# INTERNATIONAL ALLIANCES

# International Alliances

A. NATO

   1. Why was NATO formed?

B. Olson and Zeckhauser "Theory of Alliances"

   1. Two Observations

      a. Member nations contribute less than NATO requests.

      b. Exploitation Hypothesis: smaller countries free-ride on the contributions of larger countries.

# NATO STATISTICS

| Country | GNP 1964 (billions USD) | Rank | Defense Budget as % of GNP | Rank | GNP per Capita | Rank |
|---|---|---|---|---|---|---|
| United States | 569.03 | 1 | 9.0 | 1 | 2933 | 1 |
| Germany | 88.97 | 2 | 5.5 | 6 | 1579 | 5 |
| U. K. | 79.46 | 3 | 7.0 | 3 | 1471 | 8 |
| France | 73.40 | 4 | 6.7 | 4 | 1506 | 6 |
| Italy | 43.63 | 5 | 4.1 | 10 | 855 | 11 |
| Canada | 38.14 | 6 | 4.4 | 8 | 1981 | 2 |
| Netherlands | 15.00 | 7 | 4.9 | 7 | 1235 | 10 |
| Belgium | 13.43 | 8 | 3.7 | 12 | 1429 | 9 |
| Denmark | 7.73 | 9 | 3.3 | 13 | 1636 | 3 |
| Turkey | 6.69 | 10 | 5.8 | 5 | 216 | 14 |
| Norway | 5.64 | 11 | 3.9 | 11 | 1484 | 7 |
| Greece | 4.31 | 12 | 4.2 | 9 | 507 | 12 |
| Portugal | 2.88 | 13 | 7.7 | 2 | 316 | 13 |
| Luxembourg | .53 | 14 | 1.7 | 14 | 1636 | 4 |

# International Alliances

B.   Olson and Zeckhauser "Theory of Alliances"

   2.   What type of game is this?

      a.   Note: small countries free ride and large countries contribute some.

   3.  Empirical Evidence

      a.   Theoretically it seems like O&Z should measure country size in terms of benefits. Empirically they measure country size based on GNP per capita.

         1)   Is this reasonable?

         2)   Which country has the largest GNP per capita?

         3)   Which country gains the most benefits from NATO?

# International Alliances

C.  Hegemonic Stability Theory (HST)

1.  <u>Def</u>: an dominant country that is willing to contribute when other countries do not.

2.  Adherents of HST claim that a hegemon is *necessary* for sustained cooperation in alliances (and enforcement of multilateral trade agreements).

    a.  Do you agree?

        1)  Ex: consider Iran nuclear policy.

    b.  How could we get cooperation without a hegemon?

    c.  Is the current US government a hegemon?  Must they be?

# International Alliances

D. Joint Products

    1. Why do small countries like Pakistan and Nigeria always contribute a large number of forces to UN Peace keeping missions?

        a. Join Products: goods that produce both private (excludable) benefits and public (nonexcludable) benefits.

            1) With regard to NATO see O&Z p. 279.

        b. UN peace keeping missions provide the public benefits of regional stability or humanitarian aid.

        c. But they also subsidize and train of troops for contributing countries.

            a) This is cost effective for poorer countries.

# International Alliances

## E. Sandler and Hartley

### 1. The Basic Model.

Each ally maximizes it's utility equation:

$$U^i = U^i(y^i, q^i + Q_{-i}, T) \tag{1}$$

where $y^i$ are the private non-defense activites of ally $i$, $T$ is the threat of the enemy, and $Q_{-i}$ is the sum of all the defense spending of the other allies, such that
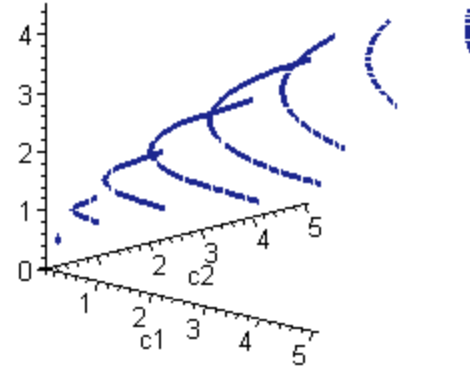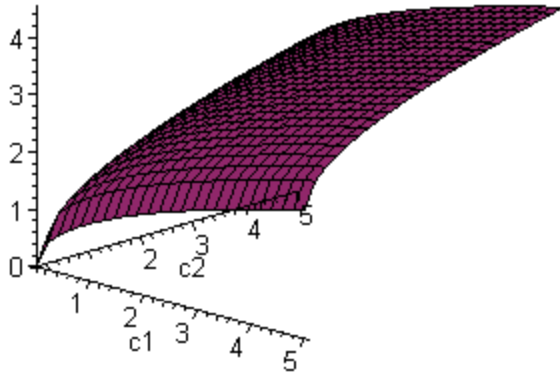
$$Q_{-i} = \sum_{j \neq i}^{n} q^j. \tag{2}$$

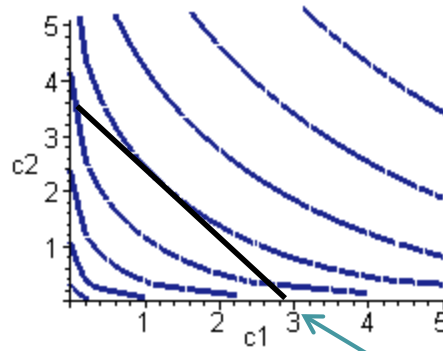Utility is maximized subject to the budget constraint

$$I^i = y^i + pq^i \tag{3}$$

where $I^i$ is the income of ally $i$, and $p$ is the relative price of the defense activity.

# Utility for two goods

## Side Views



## Top View



Budget Constraint

# International Alliances

## E.   Sandler and Hartley

### 1.   The Basic Model.

To find the constrained optimum for ally $i$, we substitute equation (3) into equation (1) which is

$$U^i = U^i(I^i - pq^i, q^i + Q_{-i}, T).$$

To get the first order condition, we take the partial derivative of this equation with respect to $q^i$, set the resulting equation equal to zero, and solve for $q_i$. Because we don't know the explicit form of the function, all of the exogenous variables have to stay.

The new equation is called the *reaction function* or demand function for ally $i$:
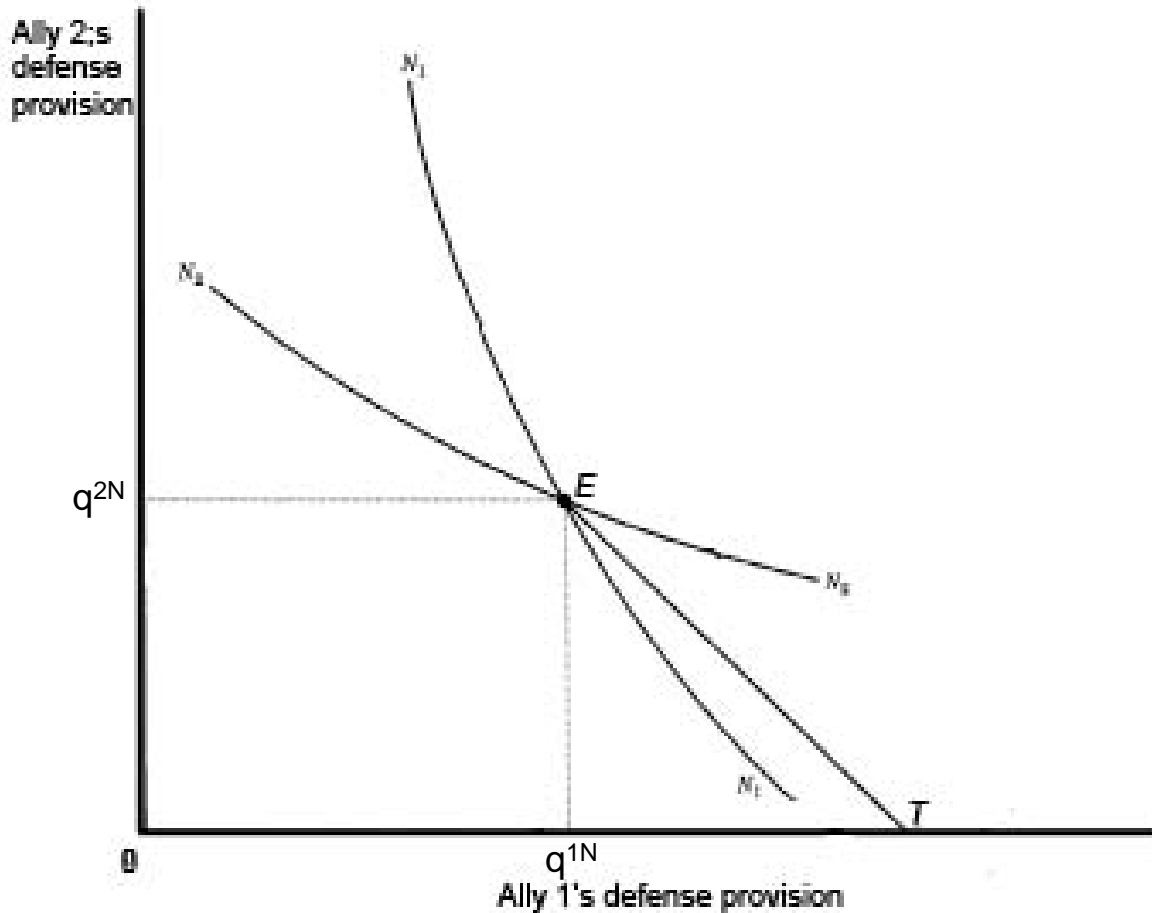
$$q^i = q^i(Q^{-i}, p, I^i, T).$$

Ally 2's defense provision

$N_1$

$N_2$

E

$N_2$

$N_1$

0

Ally 1's defense provision
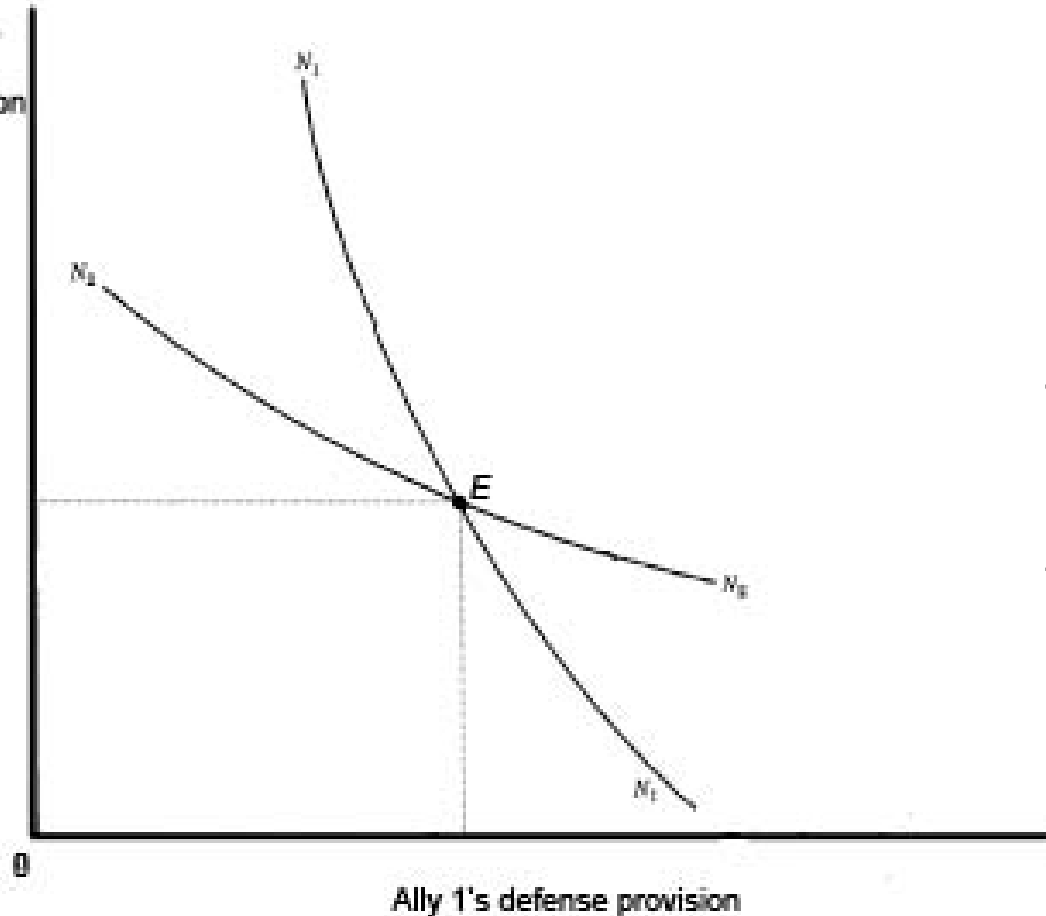
Reaction path for ally 1 is $N_1N_1$.

Reaction path for ally 2 is $N_2N_2$.

The Nash equilibrium, E, is where the reaction paths intersect, just like the intersection of two best reply graphs.

Ally 2;s defense provision

$N_1$

$N_2$

$q^{2N}$

$E$

$N_2$

$N_1$

$T$

$0$

$q^{1N}$

Ally 1's defense provision

The combined level of defense is $q^{1N} + q^{2N}$.

T has nothing to do with Threat from equation (1). The authors just want to let you know that OT = $(q^{1N} + q^{2N})$.
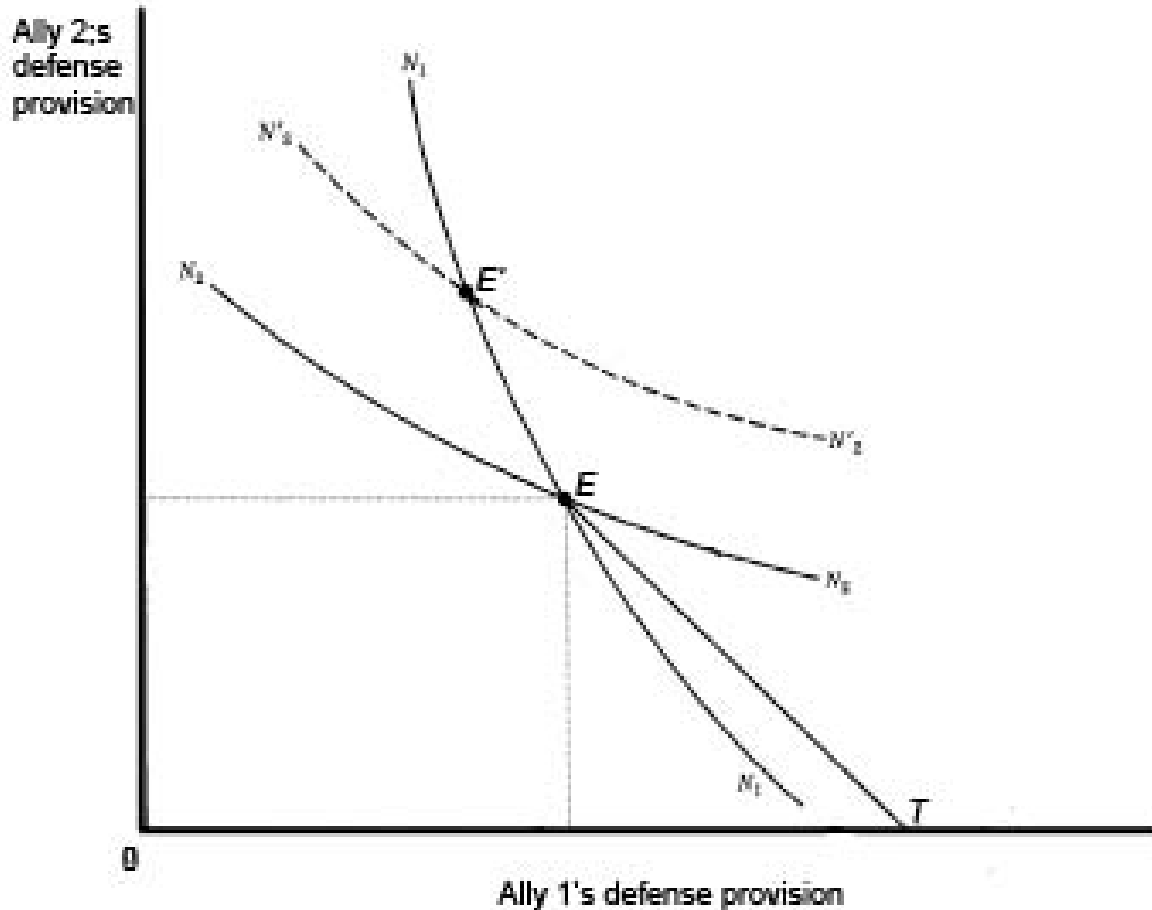
If the threat to just ally 2 increases, its reaction path will shift up and to the right, as depicted by the dotted line.

At the new equilibrium, E′, ally 2 carries a greater amount of the defense burden and ally 1 carries less.

The same thing happens if ally 2's income rises or if the relative price for defense falls for ally 2 only.

Ally 2;s defense provision

$N_1$

$N''_2$

E

$N'_1$

$N''_2$

A

0

Ally 1's defense provision
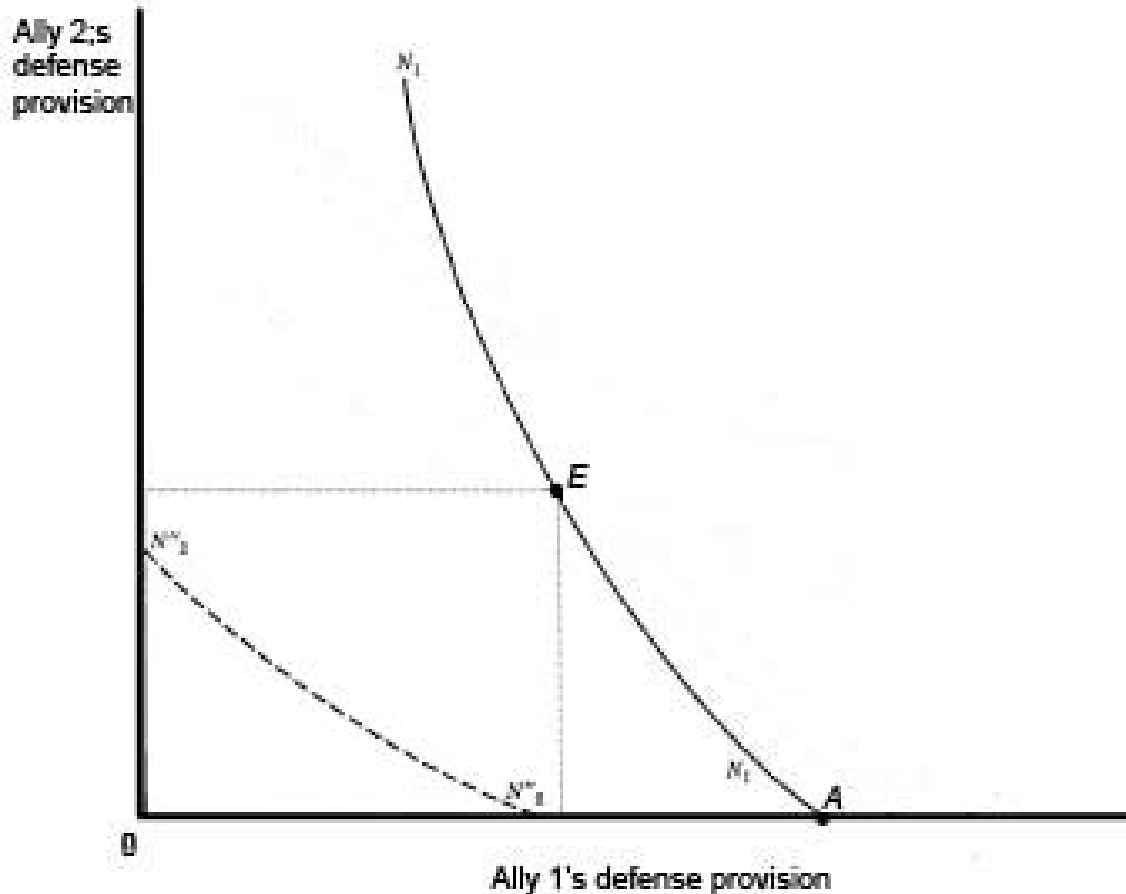
The exploitation hypothesis is easy to see if you imagine that ally 1 has a much greater income than ally 2 or values defense so much more than ally 2 that the reaction curves do not intersect.

In this case, ally 1 will contribute amount A and ally 2 will contribute zero in equilibrium.

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E.   Sandler and Hartley

   2.    Joint Products.

Each ally maximizes it's utility function:

$$U^i = U^i(y^i, \alpha q^i, \beta(q^i + Q_{-i}), T)$$

subject to the same budget constraint.

- Now the ally may want to contribute more to get the private aspects of the joint product, like the private benefits Portugal gets from spending money on the occupation of Angola.  That international defense expenditure produces little benefit for its allies but private benefits for Portugal.

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E.   Sandler and Hartley

   3.   Aggregation Technology

      a)   Perhaps the overall contribution of the public good is not the sum of the individual contributions but instead the contribution of the best shot or the weakest link.

      b)   What do you think about that?

   4.   What other issues were interesting in this paper?