TRADE IN THE SHADOW OF POWER

Stergios Skaperdas (University of California, Irvine)  
(Draws on joint work with M. Garfinkel and C. Syropoulos)

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On trade and war

“We cannot make war without trade nor trade without war"

(Governor-General of the Dutch East India Company to the directors of his company upon taking office.)

“If no Naval Force, no Trade"

(British Governor of Bombay Charles Boone in 18th century.)
A country of our size, with its focus on exports and thus reliance on foreign trade, must be aware that military deployments are necessary in an emergency to protect our interests, for example, when it comes to trade routes, for example, when it comes to preventing regional instabilities that could negatively influence our trade, jobs and incomes.

Horst Köhler, former President of Germany (NY Times, May 31, 2010)
Behind modeling and thinking about trade: Assumption of perfect and costless enforcement of property rights
Trade and security

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- Assumption fails empirically (security expenditures significant)
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Does it matter?
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- Costs of power-seeking/conflict vs. gains from trade
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Power comes (primarily) from the threat of use of force (or self-enforcement of property rights)
Costs of power-seeking/conflict vs. gains from trade
Distortions of allocations under conflict?
Trade openness and Domestic Conflict
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• How power considerations influence prices
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How power considerations influence prices
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Distortions of comparative advantage
The importance of governance: Domestic state capacity; International organizations, institutions, and norms
Related Papers

- Skaperdas (AER, 1992)
- Skaperdas and Syropoulos (AER P&P, 2001)
- Garfinkel, Skaperdas, and Syropoulos (JIE, 2008)
- McBride, Milante, and Skaperdas (JCR, 2011)
- Garfinkel, Skaperdas, and Syropoulos (JIE, forthcoming)
- Sambanis, Skaperdas, and Wohlfforth (APSR, forthcoming)
Overview

- Empirical relevance of conflict
- Trade openness and domestic conflict
- International Trade and International Conflict over a resource
- Insecure International Trade
- On the role of governance
Trade and War over the past millenium (Findlay and O'Rourke, *Power and Plenty*, 2007)
The empirical relevance of conflict and power-seeking

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- Civil wars (since WWII, in more than 73 countries with 20 million deaths and large other direct economic costs – arming, destruction, underutilization of resources; Collier et. al., World Bank, 2003)
Absence, or costly enforcement, of property rights (e.g., land).
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The empirical relevance of conflict and power-seeking

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- Transnational resource contestation (Oil: Central Asia, South China Sea; Water: Nile, Middle East, South Asia) (Klare, 2001)
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- Other welfare costs of conflict (Blomberg and Hess, *Oxford Handbook*, 2012: on average 9% of consumption; large variance)
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Conflict and power-seeking costs vs deadweight costs of taxation or trade protection.
Trade openness and domestic conflict

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- Endowments of Labor \(L_i\) secure
- \(\sigma \in [0, 1]\) fraction of total land \(T\) secure and \((1 - \sigma) T\) contested. 
  [Suppose \(T_i = \frac{\sigma}{2} T\) for both \(i\)]
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- Land produces only oil \( (O_i) \)
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Land produces only oil \((O_i)\)

Labor produces butter and guns \((B_i + g_i = L_i)\)
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- Arming used to capture the contested land (and its oil)
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Arming used to capture the contested land (and its oil)

Share of \(i(= C, D)\): \(q_i = \frac{g_i}{g_C + g_D}\)
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Arming used to capture the contested land (and its oil)
Share of $i (= C, D)$: $q_i = \frac{g_i}{g_C + g_D}$
(based on Garfinkel, Skaperdas, and Syropoulos, JIE, 2008)
Timing:

1. Arming \( (g_C \text{ and } g_D) \) and butter production \( (B_i = L_i - g_i) \) determined.

2. Contested land distributed. Endowments of land or oil:
   \( T \left( \frac{\sigma}{2} + q_C (1 - \sigma) \right), T \left( \frac{\sigma}{2} + q_D (1 - \sigma) \right). \)

3. Butter and oil traded competitively either
   (i) domestically within the country under autarky or
   (ii) internationally with country taking world prices as given.
No international trade: Price determined domestically

- Arming: \( g^A = \frac{1}{4}p^A(1 - \sigma)T = \frac{\alpha(1-\sigma)}{2(1-\alpha)+\alpha(1-\sigma)}L \)
No international trade: Price determined domestically

- Arming: \( g^A = \frac{1}{4} p^A (1 - \sigma) T = \frac{\alpha (1 - \sigma)}{2(1 - \alpha) + \alpha (1 - \sigma)} L \)
- Autarkic price of land and oil (relative to labor and land):
  \[ p^A = \frac{\alpha}{1 - \alpha} \frac{2L}{T} \left[ \frac{2(1 - \alpha)}{2(1 - \alpha) + \alpha (1 - \sigma)} \right] \]
Trade openness and domestic conflict: Autarky

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  \[
p^A = \frac{\alpha}{1-\alpha} \frac{2L}{T} \left[ \frac{2(1-\alpha)}{2(1-\alpha)+\alpha (1-\sigma)} \right]
\]

- Welfare: \( V_i^A = V^A = \left[ \frac{2(1-\alpha)}{2(1-\alpha)+\alpha (1-\sigma)} \right]^{1-\alpha} \left( \frac{T}{2} \right)^{\alpha} L^{1-\alpha} \)
- Price of land and oil determined in international markets: $p$
- Arming: $g^F = \frac{1}{4} p (1 - \sigma) T$
- Welfare: $V_i^F (p) = V^F (p) = \gamma p^{-\alpha} \left( \frac{1}{4} p T (1 + \sigma) + L \right)$
- Welfare minimized at $p^{\text{min}} = \frac{\alpha}{1-\alpha} \frac{2L}{T} \frac{2}{1+\sigma}$ (usually autarkic price, but not here)
Comparing Autarky to Free Trade

Figure: Free trade with conflict
Stergios Skaperdas (University of California, Irvine) (Draws on joint work with M. Garavello and C. Syropoulos) (International Agricultural Trade Research Consortium Annual Meeting)

\( \bar{W} \)

\( \bar{W}_A^* \)

\( \bar{W}_T^* \)

\( \bar{W}_T^n \)

\( p_A^* \quad p_A^n \quad p_{\text{min}} \quad p' \)
Insecurity shifts welfare down.
Costs of conflict vs gains from trade + other distortions
Countries importing oil gain unambiguously.
Exporters of oil lose as long as its price is not too high.
Tendency to over-export oil

[Reversal of comparative advantage relative to the absence of conflict (over a certain price range)]

Price range over which increasing international price of oil associated with reduction in welfare (natural resource curse)
Trade and international conflict (over a resource)

- (Garfinkel, Skaperdas, and Syropoulos, JIE, forthcoming; Skaperdas and Syropoulos, AER P&P, 2001)

Butter, Oil, and Guns produced using both land and labor (generalization of Heckscher-Ohlin). Arming under Autarky and Free Trade different in general; tendency of Free Trade to equalize arming (due to factor price equalization). Free Trade inferior to Autarky over range of international prices. Yet Free Trade can be a Prisoners' Dilemma outcome. Distortion of comparative advantage over a range of prices.
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- Distortion of comparative advantage over a range of prices.
An example with Insecure International Trade

- Two countries: $E$ (England) and $S$ (Spain); initial resources, $R_E$ and $R_S$

Utility function:

$$U(c_i, w_i) = c_\alpha i w^{1-\alpha}$$

fraction of each country output that is secure

Share of both insecure goods captured:

$$q_i = g_i g_E + g_S$$
Two countries: $E$ (England) and $S$ (Spain); initial resources, $R_E$ and $R_S$.

Specialization in cloth ($c$) for England and wine ($w$) for Spain.
An example with Insecure International Trade

- Two countries: \( E \) (England) and \( S \) (Spain); initial resources, \( R_E \) and \( R_S \)
- Specialization in cloth (\( c \)) for England and wine (\( w \)) for Spain.
- Both can produce guns, so that \( c = R_E - g_E \) and \( w = R_S - g_S \).
An example with Insecure International Trade

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Specialization in cloth ($c$) for England and wine ($w$) for Spain.

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Utility function: $U(c_i, w_i) = c_i^\alpha w_i^{1-\alpha}$

$\sigma \in [0, 1]$: fraction of each country output that is secure

Share of both insecure goods captured: $q_i = \frac{g_i}{g_E + g_S}$
Insecure Trade

Timing:

1. Arming \((g_E \text{ and } g_S)\), cloth and wine production take place.
2. Arming determines how the insecure outputs are divided. \(E\) keeps a \(\sigma + (1 - \sigma)q(g_E, g_S)\) share of \(c\) and obtains a \((1 - \sigma)q(g_E, g_S)\) share of \(w\); \(S\) obtains a \((1 - \sigma)[1 - q(g_E, g_S)]\) share of \(c\) and keeps a \(\sigma + (1 - \sigma)[1 - q(g_E, g_S)]\) share of \(w\).
3. \(c\) and \(w\) are traded competitively.

Trade and naval warfare between the 16th and 18th centuries.

Stergios Skaperdas (University of California, I) (Draws on joint work with M.Gar…nkel and C.Syropoulos) (International Agricultural Trade Research Consortium Annual Meeting)
Insecure Trade

- Price, given endowments in stage 2: \( p^* = \frac{\alpha w}{1-\alpha} = \frac{\alpha R_S - g_S}{1-\alpha (R_E - g_E)} \)

- Effective price (after stage 1): \( \bar{p} = \frac{\sigma \alpha + (1-\sigma)q(g_E, g_S)}{\sigma (1-\alpha) + (1-\sigma)(1-q(g_E, g_S))} \frac{R_S - g_S}{R_E - g_E} \)

- Payoff functions:

\[
V_E(g_E, g_S) = [\sigma \alpha + (1-\sigma)q(g_E, g_S)](R_E - g_E)^\alpha (R_S - g_S)^{1-\alpha} \\
V_S(g_E, g_S) = [\sigma (1-\alpha) + (1-\sigma)(1-q(g_E, g_S))] (R_E - g_E)^\alpha (R_S - g_S)^{1-\alpha}
\]

- Perfect security (\( \sigma = 1 \)): Ordinary competitive model

- For example, if \( \alpha < 1/2 \) (Cloth less valuable than wine), other things being equal, England enjoys lower welfare than Spain (because England produces the less valuable good).
(σ = 0)

Let $R_E = R_S$. Then, the following conditions are equivalent:

(a) $\alpha < 1/2$ (Cloth less valuable than wine);
(b) $g_E^* > g_S^*$ (England arming more than Spain); and,
(c) $q_E^* > 1/2$ (England getting a bigger share of the insecure output)
(d) England will have higher Welfare than Spain.
Let $R_E = R_S$. Then, the following conditions are equivalent:

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(d) England will have higher Welfare than Spain.

For any combination of $R_E$ and $R_S$, an increase in $\alpha$ induces a reduction in $g^*_E$ relative to $g^*_S$ and therefore a reduction in $q^*_E$. 

$(\sigma = 0)$
(\sigma \in (0, 1))

- Let \( R_E = R_S \). Then, the following conditions are equivalent: (a) \( \alpha < 1/2 \); (b) \( g^*_E > g^*_S \); and, (c) \( q^*_E > 1/2 \).
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- Let $R_E = R_S$. Then, the following conditions are equivalent: (a) $\alpha < 1/2$; (b) $g_E^* > g_S^*$; and, (c) $q_E^* > 1/2$.

- For any combination of $R_E$ and $R_S$, an increase in $\alpha$ induces a reduction in $g_E^*$ relative to $g_S^*$ and therefore a reduction in $q_E^*$.
Imperfect Security

$\sigma \in (0, 1)$

- Let $R_E = R_S$. Then, the following conditions are equivalent: (a) $\alpha < 1/2$; (b) $g^*_E > g^*_S$; and, (c) $q^*_E > 1/2$.
- For any combination of $R_E$ and $R_S$, an increase in $\alpha$ induces a reduction in $g^*_E$ relative to $g^*_S$ and therefore a reduction in $q^*_E$.
- For any combination of $R_E$ and $R_S$, an increase in $\sigma$ induces a reduction in both $g^*_E$ and $g^*_S$. 
Imperfect Security

\((\sigma \in (0,1))\)

- Let \(R_E = R_S\). Then, the following conditions are equivalent: (a) \(\alpha < 1/2\); (b) \(g_E^* > g_S^*\); and, (c) \(q_E^* > 1/2\).
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- For any combination of \(R_E\) and \(R_S\), \(E\) (\(S\)) will prefer some conflict to none if \(\alpha\) is sufficiently small (large);
(σ ∈ (0, 1))

- Let \( R_E = R_S \). Then, the following conditions are equivalent: (a) \( \alpha < 1/2 \); (b) \( g^*_E > g^*_S \); and, (c) \( q^*_E > 1/2 \).

- For any combination of \( R_E \) and \( R_S \), an increase in \( \alpha \) induces a reduction in \( g^*_E \) relative to \( g^*_S \) and therefore a reduction in \( q^*_E \).

- For any combination of \( R_E \) and \( R_S \), an increase in \( \sigma \) induces a reduction in both \( g^*_E \) and \( g^*_S \).

- For any combination of \( R_E \) and \( R_S \), \( E (S) \) will prefer some conflict to none if \( \alpha \) is sufficiently small (large);

- For any combination of \( R_E \) and \( R_S \), if \( \alpha \) is sufficiently small (large) then the welfare of \( E (S) \) need not be monotonically increasing in the degree of security \( \sigma \).
On the role of Governance

- Domestic conflict: Developing state capacity (Besley and Persson, 2011; McBride, Milante, and Skaperdas, 2011)
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- International organizations, laws, institutions, and norms limit the worst effects of anarchy
- Economic globalization without political harmonization difficult to sustain without problems (WWI)
Concluding Remarks

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- Wide set of conditions under which free trade inferior to autarky.
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Concluding Remarks

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- Prices reflect power (arming and distorted factor endowments)
- Preferences and technologies can have "perverse" effects (e.g., inverse relationship of power and productivity).
- Distortion of comparative advantage.
- Wide set of conditions under which free trade inferior to autarky.
- Yet, free trade can be an equilibrium choice.
- How empirically plausible are first-best (Nirvana) models
- Critically important to think about power and its control in both domestic and international contexts.