As discussed in the introduction, the result that trade increases inefficiency through the increase in expropriation is true as long as there is certain complementarity between what the elites and the middle class produce. In the paper this is captured by assuming an elasticity of one (Cobb-Douglas technology for the final good). If I was to allow for a more general case, the result would be stronger the smaller the elasticity of substitution between those two sectors. Of course, if both sectors were perfect substitutes, opening to trade would have no effect on expropriation.

[23]It is important to point out that trade liberalization is exogenous. If I was to endogenize the decision to liberalize, the elites would only do so when they benefited from it. And in most of those cases, as discussed below, they would do so at the expense of the economy, that is, welfare would decrease with trade liberalization.

Total welfare before and after trade is then

$$W_{RE} = \pi^e_{RE} + \phi\tau^m_{RE}p^m_{RE}y^m_{RE} + \pi^m_{RE}$$

$$W_{RE,T} = \pi^e_{RE,T} + \phi\tau^m_{RE,T}p^{*m}_{RE,T}y^m_{RE,T} + \pi^m_{RE,T},$$

where the first two terms are profits and taxation that go to the elite and the third term are profits of the middle class. Let me look first at what would happen in this model without taxation. Both the middle class and the elite make profits before and after trade. Who wins and who loses with trade depends on whose profits go up. Taking the expression for profits and eliminating taxation from them we see that the elite producers win with trade if

$$\left(\frac{\lambda\theta^m}{\lambda\theta^e}\right) < \frac{\beta}{1-\beta},$$

and the middle class wins if this condition does not hold,

$$\left(\frac{\lambda\theta^m}{\lambda\theta^e}\right) > \frac{\beta}{1-\beta}$$

This is straightforward to interpret. Before trade prices are determined by relative abundance of each group, so the group that is more abundant has smaller profits. Opening to trade implies that the price for the abundant group goes up while the price for the scarce group goes down.

Let us look now at what happens in our model once we incorporate taxation. Proposition 8 summarizes the results.

Proposition 8 *When Revenue Extraction is the source of inefficiency and the economy opens to trade, workers are unaffected. The middle class wins with trade whenever $\left(\frac{\lambda\theta^m}{\lambda\theta^e}\right) > \left(\widehat{\frac{\lambda\theta^m}{\lambda\theta^e}}\right)$, where $\left(\widehat{\frac{\lambda\theta^m}{\lambda\theta^e}}\right) > \frac{\beta}{1-\beta}$ is defined in (43) (Appendix). The elite producers win with trade whenever $\frac{\lambda\theta^m}{\lambda\theta^e} < \overleftrightarrow{\frac{\lambda\theta^m}{\lambda\theta^e}}$, and $\frac{\lambda\theta^m}{\lambda\theta^e} > \overrightarrow{\frac{\lambda\theta^m}{\lambda\theta^e}}$, where $\frac{\beta}{1-\beta} < \overleftrightarrow{\frac{\lambda\theta^m}{\lambda\theta^e}} < \overrightarrow{\frac{\lambda\theta^m}{\lambda\theta^e}}$ are defined in (44) (Appendix). Welfare decreases in the whole economy when opening to trade whenever $\frac{\lambda\theta^m}{\lambda\theta^e} \in \left(\underline{\frac{\lambda\theta^m}{\lambda\theta^e}}, \overline{\frac{\lambda\theta^m}{\lambda\theta^e}}\right)$, where $\underline{\frac{\lambda\theta^m}{\lambda\theta^e}}$ and $\overline{\frac{\lambda\theta^m}{\lambda\theta^e}}$ are defined in (46).*
    Proof. *See Appendix* ∎

Let us interpret this proposition. The first statement says that the middle class producers only benefit with trade only when they are large enough relative to the size of the elite. And this is again capturing comparative advantage: when the middle class are large their prices are really low in the closed economy. Opening to trade increases the price of the good

trade. Second, the middle class will remain unaffected by trade opening: they make no profit in either case [24] Thus, whether the economy wins or loses with trade will depend on whether the elite producers win enough to outweigh the welfare loss of the workers. Proposition 9 summarizes the results:

Proposition 9 *When Factor Price manipulation is the source of inefficiency and the economy opens to trade, workers always lose. The middle class is unaffected, having no profits either before or after trade. For the elite producers, if (50) (Appendix) holds they win with trade whenever $\lambda\theta^e > \underline{\lambda\theta^e_{FPM}}$, where $\underline{\lambda\theta^e_{FPM}} < \beta$ is defined in (49) (Appendix). Whenever (50) does not hold, elite producers win with trade when $\lambda\theta^e > \overline{\lambda\theta^e_{FPM}}$, with $\overline{\lambda\theta^e_{FPM}} > \beta$ defined in (51) (Appendix). Welfare decreases in the whole economy when opening to trade whenever $\lambda\theta^e < \lambda\theta^e_{FPM}$, where $\lambda\theta^e_{FPM} > \beta$ is defined in (48) (Appendix).*

Let us discuss the intuition behind these results. Why do the elite producers lose with trade when they are a small group? In this model, comparative advantage with the rest of the world is determined by the relative size of each group. When the elite producers are small, that means that in the closed economy the prices of the goods they produce are very high because they are the scarce "factor". On the other hand, trade allows the elite rulers to tax the middle class more heavily, dropping the wage rate to 0. Which effect dominates will depend on how small the elite producers are, the smaller the group the bigger the drop in prices, which might more than outweigh the decrease in the wage rate. Notice that, as in the previous section, the elite benefit from trade for a bigger range of parameters than without expropriation.

Also, because the only group that ever wins with trade is the elite producers (whenever they do), for trade to be welfare enhancing it must be the case that the economy is almost only composed of this elite. The country only wins with trade if the elite is a very large part of society.

By adding expropriation, we go from a situation where the economy always wins with trade and the elite either loses or stays the same, to another situation in which the economy loses with trade unless the elite producers are a very big group, and the elite producers win unless they are a very small group. This is the heart of the problem: political institutions allow the elite producers to choose the policies that benefit them the most, without considering their repercussions on other groups of society. And they manage to benefit from trade at the expense of these other groups.

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[24]In the closed economy the elite producers always tax the middle class to shift relative demand until they make profits. The only case when they do not tax the middle class is when $\sigma(\beta, \theta^e) > 1$. Lemma 1 shows that the middle class producers do not make profits either in this case.

they produce and benefits them. But notice that the condition now is more restrictive than before, $\left(\widehat{\frac{\lambda\theta^m}{\lambda\theta^e}}\right) > \frac{\beta}{1-\beta}$. And this is reflecting the fact that trade increases expropriation. For the middle class producers to win with trade, their relative size has to be large enough to outweigh the increase in expropriation too.

For the elite the analysis is similar. Because they benefit from the increase in expropriation their relative size does not have to be as large for them to benefit with trade, $\frac{\lambda\theta^m}{\lambda\theta^e} < \overleftrightarrow{\frac{\lambda\theta^m}{\lambda\theta^e}}$, where $\frac{\beta}{1-\beta} < \overleftrightarrow{\frac{\lambda\theta^m}{\lambda\theta^e}}$. Notice that the elite producers also benefit with trade when they are small enough, that is when $\frac{\lambda\theta^m}{\lambda\theta^e} > \overrightarrow{\frac{\lambda\theta^m}{\lambda\theta^e}}$. The reason is that their income is composed of profits and taxation. When the middle class is a very large group, most of the elite's income comes from tax revenues. Also, when the middle class producers are very large, their price goes up when they open to trade. This benefits the elite too, and more than outweighs the decrease in the elite's profits.

Welfare increases with trade only if the elite producers are either very large or very small. And this is simple to interpret. When the two groups are very similar, the relative price of their goods is close to 1. This means that the gains from opening to trade are not that large. In this case the increase in inefficiency outweighs the gains from trade. We need the gains from trade to be large enough for trade to be welfare enhancing. And this is the case when the groups are very different in size.

4.2 Factor Price Manipulation

Whenever this is the case we have seen that only the elite producers make profits, both with and without trade. Also, because state capacity is null, $\phi = 0$, there is no direct benefit from taxation, $T^e = 0$. Total welfare before and after trade is then

$$
\begin{aligned}
W_{FPM} &= w_{FPM} + \pi^e_{FPM} \\
W_{FPM,T} &= \pi^e_{FPM,T}.
\end{aligned}
$$

Let us discuss first what would happen in this model without taxation. As we have already discussed, the economy as a whole would always win. What happens with the elite and the middle class in such a model? Because prices would be equal in both sectors, neither of the groups would make profits with trade: all the benefits would go to labor. Thus, the elite producers would lose with trade whenever they had profits in the closed economy, that is when $\beta > \lambda\theta^e$.

When we incorporate taxation two points are worth making. First, workers are strictly worse off. Wages drop from a positive value in the closed economy all the way down to 0 with

Finally, it is important to point out that the bigger losers in this context are the workers. The middle class producers make no profit either before or after trade; they are equally expropriated. But taxation on the middle class actually leaves the workers worse off through its effect on wages: the elite producers manage to expropriate all labor income from them.

5 Political Equilibrium under Democracy

Let us now briefly discuss what happens when, instead of a dictatorship of the elite, we have a democracy. A democracy is a set of political institutions that gives the right to vote and thus take part in the policy-making process to the majority of the population. In what follows I assume $\theta^e + \theta^m < 1$. With this assumption political institutions that give all the political power to the workers correspond to a democracy, as workers are the majority. It could be argued that this is an ad-hoc assumption about the composition of power in a democracy, that democracies do not necessarily represent the preferences of the workers; in most of the developed world, for example, the majority is the middle class. At a first approximation, however, when a country transitions from dictatorship to democracy, it tends to be the case that most of its society is composed of workers. When one examines the dictatorships in today's less-developed economies, in most cases one finds that workers are in the majority. Great levels of inequality, a small elite, and an almost non-existent middle class characterize most economies with dictatorships, especially in sub-Saharan Africa.

The main difference between democracy and dictatorship for these purposes is that the workers, participating as they do in all sectors of the economy, have preferences for inefficiency that are in line with the economy as a whole. In other words: because workers are hired in all sectors, and because they do not care about profits, they do not want to distort resource allocation across sectors. Because they do not distort resource allocation across sectors, it is not costly for them to set their desired tax rates in the closed economy on a basis other than the standard Laffer Curve. As a consequence, trade will not have an effect on the taxes they set.

The following sections will characterize the political equilibrium of this democracy with and without trade. Before doing that, let us note what happens when the source of inefficiency is exclusively Factor Price manipulation, $\phi = 0$. This is a very trivial case. Workers never make profits and they are not able to benefit directly from taxation. Because any taxation feeds directly into the wage rate and reduces it, both with and without trade, they will never set a positive level of taxation in any of the groups. Therefore, when Factor Price manipulation is the source of inefficiency, a democracy is non-distortionary, and opening to international trade is always welfare enhancing. Let us now analyze Revenue Extraction.

5.1 Closed Economy

Because we assume that Condition (4) holds, wages drop to 0 and the only source of income for workers are taxes. The problem for the workers becomes

$$\underset{\tau^e, \tau^m}{Max} \ \phi y(\beta \tau^e + (1-\beta)\tau^m),$$

with y given by (15). After the analysis for the dictatorship it is straightforward to see that the solution to this problem is

$$\tau_{RE}^{m,d} = \tau_{RE}^{e,d} = \alpha,$$

where d stands for democracy.[25] Workers tax both sectors symmetrically. This is intuitive, given that workers do not care about profits. Taxing both sectors in the same amount does not distort relative demands, thus minimizing the effect of the distortion in final output. Notice that the general equilibrium effect is not stopping the workers from setting the desired tax rates; this is precisely because workers themselves remove the general equilibrium effect by setting equal tax rates.

5.2 Small Open Economy and Democracy

When we open the democracy to trade, the problem for the workers is given by

$$\underset{\tau^e, \tau^m}{Max} \phi \frac{\tau^m}{1-\alpha} \left(1 - \tau^m\right)^{\frac{1-\alpha}{\alpha}} \lambda \theta^m + \phi \frac{\tau^e}{1-\alpha} \left(1 - \tau^e\right)^{\frac{1-\alpha}{\alpha}} \lambda \theta^e,$$

where recall that wages are still 0 in the open economy, so income for the workers is solely taxes. This is exactly the same problem as with the closed economy, replacing β and $(1-\beta)$ with $\lambda \theta^e$ and $\lambda \theta^m$, which implies that the solution does not change,

$$\tau_{RE,T}^{m,d} = \tau_{RE,T}^{e,d} = \alpha.$$

Taxation does not change with trade; this has the immediate implication that trade is welfare improving for this economy as it will only be affected by the standard benefits of trade.

Proposition 10 *Under a democracy, trade does not have any effect on the sources of inefficiency and taxation does not change. Opening to trade is always welfare enhancing.*

What is different between democracies and dictatorships that leads to such different results? Democracies typically give more weight to workers in the decision-making process

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[25]See appendix for the proof that symmetric taxation is always the solution where Revenue Extraction is the sole source of inefficiency.

and workers participate in all sectors of the economy. This makes them reluctant to tax and distort resource allocation across sectors, because any distortion feeds back into the wage rate; this reticence leads in general to lower distortions. In addition, workers do not care about profits. Because they do not care about profits, the general equilibrium effect that stops the elite producers from setting their desired tax rates does not apply to them and trade has no effect on workers' preferences for inefficiency.

Finally it is important to notice that although in the Factor Price Manipulation case a democracy is more efficient than a dictatorship in absolute terms, under Revenue Extraction this may not be the case. In particular it can be shown that a democracy will give higher welfare except for really low levels of state capacity, ϕ. The reason is that when this is the case, dictatorships do not tax at all or tax at really low levels because the general equilibrium effect hurts them too much.[26] This result is just a consequence of assuming excess labor supply. With labor market clearance workers would take into account the effect of taxation in wages and democracies would always tend to be more efficient than dictatorships.[27]

6   Conclusions

This paper began by describing how less-developed economies with dictatorial regimes have remained stagnant with respect to economic performance over the last four decades. At the same time, those countries are much more integrated to the global economy than they were 40 years ago. I claimed that these two facts are not independent of each other and interpreted them as evidence that traditional trade theories cannot explain these experiences because they lack an important ingredient: the efficiency of institutions.

I developed a simple model that endogenized the efficiency of institutions and argued that part of the reason why poor nations may not have benefited as much from international trade is because increased trade may lead to worse policies and economic institutions in societies with weak political institutions: in a closed economy, groups with political power are restrained in their rent extraction policies because of the general equilibrium price effects that these will create. Increased international trade removes these price effects and may increase the intensity of rent extraction, and with that increase inefficiency. The increase in inefficiency may more than outweigh the standard gains from trade, and trade integration can potentially make the whole economy worse off.[28]

Whether this is something relevant empirically is something to address in the future,

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[26] And remember that workers tax both sectors always.

[27] See Acemoglu (2006) for a discussion of this.

[28] Because in my model preferences were linear, all th discussion about welfare applies to income levels.

although as mentioned in the introduction, Segura-Cayuela (2006a) is a first effort to provide evidence that the main result in the current paper is present on the data. I use a panel of 92 countries and 17 years to show that expropriation increases with trade opening for non-democratic countries, while it is reduced for democratic ones.

This paper tries to caution about trade policy recommendations for less-developed economies with weak political institutions and insufficient checks on the executive power. Policy recommendations should be about long run economic performance, not about trade. Rodrik (1998), in the context of sub-Saharan Africa, argued that trade should not be the focus of economic policy: the quick fix that trade may provide cannot substitute for the poor quality of institutions. My paper goes even further by saying that trade may not even provide that quick fix and it can actually deteriorate the quality of institutions.

External trade policy recommendations will have damaging effects, according to my model. And this will be true even if these recommendations include measures to reduce the state's intrusion and liberalize markets. If incentives are not modified, governments in these countries can easily find alternative ways of reaching its intrusive and rent extracting objectives. As long as political institutions do not change, incentives to expropriate will be in place and trade can potentially deteriorate the quality of institutions. The important question that follows from this discussion is whether trade can help transition to better political institutions.

Can trade change political institutions? This paper analyzes how trade affects preference for inefficiency, but all the analysis assumes that, with the introduction of trade, political power either does not change or changes in a direction that does not affect the results. Nonetheless, the relationship between political power, economic performance, economic institutions, and political institutions is a non-trivial, dynamic one. There are two types of political power: de jure and de facto. De jure political power is the power of the ruler as derived from political institutions. De facto political power is the ability of other groups in society to restrict de jure political power and exert their own through, for instance, violence or protests. It is important to note that de facto power derives directly from the distribution of resources. Thus, policies that affect the distribution of resources will indirectly affect tomorrow's allocation of power and with that the persistence and efficiency of political institutions.[29] Because trade might change the distribution of resources today, it might affect the allocation of power tomorrow, and with that it might affect the type of political institutions a country develops. In other words, trade itself might affect whether a country is in the top or bottom of Figure 2.

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[29]See Acemoglu and Robinson (2005) for a discussion on the distinction between de jure and de facto political power.

An example of this is found in chapter 10 of Acemoglu and Robinson (2005). In their framework, democracies are costly for political elites because they imply redistribution towards other social groups. To the extent that trade reduces inequality it also reduces redistribution, which can make the political elite less reluctant to allow democratization. Also, in an extension to my paper I am currently working on, I am analyzing how trade affects political institutions. For instance, the fact that trade exacerbates expropriation does not necessarily mean that trade makes a regime change less likely to occur. While trade can have negative effects, it might still benefit some groups -other than the elite- through standard trade effects and it might increase the incentives to overthrow inefficient regimes. First non-elite groups are now more oppressed and this makes their situation less desirable; and second, the benefits of being in power increase for non-elite groups for the same reason than it increases for the elite minority. When does opening to trade evolve into a democracy? When do we get a dictatorship of the middle class? All these questions are interesting areas for future research, and questions that I am currently addressing on a companion paper.

Finally this paper has abstracted from factor mobility and the role of factor endowments. It would be interesting to combine the forces at play in this model with the standard force in the literature: capital mobility reduces expropriation in less-developed economy to avoid capital leaving the economy. To address this question it is important to understand several issues. First, who is the elite of a dictatorship and why? It is clear that dictatorships from now and the past have differed on the type of elite they had. And even inside the same dictatorship the elite modified over time. Second, what is the role of factor endowments in all this? Do factor endowments have any role determining the type of elite? All these forces are important if we want to understand how the mechanism in this model interacts with capital mobility. My work in Segura Cayuela (2006b) is a first attempt to understand these issues.

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7   Appendix A: Proofs

7.1   Proof of Proposition 3

We need to show that the elite producers never want to tax themselves. To do this, we split the analysis in two. First, we need to show that there is no solution where the elite tax both sectors. Then, we need to show that any solution where the elite only tax themselves gives them less income than taxing only the middle class. The problem for the elite is

$$
\underset{\tau^m, \tau^e}{Max} \ \left((1 - \tau^e)^\beta (1 - \tau^m)^{(1-\beta)} \right)^{(1-\alpha)/\alpha} \ *
$$

$$
\left(\phi \left(\beta \tau^e + (1 - \beta) \tau^m \right) + \alpha \beta (1 - \tau^e) \right).
$$

The $F.O.C.s$ are

$$
(\tau^e) \ \ \left((1 - \tau^e)^\beta (1 - \tau^m)^{(1-\beta)} \right)^{(1-\alpha)/\alpha} \ *
$$

$$
\left[-\frac{\beta \frac{(1-\alpha)}{\alpha}}{(1 - \tau^e)} \left(\phi \left(\beta \tau^e + (1 - \beta) \tau^m \right) + \alpha \beta (1 - \tau^e) \right) + \beta (\phi - \alpha) \right] = 0
$$

$$
(\tau^m) \ \ \left((1 - \tau^e)^\beta (1 - \tau^m)^{(1-\beta)} \right)^{(1-\alpha)/\alpha} \ *
$$

$$
\left[-\frac{(1 - \beta) \frac{(1-\alpha)}{\alpha}}{(1 - \tau^m)} \left(\phi \left(\beta \tau^e + (1 - \beta) \tau^m \right) + \alpha \beta (1 - \tau^e) \right) + (1 - \beta) \phi \right] = 0
$$

Notice that if $\phi < \alpha$ the FOC for τ^e is always negative , so the elite would set $\tau^e = 0$. Assume this is not the case. A solution with both tax rates positive requires, combining both equations, that

$$
(1 - \tau^m) = \frac{\phi - \alpha}{\phi} (1 - \tau^e) = \eta (1 - \tau^e).
$$

We can now replace this in the FOC for τ^e and after some algebra we get to

$$
-(1 - \alpha) \phi + (1 - \tau^e)(\phi - \alpha),
$$

And notice that even for $\tau^e = 0$ this is negative. So there is no equilibrium where the elite tax both sectors at the same time. If they tax just one sector the equilibrium rates in each case are just found by solving each of the FOC assuming the other tax rate is 0. This gives

$$
\tau^{m*} = Max \left[0, \frac{\alpha \left(\phi - \beta (1 - a) \right)}{\phi (1 - \beta (1 - \alpha))} \right]
$$

and

$$1 - \tau^{e*} = Min\left[1, \frac{\phi}{\phi - \alpha}\frac{\beta(1 - \alpha)}{\alpha + \beta(1 - \alpha)}\right]$$

From this we derive that $\tau^e > 0$ if $\phi > (\alpha + \beta(1 - \alpha))$, and $\tau^m > 0$ if $\phi > \beta(1 - a)$. So for $\phi \in [\beta(1 - a), (\alpha + \beta(1 - \alpha))]$ we know that the solution is given by $\tau^m = Max\left[0, \frac{\alpha(\phi - \beta(1-a))}{\phi(1 - \beta(1-\alpha))}\right]$. For $\phi \in [(\alpha + \beta(1 - \alpha)), 1]$ we need to check which taxation gives the elite producers more income. It is straightforward to check that

$$\left.\frac{\partial \pi^e}{\partial \tau^e}\right|_{\tau^e = 0, \tau^m = \tau^{m*}} \leq 0, \quad \left.\frac{\partial \pi^e}{\partial \tau^m}\right|_{\tau^e = 0, \tau^m = \tau^{m*}} = 0$$

$$\left.\frac{\partial \pi^e}{\partial \tau^e}\right|_{\tau^e = \tau^{e*}, \tau^m = 0} = 0, \quad \left.\frac{\partial \pi^e}{\partial \tau^m}\right|_{\tau^e = \tau^{e*}, \tau^m = 0} > 0,$$

for $\phi \in [(\alpha + \beta(1 - \alpha)), 1]$, which immediately implies that $\tau^e = \tau^{e*}$ and $\tau^m = 0$ is not a solution. This concludes the proof.

7.2 Proof that Symmetric Taxation is the Solution with a Democracy in a Closed Economy

The problem for the workers is

$$\underset{\tau^e, \tau^m}{Max} \phi\frac{\chi\left(\lambda\theta^e\right)^\beta\left(\lambda\theta^m\right)^{1-\beta}}{1 - \alpha}\left((1 - \tau^e)^\beta(1 - \tau^m)^{(1-\beta)}\right)^{(1-\alpha)/\alpha}(\beta\tau^e + (1 - \beta)\tau^m).$$

The $F.O.C.s$ are

$$(\tau^e)\ \left((1 - \tau^e)^\beta(1 - \tau^m)^{(1-\beta)}\right)^{(1-\alpha)/\alpha} *$$

$$\left[-\frac{\beta\frac{(1-\alpha)}{\alpha}}{(1 - \tau^e)}(\beta\tau^e + (1 - \beta)\tau^m) + \beta\right] = 0$$

$$(\tau^m)\ \left((1 - \tau^e)^\beta(1 - \tau^m)^{(1-\beta)}\right)^{(1-\alpha)/\alpha} *$$

$$\left[-\frac{(1 - \beta)\frac{(1-\alpha)}{\alpha}}{(1 - \tau^m)}(\beta\tau^e + (1 - \beta)\tau^m) + 1 - \beta\right] = 0.$$

The solution with both tax rates positive is given by,

$$\tau^e = \tau^m = \alpha.$$

If they only tax one sector it is easy to check that

$$\left.\frac{\partial \pi^e}{\partial \tau^e}\right|_{\tau^e=0, \tau^m=\tau^{m*}} > \quad 0, \quad \left.\frac{\partial \pi^e}{\partial \tau^m}\right|_{\tau^e=0, \tau^m=\tau^{m*}} = 0$$

$$\left.\frac{\partial \pi^e}{\partial \tau^e}\right|_{\tau^e=\tau^{e*}, \tau^m=0} = \quad 0, \quad \left.\frac{\partial \pi^e}{\partial \tau^m}\right|_{\tau^e=\tau^{e*}, \tau^m=0} > 0,$$

i.e. taxing just one sector is not a solution. This completes the proof.

7.3 Proofs for Welfare Analysis with Revenue Extraction

7.3.1 Individual Groups

Let us look at what happens with the middle class once we incorporate taxation. The middle class is better off with trade if $\pi^m_{RE,T} > \pi^m_{RE}$, which looking at equations (17) and (37) translates into

$$\frac{\left(1-\tau^m_{RE}\right)^{(1-\beta(1-\alpha))/\alpha}}{\left(1-\tau^m_{RE,T}\right)^{1/\alpha}} \left(\frac{1-\beta}{\beta} \frac{\lambda\theta^e}{\lambda\theta^m}\right)^\beta < 1,$$

or

$$\left(\frac{\lambda\theta^m}{\lambda\theta^e}\right)^\beta > \left(\frac{1-\beta}{\beta}\right)^\beta \frac{\left(1-\tau^m_{RE}\right)^{(1-\beta(1-\alpha))/\alpha}}{\left(1-\alpha\right)^{1/\alpha}} = \left(\widehat{\frac{\lambda\theta^m}{\lambda\theta^e}}\right), \tag{43}$$

where notice that $\left(\widehat{\frac{\lambda\theta^m}{\lambda\theta^e}}\right) > \left(\frac{1-\beta}{\beta}\right)^\beta$ because $\tau^m_{RE} < \alpha$ and $1-\beta(1-\alpha) < 1$.

For the elite the analysis is much more cumbersome. I want to prove that they benefit for $\left(\frac{\lambda\theta^m}{\lambda\theta^e}\right)^\beta < \left(\frac{1-\beta}{\beta}\right)^\beta \omega$, for some $\omega > 1$ and that they also benefit even when $\left(\frac{\lambda\theta^m}{\lambda\theta^e}\right)$ is very large. In other words I want to proof that there is an intermediate range of $\frac{\lambda\theta^m}{\lambda\theta^e}$ in which the elite is worse off. Income for the elite is higher with trade if

$$\alpha\lambda\theta^e + \alpha\lambda\theta^m \left(1-\alpha\right)^{(1-\alpha)/\alpha} \phi >$$
$$\chi \left(1-\tau^m_{RE}\right)^{(1-\beta(1-\alpha))/\alpha} \left(\lambda\theta^e\right)^\beta \left(\lambda\theta^m\right)^{1-\beta} \left[\alpha\beta + \phi(1-\beta)\tau^m_{RE}\right],$$

and rearranging terms this translates into

$$\left(\frac{\lambda\theta^m}{\lambda\theta^e}\right)^{1-\beta} \leq \left(\frac{1-\beta}{\beta}\right)^{1-\beta} \beta \frac{1 + \frac{\lambda\theta^m}{\lambda\theta^e}\phi \left(1-\alpha\right)^{(1-\alpha)/a}}{\left(1-\tau^m_{RE}\right)^{(1-\beta)(1-\alpha)/a} \left(\beta + \frac{\tau^m_{RE}}{\alpha}\phi(1-\beta)\right)}. \tag{44}$$

where τ^m_{RE} is defined as in Proposition 3. Allow me to define

$$\eta \equiv \frac{\phi(1-\alpha)^{(1-\alpha)/a}}{(1-\tau^m_{RE})^{(1-\beta)(1-\alpha)/a}\left(\beta + \frac{\tau^m_{RE}}{\alpha}\phi(1-\beta)\right)}.$$

Notice two things. First, the right hand side (RHS) of equation (44) is linear (and increasing) in $\frac{\lambda\theta^m}{\lambda\theta^e}$ while the LHS is concave and increasing in $\frac{\lambda\theta^m}{\lambda\theta^e}$. Second, when $\frac{\lambda\theta^m}{\lambda\theta^e} \to 0$ the condition is satisfied. And because the derivative of the LHS goes to 0 when $\frac{\lambda\theta^m}{\lambda\theta^e} \to \infty$ we know that if the LHS and the RHS cross once, they will cross a second time. If they do not cross trade makes the elite better off for any relative size of the middle class and the elite. If they cross, the elite producers are better off with trade both when they are relatively small or they are relatively large with respect to the middle class. To proof that there is a crossing is enough to show that when the derivative of both sides are equal, the value of the LHS is bigger than that of the RHS. This is how I proceed now. The derivatives with respect to $\frac{\lambda\theta^m}{\lambda\theta^e}$ are equal when

$$(1-\beta)\left(\frac{\lambda\theta^m}{\lambda\theta^e}\right)^{-\beta} = \left(\frac{1-\beta}{\beta}\right)^{1-\beta}\beta\eta,$$

or rearranging

$$\frac{\lambda\theta^m}{\lambda\theta^e} = \frac{1-\beta}{\beta}\eta^{-1/\beta}. \tag{45}$$

I now replace this on the RHS and LHS and check whether LHS>RHS, or

$$\eta^{-(1-\beta)/\beta} > \frac{1}{(1-\tau^m_{RE})^{(1-\beta)(1-\alpha)/a}\left(1 + \frac{\tau^m_{RE}}{\alpha}\phi\frac{1-\beta}{\beta}\right)}$$

$$\Leftrightarrow \left(\frac{1-\tau^m_{RE}}{(1-\alpha)}\right)^{(1-\beta)(1-\alpha)/a} > \frac{\phi^{1-\beta}}{\left(\left(1 + \frac{\tau^m_{RE}}{\alpha}\phi\frac{1-\beta}{\beta}\right)\right)}.$$

And notice that $\left(\frac{1-\tau^m_{RE}}{(1-\alpha)}\right)^{(1-\beta)(1-\alpha)/a} \geq 1$ and. $\frac{\phi^{1-\beta}}{\left(\left(1 + \frac{\tau^m_{RE}}{\alpha}\phi\frac{1-\beta}{\beta}\right)\right)} < 1$. This proofs that there is an intermediate range of $\frac{\lambda\theta^m}{\lambda\theta^e}$ for which income of he elite decreases with trade.

We only need to proof now that the first range for which the elite benefits with trade is bigger than in a model without expropriation, that is, the first time the two curves cross is for $\frac{\lambda\theta^m}{\lambda\theta^e} < \frac{1-\beta}{\beta}\omega$ for some $\omega > 1$. We know that $\eta < 1$ To see this notice that $(1-\tau^m_{RE})^{(1-\beta)(1-\alpha)/a} > (1-\alpha)^{(1-\alpha)/a}$ and

$$\left(\beta + \frac{\tau^m_{RE}}{\alpha}\phi(1-\beta)\right) = \frac{(1-\beta)\phi + \alpha\beta}{(1-\beta) + \beta\alpha} > \phi.$$

Given that $\eta < 1$ and looking at (45) we know that the point where our two income curves have the same slop is one in which $\frac{\lambda\theta^m}{\lambda\theta^e} > \frac{1-\beta}{\beta}$. And this means that the second crossing of the two curves is for $\frac{\lambda\theta^m}{\lambda\theta^e} >> \frac{1-\beta}{\beta}$. That means that if we find that for $\frac{\lambda\theta^m}{\lambda\theta^e} = \frac{1-\beta}{\beta}$ trade gives higher income to the elite we are done: the first crossing will be for $\frac{\lambda\theta^m}{\lambda\theta^e} \in \left(\frac{1-\beta}{\beta}, \frac{1-\beta}{\beta}\eta^{-1/\beta}\right)$. And this is easy to show. Replacing $\frac{\lambda\theta^m}{\lambda\theta^e}$ in (44) the condition translates into

$$1 \leq \frac{1 + \frac{(1-\beta)}{\beta}\phi\left(1-\alpha\right)^{(1-\alpha)/a}}{(1 - \tau_{RE}^m)^{(1-\beta)(1-\alpha)/a}\left(1 + \frac{\tau_{RE}^m}{\alpha}\phi\frac{(1-\beta)}{\beta}\right)}.$$

Replacing by τ_{RE}^m it is straightforward to check that this is always the case. This completes the proof. There is a range $\left(\overleftarrow{\frac{\lambda\theta^m}{\lambda\theta^e}}, \overrightarrow{\frac{\lambda\theta^m}{\lambda\theta^e}}\right)$ such that inside the range the elite are worse off with trade and better off outside that range. Also, $\overleftarrow{\frac{\lambda\theta^m}{\lambda\theta^e}} > \frac{(1-\beta)}{\beta}$, that is expropriation allows the elite to benefit from trade for a bigger range of relative sizes. The cut-off values are the solution to (44)

7.3.2 Total Welfare

The steps of the proof will be very similar to the discussion for the elite. We want to proof that there is an intermediate range of $\frac{\lambda\theta^m}{\lambda\theta^e}$ in which the economy is better off without trade. Comparing the expressions for total income before and after trade opening to trade reduces welfare if

$$\frac{\left(1 + \frac{\tau_{RE}^m}{\alpha}(\phi - \alpha)(1-\beta)\right)\left(1 - \tau_{RE}^m\right)^{(1-\beta)(1-\alpha)/a}}{\beta^\beta(1-\beta)^{1-\beta)}}\left(\frac{\lambda\theta^m}{\lambda\theta^e}\right)^{1-\beta} \geq \left(1 + \frac{\lambda\theta^m}{\lambda\theta^e}(1 + \phi - \alpha)\left(1-\alpha\right)^{(1-\alpha)/a}\right).$$
$$(46)$$

Notice again that the LHS is concave and increasing in $\frac{\lambda\theta^m}{\lambda\theta^e}$, while the RHS is increasing and linear in $\frac{\lambda\theta^m}{\lambda\theta^e}$. Also when $\frac{\lambda\theta^m}{\lambda\theta^e} \to 0$, RHS<LHS, which means that when the middle class is small trade increases welfare. Again we need to find whether the LHS and the RHS cross. If they do not, trade is always welfare enhancing. If they do, they will cross twice, and trade will only be welfare enhancing for either small or large $\frac{\lambda\theta^m}{\lambda\theta^e}$. Proceeding as before, for the two curves to have the same slope it has to be the case that

$$(1-\beta)\left(\frac{\lambda\theta^m}{\lambda\theta^e}\right)^{-\beta}\upsilon = \beta^\beta(1-\beta)^{1-\beta}\kappa,$$

or

$$\frac{\lambda\theta^m}{\lambda\theta^e} = \frac{1-\beta}{\beta}\left(\frac{\upsilon}{\kappa}\right)^{1/\beta}, \qquad\qquad (47)$$

where I define

$$\upsilon \equiv \left(1 + \frac{\tau_{RE}^m}{\alpha}(\phi - \alpha)(1 - \beta)\right)(1 - \tau_{RE}^m)^{(1-\beta)(1-\alpha)/a}$$

$$\kappa \equiv (1 + \phi - \alpha)(1 - \alpha)^{(1-\alpha)/a}.$$

Replacing (47) in the equation comparing profits, we have that no trade gives a higher welfare when both curves have the same slope if

$$\frac{\upsilon^{1/\beta}\kappa^{-(1-\beta)/\beta}}{\beta} \geq 1 + \frac{1-\beta}{\beta}\upsilon^{1/\beta}\kappa^{-(1-\beta)/\beta},$$

or $\upsilon \geq \kappa^{1-\beta}$, which can be rewritten as

$$\frac{(1 - \tau_{RE}^m)^{(1-\beta)(1-\alpha)/a}\left(1 + \frac{\tau_{RE}^m}{\alpha}(\phi - \alpha)(1 - \beta)\right)}{(1 + \phi - \alpha)^{1-\beta}} \geq ((1 - \alpha))^{(1-\beta)(1-\alpha)/a}.$$

After some algebra it is easy to see that the LHS is a decreasing function of ϕ. And notice that for $\phi = 1$ (and $\tau_{RE}^m = \alpha$) this condition is satisfied,

$$1 + (1 - \alpha)(1 - \beta) > (1 - \alpha)^{1-\beta}.$$

Thus for all $\phi < 1$ the condition is satisfied too. This concludes the proof. There is a range $\left(\frac{\lambda\theta^m}{\lambda\theta^e}, \overline{\frac{\lambda\theta^m}{\lambda\theta^e}}\right)$ such that for $\frac{\lambda\theta^m}{\lambda\theta^e}$ inside that range trade reduces welfare. The cut-off values are the solution to (46).

7.4   Proofs for Welfare Analysis with Factor Price Manipulation

Total welfare before and after trade is then

$$W_{FPM} = w_{FPM} + \pi_{FPM}^e = \frac{\theta^e\lambda}{\sigma(\beta,\theta^e)^\beta}\frac{\alpha}{1-\alpha}[\sigma(\beta,\theta^e) - (1 - \tau_{FPM}^m)](1 - \tau_{FPM}^m)^{(1-\beta)(1-\alpha)/\alpha}$$

$$+ \frac{\alpha}{1-\alpha}(1 - \tau_{FPM}^m)^{(1-\beta)1/\alpha}\left(\frac{\sigma(\beta,\theta^e)}{(1 - \tau_{FPM}^m)}\right)^{-\beta}$$

$$W_{FPM,T} = \pi_{FPM,T}^e = \frac{\alpha}{1-\alpha}\lambda\theta^e.$$

Remember that whenever $\sigma(\beta,\theta^e) > ((1 - \beta)(1 - \alpha) + \alpha)/(1 - \beta)(1 - \alpha)$ there is no taxation in the closed economy. In this case, welfare in the closed economy is higher than with trade if the following is true,

$$\sigma(\beta,\theta^e)^{1-\beta} > \beta,$$

where to derive this expression I just manipulate W_{FPM} and $W_{FPM,T}$ and cancel terms. Notice that we are analyzing the case where $\sigma(\beta, \theta^e) > ((1-\beta)(1-\alpha)+\alpha)/(1-\beta)(1-\alpha) > 1$. Thus when the elite producers do not set any tax on the middle class in the closed economy and the economy opens to trade, the whole economy loses.

Whenever there is positive taxation in the closed economy, where the tax rate is given in Proposition 4, welfare in the closed economy is higher if, after replacing the tax rate and manipulating the equations,

$$\frac{(\sigma(\beta, \theta^e)\delta)^{(1-\beta)/a}}{\delta^{1-\beta}}(1 + \delta(1 - \lambda\theta^e) > \lambda\theta^e$$

where I define $\delta = (1-\beta)(1-\alpha)/((1-\beta)(1-\alpha)+\alpha)$. Notice first that whenever $\sigma(\beta, \theta^e) = \delta^{-1}$, which is the point where taxation starts to be positive in the closed economy, the above condition is satisfied. Also, if we increase $\lambda\theta^e$, the right hand side of the condition goes up, while the left hand side goes down. In the limit, when $\lambda\theta^e = 1$, the condition is not satisfied. This means that there is a level $\lambda\theta^e_{FPM} > \beta$ such that the economy as a whole wins when opening to trade if $\lambda\theta^e_{FPM} < \lambda\theta^e$, where $\lambda\theta^e_{FPM}$ is implicitly defined in

$$\frac{(\sigma(\beta, \lambda\theta^e_{FPM})\delta)^{(1-\beta)/a}}{\delta^{1-\beta}}(1 + \delta(1 - \lambda\theta^e_{FPM}) = \lambda\theta^e_{FPM}. \tag{48}$$

Now let us look at what happens to the elite. The elite wins with trade if $\pi^e_{FPM} < \pi^e_{FPM,T}$. For $\sigma(\beta, \theta^e) \geq \delta^{-1}$ this translates into the following condition, (where recall that in this case $\tau^m_{FPM} = 0$),

$$1 > \frac{\sigma(\beta, \theta^e) - 1}{\sigma(\beta, \theta^e)^\beta}.$$

Notice that it is not necessarily the case that when $\sigma(\beta, \theta^e) = \delta^{-1}$, the condition is satisfied. And because $(\sigma(\beta, \theta^e) - 1)/\sigma(\beta, \theta^e)^\beta$ is decreasing in $\lambda\theta^e$, if the condition is not satisfied when $\sigma(\beta, \theta^e) = \delta^{-1}$ it will not satisfy for any higher $\sigma(\beta, \theta^e)$ (lower $\lambda\theta^e$, recall that $\sigma(\beta, \theta^e)$ is decreasing in $\lambda\theta^e$). If it is satisfied for $\sigma(\beta, \theta^e) = \delta^{-1}$, because the right hand side of the condition is decreasing in $\lambda\theta^e$, there will be a $\underline{\lambda\theta^e_{FPM}} < \beta$ such that for $\lambda\theta^e < \underline{\lambda\theta^e_{FPM}}$, the elite producers do not win with trade. $\underline{\lambda\theta^e_{FPM}}$ is implicitly defined as

$$1 = \frac{\underline{\lambda\theta^e_{FPM}} - 1}{\underline{\lambda\theta^e_{FPM}}} \tag{49}$$

For convenience let us write the condition evaluated in δ^{-1}.

$$\frac{1 - \delta}{\delta}\delta^\beta < 1. \tag{50}$$

Let us see now what happens for $\sigma(\beta, \theta^e) < \delta^{-1}$ (positive taxation in the closed economy). In this case, replacing the tax rate by its expression, the elite producers win with trade if

$$\frac{1-\delta}{\delta}\delta^\beta \left(\sigma(\beta, \theta^e)\delta\right)^{(1-\beta)/\alpha} < 1.$$

Notice that this condition always holds if $\delta^\beta(1-\delta)/\delta < 1$ because $\delta\sigma(\beta, \theta^e) < 1$. If this is not the case, then we need $\sigma(\beta, \theta^e)$ small enough so as to compensate ($\lambda\theta^e_{FPM}$ big enough), which translates into a cut off value $\overline{\lambda\theta^e_{FPM}} > \beta$ such that the elite wins with trade whenever $\lambda\theta^e > \overline{\lambda\theta^e_{FPM}}$. The parameter is defined implicitly in

$$\frac{1-\delta}{\delta}\delta^\beta \left(\sigma(\beta, \overline{\lambda\theta^e_{FPM}})\delta\right)^{(1-\beta)/\alpha} = 1 \tag{51}$$

This completes the proof.

8 Appendix B: Figures

Figure 1
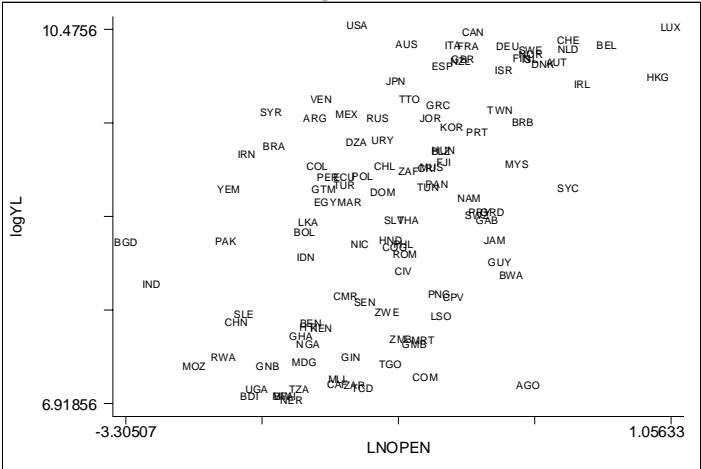
Source: Penn World Table Version 6.1

Figure 2
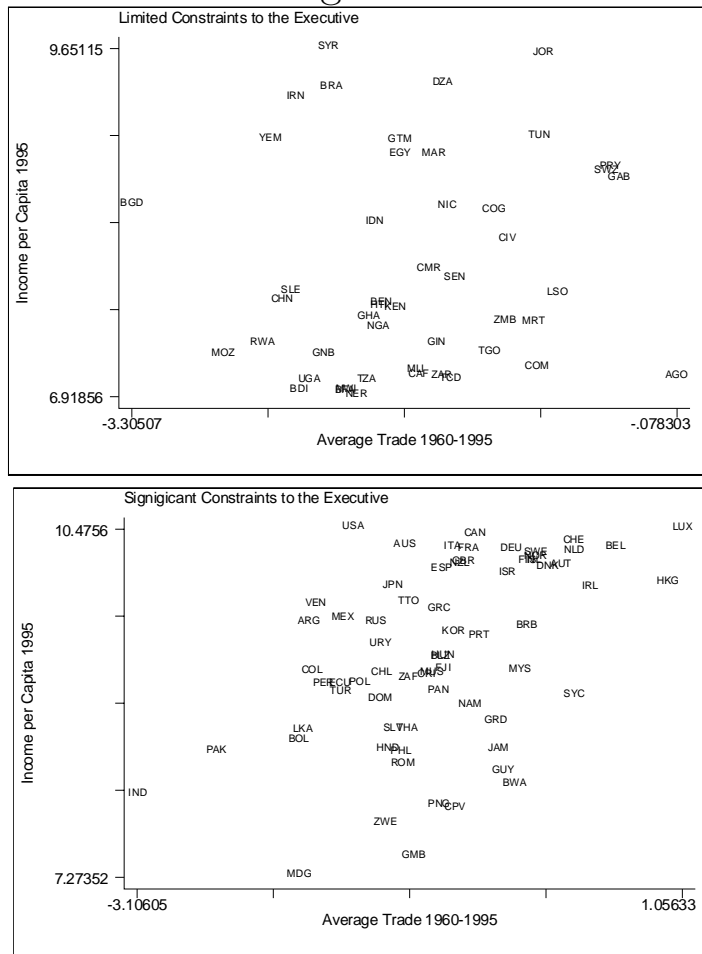
Sources: Penn World Table Version 6.1 and Polity IV data set

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