WORKING Papers

World Price Shocks, Income, and Democratization

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Abstract

This paper shows how a world price shock can increase the likelihood that democratization must be used to resolve the threat of revolution. Initially, a ruling elite may be able to use trade policy to maintain political stability. But a world price shock can push the country into a situation where the elite face a commitment problem that only democratization can resolve. Because the world price shock may also reduce average incomes, the model provides a way to understand why the level of national income per capita and democracy may not be positively correlated. The model is also useful for understanding dictatorial regimes' rebuttal of World Bank calls to keep their export markets open in the face of the 2007-08 world food crisis.

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1. Introduction

Lipset's 'modernization hypothesis,' that the level of income per capita and hence economic development drives the creation and consolidation of democracy, has recently come into question. By estimating Markov transition models, Przeworski , Alvarez, Cheibub and Limongi (2000) failed to find a significant relationship between the level of income per capita and the likelihood of transition to democracy. Taking a difference-in-difference approach, Acemoglu, Johnson, Robinson and Yared (2008) replicate this finding by controlling for country-specific factors affecting both income and democracy. Although these findings have themselves been challenged, they are taken to be supportive of the 'new institutional economics' view that political and economic institutions form the foundations of long-run economic growth (see Acemoglu, Johnson and Robinson 2005).

With these developments, economists have begun to consider ways in which democratization might take place without any systematic reliance on increases in income. The present paper shows how democratization can arise as a result of a world price shock that may actually reduce average incomes. Throughout history price shocks, especially food price shocks, have been a key trigger of social unrest, in some cases giving rise to democratization.[3] Yet price shocks have largely been overlooked in prior models of democratization since these tend to be based on single-sector macro models that have no role for prices. Since the model that we will develop in the present paper has the underlying structure of an international trade model with two sectors, the role of price shocks in creating the potential for democratization can be analyzed in a natural way.

Drawing on Zissimos (2014), the model of this present paper combines Acemoglu and Robinson's (2000) closed economy model of democratization with a standard Heckscher-Ohlin (H-O) model of international trade to consider how price shocks can affect democratization. Following Acemoglu and Robinson (2000, henceforth AR), the ruling dictatorial elite may face a commitment problem in their attempts to address a threat of revolution by the rest of society. The elite would like to be able to make transfers over time large enough to quell the threat of revolution. But it is common knowledge that if the rest of society's ability to coordinate over revolution subsides in future then so will the credibility

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[3]See Carter, Rausser and Smith (2011) for a review of the literature showing that commodity price volatility can provoke political as well as economic instability.

of any commitment to make transfers. Through the 2×2 H-O model, transfers are made using international trade policy. For concreteness, and to understand the events of the 2007-08 world food crisis, we will assume that the elite own land used intensively in the production of food while the rest of society own labor used intensively in manufacturing. We will also assume that the country is relatively land abundant so that it has a comparative advantage in food. By the Stolper-Samuelson theorem there is a conflict of interest over international trade policy: the ruling elite, as owners of the abundant factor, prefer a relatively open regime while the rest of society would prefer a relatively closed one.

The model focuses on countries that are at an early stage of development and lack domestic fiscal capacity, so domestic taxation cannot be used as in AR to make transfers. But the ruling elite can effectively make transfers to the rest of society using trade policy. If the commitment problem is binding the elite cannot redistribute on a sufficient scale to maintain the status quo (i.e. avert a revolution) using trade policy. The elite can resolve the commitment problem by extending the franchise though, hence making a credible commitment over time to the trade policy that the rest of society would prefer. But if the commitment problem is not binding then the elite would prefer to maintain the status quo using trade policy, thereby retaining the ability to set trade policy to their advantage in future.[4]

The circumstances under which the elite must democratize in order to avoid a revolution and when they can use trade policy to maintain the status quo are similar to those in AR for domestic fiscal policy. It is when there is a high probability that the rest of society will be able to effectively coordinate their efforts to mount a revolution that the elite can use trade policy to maintain the status quo. The reason is that if the probability of being able to coordinate is sufficiently high then the rest of society's expected return through favorable trade policy is at least as great as through revolution, which bears a cost. It is when this probability is low that the commitment problem binds and democratization must be used instead to avoid a revolution. By lowering the rest of society's income, the food price shock is shown to increase the range of probabilities over which the commitment problem is binding and thereby increase the likelihood of democratization.

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[4]Low income countries generally lack domestic fiscal capacity and so rely extensively on trade policies for fiscal purposes including redistribution: see Zissimos (2014) for references.

The model can be used to understand the events of the 2007-08 world food crisis which increased the relative price of food. Between 2007 and 2011 an estimated 33 food-exporting countries resorted to restrictions on exports of grains, rice, and other foodstuffs in response to the initial increase in food prices (Sharma 2011). A number of these countries were dictatorships such as Egypt and Jordan. And as owners of land, the abundant factor, the ruling elites in these countries stood to gain significantly by leaving export markets open during the period of food price shocks. However, the rest of society suffered significant negative income shocks and protested violently on the streets in response. In some countries the effects of the shocks could be offset by the elite using export restrictions. But in other cases such as Egypt the rest of society were arguably pushed out of the range where trade policy could be used to maintain political stability and into the range where democratization would be required to maintain the status quo.[5]

The present paper simplifies the model of Zissimos (2014) by moving from an infinite time horizon framework to a two-period one. This simplification makes it easier to see how a world price shock could push the feasible outcome from one where trade policy can be used to maintain the status quo to one where democratization is required to avert a revolution. Zissimos (2014) does analyze the implications of a world price shock but, differently from the present paper, does so by focusing an a situation where the status quo can be maintained using trade policy before and after the shock.

Since the economic and political structure is based on Zissimos (2014), the relationship to the literature is similar (see Zissimos 2014 for a review). By focusing on how democratization becomes more likely as the result of a food price shock, the present paper forges closer links than Zissimos (2014) to the literature on income and democratization. Following Lipset (1959), important works such as Huntington (1991), Rusechemeyer, Stephens, and Stephens (1992) argue in favor of a causal positive relationship between income and democracy. The main argument that there might be a negative relationship between income and democracy is based on the idea that people are more likely to protest in favor of democracy when the opportunity cost of doing so is sufficiently low (Acemoglu

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[5]It remains to be seen whether democracy successfully consolidates in a number of the countries such as Egypt that have had revolutions in the Arab Spring. The theoretical framework of this paper assumes that democracy consolidates with certainty and revolution is not observed on the equilibrium path. The logic extends to a framework where both assumptions are relaxed.

and Robinson 2006). The present paper shows how the range over which this opportunity cost becomes sufficiently low is determined partly by world prices.[6]

The paper is structured as follows. Section 2 develops the economic model and uses this to characterize the levels of trade policy intervention that would be preferred by the elite and the rest of society respectively. Section 3 then uses the model to determine the parameter range over which trade policy can be used to maintain the status quo. Section 4 then shows how a price shock reduces the parameter range over which trade policy can be used to maintain the status quo, increasing the likelihood of democratization. Conclusions are drawn in Section 5.

2. The H-O Model with International Trade Policy

The model developed in this section is adapted from the infinite time horizon model of Zissimos (2014) to a two period setting. The model is of a small country that takes world prices as given, populated by a continuum of risk-neutral citizens. Each citizen belongs either to the elite, e, or 'the rest of society,' n (for non-elite). The mass of each of these groups is normalized to θ and 1 respectively, where the elite are in a minority: $\theta < 1$.[7] The economy is endowed with a unit each of land and labor. Each member of the elite is endowed with an equal share of land while all of the labor is distributed evenly across the rest of society. The only difference between the respective groups is their factor endowments. The model has two time periods, $t = 1, 2$.

The production structure is standard 2×2 H-O, where the two goods are food, f, and manufactures, m; food is land intensive while manufactures are labor intensive. Since the model is standard H-O, we can make use of standard results. By the Stolper-Samuelson theorem,

$$r_t^* > p_t^* > 0 > w_t^*$$

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[6]The opportunity cost of revolution is also discussed in the context of an open economy model by Acemoglu and Robinson (2006, Ch.10). Surprisingly, in a similar land-abundant environment their prediction is the opposite of ours: trade opening makes democratization less likely. The key difference is that they examine a setting in which the commitment problem is always binding and do not consider the possibility that endogenously determined trade policy might be used to maintain the status quo.

[7]The assumption that the elite are in a minority is made to ensure that democratization shifts the power to set policy from the elite to the rest of society.

where r_t and w_t are the rental rate and wage rate and p_t is the domestic relative price of food, which can lie anywhere between the world price and the autarky price, in period t respectively. A superscript-$*$ on a variable z denotes proportional change: $z^* = dz/z$.

Agents $j \in \{e, n\}$ have identical preferences and the same discount factor, $\delta < 1$. The expected utility of agent j in period 1 is given by $U_1^j = \mathbb{E}_1 \left(u \left(c_{f1}^j, c_{m1}^j \right) + \delta u \left(c_{f2}^j, c_{m2}^j \right) \right)$ where $\mathbb{E}_1$ is the expectations operator conditional on information available in period 1. Utility in period 2 is given by $U_2^j = u \left(c_{f2}^j, c_{m2}^j \right)$. In period t, c_{it}^j is consumption of good $i \in \{f, m\}$ by agent j. The per-period utility function is given by the quasi-linear functional form $u \left(c_{ft}^j, c_{mt}^j \right) = c_{mt}^j + u_f \left(c_{ft}^j \right)$ where the sub-utility function $u_f \left(\cdot \right)$ is differentiable, increasing, and strictly concave.

Since there is no domestic fiscal capacity, the only policy instruments available are trade taxes. For convenience, and without loss of generality, we will assume that trade policy is applied to food. We will assume throughout that the abundant factor is land, so the country has a comparative advantage in food and the trade policy instrument is an export tax. Any revenue collected from a trade policy is rebated to each individual j in lump sum.[8] Then the net revenue function for an individual j, $tr^j (p_t)$, is determined as follows:

$$tr^j (p_t) = (p_t - p^w) \left(d_f (p_t) - \frac{1}{1 + \theta} x_f (p_t) \right), \tag{2.1}$$

where p^w is the world relative price of food, while $d_f (p_t)$ and $x_f (p_t)$ are the domestic demand and supply functions for food; $d'_f (p_t) < 0$, $x'_f (p_t) > 0$. Since the policy instrument is an export tax, $p_t \le p^w$ and so $tr^j (p_t) \ge 0$.

2.1. Welfare of the Groups and their Preferred Levels of Openness

The total income of individual $j \in \{e, n\}$ is given by the sum of factor income and trade policy revenue: $Y_t^j = Y^j (p_t) = y^j (p_t) + tr^j (p_t)$. Given the quasi-linear structure of preferences, individual j's welfare can be expressed as follows:

$$W_t^j = W^j (p_t) = y^j (p_t) + tr^j (p_t) + s_f (p_t),$$

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[8]Alternatively we could have assumed that the elite keeps the trade policy revenue for itself, only redistributing it to the rest of society when this would be helpful in averting a revolution. Introducing this possibility would not change our results qualitatively, but would affect the parameter range for which the commitment problem becomes binding.

where $s_f(p_t) \equiv u_f[d_f(p_t)] - p_t d_f(p_t)$ is the consumer surplus derived from consumption of good f, and $W^j(p_t)$ is assumed to be concave in p_t.

From this welfare function, we can derive preferred price levels for the elite, $\hat{p}^e$, and the rest of society, $\hat{p}^n$, respectively. We have already seen by the Stolper-Samuelson theorem that the elite will prefer a relatively high price of food, p_t, since this raises their factor income, and it follows that $\hat{p}^e > \hat{p}^n$. While each preferred price level would be put in place using an export tax, we will follow the international trade literature by focusing on the corresponding price level itself.

If the country has a comparative advantage in food then $p^w > p^a$, where p^a is the relative price of food in autarky. In that case the elite's welfare is maximized at a higher level of openness than is the rest of society's since the elite own the abundant factor. Note that in general it could be the case that $\hat{p}^e > p^w$ and/or $p^a > \hat{p}^n$. But $\hat{p}^e > p^w$ would imply an export subsidy on food while $p^a > \hat{p}^n$ would imply an import subsidy on manufactures. And any trade subsidy would require revenue to be raised through domestic taxation. Under our assumption that there is no domestic fiscal capacity, the 'funding constrained solutions' are $\hat{p}^e = p^w$ and $\hat{p}^n = p^a$. We will use these funding constrained solutions to simplify the analysis below.[9]

3. Trade Policy and the Form of Government

Initially, (de jure) political power is held by the elite, which they exercise through their control of trade policy. While the elite hold power they set p_t directly. Denote the value of p_t chosen by the elite as p_t^e.

To simplify the analysis, we will assume that in period 1 the threat level to the elite is high (H), in that the rest of society are able to resolve their coordination problem and can mount a revolution if they wish. If they mount a revolution then it is successful with certainty, but costs ψ to each member of society (the elite and the rest of society). In period 2, with probability ρ the state will remain at H. But with probability $1 - \rho$ the state will switch to 'low threat' (L), in which case the rest of society cannot coordinate and hence are unable to mount a revolution.

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[9]Zissimos (2014) justifies this simplification at greater length and shows how it can be relaxed.

If either in period 1 or in period 2 the rest of society mount a revolution they subsequently install democracy. Since the elite are in a minority, $\theta < 1$, under democracy the median voter is a member of the rest of society. So democratization involves a transfer of power to set trade policy from the elite to the rest of society. Democratization can also arise if the elite extend the franchise voluntarily. Democracy is an absorbing state: once the franchise has been extended it cannot be rescinded. This assumption enables us to focus on the use of trade policy to maintain the status quo.

3.1. Addressing the Threat of Revolution

If the elite extend the franchise, they make a credible commitment to $\hat{p}^n$ in the current period and the next if there is one. But the elite may alternatively be able to avert revolution by setting p_t^e at a level whereby the rest of society are just indifferent between mounting a revolution and maintaining the status quo: the 'status quo price' p_t^s.

In this paper we will not undertake a full characterization of equilibrium. We will focus instead on characterizing the circumstances under which revolution can be averted in period 1 using trade policy in principle and when the elite must avert a revolution by extending the franchise. To do this we will begin by formalizing the payoffs to the respective groups under the various possible outcomes. Let $V^j(D, \hat{p}^n)$ represent the present discounted value of democracy in period 1 for $j \in \{e, n\}$. For a member of group j, the payoff to democracy in period 1 takes the form:

$$V^j(D, \hat{p}^n) \equiv (1 + \delta) W^j(\hat{p}^n). \tag{3.1}$$

Denoting the occurrence of revolution by R, the payoff to revolution in period 1 is given by

$$V^j(R, \hat{p}^n) \equiv (1 + \delta) W^j(\hat{p}^n) - \psi. \tag{3.2}$$

Clearly, both groups would prefer democracy to revolution because this avoids the cost ψ associated with revolution. So an extension of the franchise has the potential to defuse revolution in period 1.

The payoff to a member of the rest of society in period 1 when the elite redistribute by setting the status quo price p_1^s is given by

$$V^n(p_1^s, p_2^s; H) \equiv W^n(p_1^s) + \delta(\rho W^n(p_2^s) + (1 - \rho) W^n(\hat{p}^e)), \tag{3.3}$$

where p_2^s is the status quo price adopted by the elite in period 2 if the threat level remains high and $\hat{p}^e$ is the price they adopt if the threat level switches to low. We can now examine the circumstances under which it would be feasible for the elite to use trade policy to prevent a revolution. This is equivalent to working out when it would be feasible for the elite to credibly commit to a trade policy that would give the rest of society at least as high a level of welfare as they could obtain from mounting a revolution.

For the purpose of establishing feasibility, let $\widetilde{V}^n(\rho)$ be the maximum utility that the elite can induce for the rest of society using trade policy (as an alternative to extending the franchise). This maximum utility is induced by setting $p_1^s = p_2^s = \hat{p}^n$ in (3.3):

$$
\begin{aligned}
\widetilde{V}^n(\rho) &\equiv V^n(\hat{p}^n, \hat{p}^n; H) && (3.4) \\
&= W^n(\hat{p}^n) + \delta W^n(\hat{p}^e) + \rho\delta(W^n(\hat{p}^n) - W^n(\hat{p}^e))
\end{aligned}
$$

Then the condition for the elite to feasibly use trade policy to maintain the status quo is $\widetilde{V}^n(\rho) \geq V^n(R, \hat{p}^n)$. We can now illustrate graphically the elite's options in maintaining the status quo using Figure 1a. The value of ρ is shown in Figure 1a on the horizontal axis while the welfare level of the rest of society is on the vertical axis. The horizontal dashed line shows the payoff to the rest of society from democracy, as calculated by (3.1). The horizontal solid line shows the payoff to revolution, as given by (3.2), where the vertical difference between them is given by ψ. The upward sloping line shows $\widetilde{V}^n(\rho)$ as given by (3.4). The intercept of $\widetilde{V}^n(\rho)$ with the vertical axis, where $\rho = 0$, corresponds to the payoff that the rest of society would receive from a policy of $\hat{p}^n$ in period 1 followed by reversion to $\hat{p}^e$ in period 2. Since $W^n(\hat{p}^n) > W^n(\hat{p}^e)$, for the intercept to be smaller than $V^n(R, \hat{p}^n)$ we only have to choose a value of ψ sufficiently small that $W^n(\hat{p}^n) + \delta W^n(\hat{p}^e) < V^n(R, \hat{p}^n)$. $\widetilde{V}^n(\rho)$ slopes upwards from this point because an increase in ρ increases the likelihood that in the following period the rest of society can credibly threaten to mount a revolution and hence obtain a higher level of welfare. At $\rho = 1$ the rest of society are able to resolve their coordination problem and mount a revolution with certainty in the next period. Then the elite can credibly commit with certainty to set $p_2^e = \hat{p}^n$ in period 2, inducing the same level of welfare as democracy. At $\rho = \overline{\rho}$, the rest of society are indifferent between revolution and maintaining the status quo with trade policy.

Now consider the elite's options when they face the threat of revolution in period 1.

We can see from Figure 1a that when resolution of the coordination problem is relatively unlikely ($\rho < \bar{\rho}$) the elite cannot credibly commit to raise the rest of society's welfare using trade policy above the level of revolution. The reason is that the high threat state, H, in which the rest of society receive the higher payoff associated with the status quo price, is so unlikely to arise in the next period that the rest of society would be better off bearing the cost of revolution ψ in exchange for being able to set trade policy at $p_t^n = \hat{p}^n$ in both periods for certain. On the other hand, if resolution of the rest of society's coordination problem is relatively likely in period 2 ($\rho > \bar{\rho}$), redistribution using trade policy is sufficiently likely to recur in period 2 that it can be used to avert a revolution.

4. World Price Shocks and Democratization

Based on the framework set out above, the effect of a world price shock can be analyzed in a straight forward way. Recall that we are assuming $\hat{p}^e = p^w$. In that case, a world food price shock that increases the relative price of food also increases $\hat{p}^e$. We will be able to analyze the effect of a shock to p^w by letting $\hat{p}^e = p^w$ in (3.4). To analyze a shock to p^w, let us rewrite $\widetilde{V}^n(\rho)$ where $\hat{p}^e = p^w$ as $\widetilde{V}^n(\rho, p^w)$.

We will analyze the effects of a food price shock by comparing two situations in the model, one for p^w and one for $p^{w\prime}$, where $p^{w\prime} > p^w$. An increase in $\hat{p}^e = p^w$ increases the price that the rest of society must pay for food, thus reducing the rest of society's real income and hence $W^n(p^{w\prime})$, if in period 2 the state switches to L. Figure 1b illustrates two situations: one for p^w and $\widetilde{V}^n(\rho, p^w)$; the other for $p^{w\prime}$ and $\widetilde{V}^n(\rho, p^{w\prime})$. The figure shows that the intercept of $\widetilde{V}^n(\rho, p^{w\prime})$ is smaller than for $\widetilde{V}^n(\rho, p^w)$. Since the endpoint is the same for $\widetilde{V}^n(\rho, p^{w\prime})$ as for $\widetilde{V}^n(\rho, p^w)$, the result of a higher world price $p^{w\prime}$ is a higher value of $\bar{\rho}$ at $\bar{\rho}'$. This enlarges the range of values of ρ from $\rho \in [0, \bar{\rho}]$ to $\rho \in [0, \bar{\rho}']$ for which the threat of revolution must be resolved through democratization. Therefore, for any given value of ρ, it becomes more likely after a positive food price shock that the threat of revolution can only be resolved by democratization.

It is worth reiterating that although the food price shock reduces the rest of society's real income it increases the income of the elite. So a food price shock that increases the likelihood of democratization will only reduce average per capita income if the fall in per

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capita income among the rest of society is large relative to the gain in per capita elite income and if the elite make up a relatively small share of the total population.

5. Conclusions

The analysis we have undertaken raises two issues. First, the likelihood of democratization increases as the result of a price shock, but average incomes do not necessarily fall. This suggests more broadly that a focus on the underlying mechanisms driving conflicts of interest between different groups over policy is necessary to fully understand the relationship between income and democratization. The second issue concerns how multilateral agencies such as the International Monetary Fund, World Bank, and World Trade Organization should manage the process of democratization and trade liberalization given that they may have an important bearing on one another. Calls for trade policy to remain open in the face of food price shocks (World Bank 2008) are likely to be ignored when increasing protectionism is key to political survival. By the same token, calls for democratization are likely to be ignored unless this is necessary to avert revolution.

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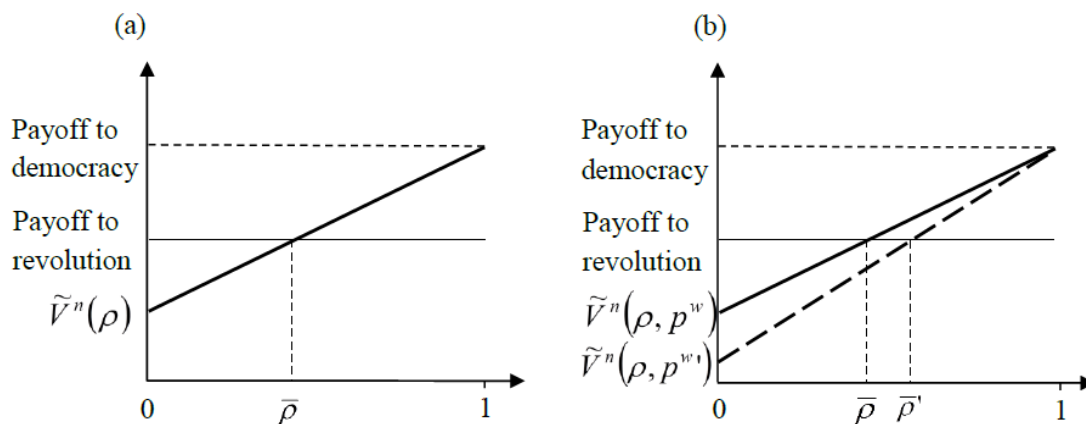
Figure 1: The Feasibility of Using Trade Policy to Maintain the Status Quo