THE DEVELOPMENT OF THE DEBT-RATIO IN A SMALL OPEN ECONOMY

Olav Fjellså
Resource Policy Group
Sagveien 21
Oslo 4, Norway

Abstract

This paper describes a System Dynamics model of the foreign trade sector in a small open economy. The model is used to investigate the consequences of various economic policies aimed at solving problems which a high-cost country may experience when its debt-ratio begins to increase. With the model, we simulate some of the economic consequences of currency devaluation, tax increase, restrictive public policy and income freeze.

Each of these measures significantly improve the debt-ratio, but only after a delay of 5-8 years, as a result of various bottlenecks in the decision-making process.

1. Introduction

In a number of western industrialized countries, the foreign debt has increased considerably, as a result of several years during which there has been a deficit in current accounts. The debt-ratio, which is defined as the ratio of the foreign debt to the yearly exports, has therefore increased. This debt has arisen mainly as a result of the increasing cost level, which has brought a higher ratio of imports to exports.

Different countries are sensitive in different degrees to the international exchange of goods and services. Exports, for example, account for a higher percentage of national income in Norway and Canada than they do in the USA. Therefore, the former two are classified as countries with a small open economy.

As a step towards increasing our understanding of the link between a single country and the world at large, a simple System Dynamics model is employd (see GRS-report 175). This model describes a typical time development in the debt-ratio in situations involving high costs. The debt-ratio can be said to give a somewhat imprecise expression of a country's ability to repay it's net foregn debt. A debt-ratio of 0,5 years indicates that it will cost the country a half year of exports to repay the debt.

The model, which focuses on the country's exchange of

goods and services, simulates the relationships between several important variables, such as the debt-ratio, exports, imports and the foreign exchange rate. It's point of departure is a situation where the country's income level increases relative to its competitors. This causes the country's cost level to rise. We may say rather imprecisely that the country has become a "high-cost country".

We are particularly interested in answering the following questions:

- What consequences will the cost increases have for the development of important variables relating to foreign trade ?
- What must be done to correct the imbalance ?
- What consequences will these measures have ?
- How long will it take before a new equilibrium arises ?

2. General Features of the Model

The purpose of this analysis is neither to simulate an actual development nor to make forecasts, but rather to provide a clear and simple understanding of the dynamic mechanisms which manifest themself in a small open economy.

The model which we are considering here is highly aggregated with relatively few key variables. The analysis is limited to considering the goods and services side of a country's foreign trade. It does not consider financial

transactions. The model has a simple structure which attempts to describe the most important cause-and-effect relationships in an open economy, when we direct our attention to finding out which variables influence the size of imports, exports and the debt-ratio.

Most of the economic relationships employed in the model are well-known macro-economic quantities.

A country's exports and imports are determined by supply and demand conditions, both within the country and in the countries with which it trades (hereafter called the foreign countries). If we had a clear and unambiguous measure of these quantities, the problem of formalizing theories would be much simpler. Such a measure, however, does not exist, and in its absence we must try to find other quantities which we consider to be good indicators of supply and demand conditions.

In the attempts which have been made up to now, three key explanatory factors have usually designated:

a) a measure of the country's level of activity
b) relative price relationships
c) a measure of the degree of capacity utilization (often used synonymously in this context for the pressure of demand).

In this analysis, we will limit ourselves to considering only the second explonatory factor i.e. relative

price relationship, partly beecause it is easy to quantify and and partly because of the extent of the analysis.

3. Assumptions in the Model

We can now list the main assumptions which we have made in this model :

- Exports and imports (both expressed in foreign exchange per year) are determined on the basis of the country's cost level. If the cost level increases relative to the foreign countries, then exports will decrease because increased costs will cause marginal products to sell at a loss. The extent to which exports decrease depends on several factors such as the size of the loss per unit produced, the amount of time that the firm can keep operating, government subsidies, etc. In a similar way, cost increases bring about rising prices for domestically produces goods (it is assumed that the costs are shifted over after a while to the prices). Consumption is forced over from domestically produced to imported goods.
- For finished products, the prices of imports will directly affect the consumer-price index. In addition, increased prices of imported raw materials will give rise to higher costs. After some time has elapsed, these will be shifted over to the prices and the index will increase.
- In addition to the relative price level, the imports will be dependent on the total demand in the country (because it is assumed that a certain fraction goes to the purchase of

of imported goods).

- The exchange rate is an important variable in the model. It will change if the balance of current accounts moves out of equilibrium.
- Elasticities of supply and demand are assumed to be such that a currency devaluation will give rise to increased exports and reduced imports (both expressed in foreign exchange per year).
- Prices are determined by costs, not by demand.
- The model's time horizon is 10 - 15 years. The public authorities are assumed to have two goals: a balance of current acounts and a debt-ratio of 0.25 years. Since the authorities have only limited possibilities of directly affecting productivity, we assume that they have two ways of achieving these two goals:
- currency adjustments
- restrictive policy measures.

4. The Structure of the Model

The most important feedback loops in the model are depicted in the diagram on page 7 (see figure 1). The model consists of two sectors: an import and an export sector.

4.1 The Import Sector

The import sector of the model consists of both positive and negative feedback loops.

An increase in the quantity of imports will have two effects. The foreign debt and the deficit in current accounts will both increase. Thus, the pressure on the exchange rate will be increased. A lower exchange rate will give rise to increasing import prices expressed in local currency. According to market theory, demand will abate when prices rise. Thus, this loop is goal-seeking, i.e. a negative feedback loop.

However, the effect of a devaluation on imports will not be exclusively negative. Since the average tendency to import is relatively large in a small country with an open economy, increased import prices will increase the consumer-price index. This index is important in wage negotiations. If it shows a tendency to increase, it will require wage compensation in order to maintain the real income. Since a given proportion of the wage increases will be used to purchase foreign goods, the devaluation will also have a tendency to increase imports.

A second aspect of wage increase is that they tend to boost the cost level in the country, becausee wage costs constitute a significant cost factor for the country's firms. As time goes by, the costs will be shifted over to the prices, so that the cost of domestically produced goods will increase. The result is that consumer demand will shift from domestically produced over to imported goods, because the relative

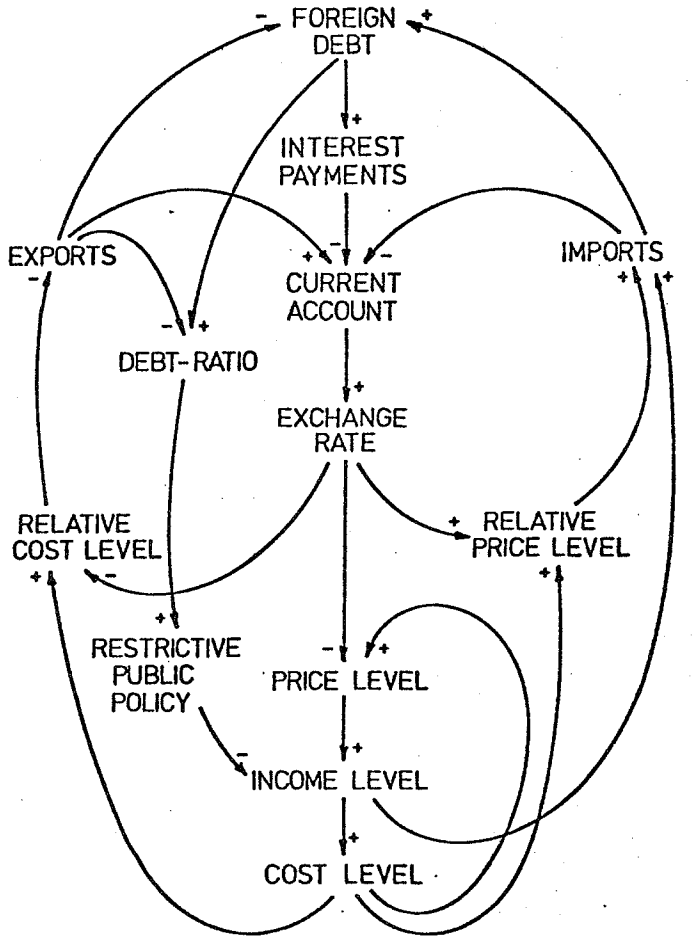

Figure 1 Causal Structure

price level is worsened in favor of imports. Hence, imports will increase. However, the increased price of domestically produced goods does not just affect the relative level of prices. The price increases will also stimulate the well-known wage and price spiral.

4.2 The Export Sector

The model's export sector also consists of both positive and negative feedback loops.

A reduction in exports will cause the foreign debt and the deficit in current accounts to increase. As a result of the pressure on the exchange rate, the currency will be devaluated. The devaluation will cause the country's relative cost level, expressed in foreign currency, to decrease. Improvements in the relative cost level will cause marginal products to become competitive again. Exports will be stimulated. This then is a goal-seeking negative feedback loop.

However, the devaluation will, as previously mentioned also result in an increasing income and cost level. The cost increase will mean that the improvements in the relative cost level will not be as large as orginally expected, so that the expected growth in exports will decline. A reduction in exports together with an increasing foreign debt will cause the country's debt-ratio, defined here as the ratio of the foreign debt to exports, to increase. If the debt-ratio

becomes too high, it will bring about a reaction from the authorities who will feel obligated to initiate some sort of restrictive public policy. In other words, we assume that the authorities have enough influence to carry out these sorts of measures. A general income freeze is one example of this type of policy. Measures of this sort will directly influence the income level. By reducing the growth in the income level, the cost level will be improved in the country, which, taken by itself, will stimulate exports and restrict imports. In addition, the wage and price spiral will be reduced.

4.3 Delays

If the above-mentioned mechanisms acted instantaneously, we would arrive at equilibrium again rather quickly. However, the system is sluggish, because the processes of gathering information and making decisions take time. In the model, we have included a number of the most important delays, such as the time it takes:

- before increased costs reveal themselves in the form of increased prices
- to change one's market shares
- before the restrictive public policy is put into practice
- before the exchange rate is altered
- to perceive the surplus in current accounts
- to perceive the size of the debt-ratio

The above-mentioned delays in the system are important factors

in understanding why it takes time before a new equilibrium arises.

5. Base Run

In the base run we attempt to describe the most likely course of development for important variables in the foreign trade of a small country with an open economy, when that country grants itself a higher income level than the economy is actually capable of providing. Among other things, this causes the country's cost level to rise. The aim of this run is to give an indication of how long it will take until the measures taken by the authorities reestablish equilibrium again. The model is initially in balance, i.e. exports equal the sum of imports and interest payments, the foreign debt is 3 billion kroner, the debt-ratio is 0.25 years, and the exchange rate is 0.2 $/kr. The point of departure for the base run is an increase of 10 % in the income level after one year. The behavior of the model system under these circumstances is depicted in figure 2. The increase in income results in an increase in imports and a decline in exports, which causes the debt-ratio, the foreign dept, and the deficit in current accounts to all rise. Two measures are then put into practice: a currency devaluation and a restrictive public policy. The deficit in current accounts increases the pressure on the exchange rate. The devaluation brings about a relatively rapid drop in imports and a somewhat delayed rise

in exports.

When the debt-ratio exceeds its beginning level of 0.25 years, the authorities put the restrictive public policy in practice as a reaction to the mounting debt-ratio. Higher debt-ratios result in even stronger measures. These measures will directly affect the income level, which leads to an improvement in the cost level. Thus, the debt-ratio will be influenced in a favourable direction.

The drop in the exchange rate and the restrictive public policy will continue until the debt-ratio comes down to an acceptable level. Thus, we can conclude that the result of the policy followed by the authorities in the base run will be a stabilization of the model system, but only after a delay of 10 - 12 years.

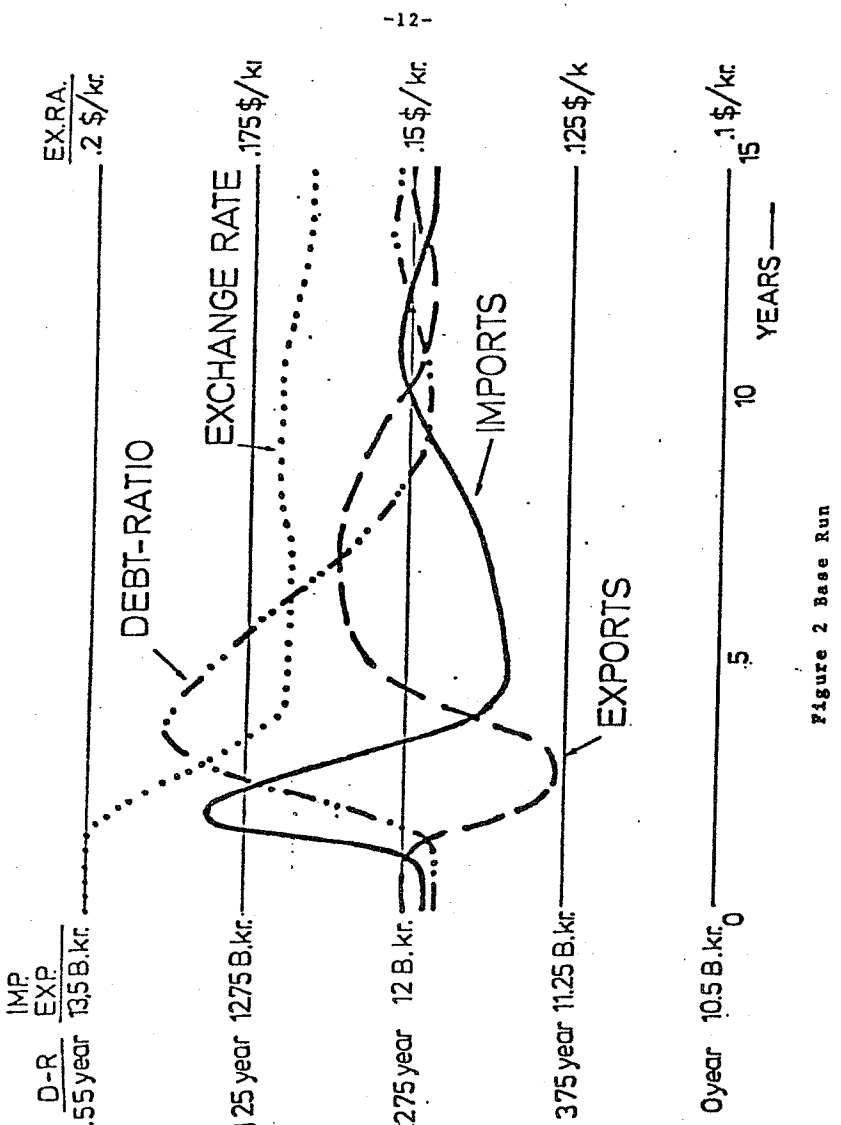

Figure 2 Base Run

6. Policy Analysis

Is there any policy which will enable us to reduce the debt-ratio and restore the balance of trade more rapidly than the policy discussed in the base run? To answer this question, we have considered several conceivable measures which could be taken. The policies analyzed include the following:

Policy	Intended Effect
Devaluation	Increases exports Reduces imports
No compensation for inflation	Reduces the growth in income
Tax increases	Restricts purchasing power
More restricive public policy	Reduces the income level

Stronger Devaluation

In this measure, we assume that the authorities lower the exchange rate more than in the case of the base run. The aim is to stimulate exports and reduce imports. There is considerable empirical evidence which suggests that changes in relative price levels have a strong influence on imports and exports. Time is required, however for the requisite changes in demand and production to take place. Therefore, only about one fourth to one half of the effects of the devaluation will be observed during the first year. The simulation shows a significant reduction in the debt-ratio. It stabilizes faster than in the base run, but this still takes 7 - 8 years. However, the income level rises faster, as a result of the large devaluation. This happens because the currency devaluation gives rise to increased import prices and thus a higher consumer-price index. Therefore, the demand for compensation will cause the income level to increase, which works against the improvement in the debt-ratio.

One danger with currency policy is that the country's most important trading partners may take similar measures, so that competitive devaluations will arise. In the model, we do not take these possible reactions from foreign countries into consideration.

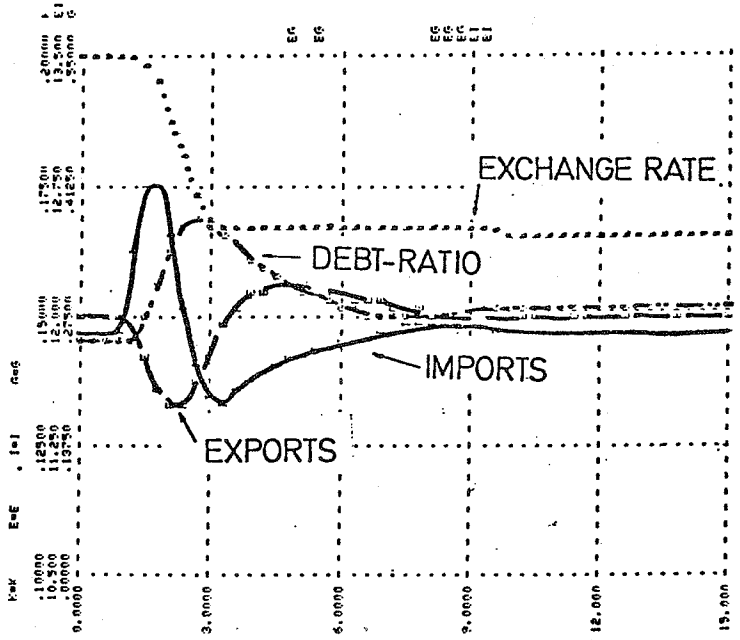

Figure 3 Stronger Devaluvation

No Compensation for Inflation

When prices - both import prices and domestic prices - rise, demands are invariably advanced for income compensation, so that the real income remains constant.

In this simulation, we assume that no compensation is given for the price rises. Consequently, the wage and price spiral is broken.

Real income decreases as a result of the unchanged nominal income level. This results in more favourable export and import developments, which cause the debt-ratio to improve relatively quickly, i.e. after 5 years the ratio is at an acceptable level. A negative debt-ratio implies that the country's foreign debt becomes positive, i.e. the country shifts from being a net-borrower to a net-lender. This policy is the most effective in terms of our stated aims,but in purely political terms, it would be difficult, if not impossible, to carry out reduction in real income over a sustained period of time.

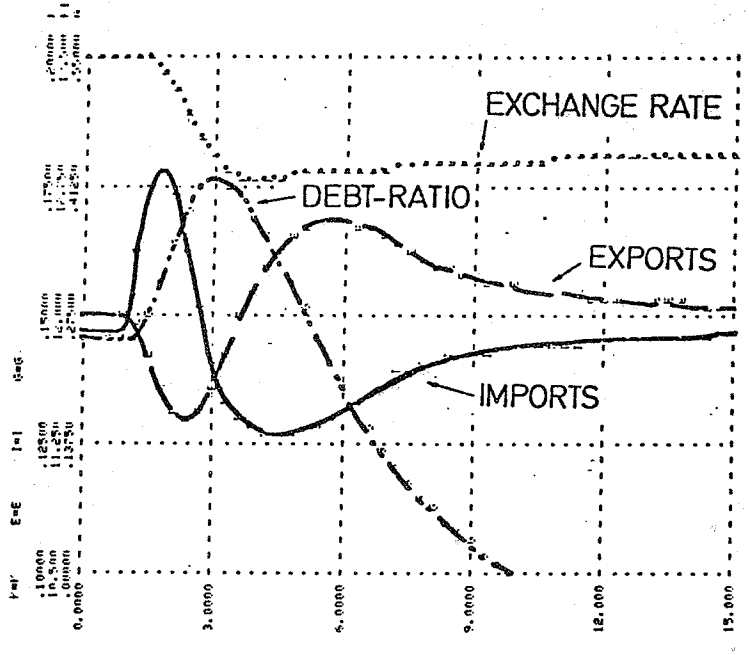

Figure 4 No Compensation for Inflation

Tax Increase

The government reduces buying power by means of increased taxes. This simulation shows how the model reacts to a 10 per cent tax increase. As a result of reduced disposable income, the buying power directed towards imported goods is reduced. The resulting reduction in imports improves the foreign debt, the debt-ratio and the current accounts. The pressure on the exchange rate declines somewhat, which results in a smaller devaluation of the currency. Both debt-ratio and imports stabilize at a lower level than in the base run.

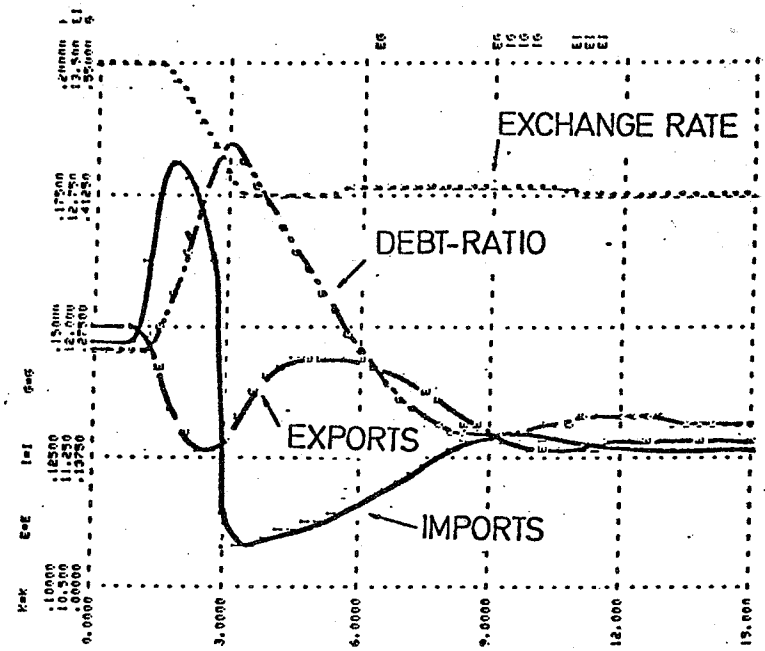

Figure 5 10% Tax Increase

More Restrictive Public Polic

In this measure, we assume that the authorities will put a more restrictive public policy into practise than in the case of the base run. The aim is to reduce the income level. The adjustment of the income level will lead to a stimulation of exports and a reduction of imports which will improve the debt-ratio. The ratio is favourable after 6 years and stable after 10 years at a lower value compaired to the base run.

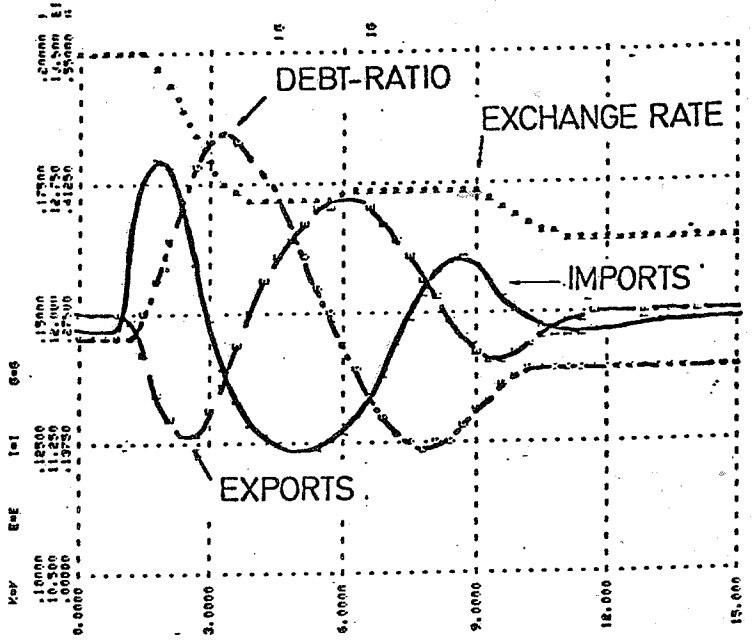

Figure 6 More Restrictive Public Policy

7. Conclusion

We can draw three main conclutions from the results of these simulations.

First, every high cost situation is only a passing phenomenon. For a given amount of productivity, a currency adjustment combined with restrictive public policies will sooner or later bring the cost level in line with that of one's competitors.

Secondly, the adjustment process will take a long time - roughly just as long as it takes to react to the problem in the first place. One reason for this is the numerous delays and considerable lags which exist in the system. "Everything takes time."

Finally, the period of high costs can be shortened by a faster and more energetic reaction on the part of the government. However, it will often be difficult to obtain data which is completely up to date. Consequently, it will be difficult to obtain the necessary consensus to act swiftly and unequivocally. This reinforces the "wait and see" attitude which is prevalent in reality.

Bibliography

GRS-175, Fjellså, Olav: "Gjeldsbyrdens utvikling i et lite land med åpen økonomi. (The development of the debt-ratio in a small open economy), 98 pages.

Appendix A

Additional Information About the Debt-Ratio Model

1. The source of the idea for the modeling study:

In most important macroeconomic planning models in Norway, foreign trade is treated rather scantily. This is true despite the fact that the import and export developments are determined to a relatively high degree by national conditions. The idea behind this model is to make the two most important foreign economic variables - exports and imports endogenous.

2. New Knowledge Generated By the Model:

The aim of the model was to increase our knowledge and understanding of typical export and import developments in a small open economy, when the country in question is caught up in a high-cost situation. We also intended to look into the possiblities which such a country would have of returning it's economy to equilibrium.

3. Potential Clients for the Work:

The Ministry of Finance, The Federal Bank.
The clients can use the model to investigate the consequences of various economic policies aimed at solving problems which a high-cost country may experience when its debt-ratio begins to increase.

4. Influence of the Public Sector on Model Construction:

A number of small countries with open economies experienced a significant worsening of their balance of trade during the 1970's as a result of increased imports and reduced exports. Norway, for example, underwent a rapid increase in its foreign debt during this period, (from 13 billion kroner in 1972 to 99 billion kroner in 1978).

Measures to straighten out this imbalance had to be taken. Among the questions raised were these:
- What will be the consequences for the balance of trade of various policies? How long will it take before the economy returns to an equilibrium condition?

5. Structural Changes in the Model:

In order to better adapt the model to a particular country, other versions of the model were created which take into consideration the balance trade in Norway.

CLASS II DOCUMENTATION STANDARDS
FOR SIMULATION MODELS

ACCESS TO MODEL:

Name of Model: Gjeld 20 (1)

Name and current address of the senior technical person responsible for the model's construction: Olav Fiellså, Resource Policy Group, Sarv. 21, Oslo, Norway

Who funded the model development? The Resource Policy Group

In what language is the program written? Dynamo

On what computer system is the model currently implemented? IBM

What is the maximum memory required to store and execute the program? 10 K words

What is the length of time required for one typical run of the model? 30 seconds

Is there a detailed user's manual for the model? Yes

PURPOSE OF THE MODEL:

For what individual or institution was the model designed? Royal Norwegian Council for Scientific & Industrial Research

What were the basic variables included in the model?

Debt-ratio, exchange-rate, exports and imports

Over what time period is the model supposed to provide useful information on real world behavior?

10 - 15 years

Was the model intended to serve as the basis of:

an academic exercise designed to test the implications of a set of assumptions or to see if a specific theory would explain historical behavior: Yes

communication with others about the nature and implications of an important set of interactions: Yes

projecting the general behavioral tendencies of the real system: Yes

predicting the value of some system element(s) at some future point in time: No

3. MODEL SPECIFICATION AND THEORETICAL JUSTIFICATION:

Provide two diagrams illustrating the extreme behavior modes exhibited by the major model elements:

See later

If they are not included in the body of the paper indicate where the reader may find:

a model boundary diagram that indicates the important endogenous, exogenous and excluded variables: In this appendix

a causal influence diagram, a flow diagram, the computer program and definitions of the program elements: In this appendix

Is the model composed of:

simultaneous equations: No

difference or differential equations: Yes

procedural instructions: Yes

Is the model deterministic: Yes or stochastic: ____

continuous: Yes or discrete: ____

4. DATA ACQUISITION

What were the primary sources for the data and theories incorporated in the model?

Data: The numerical data was arbitrarily selected, but the relation-between the various numbers is appropriate for a small open economy.

Theory: Macroeconomic theory

What percent of the coefficients of the model were obtained from:

measurements of physical systems: ____

inference from social survey data: ____

econometric analyses: ____

expert judgment: 30%

the analyst's intuition: 70%

What was the general quality of the data?

5. PARAMETER ESTIMATION

If they are not given in the publication, where may the reader obtain detailed information on the data transformations, statistical techniques, data acquisition procedures, and results of the tests of fit and significance used in building and analyzing the model? Ratio's were computed from data in the statistical yearboks of the Nordic Countries. These computations are not documented

6. MODEL PERFORMANCE AND TESTING

Over what period was the model's behavior compared with historical data? ____

Not applicable

What other tests were employed to gauge the confidence deserved by the model? ____

None

Where may the reader obtain a detailed discussion of the prediction errors and the dynamic properties of the model? Partly in GRS-175, Olav Fjellså: Gjeldsbyrdens utvikling i et lite land med åpen økonomi (The development of the debt-ratio in a small open economy) 98 pages Oslo 1979

7. APPLICATIONS

What other reports are based upon the model? *)

Name any analysts outside the parent group that have implemented the model on another computer system. Jan Jantzen, The Technical University of Denmark on IBM, Students at the Norwegian Business School in Oslo on PRIME

List any reports or publications that may have resulted from an evaluation of the model by an outside source.

Has any decision maker responded to the recommendations derived from the model? No

Will there be any further modifications or documentation of the model? No

Where may information on these be obtained? Nowhere

*)

a) GRS-226 Olav Fjellså: Hvilke følger vil ulike former for ubalanse få på utenriksøkonomien? (What will be the effects of various economic disturbances on foreign trade?), Oslo, 1979.

b) Jan Jantzen, APL-baserede modelværktøjer (APL-based modeling tools) The Technical University of Denmark, 1979

c) Students at the Norwegian Business School in Oslo: "Konsekvenser ved bruk av oljeinntektene, innenlands såvel som utenlands, i gjeldsbyrde-modellen." (The consequences of both internal and external use of oil revenues in the debt-ratio model). Oslo, 1981.

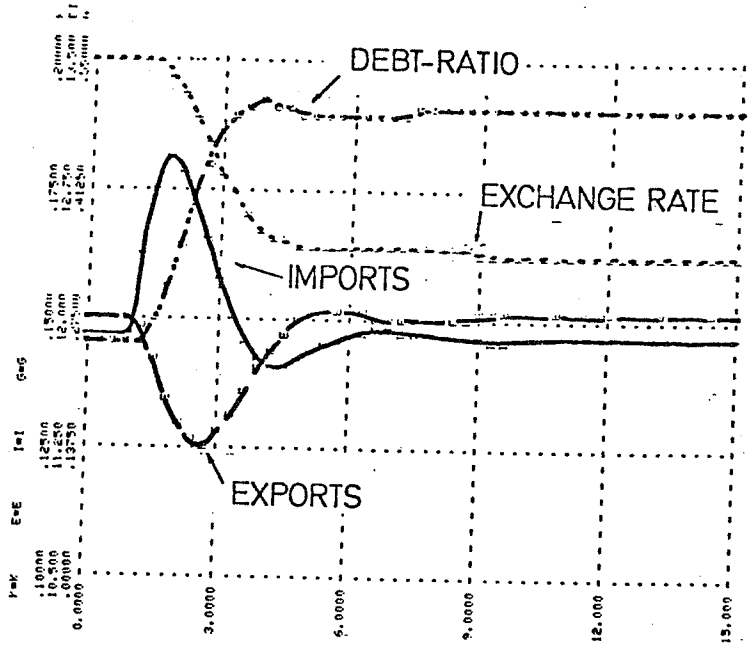

Figure 7 No Restrictive Public Policy

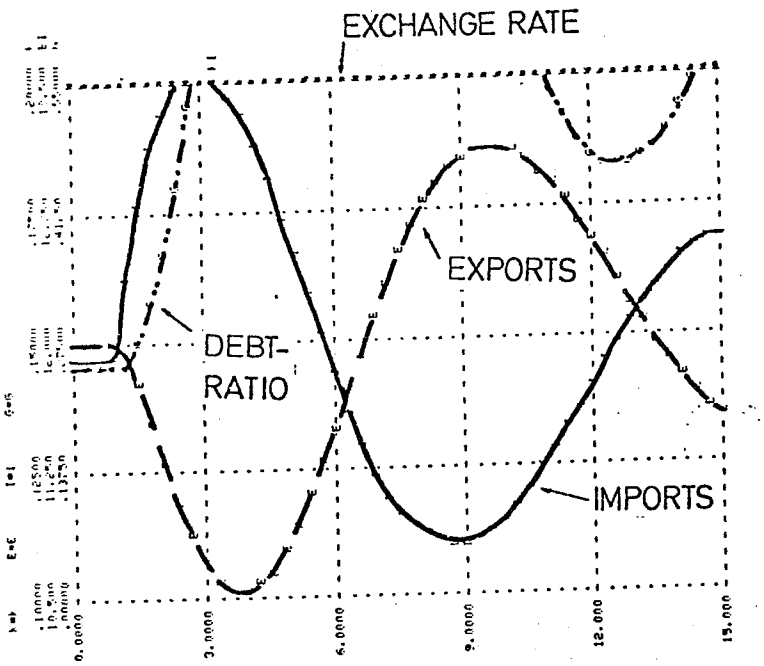

Figure 8 No Devaluation

MODELSIMULATIONS

	ETKT	....	....	....	....
PRESENT	-.24000	-.16000	0.0000	5.0000A	10.000A
ORIGINAL	-.12000	-80.000A	0.0000	5.0000A	10.000A

Figure 3 Stronger Devaluvation

	IIFKT	....	....	....	....	....
PRESENT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
ORIGINAL	.90000	1.0000	1.1000	1.2000	1.3000	1.4000

Figure 4 No Compensation for Inflation

	SS	ST
PRESENT	.10000	3.0000
ORIGINAL	0.0000	0.0000

Figure 5 10% Tax Increase

	IIFGT	....	....	....	....
PRESENT	1.0000	1.0000	.88000	.80000	.70000
ORIGINAL	1.0000	1.0000	.95000	.90000	.85000

Figure 6 More Restrictive Public Policy

	IIFGT	....	....	....	....
PRESENT	1.0000	1.0000	1.0000	1.0000	1.0000
ORIGINAL	1.0000	1.0000	.95000	.90000	.85000

Figure 7 No Restrictive Public Policy

	ETKT	....	....	....	....
PRESENT	0.0000	0.0000	0.0000	0.0000	0.0000
ORIGINAL	-.12000	-80.000A	0.0000	5.0000A	10.000A

Figure 8 No Devaluation

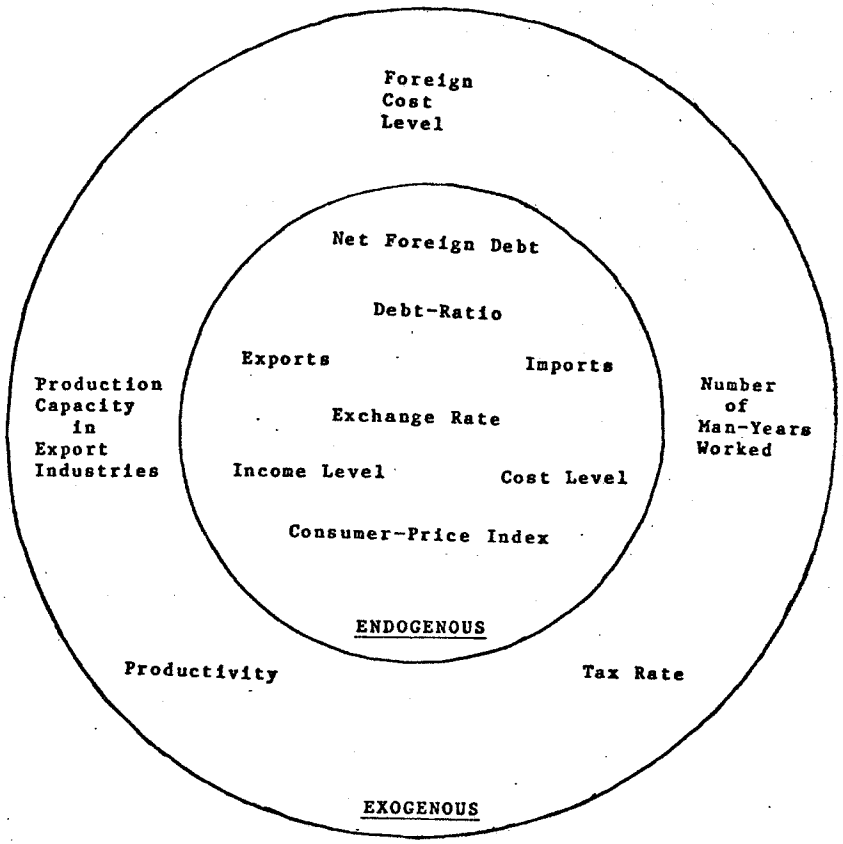

Figure 9 Boundary Diagram

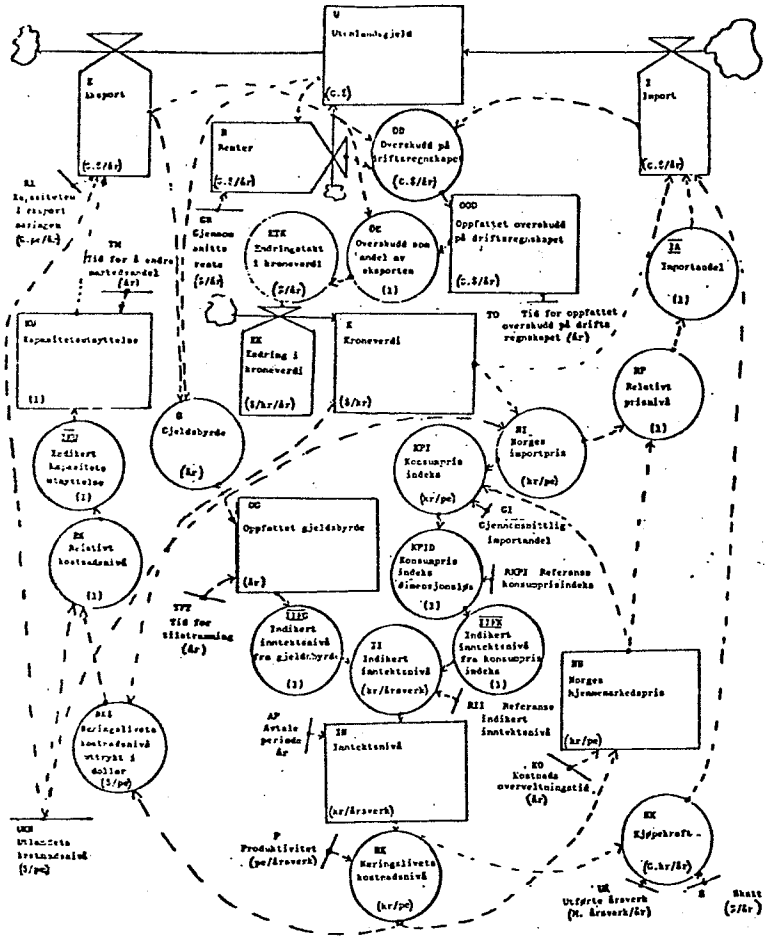

Figure 10 Flow Diagram

TRANSLATION FROM NORWEGIAN TO ENGLISH OF THE VARIABLES IN THE FLOW DIAGRAM (taken in the order they appear in the equations)

(1) Utenlandsgjeld (G.$) (U) = Foreign Debt (Billion $)

(2) Import (G.$/år) (I) = Imports (Billion $/year)

(3) Eksport (G.$/år) (E) = Exports (Billion $/year)

(4) Renter (G.$/år) (R) = Interest Payments (Billion $/year)

(5) Gjennomsnitts Rente (%/år) (GR) = Average Interest Rate (%/year)

(6) Kroneverdi ($/Kr) (K) = Exchange Rate ($/Kroner)

(7) Kjøpekraft (G.Kr/år) (KK) = Buying Power (Billion Kroner/year)

(8) Import andel (1) (IA) = Import Fraction (dimensionless)

(9) Endring i Kroneverdi ($/Kr/år) (EK) = Change in the Exchange Rate ($/Kr/year)

(10) Endringstakt i Kroneverdi (%/år) (ETK) = Rate of Change in the Exchange Rate (%/year)

(11) Overskudd som andel av eksporten (1) (OE) = Surplus as a Percentage of Exports (dimensionless)

(12) Oppfattet Overskudd på drifts- regnskapet (G.$/år) (OOD) = Perceived Surplus in Current Accounts (Billion $/year)

(13) Tid for oppfattet overskudd på driftsregnskapet (år)(TO) = Time Required to Perceive the Surplus in Current Accounts (years)

(14) Overskudd på driftsregnskapet (G.$/år) (OD) = Surplus in Current Accounts (Billion $/year) (OD)

(15) Gjeldsbyrde (år) (G) = Debt Ratio (years)

(16) Utførte Årsverk (M. årsverk/år) (UA) = Number of Man-Years Worked (Million man-years/year)

(17)Inntektsnivå (Kr/årsverk) (IN) = Income Level (Kroner/man-year)

(18)Avtale Periode (år) (AP) = Period of Agreement (Years)

(19)Indikert Inntektsnivå(Kr/årsverk) (II) = Indicated Income Level (Kroner/man-year)

(20)Referanse Indikert Inntektsnivå (Kr/årsverk (RII) = Reference Indicated Income Level (Kroner/man-year)

(21)Indikert Inntektsnivå fra Gjeldsbyrde (1) (IIFG) = Income Level Indicated from the Debt Ratio (dimensionless)

(22)Indikert Inntektsnivå fra konsumpris Indeks (1) (IIFK) = Income Level Indicated from the Consumer-Price Index (dimensionless)

(23)Oppfattet Gjeldsbyrde (år) (OG) = Perceived Debt Ratio (years)

(24)Tid for Tilstramming (år) (TFT) = Time Elapsed Before Restrictive Policy Goes Into Effect (years)

(25)Konsumpris Indeks Dimensjonsløs (1) (KPID) = Dimensionless Consumer Price Index (dimensionless)

(26)Konsumpris Indeks (Kr/pe) (KPI) = Consumer Price Index (Kroner/production unit)

(27)Referanse Konsumprisindeks (Kr/pe) (RKPI) = Reference Consumer - Price Index (Kroner/production unit)

(28)Gjennomsnittlig import andel (1) (GI) = Average Import Fraction (dimensionless)

(29)Norges Importpris (Kr/pe) (NI) = Import Price for the Country in Question (Kroner/production unit)

(30)Norges hjemmemarkedspris (Kr/pe) (NH) = Domestic Market Price for the Country in Question (Kroner/production unit)

(31)Utlandets Kostnadsnivå ($/pe) (UKN) = Foreign Cost Level ($/production unit)

(32)Relativt Prisnivå (1) (RP) = Relative Price Level (dimensionless)

(33)Kostnadsoverveltingstid (år) (KO) = Turnover Time for Cost Increases (years)

(34)Næringslivets Kostnadsnivå (Kr/pe) (NK) = Cost Level (Kroner/production unit)

(35)Produktivitet (pe/årsverk) (P) = Productivity (production unit/man-year)

(36)Kapasiteten i eksport næringen (G.pe/år) (KE) = Production Capacity in Export Industries (Billion production units/year)

(37)Kapasitetsutnyttelse (1) (KU) = Capacity Utilization (dimensionless)

(38)Tid for å Endre Markedsandel (år) (TM) = Time Required to Alter One's Market Share (years)

(39)Indikert Kapasitetsutnyttelse (1) (IKU) = Indicated Capacity Utilization (dimensionless)

(40)Relativt Kostnadsnivå (1) (RK) = Relative Cost Level (dimensionless)

(41)Næringslivets Kostnadsnivå Uttrykt i Dollar ($/pe) (NK$) = Cost Level Expressed in Dollars ($/production unit)

(42)Skatt (%/år) (S) = Tax Rate (%/year)

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```
*     GJELD 20(1)
L     U.K=U.J+DT*(I.JK+R.JK-E.JK)
N     U=UI
C     UI=3
R     I.KL=K.K*NK.K*IA.K
L     K.K=K.J+DT*EK.JK
N     K=KI
R     EK.KL=K.K*ETK.K
C     KI=.2
A     ETK.K=TABLE(ETKT,DE.K,-.2,.2,.1)
T     ETKT=-.12/-.08/0/.005/.01
A     DE.K=DDD.K/E.JK
L     DDD.K=DDD.J+(DT/TD)*(DD.J-DDD.J)
N     DDD=DDDI
C     DDDI=0
C     TD=.5
A     DD.K=E.JK-(I.JK+R.JK)
R     R.KL=U.K*GR
C     GR=.025
A     IA.K=TABLE(IAT,RP.K,.5,2,.5)
T     IAT=.45/.5/.55/.6
A     RP.K=(NH.K/NI.K)
A     NI.K=UKN/K.K
A     KK.K=(UA*(IN.K/1000))(1-STEP(SS,ST))
C     SS=0
C     ST=0
C     UA=1.59
L     IN.K=IN.J+(DT/AP)*(II.J-IN.J)
N     IN=INI
C     INI=75000
C     AP=.5
A     II.K=(RII+IIFG.K*IIFK.K)*(1+STEP(IIS,IIPT))
C     RII=75000
C     IIS=.1
C     IIPT=1
A     IIFK.K=TABLE(IIFKT,KPID.K,.8,1.8,.2)
T     IIFKT=.9/1/1.1/1.2/1.3/1.4
A     KPID.K=KPI.K/RKPI
C     RKPI=750
A     KPI.K=GI*NI.K+(1-GI)*NH.K
C     GI=.5
L     NH.K=NH.J+(DT/KO)*(NK.J-NH.J)
N     NH=NHI
C     NHI=750
C     KO=.5
A     NK.K=IN.K/P.K
A     P.K=100+RAMP(PRS,PRT)-RAMP(PRS,PRTT)
C     PRS=0
C     PRT=0
C     PRTT=0
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```
R     E.KL=KE*KU.K*UKN
C     KE=.1
L     KU.K=KU.J+(DT/TM)*(IKU.J-KU.J)
N     KU=KUI
C     KUI=.8
C     TM=1
A     IKU.K=TABLE(IKUT,RK.K,.8,1.6,.2)
T     IKUT=1/.8/.6/.5/.4
A     RK.K=NKD.K/UKN
C     UKN=150
A     NKD.K=NK.K*K.K
A     G.K=U.K/E.JK
L     DG.K=DG.J+(DT/TFT)*(G.J-DG.J)
N     DG=DGI
C     DGI=.25
C     TFT=2
A     IIFG.K=TABLE(IIFGT,DG.K,0,1,.25)
T     IIFGT=1/1/.95/.90/.85
SPEC  DT=.1/LENGTH=0/PLTPER=.3
PLOT  K=K(.1,.2)/E=E,I=I(10.5,13.5)/G=G(0,.55)
```