Revolution and the Stolper-Samuelson Theorem[1]

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ABSTRACT: This paper presents a new theory of trade policy-making based on the possibility of social unrest, and determines the conditions under which it will apply. In a setting where democracy functions badly and property rights are poorly enforced, the paper shows that the Stolper-Samuelson theorem embodies a set of sufficient conditions for a revolution to occur. By pinpointing a conflict of interest between the ruling elite and workers over trade policy, the theorem implies that workers may have an incentive to mount a revolution. However, this also implies that the elite can use trade policy to make concessions to the workers and hence avert a revolution. In an extended framework, a set of sufficient conditions for revolution to occur are provided even when the Stolper-Samuelson theorem fails to hold. The theory is used to resolve three puzzles: why Britain repealed the Corn Laws; why food exporting countries may shut down exports in response to an increase in world food prices; why some middle-income countries have unilaterally liberalized trade.

KEYWORDS. Protectionism, social conflict, Stolper-Samuelson, trade policy, unilateral trade liberalization.

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1. Introduction

The prior literature on the political economy of trade policy has tended to focus on a situation where policymakers balance the interests of voters against those of special interest groups (Hillman 1982, Hillman and Ursprung 1988, Magee, Brock and Young 1989, Grossman and Helpman 1994). These policy interactions are assumed to take place in a setting where institutions function well, wherein political office is determined democratically, property rights are perfectly enforced, and political contributions are governed by constitutional limits. This literature captures the forces that determine trade policy in developed countries where institutions do function relatively well. Arguably, the existing literature does not do such a good job of explaining policy outcomes throughout the early history of trade policy-making and in developing countries today; a time-period and places characterized by poor institutional performance.

The purpose of this paper is to present a new political-economy theory of trade policy that applies, differently from the prior literature, to situations where two of the most highly regarded institutions function badly: Incumbent politicians are not disciplined effectively by the democratic process and property rights are poorly enforced. To be more specific, a ruling elite controls the government and in particular trade policy outright. While the elite are assumed to have direct control over trade policy, the rest of society do not have sufficient resources or influence to lobby for the trade policy that they prefer. However, reflecting the poor enforcement of property rights, the rest of society may be able to exert influence over trade policy through the periodic opportunity to mount a revolution. Therefore, the main contribution of the theory is to yield an understanding of trade policy-making in a setting of poor institutional performance: Democracy is limited but, due to the poor enforcement of property rights, the threat of politically motivated violence can play a key role in determining the outcome.[3]

What is the modern practical relevance of a theory that focuses on democratic limitations at a time when democracy around the world appears to be spreading? After all, today 118 of the world's 193 countries are democratic, in the sense that political leaders are chosen at the ballot box. The relevance of the theory lies in the fact that increasingly,

[3]This approach builds on the 'institutions hypothesis,' which relates differences in economic performance to the organization of society (North and Thomas 1973, North and Weingast 1989, Olson 2000).

political scientists are drawing a distinction between the spread of liberal and illiberal democracy. There is a growing sense that much of the spread of democracy during the post-World War II period has been of the illiberal kind. "Democratically elected regimes, often ones that have been reelected or reaffirmed through referenda, are routinely ignoring constitutional limits on their power and depriving their citizens of basic rights and freedoms. From ... Sierra Leone to Slovakia, from Pakistan to the Philipines, we see the rise of a disturbing phenomenon in international life - illiberal democracy" Zakaria (1997).[4]

And why focus on the threat faced by an elite of expropriation and political overthrow in a revolution when those in power can surely always suppress such threats through military force? Some scholars have argued that, particularly since World War II, there has been a proliferation of politically weak states which lack the Weberian monopoly over violence (Centeno 2002, Herbst 2004). According to this view, an elite fear the establishment of a strong military precisely because it may be used by the rest of society to depose them from power. While the elite will typically establish enough military strength to maintain the status quo during normal times there will be periods, when the nation faces an external threat for example, when the elite may not be able to face down a popular uprising. This is captured by the feature of our model that the rest of society get a periodic opportunity to mount a revolution.

The analysis carried out in this paper will show that the conditions required for the Stolper-Samuelson theorem to hold represent the key components in a set of sufficient conditions for the rest of society to have an incentive to mount a revolution. And yet, the same set of sufficient conditions give the elite the ability to bring about redistribution towards the rest of society using trade policy and thus fully offset the incentive to mount a revolution.

The model developed here combines a standard model of international trade with a model of social conflict and franchise extension by Acemoglu and Robinson (2000a, henceforth referred to as AR). The combination of these two models extends each in a

[4]In reflection of this trend, the annual publication by Freedom House of data measuring political freedoms across countries, *Freedom Around the World*, divides its survey into two parts: political liberties and civil liberties. The former reflects the determination of political office through the ballot box but the latter measures other components of political freedom such as freedom of political representation and freedom of speech. Countries that score well on the first but poorly on the second are regarded to be 'illiberal democracies.'

non-trivial way to provide a new model of trade policy-making. The rest of society (outside the elite) are represented in the model by 'the workers.' Perhaps most importantly, in standard models of international trade property rights are perfectly enforced while in the present model the factor(s) owned by the elite can be expropriated by the workers in a revolution. Therefore, the present model makes it possible to incorporate considerations of social conflict leading to expropriation and franchise extension in a model of trade policy-making.

At the same time, following AR, previous models of social conflict and franchise extension have tended to focus on a simple one-sector production structure with a single factor of production while in our model there are more than one of each. It is the extension of the trade model to allow for expropriation that provides the fundamental motivation for the new theory of trade policy developed here. It is the extension of the production structure to more than one good and factor that gives rise to a more nuanced set of circumstances under which the threat of revolution exists; these are embodied in the Stolper-Samuelson Theorem and based on the general-equilibrium interactions of the model.

By developing a new theory of trade policy, this paper represents a development in the theory of social conflict and franchise extension because the prior literature has tended to focus on a closed-economy setting. In particular, the prior literature has focused on domestic taxation. Our focus here on trade policy as opposed to domestic policy seems appropriate since many dictatorships and partial democracies at an early stage of development lack domestic fiscal capacity and so rely extensively, often exclusively, on trade policy to fulfill their fiscal objectives. These objectives include those of maintaining social stability.

The new theory can be used to explain a number of episodes of dramatic change in trade policy which cannot be adequately explained using the existing theory. One is Britain's repeal of the Corn Laws, regarded by some as the greatest puzzle in the history of trade policy. A deeper understanding of this episode is important because Britain's repeal of the Corn Laws in 1846 is believed to have precipitated rapid trade liberalization throughout the rest of Europe in the second half of the 19th Century; the so-called 'first wave of globalization' (O'Rourke and Williamson 1999). Repeal of the Corn Laws has

received a lot of attention in prior research, tending to focus on explanations consistent with the existing theory. Britain had a comparative advantage in manufactures but the British aristocracy, still holding most of their wealth in land, sought protection in the form of the Corn Laws. The existing literature explains repeal in terms of lobbying by industrialists in the nascent manufacturing sector.

Yet recent research by Schonhardt-Bailey (2006) has cast new light on the issue by focusing on the role played by the threat of a revolution. A key innovation in her research is to draw attention to the veto power held over repeal by House of Lords whose representatives were drawn exclusively from the aristocracy, and who stood to loose vast wealth from repeal (Williamson 1990). Shonhardt-Bailey argues that, while financial lobbying by industrialists may not have been sufficient on its own to persuade the Lords to abstain from using their veto, the threat of revolution played a decisive role in persuading them not to block repeal.[5]

A second puzzle is why many food exporting countries respond to spikes in world food prices not be increasing exports as we would expect but by shutting down their supplies of exports instead. This happened most recently in 2008 but has happened several times before that (Anderson and Nelgen 2010). It is important to understand this practice better because it compromises the role of world trade in bringing stability to food markets. The critical element introduced in this paper is the widely observed fact that restricted access to food, reflected in food price spikes, quickly leads to 'food riots'; a form of politically motivated violence. Drawing on the comparative statics analysis carried out in the paper, we will see that a rise in world food prices necessitates an increase in export taxes by food exporting countries, possibly to prohibitive levels, in order to prevent a revolution.

A third puzzle is why many middle-income countries, that had previously eschewed all forms of liberalization, began in the 1980s to cut their tariffs autonomously. As Baldwin (2010) argues: "Unilateral tariff liberalization by developing nations is pervasive but our understanding of it is shallow." The contribution of the present paper to understand-

[5]Rogowski (1989) also argues (non-formally), by invoking the logic of the Stolper-Samuelson theorem, that abundant factors are likely to organize politically and push for trade liberalization while scarce factors are likely to resist it, possibly resulting in the threat of a revolution. He applies this logic to a number of historical settings, including mid-19th Century Britain and Germany, as well as ancient Greece and Rome.

ing this phenomenon is as follows. The elite in many middle-income countries may favor protection for one of two reasons. Either the country has recently acquired a comparative advantage in manufactures but the elite, like the 19th-Century British aristocracy, still have a vested interest in the traditional primary products sector. Or the country has a comparative advantage in primary products but the elite have a vested interest in protecting an inefficient manufacturing sector. Either way, a burgeoning class of urban workers would like to see protection removed. At the same time the revolution in information and communication technologies that has swept the developing world has made coordination easier among citizens, particularly through the widespread availability of mobile phones. This in turn has lowered the cost to society outside the elite of coordinating a revolution, requiring trade liberalization to maintain the status quo.

More broadly, the paper contributes to the literature on the interaction between institutions and trade liberalization (Levchenko 2007, Nunn 2007, Garfinkel, Skaperdas and Syropoulos 2008, Do and Levchenko 2009, Costinot 2009, Stefanides 2010, Segura-Cayuela 2006, Liu and Ornelas 2009). A move to liberal democracy and trade liberalization are generally prescribed as two central elements in a broad agenda for political and economic reform. But our framework shows that, starting from a position of limited democracy, democratic and trade reforms will only emerge simultaneously when they are forced upon the elite by the rest of society through the threat of a revolution. At other times, the elite will use trade policy as a way to maintain the status quo, thereby doing all they can to prevent the adoption of liberal democracy. By highlighting the use of trade policy as a means to maintain the status quo, the present paper may thereby present a way of understanding why the spread of liberal democracy in the post-war period has apparently been so limited.

The paper is structured as follows. Section 2 develops a basic version of the model based around the Heckscher-Ohlin model and demonstrates the sufficient conditions, embodied in the Stolper-Samuelson theorem, both for the workers in the model to mount a revolution and for the elite to avert its occurrence using trade policy. Section 3 relaxes the conditions required for the Stolper-Samuelson theorem to hold, focusing for concreteness on a version of the model based on the Specific-Factors model, and shows how in this setting the incentive for a revolution may be removed. Then a set of sufficient conditions

are established for there to be a threat of revolution over trade policy when the Stolper-Samuelson theorem does not hold. Section 4 discusses in more detail how the theory developed in this paper provides possible resolutions to the three puzzles of trade policy outlined above. Section 5 concludes.

2. The Heckscher-Ohlin Model with Revolution

The model is of a single small country. Each citizen in this country is placed in one of two socioeconomic groups: the elite, e, or the workers, l. The mass of the total population is normalized to one, and the share of the elite and workers in the population is fixed exogenously at $1-\zeta$ and ζ respectively.

The model has an infinite time horizon. A subscript t denotes the time period $t = 0, 1, ..., \infty$. The economy is endowed with a unit each of two primary factors: labor, L, and land, T. Initially, all of the land is distributed evenly among members of the elite, with no land belonging to the workers, while each worker is given an equal share of the labor endowment.[6] All members of each group, the elite and the workers respectively, are identical to one another. Each group differs from the other only by its initial factor endowment. For brevity, we will say that there are 'boundary endowments'. This is a stylized characterization of the endowment structure in many developing countries where the distribution of asset ownership is highly skewed towards the elite. The rental rate on land in period t is denoted by r_t and the wage rate in period t is denoted by w_t.

Both primary factors, supplied inelastically on aggregate, are fully employed in the production of two commodities, referred to as food and manufactures, that are priced at p_t^f and p_t^m respectively. Land is used intensively in the production of food while labor is used intensively in the production of manufactures. Let food be the numeraire in the model, so that $p_t^f = 1$ for all t, and let $p_t = p_t^m/p_t^f$. Since the country is small, the world relative price p^* is taken as given. In a more general setting where externalities are

[6] The model might appear overly stylized in that the elite are not endowed with labor. A looser interpretation of this assumption would be that the elite are also endowed with labor but that they are 'idle' in the sense of not using it. One reason could be that, given their income from land, the equilibrium wage is below their reservation wage. An alternative interpretation would be that the elite are engaged in managerial activities associated with their land and are therefore not in a position to use their labor in the production process.

possible, p^* will be regarded as the relative price that maximizes efficiency.

The economy is competitive, both in production and factor markets. Production technology in each sector exhibits constant returns to scale. There is free entry into both sectors so that profits are driven to zero. And there is free mobility of factors between sectors so each factor receives the same return in each sector equated to the value of its marginal product. If the economy is open then goods may be traded internationally but factors are not internationally mobile.

2.1. Understanding the basic structure of the model with exogenous prices

Since the structure of the economy set out above is that of a standard 2×2 Heckscher-Ohlin model, the standard results hold. We are particularly interested in the Stolper-Samuelson theorem which demonstrates that if, in a given period, p_t is increased then the real wage unambiguously increases while the real return to land unambiguously decreases. Following Jones (1965), and using 'hat algebra' whereby a hat over a variable represents a proportional change, $\hat{x} = dx/x$, we can express the main implication of the Stolper-Samuelson theorem as follows:[7]

$$\hat{w}_t > \hat{p}_t > 0 > \hat{r}_t.$$

This result will be useful in determining the gains to the respective groups from changes in p_t.

Every citizen in the country has the same homothetic utility function defined over their consumption of the two goods:

$$u_t = u\left(d_t^f, d_t^m\right),$$

where d_t^j is consumption of good $j \in \{f, m\}$. From this specification of preferences we can determine the indirect utility function for a representative member of group $i \in \{e, l\}$ as a function of prevailing prices and their income: $v_t^i = v\left(p_t^f, p_t^m, y_t^i\right)$, where y_t^i is the income of the representative member of group i in period t. The indirect utility function has the standard properties that it is decreasing in p_t^f and p_t^m. We will make the slightly stronger-than-usual assumption that the indirect utility function is strictly increasing in

[7] The conditions required for this relationship to hold globally are established by Gale and Nikaido (1965) and Chipman (1969). These are assumed to hold throughout the analysis.

y_t^i. Incorporating our choice of numeraire, we can express indirect utility as a function of relative prices:

$$v_t^i = v\left(p_t, y_t^i\right)$$

Based on initial endowments and population shares, $y_t^e = r_t/\left(1-\zeta\right)$ and $y_t^l = w_t/\zeta$.

The production structure of the model and our specification of boundary endowments and homothetic preferences gives rise to a useful property. We can say that a worker will be made unambiguously better off, and a member of the elite will be made unambiguously worse off, by an increase in p_t. The reverse holds for a decrease in p_t. We can see this immediately by first rewriting the indirect utility function as $v\left(p_t/y_t^i, 1\right)$, or for brevity $v\left(p_t/y_t^i\right)$. Then observe that, by the Stolper-Samuelson Theorem, p_t/w_t decreases with an increase in p_t, which increases the indirect utility of a worker, $v\left(p_t/\left(w_t/\zeta\right)\right)$; on the other hand p_t/r_t increases with an increase in p_t, which decreases the indirect utility of a member of the elite, $v\left(p_t/\left(r_t/\left(1-\zeta\right)\right)\right)$. This property of the model will enable the elite to bring about a transfer to the workers by raising p_t, thus making workers better off.

This simple relationship could reflect one of two possible situations. If the country had a comparative advantage in manufactures, then the tendency of the workers to prefer a relatively high value of p_t would reflect a desire to trade as freely as possible in order to obtain imports of food relatively cheaply. An export tax on manufactures would lower the domestic price of manufactures. This would in turn lower the price of manufactures relative to food, and hence reduce the welfare of workers. An import tariff on food would have the same effect via an increase in the relative price of food. Thus either type of trade policy intervention would make workers worse off. If on the other hand the country had a comparative advantage in the production of food then workers' preference for a relatively high value of p_t would reflect their desire to protect domestic production of manufactures against foreign competition. This could be achieved either by an export tax on food or by an import tariff on manufactures; in either case workers would favor trade policy intervention.

In the simple set-up of the model above, where the only arguments to enter each agent i's indirect utility function are p_t and y_t^i, in the former situation workers would want to adopt free trade. In the latter situation they may or may not want to adopt autarky, depending on their demand for the imported good and the domestic country's ability to

produce it. In each of the two respective situations, the incentives of the elite are exactly the reverse. Under a more general specification incorporating non-economic objectives, the preferred policy of either group, workers in the former situation and the elite in the latter, need not equate to free trade. Writing the workers' preferred price level as p^{l*} and the elites' preferred price level as p^{e*}, we have that $p^{l*} > p^{e*}$. Since p^{e*} and p^{l*} depend on the deep parameters of the model, namely those that determine preferences, they can be treated as parameters. This is essentially a strong version of the Stolper-Samuelson theorem that follows from the additional restrictions we have imposed on endowments (i.e. boundary) and preferences (i.e. homothetic). Without these restrictions, we could not make unambiguous inferences about the effects of price changes on the welfares of the respective groups, and so could not say anything about each group's preferred price level. As is clear from the above discussion, the theorem holds regardless of whether the country has a comparative advantage in food or manufactures.

2.2. Motivating the determination of trade policy by endogenizing prices

We will endogenize p_t by combining the Hecksher-Ohlin model of international trade set out above with the model of social conflict and franchise extension developed by Acemoglu and Robinson (2000). Initially, political power is held by the elite. The only way that the elite can exercise this power in the model is through their control of trade policy. For comparability with the earlier literature, we will assume that any revenue raised from trade policy is redistributed to consumers in lump sum and any revenue required to operate trade policy can be raised through lump-sum taxation. Under this specification, and for parsimony of notation, we can say that while the elite hold power they set p_t directly.

Although initially they do not hold power, at any point in time $t \geq 0$ the workers can mount a revolution that topples the ruling elite, after which they install a democracy through which the median voter determines trade policy, p_t. The same outcome of democracy can arise if the elite decide voluntarily to extend the franchise. Assume that $\zeta > 1/2$ and so if there is full democracy the median voter is a worker. We will formalize the form of government, F, as either rule by the elite, E, or democracy, D.

In the process of revolution, the workers also seize the land from the elite. Revolution reduces the productivity of labor and land by the same proportion, $1-\beta_t$, captured by a uniform radial contraction of the production possibility frontier. This is because the production process in both sectors is less efficiently managed by workers than by the elite.[8] Assume that β is stochastic and alternates between two values: $1 > \overline{\beta} > 0$ and $\underline{\beta} = 0$, with $\Pr\left(\beta_t = \overline{\beta}\right) = \rho$ independently of any value of β in the past. As Acemoglu and Robinson emphasize, the fact that β fluctuates captures the idea that some periods may be more conducive to revolution than others. This also introduces the feature that a promise by the elite to set trade policy in the interests of the workers may not be credible given a change of circumstances in the next period.

Within a period, t, the sequence of events is as follows.

1. The state β is revealed. Any changes to the parameters p^*, p^{e*} and p^{l*} are revealed.
2. The elite decide whether or not to extend the franchise. If not, they set trade policy.
3. The workers decide whether or not to mount a revolution. If they do not and the elite have extended the franchise then trade policy is set by the median voter (a worker). If they do mount a revolution and make the transition to democracy then trade policy is reset by the median voter.
4. Production takes place, demands are realized, markets clear and consumption takes place.

Any changes to the parameters p^*, p^{e*} and p^{l*} are assumed to be unanticipated and, if they happen, they are perceived to be permanent. If the franchise is extended then, by assumption, it cannot be rescinded; in $t+1$ and all periods thereafter the process starts from stage 3. Otherwise it starts from stage 1. The fact that all members of each of the two respective groups, the elite and the workers, are identical to one another (but obviously differ across groups by their endowments) makes the analysis of the game played

[8] This assumption is taken to reflect the idea that workers are less experienced in production management than the elite. In practice we would expect the effects of this inexperience to be more acute around the time of revolution and then atrophy over time. We will ignore this complication in the present analysis.

between the two groups significantly easier. The reason is that all members of the elite can be treated as one player and all workers can be treated as a second player. Also, it is not possible for any worker to free-ride on the revolutionary activities of the others because if they did they would be excluded from the proceeds of the revolution.[9] So we can model the situation set out above as a two-player game between the elite and the workers.

2.3. Equilibrium

The concept of equilibrium we will use is that of Markov Perfection, wherein each player's strategy depends only on the state in a given period, which is given by the value of β, either $\underline{\beta}$ or $\overline{\beta}$, and the form of government, F, which is either D or E.

The strategies played by the respective groups are as follows. Let $\sigma^e(F;\beta)$ be the strategy played by the elite when the state is $\beta = \underline{\beta}$ or $\overline{\beta}$ and when the form of government is $F = D$, or E. The elite decide whether to extend the franchise: $f = 0$ if they do not extend the franchise and $f = 1$ if they do. If $f = 0$ then $F = E$ in that period; if $f = 1$ then $F = D$ in that period and for all periods thereafter. If $f = 0$ then the elite also set the price level at p^e; not necessarily at p^{e*} as we shall see. Let $\sigma^l(F|\, f, p^e; \beta)$ be the strategy played by the workers. This consists of the decision as to whether or not to mount a revolution; $a = 1$ if they do (where a is a mnemonic for 'agitate') and 0 otherwise. If the form of government is democracy, $F = D$, then the workers set the price level at p^l. Since by the timing of events determined above the elite move before the workers, the strategy of the workers in a given period is conditioned on that of the elite. Let $\widetilde{\sigma}^e(F;\beta)$ be a best response to $\sigma^l(F|\, f, p^e; \beta)$ for all F, β, and let $\widetilde{\sigma}^l(F|\, f, p^e; \beta)$ be a best response to all $\sigma^e(F;\beta)$ for all F, β. Then a pure strategy Markov Perfect equilibrium is a set of mutual best responses $\left\{\widetilde{\sigma}^e(F;\beta), \widetilde{\sigma}^l(F|\, f, p^e); \beta\right\}$.

In our characterization of equilibrium, we will restrict attention to the region of the parameter space where the elite may have a commitment problem over trade policy. That is, under the threat of revolution they may not be able to avert its occurrence by (credibly)

[9] While there is no free-rider problem, there may be a problem of coordination between workers over revolution. This problem is ignored in the present paper but has been studied in a closed-economy context by Ellis and Fender (2011).

promising to set $p^e = p^{l*}$; but the elite will be able to avert revolution by extending the franchise and with it the power to set trade policy, facilitating $p^l = p^{l*}$. Under certain circumstances, which we will determine, the elite may also be able to use trade policy to maintain the status quo (i.e. not extend the franchise) which they would prefer to do. When possible, they will do this by setting trade policy that is favorable to the workers, although in general this will not be as favorable as p^{l*}.

Let $V^i(R, p^*)$ represent the present discounted value under revolution. The reason that the workers would choose p^* instead of p^{l*} after revolution is because after a revolution they own all the nation's assets and so their preferences over trade policy shift towards the one that maximizes national welfare. For a worker the payoff to revolution becomes

$$V^l(R, p^*) \equiv \frac{v\left(p^*, \overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)\right)}{1-\delta} \tag{2.1}$$

where payoffs over the infinite horizon are discounted by a common discount factor, δ, $0 < \delta < 1$. Also, w^* and r^* are the equilibrium values of w_t and r_t when, in any period t, $p_t = p^*$. Worker income, $\overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)$, reflects the fact that in addition to owning labor they have seized all the land and that their productivity is determined partly by their managerial productivity $\overline{\beta}$. Because in a revolution the elite lose everything, $V^e(R, p^*) = 0$. Since $\underline{\beta} = 0$, the workers do not attempt a revolution when $\beta = \underline{\beta}$ because in that event their payoff would be zero.

We will restrict attention to the region of the parameter space where the success of democracy in preventing revolution is guaranteed. To determine this restriction, observe that the value to a worker of democracy is

$$V^l\left(D, p^{l*}\right) \equiv \frac{v\left(p^{l*}, w^{l*}/\zeta\right)}{1-\delta}. \tag{2.2}$$

where w^{i*} is the equilibrium wage level given the price level p^{i*} preferred by group $i \in \{e, l\}$. We can ensure that workers prefer democracy to revolution by imposing the following restriction on the value of $\overline{\beta}$:

A1. Given a (unique) value of p^{l*}, which gives rise to w^{l*} (and r^{l*}), and a (unique) value of p^*, which gives rise to w^* and r^{l*}, assume that $\overline{\beta} \in (0, 1)$ is sufficiently small that $v\left(p^*, \overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)\right) < v\left(p^{l*}, w^{l*}/\zeta\right)$.

If $v\left(p^*, \overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)\right) < v\left(p^{l*}, w^{l*}/\zeta\right)$ then $V^l\left(R, p^{l*}\right) < V^l\left(D, p^{l*}\right)$ as required. All else equal, workers' income will increase if augmented by the proceeds of capital seized from the elite. But with $\overline{\beta}$ sufficiently small, the productivity of the economy's primary factors after revolution is sufficiently low as to make revolution less attractive than democracy. A1 will be assumed to hold throughout this section.

At the same time as wanting to ensure that extension of the franchise defuses revolution, recall that we also want to restrict attention to a situation where the elite cannot always simply head off revolution by temporary redistribution using trade policy. Assume that in period t the state is $\overline{\beta}$. The revolution constraint is then given by the following:

$$\frac{v\left(p^*, \overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)\right)}{1-\delta} > v\left(p^{l*}, w^{l*}/\zeta\right) + \delta\frac{v\left(p^{e*}, w^{e*}/\zeta\right)}{1-\delta}.$$

This expression says that the discounted payoff to revolution (on the left hand side) is greater than the immediate payoff from a single period in which the elite set the workers' preferred trade policy p^{l*} followed by a return to the elites' preferred trade policy in all periods thereafter. The following result establishes the conditions under which the revolution constraint binds.

Lemma 1. *Assuming A1, and a sufficiently high (common) discount factor, δ, there exists a range of values of $\overline{\beta}$ sufficiently high that the payoff to workers from revolution, with trade policy subsequently chosen by the median voter, is greater than a future of trade policy set by the elite, but sufficiently low that the payoff to democracy is greater than the payoff to revolution.*

Proof: See Appendix.

The intuition behind this result is as follows. For the revolution constraint to hold requires that $\overline{\beta}$ be sufficiently high as to ensure that revolution yields workers a payoff greater than a future of trade policy set by the elite but not so high that revolution yields workers a higher payoff than democracy, violating A1. This amounts to choosing $\overline{\beta}$ such that $v\left(p^{l*}, w^{l*}/\zeta\right) > v\left(p^*, \overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)\right) > v\left(p^{e*}, w^{e*}/\zeta\right)$. Since by the strong version of the Stolper-Samuelson theorem $v\left(p^{l*}, w^{l*}/\zeta\right) > v\left(p^{e*}, w^{e*}/\zeta\right)$, and since $v\left(p^*, \overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)\right)$ is monotonically increasing in β, we know that $\overline{\beta}$ can be chosen to satisfy this condition. Under the condition, if workers are relatively impatient (δ close

to zero) then given the opportunity of mounting a revolution, $\beta = \overline{\beta}$, they can be dissuaded from doing so by a single period of redistribution using trade policy; we know by A1 that $v\left(p^{l*}, w^{l*}/\zeta\right) > v\left(p^*, \overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)\right)$. But if workers are sufficiently patient (δ sufficiently close to 1), then their relatively low future payoff if $\beta = \underline{\beta}$, $v\left(p^{e*}, w^{e*}/\zeta\right)$, carries sufficient weight to render temporary redistribution insufficient. Thus we can restrict attention to a situation where the elite cannot credibly commit to the trade policy that would be preferred by the workers.

Based on Lemma 1, the following assumption ensures that the revolution constraint binds without A1 being violated.

A2. Given (unique) p^{e*}, p^{l*}, and p^*, assume $\overline{\beta}$ is sufficiently large that $v\left(p^*, \overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)\right) > v\left(p^{e*}, w^{e*}/\zeta\right)$ but not so large as to violate A1. Given this value of $\overline{\beta}$, assume that δ is sufficiently high that the revolution constraint is satisfied.

We are now ready to proceed with our characterization of equilibrium. In order to do so, we will represent the payoffs to the respective groups over time in Bellman-equation form. If in period t the state is $\underline{\beta}$ and the elite are in power, there is no threat of revolution. Therefore, in Markov Perfect Equilibrium, $f = 0$ and $p^e = p^{e*}$. We can then write the value function of a worker as

$$V^l\left(E, p^{e*}; \underline{\beta}\right) \equiv v\left(p^{e*}, w^{e*}/\zeta\right) + \delta\left(\rho V^l\left(E, p^e; \overline{\beta}\right) + \left(1 - \rho\right) V^l\left(E, p^{e*}; \underline{\beta}\right)\right).$$

Note from the first term in parentheses that, under the threat of revolution, the elite will tend to set a price p^e other than p^{e*} as we will discuss shortly. The value for a member of the elite is written in the same way except that V^e replaces V^l and $r^{e*}/\left(1 - \zeta\right)$ replaces w^{e*}/ζ.

Now consider the situation where in period t, with the elite in power, the state is $\overline{\beta}$ and so the threat of a revolution does exist. As outlined previously, the elite have two options as to how to address this threat. The first is to extend the franchise, $f = 1$. Under democracy the median voter, a worker, will vote for their most preferred price level p^{l*} and the payoff to a worker will be $V^l\left(D, p^{l*}\right)$ as given by (2.2). The second option is not to extend the franchise but to instead effect redistribution towards workers using trade policy; setting $f = 0$ and $p^e = p^s$. We will refer to p^s as the 'status quo' price.

Underlying it is a trade policy set by the elite to maintain the status quo. Given $\overline{\beta}$, it will be optimal for the elite to set p^s in such a way as to leave workers just indifferent between mounting a revolution and not doing so, in which case by assumption they will not. In general p^s must be higher than p^{e*}, though not necessarily as high as p^{l*}, and so implies a higher real income and level of utility for workers. Given either of these two actions by the elite, in principle the workers may still prefer to respond by mounting a revolution. Thus a worker's strategy solves the problem

$$\max\left\{V^l\left(R,p^*\right);fV^l\left(D,p^{l*}\right)+\left(1-f\right)V^l\left(E,p^s;\overline{\beta}\right)\right\}.$$

We have already determined in (2.1) and (2.2) the payoffs to workers from revolution, $V^l\left(R,p^*\right)$, and democracy, $V^l\left(D,p^{l*}\right)$, respectively. The payoff to a worker when the elite effect redistribution by setting p^s is

$$V^l\left(E,p^s;\overline{\beta}\right)\equiv v\left(p^s,w^s/\zeta\right)+\delta\left(\rho V^l\left(E,p^s;\overline{\beta}\right)+\left(1-\rho\right)V^l\left(E,p^{e*};\underline{\beta}\right)\right). \tag{2.3}$$

The payoff in the current period under p^s is $v\left(p^s,w^s/\zeta\right)>v\left(p^{e*},w^{e*}/\zeta\right)$. If in the following period the state of $\overline{\beta}$ is maintained then the elite will continue to set p^s and worker utility will be maintained at the same level. But if the state changes to $\underline{\beta}$ then the elite (renege on any promise to maintain redistribution with p^s and) restore their preferred trade policy, bringing about the price level p^{e*}.

We now want to consider the circumstances under which it would be possible for the elite to prevent revolution by bringing about redistribution. Let $\widetilde{V}^l\left(E|\,\rho;\overline{\beta}\right)$ be the maximum utility that the elite can induce among workers without extending the franchise. This maximum utility is induced by setting $p^s=p^{l*}$ in (2.3): $\widetilde{V}^l\left(E|\,\rho;\overline{\beta}\right)=V^l\left(E,p^{l*};\overline{\beta}\right)$.

Applying the logic developed by AR, we will now establish that there exists a critical level of ρ, denoted $\overline{\rho}$, at which the elite are just able to prevent a revolution by effecting redistribution. The equilibrium outcome will depend on whether ρ is above or below $\overline{\rho}$. To see this, first consider the maximum utility that can be induced among workers when $\rho=1$: By (2.2)

$$\widetilde{V}^l\left(E|\,\rho=1;\overline{\beta}\right)=\frac{v\left(p^{l*},w^{l*}/\zeta\right)}{1-\delta}=V^l\left(D,p^{l*}\right).$$

Now recall that, by A1, $V^l\left(D,p^{l*}\right)>V^l\left(R,p^*\right)$.

Next consider the maximum utility that can be induced among the workers when $\rho = 0$:

$$\widetilde{V}^l\left(E|\,\rho=0;\overline{\beta}\right) = v\left(p^{l*}, w^{l*}/\zeta\right) + \delta\frac{v\left(p^{e*}, w^{e*}/\zeta\right)}{1-\delta} < V^l\left(R, p^{l*}\right)$$

by A2. In addition, by the Stolper-Samuelson theorem with boundary endowments and homothetic preferences, $\widetilde{V}^l\left(E|\,\rho;\overline{\beta}\right)$ is continuously and monotonically increasing in ρ. Therefore, by the intermediate value theorem, there exists a unique $\overline{\rho} \in (0,1)$ for which $\widetilde{V}^l\left(E|\,\rho;\overline{\beta}\right) = V^l\left(R, p^*\right)$. Also by the Stolper-Samuelson theorem, $V^e\left(E, p^s;\overline{\beta}\right)$ is decreasing in p^s. And $V^e\left(E, p^s;\overline{\beta}\right) > V^e\left(D, p^{l*}\right)$ because when the elite hold power $p^e = p^s \in \left(p^{e*}, p^{l*}\right)$ whenever $\beta = \overline{\beta}$ but $p^e = p^{e*}$ when $\beta = \underline{\beta}$ whereas under democracy the elite earn $V^e\left(D, p^{l*}\right)$ in every period. With that, we now have all the elements in place to characterize equilibrium.

Proposition 1. *Assume A1 and A2 and that the economy is characterized by the Heckscher-Ohlin model. For $\rho \neq \overline{\rho}$ there exists a unique pure strategy Markov Perfect Equilibrium wherein*

1. *If $\rho < \overline{\rho}$ then the elite will respond to the threat of revolution by extending the franchise: $\widetilde{\sigma}^e\left(E;\underline{\beta}\right) = \left(f = 0, p^e = p^{e*}\right)$, $\widetilde{\sigma}^e\left(E;\overline{\beta}\right) = \left(f = 1, \cdot\right)$; $\widetilde{\sigma}^l\left(E|\,f=0,p^e;\overline{\beta}\right) = \left(a = 1, p^l = p^*\right)$, $\widetilde{\sigma}^l\left(E|\,f=1,\cdot;\overline{\beta}\right) = \left(a = 0, p^l = p^{l*}\right)$ and $\widetilde{\sigma}^l\left(D;\overline{\beta}\right) = \left(p^l = p^{l*}\right)$.*

2. *If $\rho > \overline{\rho}$ then the elite will effect temporary redistribution using trade policy in response to the threat of revolution: $\widetilde{\sigma}^e\left(E;\underline{\beta}\right) = \left(f = 0, p^e = p^{e*}\right)$, $\widetilde{\sigma}^e\left(E;\overline{\beta}\right) = \left(f = 0, p^e = p^s\right)$ where $p^s \in \left(p^{e*}, p^{l*}\right)$ is defined by $V^l\left(E, p^s;\overline{\beta}\right) = V^l\left(R, p^s\right)$, and $\widetilde{\sigma}^l\left(E|\,f=0,p^e;\overline{\beta}\right) = (a = 0)$ for all $p^e \geq p^s$. Off the equilibrium path, $\widetilde{\sigma}^l\left(E|\,f=0,p^e;\overline{\beta}\right) = \left(a = 1, p^l = p^*\right)$ for all $p^e < p^s$, $\widetilde{\sigma}^l\left(E|\,f=1,p^e;\overline{\beta}\right) = \left(a = 0, p^l = p^{l*}\right)$ and $\widetilde{\sigma}^l\left(D;\overline{\beta}\right) = \left(p^l = p^{l*}\right)$.*

Proposition 1 has the surprising feature that the elite can use trade policy to defuse a revolution when at any given time the opportunity to mount a revolution is relatively likely to arise; i.e. when $\rho > \overline{\rho}$. With the elite initially in power, only when the opportunity to mount a revolution is relatively unlikely must the elite extend the franchise to the workers if the state switches from $\underline{\beta}$ to $\overline{\beta}$, and with it the power to set trade policy. We can see

that when a revolution is relatively unlikely, the elite cannot credibly make a commitment to effect transfers using trade policy because when the opportunity to mount a revolution ceases then so will the (effective) transfers. On the other hand, if the opportunity to mount a revolution is relatively likely, the elite know it is quite likely that they will be held to account over their promise to effect transfers.

This feature parallels a similar result established by AR over the use of domestic taxation in a one-sector-one-factor framework. However, while AR use their result to explain the extension of the franchise in Western Europe, we are more interested in how this result can be used to explain the elites' use of trade policy to defuse the threat of revolution and hence maintain the status quo.

As an illustration of the usefulness of the result in this regard, we will now use it to undertake comparative statics to see how protection varies under the threat of revolution. First use (2.1) and (2.3) to define the function $G\left(p^e; p^{e*}, p^*, \overline{\beta}\right)$ that gives the net present value of the gain to workers from maintaining the status quo, given $p^e \in \left[p^{e*}, p^{l*}\right]$ and a relatively high likelihood that the opportunity to mount a revolution in any period will arise; $\rho > \overline{\rho}$:

$$\begin{aligned} G\left(p^e; p^{e*}, p^*, \overline{\beta}\right) &= V^l\left(E, p^e; \overline{\beta}\right) - V^l\left(R, p^*\right) \\ &= v\left(p^e, w^e/\zeta\right) + \rho\delta\frac{v\left(p^e, w^e/\zeta\right)}{1-\delta} + (1-\rho)\,\delta\frac{v\left(p^{e*}, w^{e*}/\zeta\right)}{1-\delta} \\ &\quad - \frac{v\left(p^*, \overline{\beta}\left(w^* + r^*\right)/\zeta\right)}{1-\delta} \end{aligned}$$

Using $G(\cdot)$, we can formalize the above definition of p^s as the value of p^e that solves $G\left(p^s; p^{e*}, p^*, \overline{\beta}\right) = 0$. In addition we can carry out comparative statics on $G(\cdot)$ in order to see how p^s is affected by unanticipated shocks. Throughout the following analysis we will consider small changes in the underlying parameters.

Consider first a change in p^* that represents an improvement in the country's terms of trade. If the country has a comparative advantage in manufactures then an improvement in the terms of trade would be represented by a (perceived as) permanent increase in p^*. This would increase $v\left(p^*, \overline{\beta}\left(w^* + r^*\right)/\zeta\right)$, the payoff to revolution, in the current and all future periods. The elite would in turn have to move p^s closer to p^{l*} in order to maintain the status quo; that is, they would have to increase p^s. This could be brought about by

a reduction in protection, either through a reduction in an import tariff or export tax. If on the other hand the country has a comparative advantage in primary products, then an improvement in the terms of trade would be represented by a decrease in p^*. The effect would be the same, to increase the payoff to revolution, but this time the policy response would be the opposite; to move p^s closer to p^{l*} by increasing protection, either through an increase in an import tariff or export tax.

Now consider a change in p^{e*}. For this we need to go beyond our specification of the simplest possible model and appeal to changes in non-economic factors that might affect the elites' gains from trade. Consider first the situation where the country has a comparative advantage in manufactures and the elite prefer relatively high levels of protectionism. Then p^{e*} would increase if the elite perceived external benefits to arise from closer contact with the rest of the world through trade. This would increase the payoff to the workers under periods where $\beta = \underline{\beta}$, so that p^s could be lowered towards p^{e*} during periods where $\beta = \overline{\beta}$ through an increase in protection without inducing a revolution. Next consider the converse, where the country has a comparative advantage in primary products. Then in our simple model p^{e*} would correspond to a policy of free trade. Now say that the elite become more insular, wanting to limit exposure to the outside world, again reflected in an increase in p^{e*}. This would again move policy towards p^{l*} during periods where $\beta = \underline{\beta}$, so that p^s could again be lowered towards p^{e*} during periods where $\beta = \overline{\beta}$ but this time through a decrease in protection.

The above exercises have illustrated how changes in the economic environment can affect international trade policy through changes in the benefits relative to the costs of mounting a revolution. Other effects on this balance could be incorporated to the model in order to analyze their impact on trade policy. In Section 4 we will use Proposition 1 and these comparative statics exercises to shed light on the puzzles of trade policy discussed in the Introduction.

3. The Specific-Factors Model with Revolution

Now we will show that when the Stolper-Samuelson theorem fails to hold, there may be no incentive for the workers to mount a revolution. To do this, we will produce a second new

model by combining a Specific-Factors model with the AR model of social conflict and franchise extension in much the same way we did above for the Heckscher-Ohlin model.

The changes relative to the model set out above concern the division of society into socioeconomic groups, the number of factors, and the production technology as it relates to factor use in production. Each citizen in the country is now placed in one of three (as opposed to two) socioeconomic groups: the capitalists, c, the landowners, (still e), or the workers, l. The mass of the total population is normalized to one as before, and the share of workers, landowners and capitalists in the population is fixed exogenously at ζ^l, ζ^e, and $1 - \zeta^e - \zeta^l$ respectively.

The economy is now endowed with a unit each of three (as opposed to two) primary factors: capital, K, labor, L, and land, T. Initially, all of the capital is distributed evenly among the capitalists, all of the land is distributed evenly among the landowners, with no capital or land belonging to the workers, while each worker is endowed with an equal share of the labor endowment. All members of each group are identical to one another as before and each group differs from the other only by its initial factor endowment. The return on capital is denoted by q_t in period t; the prices of the other two factors are denoted the same as previously.

The three factors are used in the production of two commodities, referred to as food and manufactures as before. Land is specific to the production of food while capital is specific to the production of manufactures. Labor is required in the production of both goods and can move freely between the two sectors. In all other respects the underlying structure of the economy is the same as previously.

Now consider an exogenous change of p_t; since the economic framework is a standard Specific-Factors model, we can immediately make use of standard results. It is well known that the Stolper-Samuelson Theorem fails to hold in this extended framework (Jones 1971). In particular:

$$\hat{q}_t > \hat{p}_t > \hat{w}_t > 0 > \hat{r}_t.$$

Given that we have maintained the assumption of boundary endowments in our Specific-Factors model as well, we can see straight away that capitalists gain in real terms from an increase in p_t while landowners lose. We can also see that the effect on workers is

ambiguous. If their consumption consisted entirely of food their real income and hence their welfare would rise in response to an increase in p_t while if they consumed only manufactures the effect would be the opposite. Given that in general their consumption bundle would include both goods, without more specific information about the specification of preferences, the effect of a change in p_t on the real income and hence the welfare of workers is ambiguous.

Now let us once again endogenize the determination of p_t. In this model we will assume that capitalists and landowners represent two elite groups within society in that each can separately play the role that the (single) elite did in the Hecksher-Ohlin version of the model. At $t = 0$ nature assigns power to one of the elite groups, which then has exclusive control over trade policy. The other elite group is excluded from power. In the event of a revolution, workers are assumed to expropriate all capital and land (after which they install democracy). The elite group that is excluded from power does not participate in the revolution and stand to lose everything if one occurs. In all other respects the model remains the same as previously.

We can now see that under our version of the Specific-Factors model, if capitalists were assigned power then they would tend to set a higher value of p_t than would land owners if they were assigned power. Maintaining the notation introduced earlier that p^{i*} denotes group i's preferred price level, where now $i \in \{c, e, l\}$, we have that $p^{c*} > p^{e*}$. Most importantly, unlike in the Heckscher-Ohlin model, because here the Stolper-Samuelson theorem does not hold, we cannot say anything about the relationship between the preferred price level of the ruling elite and the workers unless the workers only consume one good. If the landowners held power they would tend to set p^{e*} relatively low. If workers only consumed food then they would want food to be as cheap relative to their wages (and the price of manufactures) as possible. Thus $p^{e*} < p^{l*}$ and there would, given $\rho > \overline{\rho}$, be scope for the landowners to prevent a revolution by effecting redistribution, setting p^s such that $p^{e*} < p^s \leq p^{l*}$. But if workers only consumed manufactures then $p^{e*} = p^{l*}$ and there would be no incentive for workers to mount a revolution in the first place. In general, with workers consuming both goods, either situation may arise.

3.1. Worker Preferences over Trade Policy in the Specific-Factors Model

Following Ruffin and Jones (1977), we can in fact go further and characterize the preference of workers over trade policy in the Specific-Factors model. This in turn will enable us to provide a set of sufficient conditions for the threat of revolution to occur over trade policy, even when the Stolper-Samuelson theorem fails to hold. To do so, it will be helpful to introduce some additional notation. Let ψ_t be the relative rise in the wage rate when p_t increases by 1 percent: $\psi_t \equiv \hat{w}_t/\hat{p}_t$. And let θ be the fraction of any given individual's expenditures devoted to manufactures. Then the net change in the real income of workers as a result of an increase in p_t is

$$\hat{y}_t^l = (\psi_t - \theta)\,\hat{p}_t. \tag{3.1}$$

If $\psi_t \in (0,1)$, the effect of a change in $\hat{p}_t$ on the real income of workers is ambiguous. In the 2×2 Hecksher-Ohlin model, $\psi_t > 1$ and from this the effect of a change in p_t on workers' real income is unambiguously positive. But as we shall see, in the Specific-Factors model $\psi_t \in (0,1)$, which is the root of the ambiguity revealed in the previous subsection.

The reason for the differences between the possible ranges of values of ψ_t in the respective models is that, by construction, each good must be biased towards one factor in the 2×2 Hecksher-Ohlin model. This implies that one good must be biased towards labor; in our specification we chose this to be manufactures. On the other hand, in the Specific-Factors model manufactures can be 'unbiased with respect to labor'. Making this precise, manufactures are said to be unbiased with respect to labor if the relative change in the wage rate, $\hat{w}_t$, brought about by an increase in p_t is:

$$\hat{w}_t = \alpha^K \hat{q}_t + \alpha^L \hat{w}_t + \alpha^T \hat{r}_t;\ \alpha^I > 0,\ \sum \alpha^I = 1,$$

where α^I, $I \in \{K, L, T\}$, is the distributive share of factor I in national income. Intuitively, manufactures are unbiased with respect to labor when the change in the wage rate in response to a change in p_t is exactly equal to the weighted average of the change in all factor prices. Manufactures are biased towards labor if the change is greater than, or biased away from labor if the change is less than, the weighted average of the change in all factor prices.

We will now make use of that fact that, for the Specific-Factors model and a wide variety of general equilibrium models, the output-share-weighted-average of relative changes in commodity prices equals the distributive share weighted average of relative factor prices:

$$\alpha_f \hat{p}_t^f + \alpha_m \hat{p}_t^m = \alpha^K \hat{q}_t + \alpha^L \hat{w}_t + \alpha^T \hat{r}_t,$$

where α_j $j \in \{f, m\}$ denotes the fraction of the national income represented by the production of good j. This condition is obtained by differentiating the competitive profit conditions and then aggregating across sectors. Following the approach that we have taken throughout the paper of taking variation of p_t to represent changes of p_t^m relative to p_t^f, or equivalently changing p_t^m while holding p_t^f constant, in the unbiased case it follows from the previous two equations and the definition of ψ_t that

$$\psi_t = \alpha_m.$$

We can now use this result to demonstrate unbiasedness in the Specific-Factors model. For that model, following Jones (1971), ψ_t takes the form

$$\hat{w}_t = \psi_t \hat{p}_t = \lambda_m((\eta_m/\theta_{Km}) \,/\, \left(\lambda_f \left(\eta_f/\theta_{Tf}\right) + \ \lambda_m \left(\eta_m/\theta_{Km}\right)\right)) \cdot \hat{p}_t.$$

The λ_j, $j \in \{f, m\}$, denote the fraction of the labor force used to produce good j. The θ_{Ij} indicate the distributive share of the specific factor in the jth sector. Since the η_j express the elasticity of substitution between labor and the specific factor in sector j, the expression η_j/θ_{Ij} is the elasticity of labor's marginal product curve in the jth sector. Thus the denominator of ψ_t is the the economy-wide average over both sectors of labor's marginal product curve in each sector.

Manufactures are unbiased with respect to labor if:

(i) The elasticity of the marginal product of labor schedule for manufactures, η_m/θ_{Km}, is equal to the economy-wide average;

(ii) Manufactures are neither more nor less labor intensive than the economy as a whole. That is, the fraction of the labor force used to produce manufactures, λ_m, is equal to the fraction of national income represented by the value of production in manufactures, α_m.

Assumption (i) implies that $\psi_t = \lambda_m$ and assumption (ii) states that $\lambda_m = \alpha_m$. Thus manufactures are unbiased with respect to labor.

Now let us consider the implications of unbiasedness. Using the fact that $\psi_t = \alpha_m$ in (3.1), we have that $\hat{y}_t^l = (\alpha_m - \theta)\,\hat{p}_t$, where $-(\alpha_m - \theta)$ is the fraction of national income, Y, that is comprised of imports of manufactures, M_m. So for the neutral case, (3.1) is equivalent to:

$$\hat{y}_t^l = -(p_m M_m / Y)\,\hat{p}_t. \tag{3.2}$$

Let us maintain the (implicit) long-run assumption that trade accounts are balanced. This implies that if a country exports a good then it is because it has a comparative advantage in that good. Then we can state the main proposition of Ruffin and Jones (1977) as it applies in the present context as follows. If manufactures are unbiased with respect to labor, then a rise in the price of manufactures raises the real income of workers if and only if the country has a comparative advantage in manufactures. A rise in the price of manufactures lowers the real income of workers if and only if the country has a comparative advantage in food.

Applying this proposition to the theory of protection reveals how the implications of trade policy intervention in the Specific-Factors model can differ from those in the Heckscher-Ohlin model. If manufactures are unbiased with respect to labor, and if the country has a comparative advantage in manufactures, then an export tax on manufactures or an import tariff on food would lower the domestic relative price of manufactures, lowering workers' real income and making them worse off. If landowners were in power then the prediction would be just as in the Heckscher-Ohlin model developed above: $p^{e*} < p^{l*}$. The landowners favor protection while the workers favor free trade. Under these circumstances, given the opportunity to mount a revolution workers would take it. But, knowing this, the elite would attempt to use trade policy to defuse the incentive to mount a revolution just as in the Heckscher-Ohlin model.

Now assume that the country has a comparative advantage in food. Then an export tax on food would lower the domestic price of food and hence raise the relative price of manufactures. And similarly for an import tariff on manufactures. By the Ruffin-Jones proposition, either intervention would lower the real income of workers and hence make them worse off. So, unlike in the Heckscher-Ohlin model, under the Specific-Factors model

where manufactures are unbiased with respect to labor, workers always favor nonintervention in trade policy. This difference underpins the fact that the Stolper-Samuelson theorem can fail to hold in the Specific-Factors model. Since the landowners favor nonintervention as well and hold power, we have that $p^{e*} = p^{l*}$. Thus, there is no incentive for the workers to mount a revolution in order to seize control of trade policy.

The specific predictions regarding the relationship between comparative advantage and the predictions over whether or not there is an incentive for workers to mount a revolution are reversed when capitalists hold power, but the basic point remains the same. Under the Specific-Factors version of our model the incentives of the ruling elite to set trade policy, now the capitalists, will only conflict with those of the workers if labor is unbiased with respect to food and if the country has a comparative advantage in food. The foregoing discussion gives us the following general result:

Lemma 2. *If the elite do not (do) own the specific factor that is used intensively in the good for which the country has a comparative advantage, and if that good is unbiased with respect to labor, then the interests of the ruling elite and the workers over trade policy conflict (are aligned). Consequently, there exists (does not exist) an incentive to mount a revolution over trade policy.*

We can see that the implications of Lemma 2 map into our analysis of the incentives to mount a revolution formalized in Proposition 1. When there exists an incentive to mount a revolution, then the interactions between the ruling elite and the workers in the Specific-Factors version of the model are exactly the same as those in the Heckscher-Ohlin version. What we gain from Lemma 2 is an insight into how relaxing the conditions for the Stolper-Samuelson theorem to hold can in turn remove the incentive to mount a revolution.

It is clear that the assumption of neutrality plays an important role in Lemma 2. It essentially guarantees that the autarky price of manufactures coincides with the point at which $\psi_t = \theta$. By (3.2), this guarantees a positive relationship between $\hat{p}_t$ and $\hat{y}_t^l$ whenever the country has a comparative advantage in manufactures and a negative relationship otherwise, in turn implying that workers dislike trade policy intervention and contravening the Stolper-Samuelson theorem. It is tempting to think that all one needs to do to restore

the clear Stolper-Samuelson predictions in the Specific-Factors model is to assume that manufactures are biased towards labor. But this is not sufficient. To see why, focus on the case where manufactures are biased towards labor because they are labor intensive (as in our Heckscher-Ohlin model). This would increase ψ_t at each price, p_t, implying that $\psi_t > \theta$ in autarky. Consequently, by (3.1), at a world price just below the autarky price it would be possible to have a positive relationship between $\hat{y}_t^l$ and $\hat{p}_t$ when manufactures are imported; the relationship associated with the Stolper-Samuelson theorem. However, in general it should always be possible to find a world price sufficiently low that the negative relationship that holds under neutrality would be restored.[10] So in general there would be an ambiguous relationship between $\hat{y}_t^l$ and $\hat{p}_t$ and hence an ambiguity over workers' preferences over trade policy. Neither is it possible to make manufactures sufficiently labor intensive to rule out this ambiguity completely because as we have already established, in the Specific-Factors model $\psi_t \in (0,1)$ while the ambiguity is removed in the Heckscher-Ohlin model by the fact that $\psi_t > 1$.

From this discussion we can see that it is not possible to establish a set of necessary conditions for a revolution over trade policy under the Specific-Factors model. But a set of sufficient conditions are possible, and are presented in the following result. Before stating the result, we need to introduce modified versions of A1 and A2 that accommodate the extended structure of the Specific-Factors version of the model:

A1′. Given (a unique) p^{l*}, which gives rise to w^{l*} (and r^{l*} and q^{l*}), and a (unique) value of p^*, which gives rise to w^*, r^*, and q^*, assume that $\overline{\beta} \in (0,1)$ is sufficiently small that $v\left(\overline{\beta}\left(\left(w^* + r^* + q^*\right)/\zeta^l\right)\right) < v\left(p^{l*}, w^{l*}/\zeta^l\right)$.

A2′. Given (unique) p^{c*}, p^{e*}, p^{l*}, and p^*, assume $\overline{\beta}$ is sufficiently large that $v\left(p^*, \overline{\beta}\left(\left(w^* + r^* + q^*\right)/\zeta\right)\right) > v\left(p^{e*}, w^{e*}/\zeta\right)$ but not so large as to violate A1. Given this value of $\overline{\beta}$, assume that δ is sufficiently high that the revolution constraint is satisfied.

The following result summarizes the discussion above.[11]

Proposition 2. *Assume A1′ and A2′ and that the economy is characterized by the*

[10] This property is guaranteed by our assumption of homotheticity; see Ruffin and Jones (1977), fn 4.

[11] Note that the formal representations of equilibrium path (and off equilibrium path) strategies is suppressed in the statement of this result. The reason is that they conform precisely to the formal statement of these strategies in Proposition 1.

Specific-Factors model. Also assume that the elite do not own the specific factor that is used intensively in the good for which the country has a comparative advantage, and that this good is unbiased with respect to labor. Then for $\rho \neq \overline{\rho}$ there exists a unique pure strategy Markov Perfect Equilibrium wherein

1. *If $\rho < \overline{\rho}$ then the elite will respond to the threat of revolution by extending the franchise.*

2. *If $\rho > \overline{\rho}$ then the elite will effect temporary redistribution using trade policy in response to the threat of revolution.*

If the elite do own the specific factor that is used intensively in the good for which the country has a comparative advantage (and if that good is unbiased with respect to labor) then there does not exist an incentive to mount a revolution over trade policy.

This result emphasizes the relationship between the specific factor owned by the elite and the intensity of its use in production. It is when the elite does not own the factor that is used intensively in the good for which the country has a comparative advantage that there is a threat of revolution over trade policy. Conversely, interests between the workers and the elite are aligned if the elite group who hold power own the factor that is used intensively in the good for which the country has a comparative advantage. This reveals an interesting alternative to the extension of the franchise as a way to defuse the incentive to mount a revolution. A ruling elite who faced this threat could simply hand over power to the other elite, without necessarily extending the franchise. The result can thus be used to shed further light on the rationale behind repeal of the Corn Laws. Within a month of gaining repeal, the Peel-lead Conservative government fell to the Whigs, who represented the interests of capital in the House of Commons. The Conservatives subsequently remained out of power for decades. Given the disastrous political fall-out from repeal, why did Conservatives in both Houses of Parliament support it? Proposition 2 suggests that triggering a transfer of power from the Conservatives to the Whigs may have been a way of maintaining political stability under the threat of revolution.

4. Puzzles in Trade Policy Explained

4.1. Britain's Repeal of the Corn Laws

We return now to the first of our puzzles of trade policy, why in the mid-19th Century Britain repealed the Corn Laws, thus making a decisive unilateral move towards free trade (Schonhardt-Bailey 2006: 1). The reason this is a puzzle is because the British aristocracy had such a firm hold over the policy-making process at the time, and the Corn Laws operated so strongly in their interests, that trade liberalization seemed inconceivable. In a letter to John R. McCulloch on February 8, 1822, David Ricardo wrote:

> "I have no hope of [free trade] being adopted, the landlords are too powerful in [the first house of the British parliament] the House of Commons to give us any hope that they will relinquish the [import] tax which they have in fact contrived to impose on the rest of the community" (Peach 1993: 100).

To raise the odds against repeal of the Corn Laws even higher, the aristocracy also controlled (the second house of the British parliament) the House of Lords, which held a veto over any bill that passed through the House of Commons.[12] Ultimately, however, in June 1846 the British Prime Minister of the day Sir Robert Peel did push repeal of the Corn Laws through the House of Commons and the bill was not vetoed by the House of Lords. This political move is such a puzzle because at once it so decisively violated the core protectionist ideology of the British Conservative party while simultaneously undercutting the economic interests of the ruling landed aristocracy.

The threat of revolution plays a critical role in this theory of trade policy, as does the possibility of the extension of the franchise, roles for which there appears to be historical justification. As Schonhardt-Bailey (2006) explains, "...economic interests accounted for the momentum behind repeal, a momentum that overshadowed almost all else. Indeed, as part of a broader impulse toward democratic reform, these same interests, left unsatisfied, could have snowballed into revolution, as Peel and others feared (and as happened just two years later in France)." Based on this, it seems reasonable to assume that the probability

[12] In 1860, several years after repeal of the Corn Laws, the Lords' veto power was limited by the Commons to exclude bills concerning taxation.

of revolution in any given period, ρ, is relatively high. In terms of Proposition 1, we are assuming that $\rho > \overline{\rho}$ throughout the period. Under those circumstances, Proposition 1 predicts that it would indeed be possible to use repeal of the Corn Laws to prevent revolution, as Schonhardt-Bailey argues.

There is a large literature on Peel's paradoxical repeal of the Corn Laws, summarized nicely by O'Rourke and Williamson (1999, ch.5) and Schonhardt-Bailey (2006, see especially chs.1-2); see also Irwin (1989). Two positions have emerged in this literature. The first position has it that growing urbanization in Britain made repeal inevitable. This view emphasizes the role of urban interest groups, conforming to the literature on the political economy of protection referred to above. The second position attributes repeal to the force of logic behind the argument that free trade maximized national welfare. Kindleberger (1975) credits Ricardo, Cobden and others with bringing about repeal.

Yet neither of these positions takes account of how much the British aristocracy stood to loose from repeal nor the power that they held over the policy-making process. Williamson (1990) estimates that repeal of the Corn Laws, entailing the removal of a 54 percent tariff on grain, implied a 49 percent reduction in grain rents. Non-grain rents (on pasture, in the north and west of England) would have fallen by 6.5 percent. If members of the House of Lords acted as representatives of the British aristocracy, then to substantiate the conventional 'political economy of protection' view of repeal would have required compensating transfers of this magnitude (assuming expected losses were in line with those that actually materialized) from urban interests to the land-owning aristocracy in order to persuade them not to use their veto in the House of Lords. Yet there is no evidence that transfers of this magnitude actually took place. Neither does there seem to be evidence that members of the House of Lords were bought off through transfers strictly to themselves although this possibility cannot be ruled out.

4.2. Food Price Shocks and Responses by Food Exporters

The idea that openness in international food markets should stabilize world food prices goes all the way back to David Ricardo's work *On the Principles of Political Economy and Taxation.* Yet evidence collected in the wake of world food price increases has shown

that the response of food exporters is often to use export taxes to reduce or even shut down all together their own exports of food, thus exacerbating food price increases.

In response to the world food price increases in 1973-4, Johnson (1975) argued that if free trade in grain were in place in 1975 then the resulting shortages could have been averted. Tyers and Anderson (1992) found that, as a result of policy interventions by exporters, instability of international food prices were three times greater than they would have been under free trade in those products. The world market for rice is particularly surprising. Anderson and Nelgen (2010) document that, due to market insulating policies by governments in Asia and to a lesser extent Africa, less than 7 percent of world rice production was traded between 2000 and 2004. Less than 5 percent was traded in the period prior to that. In response to the food crisis that occurred in 2007 and the first half of 2008, the World Bank (2008) responded as follows: "For countries that are grain exporters, there may be political pressures to ban or tax grain exports in high price years. Unfortunately, several countries have now implemented these types of measures." The policy advice given by the World Bank in response to the crisis was for food exporting countries to desist from implementing such trade restrictive measures.

Yet the analysis following Proposition 1 shows that, in an environment where an elite fear expropriation and loss of power, intervention to insulate the domestic market from food price fluctuations may be rational. Anderson and Nelgen (2010) document that food price shocks often precipitate "food riots" that in some cases have culminated in the overthrow of governments. They also note that, although increases in export taxes during periods of food price increases tend to attract more attention, governments also tend to stabilize downward movements in prices by liberalizing trade. This is exactly what our analysis would predict.

Recall from our analysis following Proposition 1 that a world food price increase would be captured by a fall in p^*. Assume as standard that a food-exporting country has a comparative advantage in food. Then, as discussed following Proposition 1, a fall in p^* represents an improvement in the terms of trade that increases the attractiveness to the workers of mounting a revolution. The rational response for the ruling elite is to restore the status quo by increasing p^s, which is typically implemented in food-exporting developing countries through an increase of export taxes. Following this rationale, a

sufficiently large food price shock could motivate an outright ban of exports. Note that the effect works in reverse as well; a fall in food prices, captured by an increase in p^*, calls for a reduction of p^s in order to maintain the status quo. Thus we have a rationale for intervention that occurs in both directions, as documented by Anderson and Nelgen.

4.3. Unilateral Liberalization by Middle-Income Countries

Our third puzzle of trade policy is why many middle-income countries have, since the 1980s, undertaken trade liberalization unilaterally. Prior to that, trade liberalization tended to take place between developed countries and be predominantly reciprocal. Unilateral trade liberalization was regarded as a rarity. As Baldwin and Baldwin (1996) note, tariff liberalization is something of a paradox. "Assuming policy choices are endogenous, the initial tariff must have been optimal, so why would removing the tariff also be optimal? Any complete model of unilateralism thus requires three elements: An explanation of why protection was politically optimal in the first place, a shock that changes the political and/or economic setting, and an explanation of why the shock makes a lower tariff politically optimal." We are able to use the framework set up in this paper to satisfy these three criteria for recent unilateral trade liberalization in middle-income countries.

First let us characterize the current situation in developing countries. One possibility is that the country in question has already developed a comparative advantage in manufactures but that the elite have maintained a significant interest in the natural resource/primary product sector. In that case the country could be characterized in the same was as mid-19th Century Britain. Then Proposition 1 could be used to explain the recent wave of trade liberalization in these countries as well, much as we did for Britain in our discussion above. A second possibility is that the country has not yet acquired a comparative advantage in manufactures but that its ruling elite has a significant interest in a manufacturing sector that receives so-called infant industry protection. There could be a second land-owning elite in this country as well. The workers are assumed to be mobile between manufactures and primary products. This country would be characterized by the Specific-Factors version of the model set up in Section 3. In that case, Proposition 2 would predict that while the ruling elite prefer protection, they may also have an incentive to liberalize trade in order to maintain the status quo.

The shock that could explain the change in the political and/or economic setting is the revolution in information and communications technologies. This arguably reduced the costs of coordinating a revolution and thus made a revolution more likely in any given period, represented in our framework by an increase in ρ. As a result, use of trade policy to quell the now more frequent opportunity to mount a revolution becomes the rational response. Indeed, use of trade policy to maintain the status quo is appealing to the ruling elite because it provides them with an alternative to handing over power in a move to democracy.

Mobile phones began to penetrate the developing world in the late 1980s and early 1990s, at much the same time as the wave of unilateral trade liberalization began. Even in Africa, the poorest region in the world, mobile phone penetration had already reached 16 million people by 2000 and is reckoned to be growing in some countries at a rate of forty to fifty percent per year (United Nations 2009). Much has been made of the role of web-based media such as Twitter and Facebook in providing coordination devices for the recent wave of uprisings in the Middle East dubbed the Arab Spring. But some have argued that, given relatively low levels of literacy and computer penetration throughout many countries in the region, it was in fact more 'traditional' means of communication, principally the mobile phone, that played a decisive role (Stepanova 2011).

5. Conclusions

In this paper, we have shown that the conditions required for the Stolper-Samuelson theorem to hold, embodied by the 2×2 Heckscher-Ohlin model, represent the key components in a set of sufficient conditions for workers to have an incentive to mount a revolution, but also for the ruling elite to offset its occurrence using trade policy. We have explored these sufficient conditions by relaxing a key assumption required for the Stolper-Samuelson theorem to hold, moving from the Heckscher-Ohlin model to the Specific-Factors model. In doing so we showed that the incentive to mount a revolution over trade policy could be removed. In the context of the latter model, we then established a different set of sufficient conditions for there to be a threat of revolution over trade policy. This theory was used to explain the repeal of Britain's Corn Laws, the seemingly perverse response

of food exporting countries of curtailing their exports in response to food price increases, and the recent wave of unilateral trade liberalization in middle-income countries.

Three main questions are provoked by the framework presented in this paper. The first concerns how this theory measures up against previous theories of protectionism in its ability to explain patterns in the data? The second concerns the dynamic process governing the interaction between trade liberalization and eventual franchise extension. The third is why we ever observe revolution, as in the Arab Spring, if either trade policy or franchise extension can be used to maintain the status quo. Let us briefly discuss the scope for future research in each of these areas in turn.

As discussed in the Introduction, previous theories of protectionism tended to focus on efforts by special interest groups to lobby the government financially for their preferred trade policy. A combination of the theory developed in the present paper and earlier theories would facilitate an even more nuanced account of the variation in tariff rates across countries. Following the literature initiated by Goldberg and Maggi (1999), there would also be scope to test the relative importance of the respective theories of protectionism against the data.

It would be interesting to examine the interaction over time of the incentive to use tariffs to defuse the threat of revolution against the broader impetus to extend the franchise. For example, technological change could alter the relative payoff to the workers over time of gaining control over trade policy under democracy versus maintaining the status quo. Following Neary (1978), the freeing up of the mobility of various different types of factor over time could affect the preferences of their owners over trade policy. This in turn might help to explain, for example, why tariff reduction both through the 19th Century and nowadays is often gradual.

Finally, our analysis begs the question as to why the deposed regimes in the Middle East did not used trade policy to prevent the revolutions of the Arab Spring? Ellis and Fender (2010) show, in a closed economy environment characterized by uncertainty, that it may be rational for a ruling elite to set policies under which a revolution may arise with some probability. The framework of the present paper is open-economy but does not allow for uncertainty. A combination of the two frameworks could explain why an elite

might fail to use trade policy to the fullest extent possible to prevent a revolution, even though such policy action might be possible in principle.

A. Appendix

Proof of Lemma 1. Multiplying the revolution constraint through by $(1-\delta)$, it can be rewritten as

$$v\left(p^*, \overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)\right) > (1-\delta)\, v\left(p^{l*}, w^{l*}/\zeta\right) + \delta v\left(p^{e*}, w^{e*}/\zeta\right).$$

By A1, $\overline{\beta}$ is chosen to be sufficiently small that $v\left(p^{l*}, w^{l*}/\zeta\right) > v\left(p^*, \overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)\right)$. But by the Stolper-Samuelson Theorem with boundary endowments and homothetic preferences, $v\left(p^{l*}, w^{l*}/\zeta\right) > v\left(p^{e*}, w^{e*}/\zeta\right)$. So it is possible to choose $\overline{\beta}$ sufficiently large that $v\left(p^{l*}, \overline{\beta}\left(\left(w^{l*} + r^{l*}\right)/\zeta\right)\right) > v\left(p^{e*}, w^{e*}/\zeta\right)$ while still maintaining $\overline{\beta}$ small enough to satisfy A1. Thus we have established that the revolution constraint holds for $\delta = 1$. By continuity and monotonicity of the right hand side of the revolution constraint in δ, it holds for values of δ sufficiently close to 1 as well. The value of δ must be sufficiently close to 1 because the right hand side of the revolution constraint approaches $v\left(p^{l*}, w^{l*}/\zeta\right)$ as δ approaches zero which, by A1, is greater than $v\left(p^*, \overline{\beta}\left(\left(w^* + r^*\right)/\zeta\right)\right)$, violating the revolution constraint. □

References

[1] Acemoglu, D. and J.A. Robinson, (2000a); "Why Did the West Extend the Franchise? Democracy, Inequality and Growth in Historical Perspective." *Quarterly Journal of Economics*, 115: 1167-1199.

[2] Anderson, K., and S. Nelgen, (2010); "How Do Governments Respond to Food Price Spikes? Lessons from the Past." Centre for International Economic Studies Discussion Paper No. 1015.

[3] Bairoch, P., (1989); "European Trade Policy, 1815-1914. In P. Mathias and S. Pollard (eds.) , *The Cambridge History of Europe*, Vol 8. Cambridge University Press, Cambridge, UK.

[4] Baldwin, R., (2010); "Unilateral tariff liberalisation." *International Economy, Journal of The Japan Society of International Economics*, 14: 10-43. Also NBER WP 16600, 2010.

[5] Centeno, M. (2002); *Blood and Debt: War and Nation-State in Latin America*. Pennsylvania State University Press.

[6] Chipman, J., (1969); "Factor Price Equalization and the Stolper-Samuelson Theorem." *International Economic Review*, 10:399-406.

[7] Costinot, A., (2009); "On the Origins of Comparative Advantage." *Journal of International Economics*, 77: 255-264.

[8] Do, Q.-T. and A. Levchenko, (2009); "Trade, Inequality, and the Political Economy of Institutions." *Journal of Economic Theory*, 144(4): 1489-1520.

[9] Ellis, C., and J. Fender, (2011); "Information Cascades and Revolutionary Regime Transitions." *Economic Journal* Volume 121(553): 763–792.

[10] Gail, D. and H. Nikaido, (1965); "The Jacobian Matrix and Global Univalence of Mappings." *Mathematische Annalen* 159(2).

[11] Garfinkel, M., S. Skaperdas and C. Syropoulos, (2008); "Globalization and Domestic Conflict." *Journal of International Economics*.

[12] Goldberg, P.K. and G. Maggi, (1999); "Protection for Sale: An Empirical Investigation." *American Economic Review*, 89(5): 1135-1155.

[13] Herbst, J. (2004); "African Militaries and Rebellion: The Political Economy of Threat and Combat Effectiveness." *Journal of Peace Research*, 41: 357-369.

[14] Hillman, A.L., (1982); "Declining Industries and Political-Support Protectionist Motives." *American Economic Review*, 72(5): 1180-87.

[15] Hillman, A.L. and H.W. Ursprung, (1988); "Domestic Politics, Foreign Interests, and International Trade Policy." *American Economic Review*, 78(4): 729-45.

[16] Irwin, D.A. (1989); "Political Economy and Peel's Repeal of the Corn Laws." *Economics and Politics*, 1: 41-59.

[17] Johnson, H., (1975); "World Agriculture, Commodity Policy, and Price Variability." *American Journal of Agricultural Economics*, 57(5): 823-28.

[18] Jones, R.W., (1965); "The Structure of Simple General Equilibrium Models." *Journal of Political Economy*, 73(6): 557-72.

[19] Jones, R.W., (1971); "A Three-Factor Model in Theory, Trade and History." Chapter 1 of Bhagwati et al *Trade, Balance of Payments and Growth*, Elsevier, Amsterdam, Netherlands.

[20] Kindleberger, C.P. (1975); "The Rise of Free Trade in Western Europe, 1820-1875." *Journal of Economic History*, 35(1): 20-55.

[21] Levchenko, A., (2007); "Institutional Quality and International Trade." *Review of Economic Studies*, 74:3 (July 2007), 791-819.

[22] Liu, X. and E. Ornelas, (2009); "Free Trade Agreements and the Consolidation of Democracy." Typescript.

[23] Magee, S.P., W.A. Brock and L. Young, (1989); *Black Hole Tariffs and Endogenous Policy Theory: Political Economy in General Equilibrium*. Cambridge University Press, Cambridge, UK.

[24] Neary, P., (1978); "Short-Run Capital Specificity and the Pure Theory of International Trade." *Economic Journal*, 88: 488-510.

[25] North, D.C. and R.P. Thomas, (1973); *The Rise of the Western World: A New Economic History*, Cambridge University Press, Cambridge, UK.

[26] North, D.C. and B.R. Weingast (1989); "Constitutions and Commitment: Evolution of Institutions Governing Public Choice in Seventeenth Century England." *Journal of Economic History*, 803-832.

[27] Nunn, N., (2007); "Relationship-Specificity, Incomplete Contracts, and the Pattern of Trade," *Quarterly Journal of Economics*, 122(2): 569-600.

[28] Olson, M., (2000); *Power and Prosperity: Outgrowing Communist and Capitalist Dictatorships*, Basic Books, New York, NY.

[29] O'Rourke, K.H., and J.G. Williamson (1999); *Globalization and History: The Evolution of a Nineteenth-Century Atlantic Economy*. MIT Press, Cambridge, Massachusetts, and London, UK.

[30] Peach, T. (1993); *Interpreting Ricardo*, Cambridge: Cambridge University Press.

[31] Rogowski, R., (1989); *Commerce and Coalitions*. Princeton University Press, Princeton, New Jersey.

[32] Ruffin, R., and R.W. Jones; (1977); "Protection and Real Wages: the Neoclassical Ambiguity." *Journal of Economic Theory*, 14: 337-348.

[33] Schonhardt-Bailey, C. (2006) *From the Corn Laws to Free Trade: Interests, Ideas, and Institutions in Historical Perspective.* MIT Press, Cambridge, Massachusetts, and London, UK.

[34] Segura-Cayuela, R. (2006); "Inefficient Policies, Inefficient Institutions and Trade." Bank of Spain Working Paper no. 0633

[35] Stefanides, C. (2010); "Appropriation, Property Rights Institutions, and International Trade." *American Economic Journal: Economic Policy*, 2(4): 148–72.

[36] Tyers, R., and K. Anderson, (1992); *Disarray in World Food Markets: A Quantitative Assessment*, Cambridge University Press, Cambridge and New York.

[37] United Nations (2009); "Mobile Commerce in Africa: An Overview with Specific Reference to South Africa, Kenya and Senegal." United Nations, New York.

[38] Williamson, J.G. (1990); "The Impact of the Corn Laws Just Prior to Repeal." *Explorations in Economic History*, 27: 123-156.

[39] Williamson, J.G., (2011); *Trade and Poverty: When the Third World Fell Behind*. MIT Press, Cambridge Massachusetts and London.

[40] World Bank (2008); "Rising Food Prices: Policy Options and World Bank Response." World Bank, Washington D.C..

[41] Zakaria, F. (1997); "The Rise of Illiberal Democracy." *Foreign Affairs*, 76(6): 22-43.