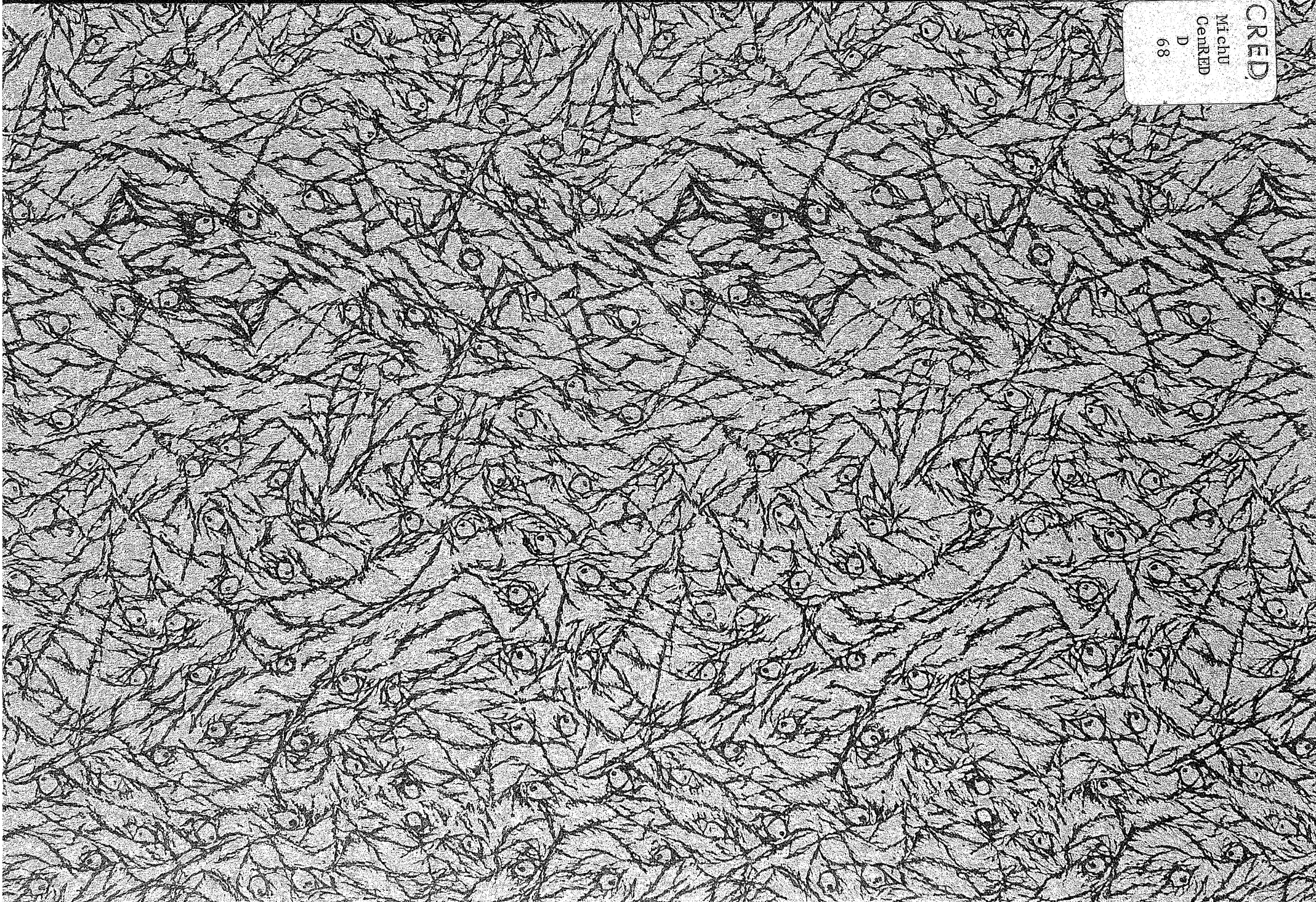Economic Sanctions: The Theory and the

Evidence from Rhodesia

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ABSTRACT

Economic Sanctions: The Theory and the

Evidence from Rhodesia

The theory behind universal economic sanctions is simple: to impose hard-
ship on the target country and thereby reduce its ability or willingness to
persist in antagonizing the world community. But the precise way in which the
sanctions cause the hardship is open to a variety of interpretations. In
this paper, a "basic theory" of sanctions is offered -- aggregate, static,
and neo-classical in nature -- and five alternative views of sanctions are
examined. Then, assessments of the effectiveness of the sanctions against
Rhodesia are reviewed, and the evidence of the aggregate data is explored.
Finally, the implications of the Rhodesian experience for the basic theory
and its five variants are outlined. The lesson from Rhodesia is clear: if
economic sanctions are incompletely applied to a relatively mature and flex-
ible economy, they are unlikely to impose much hardship beyond a brief tran-
sition period.

Economic Sanctions: The Theory and the

Evidence from Rhodesia

I. Introduction

The term, "economic sanctions", in general means the application of
restrictions by a group of countries on the external economic activities of
one particular country for the purpose of reducing the economic welfare of
the target country. In the past, particular groups of countries have applied
a wide variety of such sanctions for a wide variety of reasons. But the impo-
sition of economic sanctions "at the universal level"[1] has only been attempted
twice, by the League of Nations against Italy in the 1930s and by the United
Nations against Rhodesia during the past decade. In the Rhodesian case, the
sanctions were added in stages following Rhodesia's unilateral declaration of
independence (UDI) in November 1965; in their final form, they were intended
to stop completely the movement of products and factors of production into and
out of Rhodesia.[2]

The theory behind universal economic sanctions is simple: to impose hard-
ship on the target country and thereby reduce its willingness to persist in
antagonizing the world community.[3] But the precise way in which the sanctions
cause the hardship is open to a variety of interpretations. In this paper,
a "basic theory" of sanctions is offered -- aggregate, static, and neo-classical
in nature -- and five alternative views of sanctions are examined (Section II).
Then, assessments of the effectiveness of the sanctions against Rhodesia are
reviewed, and the evidence of the aggregate data is explored (Section III).
Finally, the implications of the Rhodesian experience for the basic theory and
its five variants are outlined (Section IV).

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[1] Doxey, 1971, p. 46.

[2] U.N. Security Council Resolution No. 253, 29 May 1968.

[3] It should be noted that the "thereby" is critical, although there is
neither logical reason nor historical evidence that political or psychological
collapse inevitably follows economic hardship.

II. The Theory of Sanctions

The manner and extent of the economic damage imposed by sanctions can be seen by examining a hypothetical target country that produces and consumes two commodities and initially trades freely at exogenously determined prices.[1] Figure 1 displays the usual (concave) production possibility curve, the (convex) community indifference curve, and the optimizing trade possibility line, tangent to both curves. For maximum welfare (W_0), the country produces x_0 and y_0, exports x and imports y, and consumes x_1 and y_1. In Figure 2, a dashed community indifference curve (W_1) is added which shows the highest welfare the country can attain if it is denied access to international trade; it produces and consumes x_2 and y_2; its welfare, W_1 instead of W_0, is clearly reduced. How much reduced cannot be discerned from W_0 and W_1 per se, but a measure can be developed in terms of the real income level of the country.[2] Assume the target country's community indifference curves are homothetic. Then it is indifferent between the autarkic consumption bundle, x_2 and y_2, and the bundle, x_3 and y_3, that it would choose to consume at existing world prices but at a reduced real income level. Thus, one measure of the effectiveness of sanctions that terminate trade is the equivalent relative loss of real income imposed in the country, that is $(y_1 - y_3)/y_1$ or $(x_1 - x_3)/x_1$.

Examination of Figure 2 indicates that the magnitude of this relative loss of real income will be the greater: 1) the less flat (i.e., more concave) is the production possibility curve; 2) the less flat (i.e., more convex) is the community indifference curve; or 3) the greater is the initial trade. In other words, trade-stopping sanctions will be more effective: 1) the more inflexible is the target country's production structure; 2) the more inflexible are its consumption preferences; or 3) the greater is its initial dependence on imports and exports.[3] In light of these three conditions, it is easy to see why great

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[1] For analytical simplicity, we ignore the possibility that factors of production also move, although it must be remembered that, for Rhodesia, factor movements have always been important.

[2] Where real means that the quantities consumed of x and y are added up valued at world prices.

[3] This last condition is usually noted in the sanctions literature -- see for example, Maizels, 1964, pp. 120-121. The first two conditions are often left implicit.
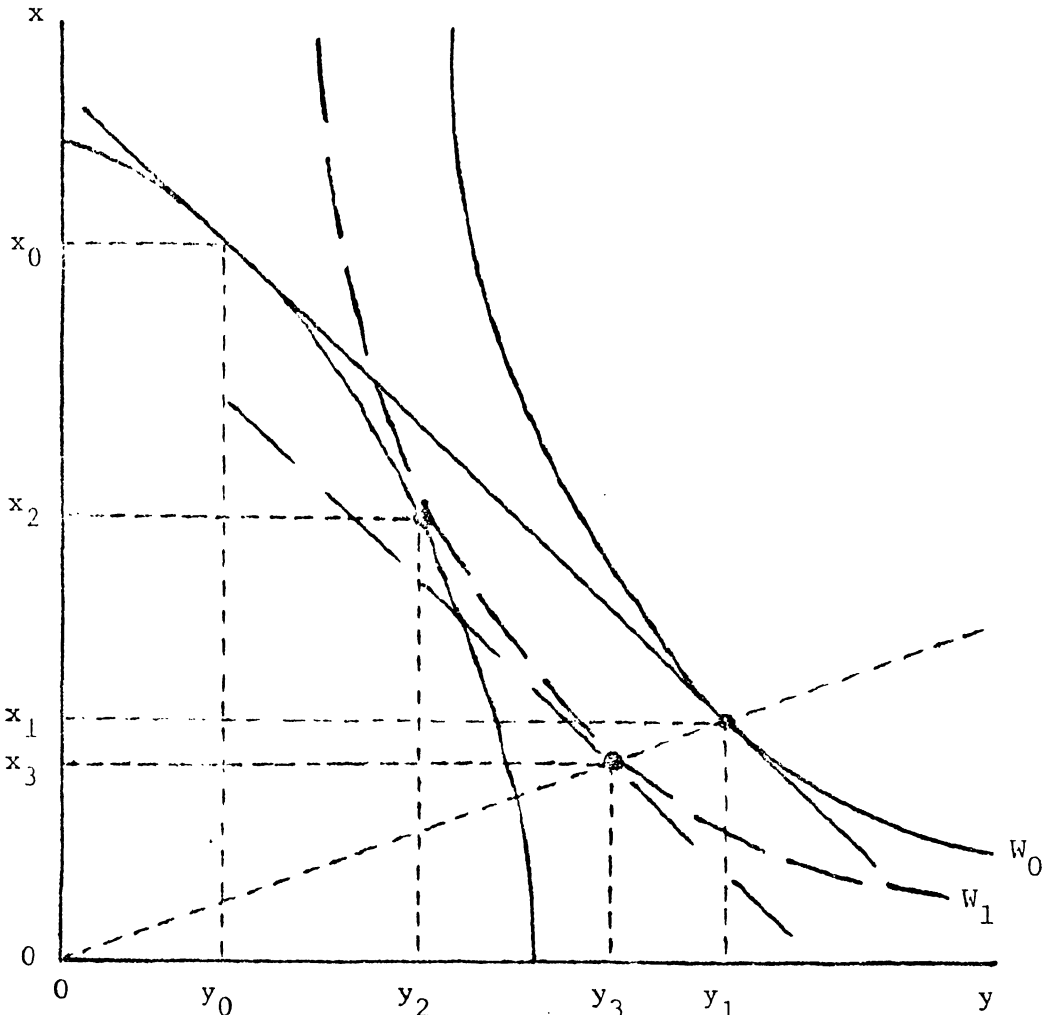
Figure 1

Export Good (x)
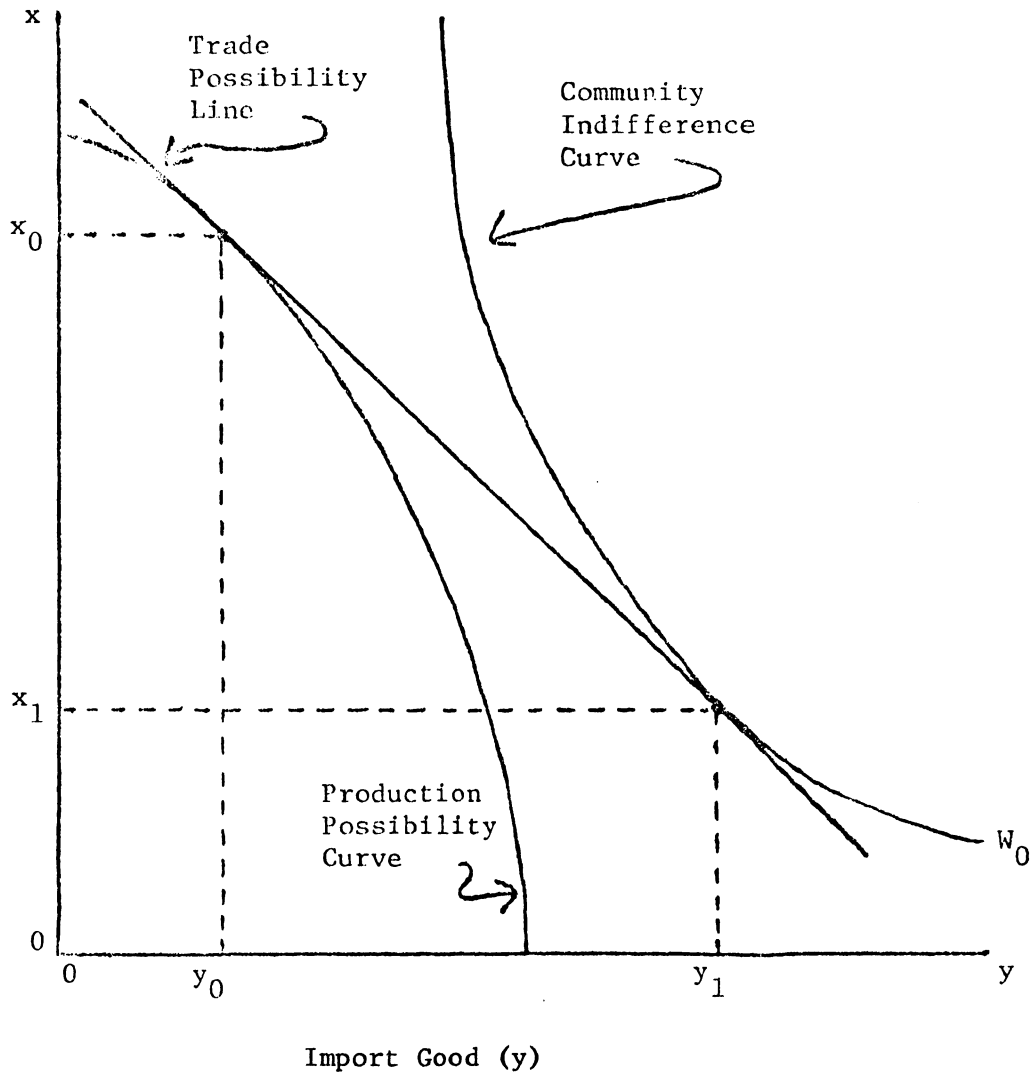
Import Good (y)

Figure 2

Export Good (x)

Import Good (y)

things were expected by the world community of sanctions against Rhodesia. Exports (and imports) comprised nearly half of Rhodesia's GNP in 1965.[1] Its production and exports were heavily dependent on tobacco and a few minerals, and it still apparently lacked the economic maturity that lends flexibility to a productive structure. Finally, its governing white population had long shown a strong inclination for a consumption pattern that required extensive imports of consumer goods.

Before turning to the evaluations of the actual effectiveness of the Rhodesian sanctions, we look briefly at five alternative views about how sanctions work. The basic theory, expressed above, is aggregate, static, and neo-classical; each of the following rejects some element of that model.

1. Inescapable inflexibility in the consumption patterns or (more probably) the production patterns of any economy will arise in at least some sectors of the economy, and sanctions can achieve their greatest effectiveness there. Although this, as theory, is little more than an occasionally kinked, disaggregated version of the basic theory of sanctions, it should be noted that its policy implications are different: it emphasizes that partial sanctions are potentially quite effective. In the Rhodesian case, advocates of this model placed great faith in the effects of i) a clogging up of inexportable tobacco[2], and ii) shortages of petroleum products on whose import Rhodesia was totally dependent.

2. Even if the static real income losses are not large, they represent losses at the critical margin and increasingly will show up as inefficiency in the use of labor and capital, reduced saving (and investment) rates, and hence a lower rate of growth of output. In essence, this is no more than a dynamic version of the basic theory, but again quite different policy implications are drawn: by focusing on growth, and hence the long run, it suggests the need for patience and persistence in the use of sanctions.

3. A more Keynesian view of sanctions views lost exports as lost aggregate demand. Then, after the operation of the multiplier, the effectiveness

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[1] Rhodesia's ratio of imports to GDP was exceeded by only a dozen other countries (see Kindleberger, 1965, p. 308).

[2] More than one fourth of total Rhodesian exports in 1965 and largely to the United Kingdom (see Barnekov, 1969, pp. 59ff.).

of sanctions emerges through an ensuing recession and unemployment. While this model appears similar to the basic theory -- in that sanctions generate reduced real income in both -- it is really <u>very different</u> not only in its theoretical foundations but also in its policy implications. The Keynesian model is entirely demand-focused, whereas the basic theory is entirely supply-focused.[1] Accordingly, the policy implications differ. In neither view is it necessary to impose sanctions on both sides of the export-import trade. In the basic theory, the critical sanctions are against imports;[2] in the Keynesian model, the critical sanctions are against exports.[3]

4. A dualistic view of the Rhodesian economy assumes an "unlimited" supply of black labor available to the modern white-directed industrial and agricultural sectors at a low, constant, and irreducible opportunity cost. Under this assumption, none of the damage imposed by sanctions can be shifted to blacks; and hence even a quite small impact on aggregate variables may be critical to the wages, profits, employment, consumption, and hence welfare of the relatively small white ruling community.[4]

5. According to the widely held (and widely criticized) views of Myrdal, Singer and Prebisch, economic development requires that a poor country first free itself of dependence on the export of primary products. The appropriate policies include government encouragement of agricultural self-sufficiency and increased protection of industrial production. If one focuses only on this model, and ignores all the preceding arguments about sanctions, then it is easy to discover that the effect of economic sanctions is perverse, in that

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[1] It should be noticed that this aggregate-demand model must also assume that the target country is unable either to recognize the source of its reduced real income or to undertake the expansionary macroeconomic policies necessary to offset the losses in export demand.

[2] In terms of Figure 2, if the country continues to export but is unable to import, its consumption bundle will be somewhere <u>within</u> the production possibility curve, and its welfare level therefore even lower than W_1.

[3] Although sanctions against imports will also have some effect because they lower the propensity to import and hence raise the multiplier.

[4] See Porter, 1976, for a more complete development of the model of a "South-African-type economy which underlies this view of sanctions.

they force the target country to adopt the very policies needed for its
"development". Of course, for best results (from the target country's view-
point) the sanctions must be _partial_, effective enough to induce industrial-
ization but not so complete as to make it impossible. Such partially effec-
tive sanctions are not seen as all bad, however, since a more equitable
income distribution is also forced on the sanctioned country (if it is to
create adequate internal demand for the products of its new industry). While
very few writers take this extreme position on the working of economic sanc-
tions,[1] it is worth displaying because it is the source of many "radical"
economists' ambivalence toward the use of sanctions.[2]

III. Assessments of the Effects on Rhodesia of Sanctions

In this section, two kinds of assessment are offered. First, a chrono-
logical review of what has been written about the impact of sanctions against
Rhodesia.[3] The general conclusion of these studies, to anticipate, is that
there has been little impact. The second part then briefly examines the aggre-
gate data in an effort to uncover the sources of Rhodesia's ability to
avert more serious damage.

T. Curtin and D. Murray (1967)

The date is important. While it was then already clear that the sanctions
were not going to "bring the rebellion to an end in a matter of weeks rather
than months,"[4] there were still few hard data with which to assess the actual

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[1] With respect to Rhodesian sanctions, only Hoogvelt and Child, 1973
(see Section III).

[2] The second source of ambivalence is the added power that sanctions give
to large, industrialized countries in their already unequal economic quarrels
with small, underdeveloped countries (e.g., the United States and Cuba).

[3] A more complete listing up to 1973 is found in Clarke, 1973, pp. 325-
327. This list is not so obsolete as one might guess, for, as Rhodesia has
become more the focus of international political and military concern in recent
years, economists' interest in sanctions seems to have waned.

[4] "Sanctions...", 1966, p. 8.

impact of sanctions. Indeed, the subtitle of their monograph indicates that it is no more than an "examination" of the "possible" effects of sanctions.

Their analysis is conducted through the use of an eight-sector input-output table, but their uniform treatment of the sectors means than an aggregate analysis would have done just about as well. In essence, their model consists of two equations:

1) $Y = F - M$, and

2) $M - mY$,

where: Y = Gross Domestic Product (GDP),

F = Final Demand,

M = Imports, and

m = Marginal (and Average) Propensity to Import.

They then consider two models, one without and one with import substitution (defined as a change in the propensity to import).

1. <u>No change in m</u>. Substituting (2) into (1), taking first differences, and solving for Y (where Δ refers to the change):

3) $$\Delta Y = \frac{\Delta F}{1 + m}.$$

Since their m is about 0.45,[1] and they expect F to fall by R£68.0 as a result of sanctions.[2] This means a decline in GDP (i.e., ΔY) of almost R£47 million, or of almost 14 percent of the 1965 GDP.

2. <u>Reduction in m by 50 percent</u>. Solving (1) and (2) as before, but now including a Δm term:

4) $$\Delta Y = \frac{\Delta F}{1 + m} - \frac{Y\Delta m}{1 + m}.$$

Using the same numerical values as before, plus the facts that $\Delta m = -.225$ and Y (i.e., 1965 GDP) = R£332.6 million, this means an <u>increase</u> in GDP of about

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[1] I.e., 149.2/332.6, ignoring indirect taxes (figures in millions of Rhodesian pounds and taken from this study; they have since been revised). Rhodesian pounds (R£) in 1965 were equal to the British pound.

[2] The expected decline in F consisted mostly of a decline in exports, of R£107.1 million, offset somewhat by stock changes, of R£38.9 million (pp. 36-40).

R£5 million, or of about 1 percent of the 1965 GDP.

Their conclusion from these two exercises is that sanctions will probably be effective if there is no import substitution, but "as import substitution increases so the probability must decline" (p. 47). Despite the simplicity of the model and the arbitrariness of the import-substitution assumption, it does have both supply and demand elements and as a forecast has not been far off -- Rhodesian real GDP since UDI fell only in 1966 (and then by only a few percent).[1]

Curtin-McKinnell Debate (1968-69)

Three short articles in African Affairs in 1968 and 1969 are most easily treated together.[2] Curtin argues that most of Rhodesia's imports at the time of the UDI were "relatively unnecessary" (p. 102). His basic numerical example assumes that the only necessary imports are those of capital equipment and that the current fraction (i.e., one third) of all fixed capital formation must always be imported. He then shows that a much reduced and stagnant post-sanction level of exports (R£70 million instead of the actual 1965 level of R£180.5 million) would still be adequate to permit a "satisfactory" (p. 104) rate of growth for something like a half century.

McKinnell insists that the relevant calculation is not the actual GDP growth rate (or level), but rather the gap between what is and what would have been in the absence of sanctions; he sees this gap as large and growing. McKinnell further maintains that the determination of "reasonable increases" in white incomes must compare Rhodesian whites with South African whites; since South African income grows at 7 percent, according to McKinnell, the lower post-sanction growth rates calculated by Curtin do mean relative "economic hardship" (p. 232) to Rhodesian whites.

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[1] The official statistics have, throughout UDI, been subjected to doubt and criticism, but no one has suggested that the decline was much greater than this.

[2] Curtin, 1968; McKinnell, 1968; and Curtin, 1969. Only those aspects are discussed here that neither repeat Curtin's earlier work (i.e., Curtin and Murray, 1967) nor anticipate McKinnell's later, longer study (i.e., McKinnell, 1969).

C. C. Barnekov (1969)

The presentation and estimates are so diffuse that a detailed review of
the methods is difficult. Suffice it to say that a series of informed,
though ad hoc and arbitrary, estimates of the effects of sanctions in GDP are
added up.[1] The largest effect is viewed, as in the Curtin and Murray study,
as the loss of exports -- offset essentially by, in order of importance,
1) evasion of export sanctions, 2) import substitution, 3) increased trade
with South Africa, and 4) new agricultural exports. The net effect of sanc-
tions on GDP is estimated to be minus R£17 million in the short run and plus
R£12 million as "a possible long-term outcome of sanctions" (p. 73). While
the methodology lacks the apparent elegance of the Curtin and Murray study,
the important point is that this different approach nevertheless yields sim-
ilar results.

R. B. Sutcliffe (1969)

By 1969, analyses of the effect of sanctions begin to be based on post-
1965 data. This, one of the first, makes rather causal, reportorial use of the
data, but the conclusions were in agreement with others and were interestingly
interpreted. Essentially, "sanctions have undoubtedly damaged the Rhodesian
economy as a whole very severely" (p. 117) -- although his own data show a
drop in real GNP per head of only 7 percent in 1966 and a renewed growth in
1967 of 3 percent.[2] The severe damage is sectoral rather than aggregate, as
exports declined 37 percent over 1965-67 and tobacco production declined 46
percent over 1965-68. But he maintains that all this has had little political
effect because of Rhodesia's "ability to maintain white living standards at
the cost of further African impoverishment" (p. 117). He cites Rhodesian employ-
ment statistics that show, for 1965-67, a rise in white employment of 2 per-
cent and a fall in African employment of 3 percent. The regime has also "been
able to impose economic costs upon foreign capitalists (by restrictions on
profit repatriation)" (p. 121). Only the tobacco farmers among whites were hit
hard, and even here there has been a successful shift into maize, wheat and

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[1] With possible double-counting in places.

[2] Table 1, Column 1, p. 118.

cotton. In short: sanctions have had little effect on the living standards of the target group, urban whites.

R. McKinnell (1969)

Although produced some years ago, this is the most careful study of the subject yet. The conclusion (tentative, since it "is too early as yet to judge"): "...the overall effect on the economy has apparently been "slight" (p. 563). But he goes behind the "apparently" in several directions:

1. The GDP decline of only 3 percent over 1965-66 is misleading. Much tobacco was produced only to be stockpiled (5%); prices rose (3%); and population rose (3%). Thus the real, useful, per capita GDP fell by something like 14 percent.

2. The aggregates are misleading. His sectoral picture is of the "basic productive sectors of the economy buffeted by sanctions, but of incomes being maintained by compensatory changes in the tertiary sectors of the economy" (p. 569).[1]

3. There has been a "decline is gross capital formation" which has "grave implications" (p. 571) for Rhodesia's growth.[2] Indeed, it is here that McKinnell sees the greatest impact of sanctions. Past Rhodesian growth has been founded on "expanding exports and the inflow of capital and skills" (p. 594), all of which are hurt by sanctions.

G. Arnold and A. Baldwin (1972)

This brief report supports McKinnell's results, that Rhodesia is "standing still economically" (p. 2). They offer some new (as well as several already mentioned) reasons for this:

1. "The tremendous growth of secondary industry...is slowing down mainly because insufficient foreign exchange is available..."[3] (p. 4). This conforms

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[1] He goes too far when he includes manufacturing in the "buffeted" sector; by his own data, it grew by 19 percent over 1965-68 (p. 570).

[2] Actually, his own data do not appear so "grave": the ratio of gross fixed capital formation to GDP averaged .136 over 1966-68, compared to .135 in 1965 (p. 565).

[3] The quote is of J. Graylin, head of the Association of Rhodesian Industries, in April 1972.

with the conventional wisdom of the development literature that import substitution quickly passes through an easy stage into progressively more capital-intensive, import-intensive, and technology-intensive stages.

2. The growing inefficiency of the transport sector where "obsolescence" and "lack of supplies" have resulted in "large hold-ups and bottlenecks" (p. 4). This too conforms with expectations. Initially, sanctions created excess capacity in this sector by stopping the Zambian flows through Rhodesia and cutting down external trade in general. But sooner or later, with depreciation in transport and growth in demand for its services, the excess capacity must disappear.

A. M. M. Hoogvelt and D. Child (1973)

As an exponent of the "radical" theory of sanctions (i.e., the fifth alternative view of Section II), this study sees the facts as verification of the theory -- sanctions forced development through economic independence and industrialization. They note the growth between 1964 and 1971, of output, the manufacturing share of GDP, employment (white and black), and capital investment. Furthermore, there "has been an enforced redistribution of the National Product", the evidence being that the "increase in food output coupled with restricted access to foreign markets must have kept the prices of these basic foodstuffs at a level where they became more accessible to the black majority" (p. 10).

A. M. Hawkins (1976)

This most recent of evaluations also makes the most use of the empirical evidence. He notes that there are "two distinct periods" (p. 19) in recent Rhodesian growth: 1963-1968, over which real GNP rose at only 2.8 percent per year and real income per capita fell; and 1968-1974, over which real GNP rose at 8.3 percent per year. Such an "impressive" growth rate in the face of sanctions is attributed "largely" to the refusal of South Africa and Portugal to apply sanctions and the "disparity" between stated intentions and actual performance on sanctions by other countries. But there are many other reasons:

> the degree of excess capacity both in manufacturing and in the
> economic infrastructure as a whole at the time of UDI, the suc-
> cess of import substitution (especially in manufacturing but .

also in agriculture), the competitiveness of Rhodesian exports, including exports of manufactures, and the strength of international demand for Rhodesian primary products (p. 24).

Nevertheless, he argues that in the absence of sanctions "the available evidence suggests that the growth rate would have been faster" (p. 28); the reasons:

1.   There would have been export-led growth and the balance-of-payments constraint on growth "may not have existed at all (or at least would have been considerably less restrictive)" (p. 28).

2.   There has been "ever increasing state intervention in the private sector" since sanctions, especially in its "increasingly restrictive" application of price and import controls (p. 28).

The Aggregate Data

From 1965 on, the writing about the economic sanctions against Rhodesia is fairly consistent in its conclusions: some short-run damage to the Rhodesian economy, rapid growth of manufacturing to replace imports, expansion of the tertiary sectors to maintain white employment, and some slowdown in overall growth -- to rates below those that could have been expected in the absence of sanctions.

The key is that Rhodesia somehow averted any long-term absolute reduction in growth rate. Real GDP fell only in 1966 (see Table 1, Column 2), rising in every year thereafter until 1975. This growth was achieved, moreover, with price stability. The consumer price index (European) rose by less than 4 percent per annum over 1965-1975, and the major part of even that small rise was not due to sanctions but rather to the 1973-1974 increases in the price of _imported_ fuel.

The first place to look for the impact, or lack of impact, of sanctions is in exports and imports. Exports fell from R$285.0 million in 1965 to R$174.7 in 1968,[1] a nearly 40 percent decline in three years (see Table 1, Column 3). The decline is even greater relative to the hypothetical growth path that exports would have followed if there had been no sanctions, although by how much is difficult to guess since the proximity of UDI to the

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[1] R$ is Rhodesian dollars; Rhodesia converted from pounds to dollars in 1970.

break-up of the Federation (of Rhodesia with, now, Zambia and Malawi) leaves
us with little export history to extrapolate. On the other hand, sanctions
also reduced the rate at which foreign firms in Rhodesia could remit their
investment income, which was the equivalent to Rhodesia, in the short run at
least, of an increase in exports. This can be seen in the percentage differ-
ence between imports and exports (Table 1, Column 4). Before UDI, imports
were 8 to 16 percent below exports; thereafter, they were never more than 6
percent below exports and were often greater than exports.

Nevertheless, exports and imports each dropped from around 30 percent of
GDP before UDI to around 20 percent of GDP after UDI. If output and growth
had been tightly constrained by foreign exchange availability and the struc-
ture of production or consumption had been inflexible, such a decline might
have been disastrous. That adjustments were made to avert the disaster is
most readily seen, in a Harrod-Domar framework, by examining the fraction of
output invested and the productivity of capital.

Rhodesia invested (i.e., gross capital formation) slightly over 13
percent of its GDP in the years just preceding UDI (see Table 1, Column 5).
This fraction rose beyond 20 percent by 1967 and stayed at this higher level.
Of course, Rhodesia had usually maintained this level during the Federation
period, but the fact that it was re-established under sanctions is impressive.

A similar change occurred in the capital-output ratio (see Table 1,
Column 6).[1] It had ranged between 2.00 and 2.28 over 1954-1965. In the first
year after UDI, it rose slightly, but then declined dramatically through the
remainder of the 1960s. If raising the investment rate is impressive, lowering
the capital-output ratio can only be labeled amazing. Sanctions are supposed
to idle capacity, or force the use of more costly or less productive domestic
intermediate and capital goods, or induce the production of a distorted mix
of goods. It apparently achieved none of these. Moreover, the rise in capital
productivity was not achieved by a mere substitution of labor for capital:

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[1] Note that this is _not_ the usually calculated gross, incremental capital-
output ratio. There is no conceptual defense for using gross investment data.
Hence I have preferred to make explicit assumptions about initial capital
stock and rates of depreciation (see notes to Table 1, Column 6). The conclus-
ions of the text are robust in the face of large changes in the specific
values of the assumed parameters.

TABLE 1: Selected Rhodesian Economic Data, 1963-1975

Year	Real GDP	(Growth rate)	Exports	% Difference Between Imports & Exports	Ratio of Gross Capital Formation to GDP	Capital-Output Ratio
(1)	(2)		(3)	(4)	(5)	(6)
1963	710.8	(-1.9%)	n.a.	n.a.	13.1%	2.20
1964	709.0	(-0.3)	236.6	- 8.5%	13.1	2.16
1965	747.0	(5.3)	285.0	-15.9	13.7	2.02
1966	714.3	(-4.4)	178.0	- 4.8	16.6	2.06
1967	772.0	(8.1)	176.7	+ 5.9	2212	1.89
1968	789.7	(2.3)	174.7	+18.5	23.5	1.89
1969	910.7	(15.3)	212.2	- 6.0	19.6	1.66
1970	943.4	(3.6)	247.5	- 5.1	20.5	1.65
1971	1,053.5	(11.7)	270.8	+ 4.3	23.0	1.55
1972	1,138.3	(8.0)	322.3	- 1.5	21.8	1.51
1973	1,181.2	(3.8)	n.a.	n.a.	22.7	1.56
1974	1,314.3	(11.3)	n.a.	n.a.	24.6	1.49
1975	1,308.4	(-0.4)	n.a.	n.a.	22.6	1.58

Notes and Sources:

Col. 2: Real GDP is expressed in R$ millions in 1965 prices. The current GDP data have been deflated by the GNP (sic) deflator, since none for GDP is available. Source: Economic Survey and Monthly Digest, various issues; the deflators have been estimated from World Bank data and regression approximation for 1964, 1965 and 1975.

Col. 3: Data are in R$ millions. Source: Monthly Digest, various issues. No export (or import) data have been released for the years after 1972; nor are any available for Rhodesia alone during the Federation years (i.e., before 1964).

Col. 4: See notes for Column 3. The calculation is imports minus exports, divided by exports.

Col. 5: Source: Monthly Digest, Economic Survey, various issues.

Col. 6: Capital divided by GDP. Real capital is calculated by the perpetual-inventory method, assuming the start-of-1954 capital stock was twice 1954 GDP, the depreciation rate was 7.5% throughout, and real gross fixed capital formation is the addition to capital each year. Source: Economic Survey, Monthly Digest, various issues.

GDP per worker also rose, over 1965-1975, from R$1.00 thousand to R$1.23 thousand.[1]

The proximate sources of Rhodesian growth over 1955-1975 are shown in Table 2. There, per-annum rates of growth of real GDP are decomposed into the rates attributable to capital, white labor, black labor, and the "residual" (i.e., everything else, including interactions).[2] In short, Table 2 shows no evidence of damage due to sanctions (although a narrower breakdown of the years would show a temporary effect in the mid 1960s. Real GDP grew at over 6 percent per annum during the sanction years (after 1968), and this was largely attributable to capital formation, especially after 1970, and to the "residual". Of course, there is always the problem of knowing what exactly comprises this other-than-factor-growth effect, but its significance over 1965-1975 provides strong evidence that sanctions did not impose much in the way of inefficiency on the economy.

All this, to be sure, is at the level of aggregate data. There has been drastic sectoral change: in agriculture, the shift out of tobacco; in industry, the growth of import-substituting manufacture;[3] and in the rest of the economy, the relative transfer of the white labor force not only to manufacturing but also to the service sectors. The final assessment of sanctions will require examination at a disaggregated level, but this must await the release of data on the composition of Rhodesia's foreign trade, which has been withheld -- not surprisingly -- by the Rhodesian government since 1965.

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[1] And the ratio of relatively less skilled African workers to "European, Asian and coloured" employees rose, from 7.31 to 7.89 during the decade (Fassenfest, 1976, p. 7). The count of African workers excludes those on African lands.

[2] See, for an example of the approach and the derivation of the formula, Bruton (1967). The formula is:

$$g_o = r + \sum_i s_i \, g_i \, ,$$

where g_o is the growth rate of real output (i.e., GDP), r is the "residual", s_i is the income share (assumed equal to the output elasticity) of the ith factor, and g_i is the growth rate of the ith factor. We consider three factors: capital, skilled (white) labor, and unskilled (black) labor. The "residual" is calculated by subtraction.

[3] See Porter and Sherman, 1976.

TABLE 2: Proximate Sources of Rhodesian Growth, 1955-1975

		1955-1960	1960-1965	1965-1970	1970-1975
1.	Growth rate of real GDP:	4.40%	1.60%	4.76%	6.76%
	Due to:				
2.	Physical capital	3.09%	-0.31%	0.28%	2.90%
3.	White labor	1.79	0.02	0.90	0.87
4.	Black labor	0.45	-0.01	0.58	0.98
5.	The "residual"	-0.93	1.90	3.00	2.02

Notes and Sources:

Row 1: See Table 1, Column 2.

Row 2: See Table 1, Column 6. The capital share of income is found by sub-
tracting the white plus black labor shares from unity.

Row 3,4: For black (i.e., "African") and white (i.e., "European, Asian and
coloured") labor, the employment and income (i.e., "wages and
salaries") data are from Monthly Digest and Economic Survey,
various issues.

Row 5: Found by subtraction of Rows 2-4 from Row 1.

IV. Implications for the Theory

Whatever one means by "succeed", sanctions against Rhodesia clearly did
not succeed. And in terms of the basic theory of sanctions -- as outlined in
Section II -- the reasons are twofold. One, sanctions only partly cut off
trade between Rhodesia and the rest of the world; and two, Rhodesia's
production structure and consumption requirements proved surprisingly flex-
ible.

For the first alternative view, that sanctions will generate inescapable
inflexibility in some particular sector of the economy, Rhodesia offers no
evidence. Through the cooperation of neighbors and the introduction of import
licensing, Rhodesia has been able to assure continued supplies of any such
critical imports.

For the second alternative, that sanctions affect not so much short-
run levels as long-run growth of output, the evidence is contrary. Sanctions
might have caused a reduction in real GDP in 1966 and slow recovery in 1967-
1968, but Rhodesia's growth rate thereafter was high. The assumption that
sanctions would reduce savings (and investment) rates and incur inefficiency
in the use of capital and labor is not supported by Rhodesia's history under
UDI.

In the third alternative view, sanctions against exports reduce aggre-
gate demand. In Rhodesia, however, the loss of export demand was offset by a
rise in the rate of capital formation.[1] The two are fully substitutable from
the viewpoint of aggregate demand, and their different balance-of-payments
impacts can be corrected by a reduction in the economy's propensity to import
by some means (in Rhodesia, import licensing).

The fourth alternative view, more specifically oriented toward Rhodesia,
assumes that the black standard of living cannot be lowered and hence that
reductions in the level or growth of aggregate income must fall on the
whites. Rhodesia offers no evidence -- there was no long-run income decline
to be absorbed. Nevertheless, there is some feeling (not unanimously held by
observers) that short-run losses could be, and were, transferred to Africans,

[1] And, to a lesser extent, by a rise in the rate of government current
expenditure.

largely through unemployment and emigration.

For the fifth alternative view, the "radical" view that sanctions accelerate development, the evidence from Rhodesia proves nothing, mainly because this view is not really a theory of sanctions, but a theory of development. Accordingly, what we would need to know is whether the economic path actually followed under UDI was "better" for "Rhodesians" than the path that would have been followed in the absence of sanctions. We lack sufficient knowledge of the structure and data of the Rhodesian economy since 1965 to conduct such a counterfactual simulation. And even if we could, the evidence from Rhodesia would not be likely to convert anyone in this debate.

In short, we know at the end of a decade of sanctions little more than we ought to have known at the start: if economic sanctions are incompletely applied to a relatively mature and flexible economy, they are unlikely to impose much hardship beyond a brief transition period.

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