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ANALYSIS OF STRUCTURAL AND CYCLICAL
IMBALANCE IN THE FINNISH CURRENT ACCOUNT

May 1976   KT 5/76

1. INTRODUCTION

The purpose of cyclical adjustment of the current account
is to estimate the underlying position of the account.
The concept of the underlying position of the balance
of payments, namely adjustment of current and capital account
for temporary influences, is important for the assessment of
medium-term adjustment and balance of payments policy.
The estimate of the underlying deficit or surplus of
balance of payments is of concern not only for the country
itself but for international economic organisations as well,
as restrictions on current international transactions by
any country have to be supported by 'fundamental dis-
equilibrium' of the balance of payments. Thus, for

example the IMF and the OECD have conducted studies on the theoretical and empirical definition of the underlying balance of payments position. The IMF has studied also the rôle of the capital account, but the capital account is less interesting in the present case because of the existing regulation of capital flows in Finland.

My purpose here is to bring the empirical analysis of cyclical adjustment up to date and to simplify the method of analysis compared with that of the background paper.' Only cyclical variations will be touched up on here, thus a number of other temporary factors that could influence the current account are not included. Further, digressing to the causes of balance of payments disequilibrium, simple import functions for Finland and for countries most important for Finnish exports are estimated and the growth rate of Finland's GDP in relation the the growth of output in the countries important for Finnish exports is determined on the assumption of balanced trade, or more exactly, on the assumption of equal growth rates of imports.

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1. Timo Hämäläinen: Bytesbalansens konjukturbeteende, Ekonomiska Utredningar 1972, Publikationer utgivna av Finlands Banks Institut för Ekonomisk Forskning, Serie A:35, s. 50-70.

2.   METHODS FOR THE CYCLICAL ADJUSTMENT OF THE CURRENT
     ACCOUNT

In the 1972 study, cyclical adjustment was carried out
by a rather laborius way from quarterly data along the
following lines:

1) domestic and foreign demand pressures were approxi-
mated by deviations from the trend of industrial production

2) import and export functions were estimated, with
imports and exports being explained by 'demand pressure',
and so-called 'normal demand pressure' (defined on page 52
of the background paper) and by other relevant variables
such as the devaluation of the Finnish mark in 1967. Import
elasticity with respect to 'demand pressure' was assumed
to be greater than with respect to 'normal demand pressure'
or normal level of production

3) cyclical components were computed for both imports
and exports, and the effect on the trade balance was then
determined on the basis of these components

4) the underlying trend of the current balance was computed
by subtracting the cyclical component and bilateral trade
balance from the materialized or forecast current balance.

Continuing the backgound study, I am now trying to simplify the necessary computations by reducing the number of equations of current receipts and expenditures to only one equation which directly explains cyclical behaviour of current balance . The equation to be estimated can be introduced in the following way:

1) the equations for current receipts and expenditures are defined as follows:

$$X = X(S_X, D_X, T_X)$$
$$M = M(S_m, D_m, T_m)$$

where X and M denote current receipts and expenditures, S long-term structural variables, D cyclical variables and T other variables with influence of temporary nature.

The long-term structural variables could include, in addition to the average growth rates of domestic and foreign production or the 'normal demand pressure' variables, also the stucture of trade by commodities, as well as price competitiveness of domestic production, which in turn is affected by relative unit labour costs, exchange rates, and import duties.

2) The current balance derived from the equations for receipts and expenditures is divided into three components, which can be termed the structural balance, the cyclical balance and the temporary balance, explained by the respective variables. To make the exposition simpler, functions X and M are assumed to be linear. Thus

$$B = (X-M) = (X-M)_S + (X-M)_D + (X-M)_T$$

where

$$(X-M)_S = X_S^{\cdot}(S_x) - M_S^{\cdot}(S_m)$$

$$(X-M)_D = X_D^{\cdot}(D_x) - M_D^{\cdot}(D_x)$$

$$(X-M)_T = X_T^{\cdot}(T_x) - M_T^{\cdot}(T_m)$$

where   X and M with subscript are partial derivatives of the variables in question.

3) Let us assume that the structural variables for current receipts and expenditures are both described by a trend. Thus

$$(X-M)_S = (X_S - M_S) \cdot S$$

If, on the other hand, the effect of the temporary variables is assumed to be zero, the structural balance of the current account is the difference between the actual and cyclical balances.

$$(X-M)_S = (X-M) - (X-M)_D$$

Until now the method used to carry out cyclical adjustment of the current account has been the same as in the background study, where 'normal demand pressure' was also defined as a trend.

4) In order to simplify the computations we now assume, that the parameters of the cyclical variables are the same for both current receipts and current payments, that is $X_D = M_D = \dot{E}$. Some evidence for this assumption may be found in the background paper (p. 57), where the import and exports elasticities with respect to demand pressures were 1.8 for imports and 1.3 for exports. Thus

$$(X-M)_D = E \cdot (D_X - D_m)$$

5) In the final equation to be estimated, the current balance variable is normalized by dividing it by current payments, so that

$$B\% = \frac{(X-M)}{M} \cdot 100 = a + b \cdot (D_X - D_m)$$

where the cyclical component of the current balance is $b \cdot (D_X - D_m)$. Cyclical variables D_X and D_m are called demand pressure variables. Demand pressure variable of current receipts D_X is defined as percentage deviation from trend of

the volume of imports of countries most important for Finnish
exports, and demand pressure variable for current payments
as percentage deviation from trend of Finland's GDP.
The difference between export and import demand pressures,
$D_x - D_m$, is the relative demand pressure, RDP, describing
the differences between the strength and timing of domestic
and foreign cyclical variations.

3. EMPIRICAL ESTIMATES OF THE CYCLICAL COMPONENT AND
    THE UNDERLYING TREND OF THE FINNISH CURRENT ACCOUNT

Two methods have been used to measure demand pressure.
First a logaritmic linear trend is computed from the export and
import demand variables - the volume of imports of the countries
important for Finnish exports[1] and Finlands fixed price
GDP - by using observations from as long a period as possib-
le. Demand pressures are then computed as percentage
differences from the estimated trends. Another slightly
different way is to compute the trends from ten year
moving data.[2] In Figure 1 we can see the relative demand
pressure, the difference between the demand pressures
of exports and imports, computed from the same constant
trends in 1950-1976 as well as from 10-year moving trends,
in which case the first 6 years observations come from the
first 10-year trend and the last 4 observations from the
last 10-year trend and the other observations from every
sixth year of each 10-year trend.

In computing the cyclical component of the current account we
arrive at differing estimates depending on the period of
estimation and on whether constant or moving-trend demand

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1. The countries and weights are the United Kingdom
.35, Sweden .26, The Federal Republic of Germany .19,
The United States .12 and France .08.

2. This method has been used by the OECD for the computation of
cyclical indicators, see Randolf Gränzer: Cyclical Indicators
for Manufacturing Industries, OECD Occasional Studies,
December 1973.

pressure estimates are used. It is natural to start the esti-
mation period in 1958, as imports were liberalized at that time.
The graphs of the relative current balance and the relative
demand pressure variables in Figure 1 suggest a linear
relationship between these. Some estimation results are
given in the following:

1958-1976:

$$B\% = - 6.75 + 1.54 \text{ RDP}$$
$$(1.34) \ (.44)$$
constant trend

$$\bar{\bar{R}}^2 = .389$$
$$\text{S.E.E.} = 5.8$$
$$\text{D-W} = 1.24$$

1958-1976:

$$B\% = -6.57 + 1.58 \text{ RDP}$$
$$(1.47) \ (.58)$$
moving trends

$$\bar{\bar{R}}^2 = .261$$
$$\text{S.E.E.} = 6.3$$
$$\text{D-W} = 1.54$$

1958-1976:

$$B\% = -10.31 + 2.44 \text{ RDP}$$
$$(2.06) \ (.78)$$
moving trends

$$\bar{\bar{R}}^2 = .515$$
$$\text{S.E.E.} = 5.8$$
$$\text{D-W} = 1.50$$

where B% denotes current balance as percentage of current payments, RDP relative demand pressure, $\bar{R}^2$ is the square of the correlation coefficient adjusted for degrees of freedom, S.E.E. The standard error of estimate, D-W the Durbin-Watson statistic for autocorrelation. The standard errors of the regression coefficients are in brackets.

Graphs of the estimated current balances are shown in Figure 1. From 1964 onwards, the relative demand pressure seem to explain the development of the current balance quite well, but in 1972 the current balance and the relative demand pressure differed from each other considerably, due to the quick revival of forest industry exports in contrast with a slow recovery of international trade. The rate of growth of imports was also slow in relation to that of Finland's GDP.

The underlying deficit of the current account is computed in Figure 1 as the difference between actual current balance and the contribution of relative demand pressure, the shaded area in the middle of Figure 1. The underlying deficit is thus the sum of the constant term and the residuals of the equation, the latter containing the possible trend of the underlying deficit. However, moving trends themselves bring about some trend in the underlying deficit of the current balance, as can be seen clearly from the Figure 1 by comparing the two estimates. If the exceptional observation of 1972 is smoothed, the underlying deficit of

the current balance seem to have a downward sloping trend,
which, however, seems to break after the devaluation of
1967 and seem to be shifted upwards. The underlying deficit
arrived at in the 1972 study is also included in Figure 1
for comparison.

4. THE RELATION BETWEEN DOMESTIC AND FOREIGN GDP GROWTH RATES UNDER EQUAL GROWTH RATES OF IMPORTS

Causes for the underlying deficit of the current account could include one-sidedness of the domestic production structure, the concentrated commodity and country structure of exports, lack of price competitiveness of domestic production and also, as was suggested above, persistent differences in the average growth rates of domestic and foreign production. The structure of exports by countries and by commodities has in general curbed Finland's export possibilities, but if the effects of the country and commodity structure of exports is eliminated, Finland's share in export markets has slightly grown, as shown by Sukselainen in his study of Finnish export performance in 1961-1972[1]. This in turn gives a reason to assume that the lack of price competitiveness has not hindered the growth of exports and that capacity constraints have generally not held back exports.

If it is assumed that the country and commodity distributions of export do not change, the persistent deficit in foreign trade could be explained by the excessive growth of imports, and consequently of domestic demand and production, in relation to the growth of foreign demand.

1. Tuomas Sukselainen: Finnish Export Performance in 1961-1972, A Constant-Market-Shares Approach, Bank of Finland Publications, Series A:36, 1974, p. 73.

As no substantial changes have occurred in Finland's terms
of trade, it is the import volume and the volume of production
which tend to be greater than that of exports, which could
furthermore be explained by the quicker domestic inflation
and the greater growth of money incomes compared with that
in the export markets. In order to see how fast real domestic
output could grow under assumption of foreign trade equilib-
rium, simple import functions were estimated both for
Finland and for her most important export countries. In
the functions imports depend only on real output. Two
different types of functions, as shown in Table, were
experimented with. In the first function the level of imports
depends on the level of output, while in the second the
relative change of imports depends on the relative change
of output. In the first case, the response of a change
in imports to a change in output is constant for all
growth rates of output, but in the latter case this depends
on the growth rate, and as the import function includes
an autonomous trend component, the curve describing the
response of import growth to output growth does not go
through the origin. The latter import function is
reasonable in the case of Finland, since during a fast
growth of demand and money incomes, originally initiated
by an increase in exports, full use of productive capacity
leads to increasing imports, while during recession stocks
are reduced and imports decrease more than output.

The constant term in the latter function estimated for
Finland is clearly significant, giving proof for the
assumption made.

In the first case, with the constant response function, the
growth of Finland's GDP can be 1.3 times as fast as that
of the most important export countries without a deterio-
ration of the trade account on the assumptions given, but
in the latter case the equation

        Finland's GDP = 1.70 + .72 GDP in export countries

defines the relative growth rates. These two curves are
shown in Figure 2.   In actual growth rates for different
periods plotted in the same figure it can be seen how actual
growth rates of Finland's GDP have exceeded that allowed
by the foreign trade equilibrium.

CYCLICAL AND STRUCTURAL IMBALANCE IN THE FINNISH CURRENT ACCOUNT
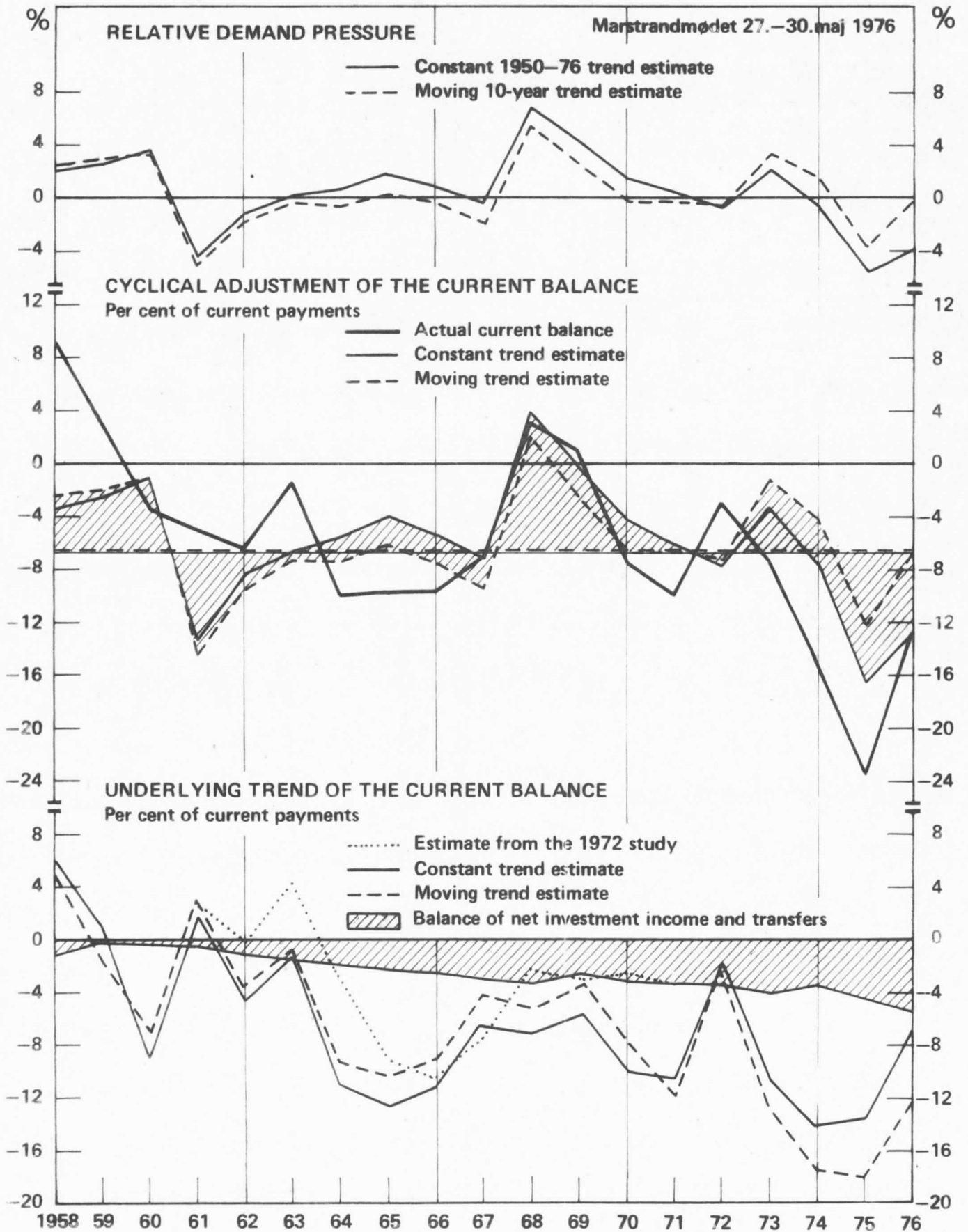by Timo Hämäläinen, Economics Department, Bank of Finland.   Figure 1.

Table: Import functions of Finland and of countries important for Finnish exports

A. Logarithmic 1950–1976

Finland:	ln M = 1.53 ln GDP (.03)	$\bar{R}^2$ = .987 SEE = .07 DW = 1.92
Countries important for Finnish exports:	ln M = 1.97 ln GDP (.02)	$\bar{R}^2$ = .997 SEE = .03 DW = .57

B. Percentage changes 1951–1976

Finland:	M = −6.42 + 3.18 GDP (2.53) (.44)	$\bar{R}^2$ = .674 SEE = 7.8 DW = 2.40
Countries important for Finnish exports:	M = −1.02 + 2.28 GDP (1.37) (.35)	$\bar{R}^2$ = .619 SEE = 2.7 DW = 2.15

ACTUAL AVERAGE GROWTH RATES	1951–60	1961–70	1971–76	1951–76
Finland: Imports	11.6	8.3	3.0	8.4
GDP	5.0	5.3	3.5	4.8
Countries important for Finnish exports:				
Imports	7.7	7.8	4.8	7.1
GDP	3.9	4.0	2.0	3.5

Figure 2. GDP growth in Finland in relation to GDP growth in countries important for Finnish exports, assuming equal growth rates of imports