

Appendix: Data Sources and Methodology

In this Part we are concerned with qualitative and quantitative characteristics of economic sanctions. So this first section of the data appendix is probably the right place for a dull warning on the reliability of data about economic sanctions. Obviously, observations about international economic warfare and particular about trade and investment flows should not automatically be considered reliable.

This Appendix considers a number of issues regarding to the data that have been used and the proper way to analyse them. One reason is that data from subject fields of three different sciences have to be combined into one data set. We will use foreign policy data, economic data and data on the political system. It pays to discuss these data, their construction and limitations so as to better understand the value of the research. First this appendix discusses the Hufbauer *et al.* (1985, 1990 and 2008) data sets. Then we move on to a discussion of the measurement issues related to economic variables such as trade (linkage) and income levels. The third section discusses the Polity III data set. The final section lists the datasources for other variables.

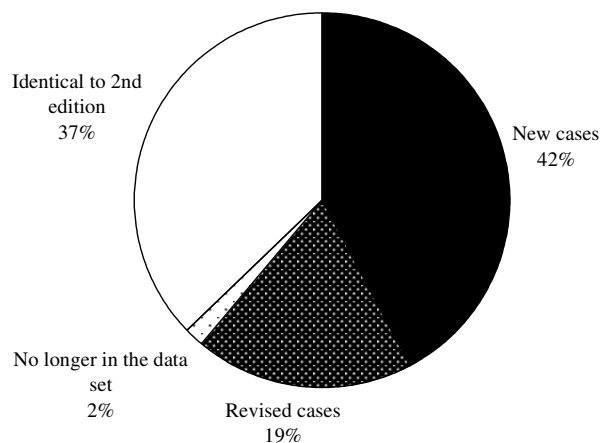
1 A CLOSER LOOK AT HUFBAUER *ET AL*

Due to a lack of sufficiently comparable observations empirical research on the subject was not possible before the publication of *Economic Sanctions Reconsidered* by Hufbauer and Schott (1985). This study offered a comprehensive and systematic treatment of 103 cases in which economic sanctions have been applied and a unique opportunity to put the sanction theory on an empirical footing. An update which appeared as Hufbauer, Schott and Elliott (1990) contained twelve additional cases and a critical re-evaluation of the cases that were discussed in the 1985 edition. It took almost

two decades before the third edition was published by Hufbauer Schott, Elliott and Oegg (2008). The third edition presents evidence on 65 post 1990 cases and thus now also covers a decade of sanction after the Iraq war and the fall of the Iron Curtain (12 pre-1990 sanction cases were also included). Thus the third edition offers the possibility to investigate the more recent history which is relevant as the efficacy and efficiency of the sanction instrument may have been influenced by the sanctions against Saddam Hussein (a major sanction episode), by *Détente* and by the increasing speed of globalisation (including the integration of China in the world economic system).

All in all the dataset has been extended substantially and moreover 38 old cases were revised, so that almost two thirds of the observations are new or revised (Figure A.1). It is thus highly relevant to analyse this dataset in order to see whether old findings and policy recipes are still valid.

Figure A.1 Comparison of the 2nd and 3rd edition of Hufbauer *et al* (1990, 2008)



Hufbauer *et al* divide the sanction episodes into five categories, classified according to the major foreign policy objective sought by the sender country (Hufbauer *et al.* 2008, pp. 53–54)

- change the target's policies in a relatively modest way;
- destabilise the target government;
- disrupt a minor military adventure;
- impair the military potential of the target country and
- change the target country's policies in a major way.

In the econometric investigation, however, I do not make a distinction as to the sender country's objectives (with one exception where I extend the core equation as reported in Table 6.5 and use a dummy variable that assumes the value 1 if the goal is 'moderate'). I do not take the objective into consideration in the core model for several reasons. First, an episode may have more than one objective. Destabilization presupposes a lesser goal, and attempts to impair the military power of an adversary usually encompass an explicit or implicit goal of destabilising the target country's government. Second, there are just not enough observations. There would only be some 40–50 cases per category and this impedes useful generalisation in case the objectives are taken into account.

Some specific methodological questions have been raised with respect to the major data base on the efficacy of economic sanctions (Hufbauer and Schott 1985, Hufbauer, Schott and Elliott 1990 and Hufbauer, Schott, Elliott and Oegg, 2008 – whenever possible I refer to the third edition). Bull (1984, p. 221), for example, wonders whether the data are sufficiently comparable to lend themselves for useful generalisations. In general this problem has become less acute as the number of sanctions covered by the study has increased substantially and the share of recent sanctions – for which comparatively better data are available – increased. (compare Figure A.1 and Table 6.6).

More worrying, the data base might be biased for several reasons. First, obviously effective sanctions could be underrepresented because they do not have to be applied. Thus some researchers expect that failure cases are overrepresented in the Hufbauer *et al* data bases (Tsebellis 1990, Smith, 1995, Blake and Klemm 2006). Second, countries that have a comparative advantage in the implementation of sanctions use the economic instruments could be overrepresented (Bergeijk 1994b). Knowing they have little or no chance to succeed, specific countries might simply not use sanctions and hence be underrepresented in the data base. Indeed large sender countries, most notably the United States, are over-represented in the Hufbauer *et al.* study. Sanctions that only involve small countries have less chance of being picked up in international scholarly research due to cultural and language barriers.

Finally, the answer of whether a specific sanction case is indeed a success or a failure has to be based on judgements of several authors. Differences of opinion of which Pane (1997) is a good example are very probable, as, for example, Hufbauer, *et al.* 2008, p. 49) admit:

since foreign objectives often come in multiple parts, since objectives evolve over time, and since the contribution of sanctions to the policy outcomes is often murky, judgment plays an important role in assigning a single number to each element of the success equation.

Table A.1 The construction of the success score of economic sanctions

Element	Index
<i>Policy result</i>	
a) Failed outcome	1
b) Unclear, but possibly positive outcome	2
c) Positive outcome	3
d) Successful outcome	4
<i>Sanction contribution</i>	
a) Zero or negative contribution	1
b) Minor contribution	2
c) Modest contribution	3
d) Significant contribution	4

Source: Hufbauer *et al.* 2008.

The dependent variable in Hufbauer *et al.* is the success score of a sanction which is defined (Hufbauer *et al.* 2008, pp. 49–50) as the product of the assessments of the policy result (the extent to which the policy outcome sought by the sender country was in fact achieved) and of the sanction contribution to this result (the contribution made by sanctions to a positive outcome). So we may write the success score as:

$$\text{Success score} = \text{Policy result} \times \text{Sanction contribution} \quad (\text{A.1})$$

Since both these assessments are each an integer from the interval 1 ('none') to 4 ('important') the success score adopts the values 1, 2, 3, 4, 6, 8, 9, 12 and 16 only (see table A.1). The value of the success score is the subject of empirical investigations by Hufbauer *et al.* in which average scores are tabulated for potentially explanatory variables. Averages, however, are simply insufficient statistical means to describe the distribution of the subsets of sanction attributes; one would at least want to know the standard errors before any valid conclusions can be drawn. Such simple counts, moreover, lead to wrong conclusions, because this approach fails to hold other potentially relevant variables constant. This implies the need to investigate the success score by means of multiple regression techniques.¹ Moreover, the question whether a sanction is a success or a failure essentially concerns a binary dependent variable ('yes' or 'no'; 1 or 0) implying an analysis on the basis of some kind of probability mechanism. According to Leitzel (1987, p. 287), 'the statistical evidence in support of the policy prescriptions that are formulated by Hufbauer *et al.* is scanty at best.' Bonetti (1991) discusses three additional objections to the multiple regression methodology in Economic Sanctions Reconsidering (i) there is no certainty that the

relationships are linear additive as is assumed throughout, (ii) the definition of success is biased in favour of finding failures and (iii) the predictive and explanatory power measured by significance tests and the standard error of the estimated equation is extremely poor. All in all, their econometrics are not rightly applied and as a consequence not very instructive. This is especially disappointing since the Hufbauer, Schott and Elliott study has become the major reference work on the subject of economic sanctions. Hence the present attempt to create an empirical basis for discussion of the efficacy of the economic instruments of diplomacy.

2 THE ECONOMIC DATA

First, there is the general problem that 'normal' errors of measurement – that cause concern to all researchers – are very significant in studies about international trade and investment flows. As early as 1950 the problem that generally accepted economic figures often have very large error components was put to the fore by Morgenstern (1950). Since then much has been improved, but many inconsistencies still do exist in generally accepted figures on international transactions that are supplied by the national Statistical Offices and the international organisations such as the OECD and the IMF.² In addition, inaccuracies resulting from differences in definitions are quite probable since this part studies a period of 55 years and countries with very different economic systems in various stages of development.

Second, in so far as the figures have been supplied by the sanctioning and the target governments, the reliability is questionable. Hayes, for example, points to the fact that even before the South African authorities suspended publication of detailed trade statistics in 1986 'considerable aggregation in the statistics of the figures for certain "sensitive" items and trading partners prevented detailed analysis of the effects of sanctions on the South African economy' (Hayes 1988, p. 271). The subject of this study being economic warfare, it is important to realise that both sides may have an interest in distorting and/or incompletely supplying data (Harris 1968, p.8). Indeed, according to Baldry and Dollery (1992, pp. 1–2),

artificially-engineered data paucities have generated problems facing researchers. Quite apart from the suppression of disaggregated trade and investment statistics by the South African authorities, nations, firms and individuals engaging in economic relationships with South Africa tend to disguise or understate the extent of their transactions.

South Africa is not unique in distorting trade statistics for strategic reasons. Governments that are supposed to impose economic sanctions often dictate the official trade statistics. Saudi Arabia, for example, reported in April 1989

that it was fully complying with the UN oil embargo of South Africa and this official view was reflected in the Saudi trade figures. The Shipping Research Bureau (1989) however, established that 76 oil tankers sailed from Saudi Arabia to deliver oil to South Africa in the years 1979–1987.³

Rather than adding observations to an earlier data set (Van Bergeijk 1994), the data set on absolute and proportional trade linkages has been reconstructed from scratch using datasets from the IMF (Direction of Trade Statistics), OECD (The World Economy: Historical Statistics) and the Penn World Tables. In addition the detailed case descriptions in Hufbauer *et al.* 2008 often provided data that could be used to calculate trade linkage in the year prior to the sanction and in some cases where data on the target's national income were unavailable proportional trade linkage could be deduced from absolute trade linkage (for example when it is (almost) zero). Data on the former East Block were taken from Joint Economic Committee (1985, Volume I, pp. 32–3, 126, 144 and 174.)

3 POLITICAL SYSTEM DATA

The Polity IV dataset (<http://www.systemicpeace.org/polity/polity4.htm>) is used to describe the political system of the sanction target. Polity IV as its predecessor Polity III (Jagers and Gurr, 1995) contains operational indicators of institutionalized authority characteristics. Over the post Second World War period, Polity IV annually codes nine democracy and autocracy indicators for 162 countries (all independent countries that in the early 1990s had a population greater than 500,000).

Table A.2 illustrates which elements play a role in the coding. Aggregating these elements yields the 'autocracy score' and the 'democracy score' for a specific country in a specific year. Subtracting the autocracy score from the democracy score yields a summary measure ('relative democraticness').

Many empirical measures for political regimes have already been designed and applied by political scientists (see Inkeles, 1991, for a useful review). Since economists are no experts on measuring 'democracy', it is important that the conceptual and empirical foundations of the data set that we use in our analysis are scientifically valid. Jagers and Gurr (1995) compared the validity of Polity III's coding of regime types with seven conceptually and operationally different indicators developed by other political scientists. They find strong correlations (0.85 to 0.92) between Polity III and the other seven data sets, so that it seems safe to conclude that the Polity indicators describe 'democracy' satisfactorily.

Table A.3 The construction of democracy and autocracy indicators in the Polity data set

Authority coding	Democracy score	Autocracy score
<i>Competitiveness of political participation</i>		
a) Competitive	3	0
b) Transitional	2	0
c) Factional	1	0
d) Restricted	0	1
e) Suppressed	0	2
<i>Regulation of political participation</i>		
a) Factional/restricted	0	1
b) Restricted	0	2
<i>Competitiveness of executive recruitment</i>		
a) Election	2	0
b) Transitional	1	0
c) Selection	0	2
<i>Openness of executive recruitment</i>		
a) Election	1	0
b) Dual: hereditary/election	1	0
c) Dual: hereditary/designation	0	1
d) Closed	0	1
<i>Constraints on chief executive</i>		
a) Executive parity or subordination	4	0
b) Intermediate	3	0
c) Substantial limitations	2	0
d) Intermediate	1	0
e) Slight to moderate limitations	0	1
f) Intermediate	0	2
g) Unlimited power of the executive	0	3

Source: Jaggers and Gurr (1995), p. 472.

4 OTHER DATA

Area (in square miles) is from The Economist Book Ltd., 1990, *The Economist Book of Vital World statistics: A Complete Guide to the World in Figures*, Hutchinson: London and updated for new cases using <http://www.infoplease.com>.

Prior relations between sender and target is a variable taken directly from Hufbauer et al. (2008, pp. 75–88, Tables 3A1 to 3A5). This is an index with values 1 antagonistic, 2 neutral, and 3 cordial. From the same Tables dummy variables were taken for cooperation with and hindrance of the sender.

Length of the sanction period, the ratio of sender GDP to target GDP, and dummy variables for financial sanctions, import sanctions and export sanctions have been directly taken from Hufbauer et al 2008, pp. 113–124, Table 4A1 to 4A5). The Hufbauer et al. dataset gives begin and end data of sanction episodes and the length of the sanction has been rounded upward to the nearest integer.

Aid in percent of GDP is from the DAC online database at <http://www.oecd.org> and in individual cases (if no OECD data were available) from the case descriptions in Hufbauer et al.

NOTES

- ¹ Hufbauer and Schott, (1985, pp. 99-102) accordingly seek to explain the success score using Ordinary Least Squares (OLS). Their regression model, however, is not appropriate. OLS cannot comply with the numerical restriction placed on the dependent variable. The 1990 edition does not contain an econometric analysis. The 2008 edition has an appendix in which logit models are estimated.
- ² See for recent studies about the inaccuracy of international economic observations for example IMF (1983, 1987 and 1992b), World Bank (1991, p. 40), Yeats (1990 and 1992) and Van Bergeijk (1995a and b).
- ³ See also Shipping Research Bureau, 1995.