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CO-INTEGRATING RELATIONSHIP BETWEEN TERMS OF TRADE, MONEY AND CURRENT ACCOUNT: THE ITALIAN EVIDENCE

The paper analyses long-run relationships between terms of trade, money and current account for Italy in the period from the first quarter of 1975 to the first quarter of 2001.

Keywords: *money, terms of trade, current account, multivariate cointegration*

1. Introduction

Analyses and assumptions concerning the terms of trade have a long history in economics, with special focus on the terms of trade between primary commodities and manufacturing, following the works of Prebisch [20] and Singer [24] on the study of gains from trade between developed and developing countries. Further studies analyse the connection between money and terms of trade and between terms of trade and the current account.

As regards the relation between money supply and terms of trade, theoretical studies have not come to a unique solution, even if the studies of Allen [1], Roberts [22], Rotemberg [23], Tso [28], and Dwyer and Lewis [7] have provided two ways by which the money supply can have an influence on the terms of trade.

The first way is through the effects of the money supply on the expected inflation rate, which shift the demand away from money and increase the demand for capital goods, whose prices – both inside and outside the country – increase, thus deteriorating the country's terms of trade.

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The second way is through domestic consumption: the inflationary effects of an increased money supply reduce consumption and an excess supply of goods reduces the export prices, thus worsening the country's terms of trade.

In both cases, in a neoclassical two-country two-currency two-goods model, monetary expansion tends to worsen the terms of trade. This conclusion seems to apply, for the majority of researchers, within the context of simple monetary models with flexible exchange rates, with the only exception of Stockman [25] and Lucas [16], who argue that money is neutral. For Stockman, in fact, a change in the money supply is associated with a proportional and immediate change in prices, with no real effects on the national income level, and therefore the monetary policy is neutral: changes in the money supply have the same impact on relative prices and exchange rates, leaving the terms of trade unchanged. Lucas [16] speculated that changes in the terms of trade are independent of the monetary expansion rate, claiming a general neutrality. In fact, money neutrality in determining the terms of trade is generally accepted under a fixed exchange rate regime. This is because, under fixed exchange rates, the monetary authority may not have full control over the money supply and an increase in a country's money supply leads to an increase in the money supply of its trading partners[1].

Early studies on the interaction between terms of trade and current account date back to Harberger [8] and Laursen-Metzler [15] followed, among others, by Khan and Knight [11], Pagan [18], Harper and Lim [9]. According to these studies, the terms of trade, even if jointly with other external and domestic factors, were relevant in explaining the current account deficits.

Harberger and Laursen–Metzler highlighted that deteriorated terms of trade lowered the real income and savings, thus worsening the current account position.

Due to the well-known Harberger–Laursen–Metzler effect [15], an adverse transitional movement in the terms of trade causes a larger decrease in a country's current income level than in the permanent income, with reduced savings and a deteriorated current account position. The consumption-smoothing response of savings to movements in the terms of trade assumes that the same tradable goods are produced all over the world .

The HLM hypothesis has been the dominant view for almost three decades. Studies by Obstfeld [17], Svensson–Razin [26], and Persson–Svensson [19] have cast some doubts on its validity. The main idea in this literature is that the link between changes in the terms of trade and the trade balance depends on the nature of a shock to the terms of trade.

[1] On the other hand, under fixed exchange rates, the terms of trade are unaffected by open market operations, since these change the monetary holdings of the whole world's residents. Nonetheless, both outputs are affected. Moreover, the lack of flexibility in the exchange rate tends to magnify the effects of monetary injection in one country on the other's output. See J.J. Rotemberg (1985), p. 142.

When the shock to the terms of trade is permanent, there will be no effect on the trade balance. In fact, a permanent change (a deterioration) in the terms of trade causes a fall in real income and real spending by a similar amount, since the agents would revise their estimate of the permanent income downward. Under the general assumption that the marginal propensity to consume out of the permanent income is unity, there will be no change in savings and, consequently, no effect on the trade balance.

If the terms of trade are only temporarily deteriorated, the impact on the current account is ambiguous. In fact, the "consumption-smoothing" motive states that there will be no change in spending if the decline in the real income is temporary, favouring a worsening in the current account position.

The "consumption-tilting" motive results in a reduction of current consumptions, causing an improvement in savings and, hence, in the trade balance.

The net effect depends on which of these effects – either "consumption-smoothing" or "consumption-tilting" – prevails. The parameter that determines the consumption-tilting effect is the elasticity of the intertemporal substitution. The larger the elasticity, the greater the substitution towards non-traded goods away from the import-substitutes. The resulting increase in the relative price of the non-traded goods will cause an increase in savings.

More recently, Backus et al. [2], Hoque [10], and Kouassi et al. [12] studied the causal relation between the terms of trade and the current account deficits and found a long-term relation in fixed-exchange regimes. Kouassi et al. [12] also indicated that the current account cannot be explained by the terms of trade: a strong one-way relation exists between the current account deficits and the terms of trade since the first Granger one causes the second.

Their conclusion is in contrast to the model of Bahmani–Oskooee and Janardhanana [3], whose results highlighted no long-run relation for a panel of 24 countries, and the contrasting results show that the relation between terms of trade and current account is still an open issue.

The review of the existing literature motivates this paper, which attempts to re--examine the connection between terms of trade, money, and current account in Italy, having two starting points in mind: (1) the relation between the terms of trade and the money supply within the framework of Bahmani–Oskooee, Shabsigh [4], and (2) the relation between the terms of trade and the current account deficits following Hoque [10].

Two sets of simulations are discussed here.

Focusing on a single-equation function, the following two linear form formulas are assumed:

$$\log Tot_t = a + b \log M_t + \varepsilon_t \qquad (1)$$

and

$$\log Cad_t = \beta + \beta_1 \log Tot_t + \beta_2 \log Y_t + \beta_3 \log Yf_t + \varepsilon_t. \quad (2)$$

Equation (1) relates the terms of trade (Tot_t) to money (M_t). The terms of trade index is calculated by the formula (Index of Export prices/index of import prices) *100, and measures the number of import units that can be exchanged for an export unit.

An increase in the terms of trade index number is described as a favourable movement (one export unit will buy more imports) and vice versa. This terminology is somewhat ambiguous; it is important to note that an improvement or a worsening of a country's terms of trade can be examined according to the general situation of the balance of payments.

The regressor is the monetary aggregate M2 in current and real prices. The nominal series may not be a perfect measure of the various variables influencing the terms of trade; it was thus decided to use the real money supply. Real values are used after deflating nominal values by an appropriate deflator (consumer price index, 1995 = 100).
The regressors in equation (2) are traditionally considered in literature, namely: the current account deficit (Cad_t), the terms of trade (Tot_t), the domestic income (Y_t), and a measure of the foreign income (Yf_t)[2]. The series for both equations (1) and (2) are obtained from the OECD's "Main economic indicators"; 2001 is the latest date for which data on all variables is available.

All quarterly data is in logarithms. All calculations are performed using Microfit 4.0.

The paper is organized as follows: section 2 provides a theoretical background to our analysis by discussing the main features of the methodology. Our attention is focused on the multivariate framework and the vector autoregressive model (VAR) is used before applying the Johansen multivariate cointegration technique to determine the existence of a long run relation between the variables. Descriptive statistics of the variables and the results of the empirical tests are contained in section 3.

Section 4 provides a summary, conclusions, and ideas for future research.

2. Integration analysis

The econometric analysis exploits the theory of cointegration within a VAR model's context and tries to present a consistent path for the variables to define a relation between them. This is done by the Johansen procedure.

The approach developed by Johansen is based on the maximum likelihood procedure, which us enables us to test for the order of cointegration and to perform hypothesis tests on the estimated cointegration vectors; its main purpose is to identify

[2] The GDP of the seven main countries.

possible long-run relations by calculating the maximum eigenvalue and trace statistics (Johansen [13], [14]). These last tests assume that the vector of the variables under consideration is integrated in order one, I(1); thus a preliminary step in the cointegration analysis is to check whether the variables selected are I(1). For this reason, both procedures are examined.

To investigate the existence of unit roots in our statistical series, the augmented Dickey Fuller test (ADF) is calculated. This test is based on autoregressive models and the results of the unit root tests are summarized in Table 1.

Table 1

Augmented Dickey–Fuller tests for the presence of a unit root

Variable (log)	Statistics for level	Statistics for first differences	Critical values
Tot_t	–2.451	–5.285	–3.454
M_t	–2.031	–17.788	–3.459
Cad_t	–2.623	–9.291	–3.445
Y_t	–0.181	–5.521	–3.448
Yf_t	–0.657	–3.579	–3.454

* Note: The number of lags was set to two, sufficient to provide for white noise residual. The Dickey-Fuller regression includes an intercept and a linear trend, where Tot_t = terms of trade; M_t = monetary aggregate M2; Cad_t = current account; Yr = gross domestic product; YF_t = gross domestic product of the main seven countries; in natural logs, for the first difference and levels of the variables.

The tests indicate all variables in level as non stationary and all variables in first differences as stationary; all variables can be considered I(1). This property brings about the question of the existence of a cointegration relation between them.

3. Determination of the VAR order

After performing the unit root tests, the VAR model was estimated; considering the number of variables and the sample size, the lag length for the VAR model cannot exceed four.

The basic specification of Johansen [13], [14] can be written as p-dimensional (VECM) in first differences as:

$$\Delta y_t = \Gamma_1 \Delta y_{t-1} + \ldots + \Gamma_{k-1} \Delta y_{t-k+1} + \Pi y_{t-1} + \mu + \varepsilon_t \qquad t = 1 \ldots T$$

where y_t is a $(p\times1)$ vector for the $I(1)$ variables discussed, $\varepsilon_t \sim niid\ (0, \Sigma)$, μ is a drift parameter, and Π is a $(p\times p)$ matrix of the form $\Pi = \alpha\beta'$, where α and β are $(p\times r)$ matrices of full rank, with β containing the r cointegration vectors and α carrying the corresponding loadings in each of the r vectors.

The statistical quality of the VECM is accessed by computing the relevant statistical diagnostics[3].

The test results point out to a lag length of 2 for both equations.

The cointegration likelihood test developed by Johansen was performed and the results are summarized in Table 2.

Table 2a

Cointegration for the relation between terms of trade and money aggregate

List of the variables included in the cointegration vector: Terms of trade (*Tot*); Money aggregate M2 (M_t);

FULL PERIOD : 1975.1–2001.1 VAR = 2

1st Equation: $\log Tot_t = a + b \log M_t + \odot_t$

Alternative	λ-Max **	95% CV	Alternative	λ-Trace**	95% CV
$r = 1$	22.264	14.880	$r>=1$	22.476	17.860
$r = 2$	0.211	8.070	$r>=2$	0.211	8.070

Long-run function : $\log Tot_t = 0.0018 - 3.292 \log M_t$ (1.377)

The error-correction model is formulated*:

$$\Delta l\, Tot_t = 0.002 + 0.172\, \Delta l Tot_t(-1) + 0.035\, \Delta l M_t(-1) - 0.148\, ecm(-1)$$
(0.022) (0.11) (0.047) (0,025)

R-Squared = 0.065; S.E. of Regression = 0.020; Mean of dependent variable = 0.002; Residual sum of squares = 0.034; Akaike info. criterion = 220.775; DW-statistic = 1.912

* The standard errors of the cointegration coefficients are reported in brackets.

** Δ stands for the first difference ** Serial correlation (Lagrange multiplier test of residual serial correlation); Functional form (Ramsey's RESET test using the square of the fitted value); Normality (based on a test of skewness and kurtosis of residuals); Heteroskedasticity (based on the regression of squared residuals on squared fitted values).

[3] The results on the VAR are available on request. The lag is selected using model selection criteria, such as AIC, SBC, HQC.

Table 2b

Cointegration for the relation between current account deficit, gross domestic product, and foreign gross domestic product

List of the variables included in the cointegration vector: Current account deficit (*Cad*); Gross Domestic Product (Y_t); Gross Domestic Product of the seven main countries (Yf_t).

2nd Equation: $\log Cad_t = \beta + \beta_1 \log Tot_t + \beta_2 \log Yt + \beta_3 \log Yf_t + \varepsilon_t$

FULL PERIOD: 1975.1-2001.1 VAR =2

$r = 1$	47.202	31.000	r>=1	79.407	58.930
$r = 2$	18.638	24.350	r>=2	32.205	39.330
$r = 3$	6.906	18.330	r>=3	13.566	23.830

Long-run Function $lCad = -0.739 lTot + 3.427\, lY_t - 3.668\, lYf_t$
(0.224) (0.702) (0.816)

The error-correction model is formulated*:

$\Delta lCad_t = 0.002 - 0.206\, \Delta lCad_t(-1) - 0.533 \Delta lTot + 0.664\, \Delta lY(-2) - 2.240\, \Delta lYf(-2) - 0.401 \text{ecm}(-1)$
(0.013) (0.090) (0.274) (0.626) (0,758) (0.093)

R-Squared = 0494; S.E. of Regression = 0.054; Mean of dependent variable = 0.002; Residual sum of squares = 0.260; Akaike info. Criterion = 144.678; DW-statistic = 2.166

I° SUB-PERIOD : 1975.1-2001.1

Alternative	λ-Max **	95% CV	Alternative	λ-Trace**	95%
$r = 1$	40.227	31.000	r>=1	68.952	53.651
$r = 2$	17.275	17.275	r>=2	28.725	39.330
$r = 3$	11.127	18.330	r>=3	11.449	23.830
$r = 4$	0.323	11.540	r>=3	0.323	11.540

Long-run Function $lCad = -\ 0.825 lTot + 1.486 lY_t - 1.763\, lYf_t$
(0.243) (0.612) (0.653)

The error-correction model is formulated *:

$\Delta lCad_t = 0.001 - 0.632\, \Delta lTot(-1) + 0.777\, \Delta lY(-2) - 2.426\, \Delta lYf(-2) - 0.472 \text{ ecm}(-1)$
(0.020) (0.309) (0.707) (0.827) (0.116)

R-Squared = 0.550; S.E. of Regression = 0.055; Mean of dependent variable = 0.001; Residual sum of squares = 0.184; Akaike info. Criterion = 97.517; DW-statistic = 2.29

II° SUB-PERIOD : 1993.1-2001.1

Alternative	λ-Max **	95% CV	Alternative	λ-Trace**	95% CV
$r = 1$	34.646	31.000	r>=1	68.105	56.930
$r = 2$	22.311	24.350	r>=2	33.458	39.330
$r = 3$	8.668	18.330	r>=2	11.147	23.830
$r = 3$	2.479	11.540	r>=3	2.479	11.540

Long-run Function	$lCad = -1.713 lTot + 9.334 lY_t - 9.68\ lYf_t$ (0.587) (3.363) (3.974)
***The error-correction model is formulated**:**	
$\Delta lCad_t = 0.047 - 0.470 \Delta lTot(-1) + 1.108\ \Delta lY(-1) - 4.702\ \Delta lYf(-1) - 0.991$ ecm (–1) (0.032) (0.696) (1.261) (2.347) (0.206)	
R-Squared = 0.613 S.E. of Regression = 0.042; Mean of dependent variable = 0.003; Residual sum of squares = 0.040 Akaike info. Criterion = 48632; DW-statistic = 2.21	

* The standard errors of the cointegration coefficients are reported in brackets; ** Δ stands for the first difference ** Serial correlation (Lagrange multiplier test of residual serial correlation); Functional form (Ramsey's RESET test using the square of the fitted value); Normality (based on a test of skewness and kurtosis of residuals); Heteroskedasticity (based on the regression of squared residuals on squared fitted values).

The main results of the analysis described in section 1 may be summarized as follows.

For equation (1), relating the monetary aggregate M2 to the terms of trade, both the maximum eigenvalue test and the trace statistical test suggest the presence of a single cointegration vector.

The ML estimates of this vector are normalized according to the terms of trade by setting its coefficients at –1, and Table 2a displays the coefficient estimates and their standard errors together with the associated probability values. This individual cointegration vector is interpreted as a long-run relation between the dependent and the independent variables.

The sign of the coefficient in the long-run cointegration equation is negative, stating that an increased money supply causes a worsening of the terms of trade. This result is in line with all text book models with a competitive market and a perfect foresight: to the extent that technologies in the different countries are similar, expansionary open market operations tend to worsen the terms of trade.

The relation between these two variables can be further investigated using the ECM. The result, at the bottom of Table 2a, shows that there are no short-run effects on the terms on trade, and from our unsuccessful search we may conclude that an increased money supply for Italy worsens the terms of trade in the long but not in the short run[4].

For purposes of short-term policy analysis and forecasting, however, it is often useful to look at shorter time frames and higher frequency data, as these may yield interesting insights into the way money operates.

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[4] For the short-term policy analysis, it is often useful to look at shorter time frames and at higher frequency data because these may yield interesting insights into the way money operates.

Equation (2), relating the current account deficits to the terms of trade, the gross domestic product, and the foreign domestic product in Table 2b, provides evidence in support of cointegration.

All the long-run coefficient estimates are significant according to the usual statistical criteria and are compatible with the model outlined above: an improvement in Tot leads to a reduction in Cad, as expected, thus the coefficient is negative[5].

While the elasticity of Cad with respect to the domestic income is positive[6], it is negative, as expected, with respect to the foreign income.

An error correction model was estimated in order to capture the short-run or disequilibrium effects.

A short-run correction model was estimated using a procedure of the "general to specific" type to obtain the error correction model in its parsimonious form. This resulted into the equation presented at the bottom of Table 2b, which has the correct sign, is highly significant by using conventional "*t*" values, and strengthens the previous result of the cointegration test; in addition, its magnitude points out to a quick adjustment to disequilibrium.

The co-integration regression was estimated for two sub-periods to consider the effect of the exit of Italy from the EMS (European Monetary System), in that such circumstance may yield different results in the observed relation between Cad and the other variables in the estimated regression.

While the results for the first period are similar to those obtained for the whole period, support to a short-run relation for the second period is definitely weak. Except for the foreign income variable, which is always significant, the other variables have no significant impact on CAD.

This shows that, in a rather free exchange rate regime, variables such as the gross domestic product and the terms of trade are less important determinants than foreign influences, due to the existence of speculative factors.

Restrictions should be imposed to identify the vectors; the quantitative restrictions were tested and the data strongly supports the quantitative restrictions.

The Chi-square test of the statistical significance of coefficient β_1 is 11.01 (p = .001), for β_2 it is 18.74 (p = .000), and for β_3 it is 20.50 (p = .000), thus confirming that these variables should be included in the long-run equation.

Unit price elasticity is rejected according to the usual statistical criteria.

Finally, the direction of causality towards the cointegration relation was investigated using the Granger test (Table 3). The resulting short and long-run causality shows bi-directional causality and this finding is in accordance with the economic theory.

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[5] On the other hand, an improvement in Tot may increase CAD (Hoque: Australia, 1987:II); thus the coefficient could be positive.

[6] The relation could be negative if the impact of the gross domestic income on exports outweighs the impact on imports.

Table 3

Granger causality test between current account deficit (Cad) and terms of trade (Tot) [7]

x	*y*	*m*	*n*	(*p*-value on F1)	*p*	*q*	(*p*-value on F1)	Estimated	causality	pattern
(long-run) lCad	lTot	2	2	0.012	2	2	0.258	lCad		lTot
(short-run)dlCad	dlTot	2	2	0.180	2	2	0.499	dlCad		dlTot

Conclusion

The purpose of this paper is to expand the existing research on the terms of trade; in particular, an attempt was made to examine the relation between terms of trade and money and between terms of trade and CAD. Our estimates are not complete models, but we only tried to identify the statistical properties and cross-links of the variables in "empirical terms", along the same line suggested in literature to explain such dynamics.

Several diagnostic procedures were employed before presenting the final estimates. Our data was first tested using the ADF procedure for stationarity. Given the existence of a unit root in the examined variables, cointegration tests were performed to check for the existence of a cointegration vector. Two sets of simulations are discussed here and the main findings may be summarized as follows.

First, the results highlight the existence of a systematic relation between terms of trade and money, implying that movements between these variables are closely associated. The foregoing results are similar to those presented by previous authors (only for the result concerning Italy).

Second, cointegration tests suggest that terms of trade and money are cointegrated in the long run, but not always in the short run, while the relation between terms of trade and Cad holds both in the long and in the short run. For these last estimates, after taking a break into account, the impact of the variables, as well the magnitude of the coefficients, were found to be mixed, thus not supporting the claim that the terms of trade caused a Cad over the 1992–2001 period. This is consistent with the view that internal factors such as gross domestic product and tot have less influence on the Cad in a flexible exchange regime than international influences due to capital flows and speculative factors.

The framework provided for the purpose of a preliminary analysis shows considerable gaps and pitfalls and we believe that some extensions, with the inclusion of investment and labour variables, could greatly improve the results.

[7] The Granger causality runs as follows: in order to detect the presence of causality rising from variable X to variable Y (i.e. X causes Y), the following regressions are run: $Y = a+\Sigma bY_{t-1}+\Sigma cX_{t-1}+\varepsilon_{t}$. The causality test is the test on the null hypothesis that the coefficients attached to the lagged values of X are not statistically significant, which can be tested using the F test. See Appendix.

Appendix

To explore causality we employ tests of Granger (1969, 1980) and Sims (1972):

The Granger causality runs as follows: in order to detect the presence of causality arising from variable *X* to variable *Y*, (i.e., *X* causes *Y*), we run the following regressions:

$$Y = \alpha + \sum_{i=1}^{n} \beta_i Y_{t-i} + \sum_{j=1}^{m} \gamma_j X_{t-j} + \varepsilon_t$$

where *n* and m must be large enough to remove the serial correlation; the causality test is therefore the test on the null hypothesis that the coefficients attached to the lagged values of *X* are not statistically significant than can be tested through the F test for joint hypotheses:

$$F_1 = \frac{RSS^R - RSS^U / r}{RSS^U / df_U}$$

where RSS^R is the residual sum of squares from the restricted model, RSS^U is the residual sum of squares of the unrestricted model, *r* is the number of restrictions under the null, and "*df* "are the degrees of freedom of the unrestricted model.

The rejection of the null hypothesis confirms the existence of a causality pattern arising from *X* to *Y*, while the failure to reject the null hypothesis just excludes this particular pattern of causality, but does not give any information about the reverse hypothesis, for which we need to run a further regression:

$$X = \alpha + \sum_{i=1}^{p} \delta_i X_{t-i} + \sum_{j=1}^{q} \lambda_j Y_{t-j} + \varepsilon_t$$

where *p* and *q* are set so as to eliminate the serial correlation, and we impose as null hypothesis: $\lambda_i = 0$, testing it with the *F*-test, described above, named as F_2, in table 3.

It might be possible that the null hypothesis is rejected in both cases: this means that we have a bidirectional causality, i.e., *X* causes *Y* and simultaneously *Y* causes *X*.

There are three possible results:

there is a unidirectional causality from *X* to *Y*; b) there is a unidirectional causality from *Y* to *X*; c) there is a bidirectional causality between *X* and *Y*. Because tests of causality are sensitive to lag length so we used the lag that characterizes white noise.

The results for current account deficit (*Cad*) and terms of trade (*Tot*) are reported in Table 3.

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Relacja kointegrująca pomiędzy terms of trade, pieniądzem i bilansem obrotów bieżących: wyniki dla Włoch

Ponieważ badania teoretyczne, dotyczące zależności pomiędzy terms of trade, pieniądzem i bilansem obrotów bieżących nie doprowadziły do jednoznacznych wniosków co do natury tej zależności, celem pracy jest więc zbadanie, czy istnieje stabilna relacja długookresowa wiążąca te zmienne. Badania obejmują okres od pierwszego kwartału 1975 roku do pierwszego kwartału 2001 roku włącznie.

Pierwsza część pracy zawiera krótkie omówienie głównych teorii, dotyczących tego zagadnienia. Najpierw wykorzystano wiele procedur diagnostycznych, następnie zaprezentowano ostateczne oceny. Przeprowadzono testy ADF dla każdej ze zmiennych oraz przy użyciu testów kointegracji wykazano istnienie wektora kointegrującego w ramach specyfikacji VAR.

Po dokonaniu wyboru właściwej postaci modelu VAR, wykorzystano test rzędu Johansena do wyznaczenia liczby wektorów kointegrujących. W celu uwzględnienia warunków nierównowagi oszacowano natomiast model z mechanizmem korekty błędu. W ten sposób uwzględniono właściwości długookresowe i dynamiczne badanych zmiennych.

Wyniki empiryczne sugerują, że terms of trade i pieniądz są skointegrowane w długim okresie, ale nie zawsze w krótkim okresie. Zależność pomiędzy terms of trade i rachunkiem obrotów bieżących utrzymuje się natomiast zarówno w długim, jak i krótkim okresie.

Przedstawiona analiza ma charakter wstępny. Jej poszerzenie o zmienne dotyczące inwestycji i zatrudnienia powinno znacznie poprawić otrzymane wyniki.

Słowa kluczowe: *pieniądz, terms of trade, deficyt obrotów bieżących, kointegracja wielowymiarowa*