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THE THEORETICAL ASPECTS OF THE COMMON CURRENCY ADOPTION IN LITHUANIA

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Abstract

Monetary integration is a key prerequisite for the optimal recourses allocation inside the economic union. Recent EU economic cycle harmonization and interdependent trade tends to monetary integration and shows its real benefit.

In case of the common currency adoption Lithuania has to meet Maastricht criterion and the latter condition is core. However in economic regard so called unofficial criterions of real convergence are enough weighty. Real convergence criterion base is the optimum currency area (OCA) theory. A currency area adopts a single currency within its area and maintains a flexible rate regime with the rest of the world. An OCA theory has been implicitly defined by Mundell in 1961 as a currency area for which the costs of relinquishing the exchange rate as an internal instrument of adjustment are outweighed by the benefits of adopting a single currency. Specifically the OCA index assesses structural similarity between investigative country economy and other country or region. OCA theory in general focuses on four inter-relationships between the members of a potential OCA: the extent of trade, the similarity of the shocks and cycles, the degree of labor mobility and the system of risk-sharing, usually through fiscal transfers. The greater any of the four linkages between the Euro zone and Lithuania, the more suitable a common currency.

Alternative tool providing the analysis of real convergence is the Theil inequality index which enables to measure the degree to which country's macroeconomic element (GDP, inflation, current account fluctuations and others) differs from another country.

Keywords:

Optimum currency area theory; monetary integration; common currency adoption; Theil inequality index; structural economic similarity; real convergence.

Introduction

Traditionally, the theoretical literature on monetary integration has been dominated by the theory of optimum currency areas. Academic and political interest in monetary integration has existed ever since Mundell's (1961) famous study pointed to a serious omission in existing exchange rate theory that was the basis of Friedman's (1953) influential "Case for Flexible Exchange Rates". The omission involved the failure to develop criteria for the choice of geographically defined areas that benefit from the adoption of their own monetary regimes while they let their exchange rates float (Grubel 2006).

Mundell accompanied his critical analysis by the introduction of the idea that the proper size of any area operating its own monetary regime is one that meets what he called the criteria of an "optimum currency area". His specification of these criteria was sufficiently suggestive and at the same time ambiguous to stimulate much future research aimed at clarifying them. Later some of the author's were used these criteria in empirical tests for optimality. The optimum currency area literature initially during the 1960s was mainly theoretical and often dealt with problems raised within the context of the then predominant Keynesian economic paradigm. Later studies became more numerous and empirical with the development of plans for the creation of a European Monetary Union. Most of the subsequent literature on adopting the common currency was extensively analyzed by Bofinger (1992), De Grauwe (1992 and 2007), Ishiyama (1975), Kugman (1992), Mason and Taylor (1992), Tavlas (1993, 1994), Tower and Willet (1976), Horvath and Komarek (2002 and 2003).

The novelty and scientific problem is the lack of attempts to model a comprehensive and integrated analysis of the various aspects involved in adopting the common currency in the country. In spite of the political and economic importance of this issue very little effort has been devoted to formalize an integrated view of this subject. A multifunctional practical model involving OCA and Theil indexes permit to assess not only preparation of Lithuania to join Euro zone but also it enables to measure the costs and benefits of this process. In that case this would help to highlight the real convergence criteria. The lack of data is the key problem to make the right econometric analysis of development of Lithuanian economy. So far there were no studies which provide recommendations for EU politicians to evaluate the preparation of European monetary union candidates.

The aim of the article is to highlight the theoretical aspects of the common currency adoption in Lithuania.

Several **tasks** are to be solved to achieve the aim of this article:

- to analyze the theoretical assumptions of the common currency adoption;
- to consider the optimum currency area theory;
- to highlight the most important functioning criteria of the optimum currency area.

The object of the article is a real convergence criterion.

The main **research method** was theoretical analysis of the scientific works in the field of monetary integration.

The theoretical assumptions of the common currency adoption

Countries that are highly integrated with each other, with respect to trade and other economic relationships, are more likely to constitute an optimum currency area (Frankel and Rose 1997). An optimum currency area is a region for which it is optimal to have its own currency and its own monetary policy. This definition can be given some more content by assuming that smaller units tend to be more open and integrated than larger units. Then an OCA can be defined by Mundell (1961) and McKinnon (1963) as a region that is neither so small and open that it would be better off pegging its currency to a neighbor nor so large that it would be better off splitting into sub-regions with different currencies (Frankel and Rose 1996).

In case to assume the necessity to adopt the common currency it is useful to discuss Mundell's model of the shifts in demand between two countries. Horvath and Komarek (2002) made the essential analysis of Mundell's model of shifts in demand. It appears as follows. There are two countries A and B[6], which are initially in their equilibrium defined as full employment and balanced trade. Both countries maintain own currencies, thus each country can alter its monetary policy if necessary. Now consider the shift in demand away from the products of country A to country B as depicted in Figure 1. If no policy is used, the result of such a shift for country A is the decline in output and the price level and likely unemployment. If domestic spending does not decline at the level of output declines, a current account deficit will occur and possibly a budget deficit, too. The opposite is valid for country B. If country B prices rise at higher speed than prices in country A, then B takes partially the burden of adjustment from country A, because price increase will deteriorate its competitiveness. If country B tightens its monetary policy in order to fight inflation, then the whole burden is thrown onto country A. In the case that countries use flexible exchange rate regimes, the whole adjustment can be solved through the depreciation of the country A's currency. But what if the national currency area (the area where the currency is actually used) does not geographically equal to the optimum currency area (the area where could be the highest welfare of using the currency).

Consider that the countries consist of western and eastern parts. If the aggregate demand falls only in the western parts of the countries and the opposite happens in the eastern parts, flexible exchange rate regime does not bring countries back to the equilibrium. Countries would be able to get rid of either inflation or unemployment, but not both problems. The country can change the price of its currency and determine the quantity of national money in circulation.

The question now is if there is any theoretical possibility of adjusting to the equilibrium. Mundell (1961) offers some non-exchange rate means without considering transaction costs. First, there is wage flexibility.

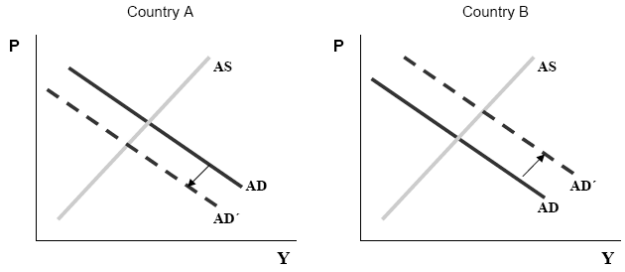

Figure 1. Asymmetric shifts in demand (De Grauwe 1997)[7]

[6] In the case of the article the country A is a group of candidates countries (e.g. Lithuania, Latvia and Estonia) to join Monetary union; B is Euro zone.

[7] AD-aggregate demand, AS-aggregate supply, P-price level, Y-output;

Wage claims in the western parts are reduced and the opposite is valid for eastern parts. Second, there is labor mobility. Workers can move from west to east in their countries.

They do this in order to eliminate the excess labor demand occurring in the eastern parts of the countries. Wages remain constant. Unemployment and inflation vanish.

Third, there is a fiscal policy. In the surplus east regions authorities can raise taxes in order to decrease eastern aggregate demand and transfer the surplus to the western parts of each country. Western parts still have a current account deficit, but transfers finance it. Empirically, many countries have regional redistribution systems through a federal budget because of the centralization of the government budget. As a result, when output in western region declines, the tax revenue of federal government declines. At the same time, the social security system will increase transfers to this region. Transfers do not solve adjustment problems, but make it easier to live with. If the negative shock is permanent, then either it will be necessary to send the transfers forever or to adjust "painfully" in wages (Horvath and Komarek 2002).

Any kind of macroeconomic shocks effects could possibly be mitigated in the area with single currency area with the characteristics considered in the next paragraph.

Optimum currency area theory characteristics

The theory of optimum currency areas (OCA) pioneered by Mundell (1961) in the early 1960s and further elaborated by McKinnon (1963), Kenen (1969) and others. The OCA theory determines the conditions that countries should satisfy to make a monetary union attractive, i.e. to ensure that the benefits of the monetary union exceed its costs. This theory has been used to analyze whether countries should join a monetary union. It can also be used to study the conditions in which existing members of a monetary union will want to leave the union. The conditions that are needed to make a monetary union among candidate Member States attractive can be summarized by three concepts:

- Symmetry of shocks;
- Flexibility;
- Integration.

Countries in a monetary union should experience macroeconomic shocks that are sufficiently correlated with those experienced in the rest of the union (symmetry). These countries should have sufficient flexibility in the labor markets to be able to adjust to asymmetric shocks once they are in the union. Finally they should have a sufficient degree of trade integration with the members of the union so as to generate benefits of using the same currency (De Grauwe 2006).

The optimum currency area theory tries to answer an almost prohibitively difficult question: what is the optimal number of currencies to be used in one region. The difficulty of the question leads to a low operational precision of OCA theory. Therefore, the OCA theory is a framework for discussion about monetary integration. Exchange rate regimes are closely related to the OCA theory, which attempts to give an answer to the choice of the regime (the OCA theory distinguishes only pure float and pure fixed, what is not often the case for economic policy makers), based on structural characteristics of the economy.

The interesting question is not the search for the optimal exchange rate regime, but the search for the optimal variability of the exchange rate. Bayoumi and Eichengreen (1997 and 1998) suggest an approach for modeling exchange rate variability, which takes into account the multiple interdependency of the economies. The purpose of such modeling is to estimate to what degree the exchange rate variability may be explained by the traditional OCA criteria, as defined in the classical OCA literature in the 1960s.

The OCA criterions strongly depend on openness. The advantages of fixed exchange rates increase with the degree of economic integration, while the advantages of flexible exchange rates diminish. Two big advantages of fixing the exchange rate were identified above: 1) to reduce transactions costs and exchange rate risk that can discourage trade and investment, and 2) to provide a credible nominal anchor for monetary policy. If traded goods constitute a large proportion of the economy, then exchange rate uncertainty is a more serious issue for the country in the aggregate. Such an economy may be too small and too open to have an independently floating currency.

Consider first, as the criterion for openness, the marginal propensity to import. Variability in output under a fixed exchange rate is relatively low when the marginal propensity to import is high; openness acts as an automatic stabilizer, dampening the effect of domestic disturbances. Consider next, as the criterion of openness the ease of labor movement between the country in question and its neighbors. If the economy is highly integrated with its neighbors by this criterion, then workers may be able to respond to a local recession by moving across the border to get jobs, so there is less need for a local monetary expansion or devaluation. Of course the neighbor may be in recession too. To the extent that businesses in the two economies are correlated, however, monetary independence is not needed in any case: the two can

share a monetary expansion in tandem. There is less need for a flexible exchange rate between them to accommodate differences.

Consider, finally, a rather special kind of integration: the existence of a federal fiscal system to transfer funds to regions that suffer adverse shocks. The existence of such a system, like the existence of high labor mobility or high correlation of business cycles, makes monetary independence less necessary (Horvath and Komarek 2002).

Countries can benefit from higher trade integration, which leads to the more effective allocation of resources. There are two opposite views on the outcome of higher trade integration as depicted in Figure 2. The European Commission's view suggests that with higher trade integration there is further synchronization of national business cycles (if the cycle is not synchronized it is likely that there are asymmetric shocks among the countries). Trade among industrial European countries is typically intra-industry trade based on economies of scale and imperfect competition. As a result, it does not lead to a higher specialization of the countries, which could cause the higher possibility of asymmetric shocks.

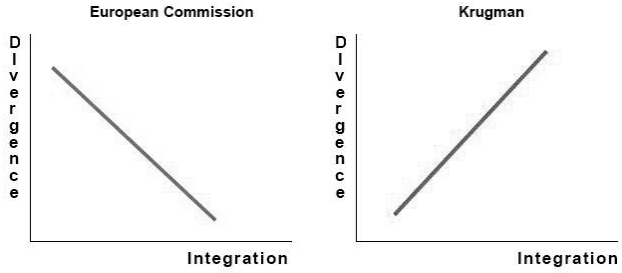

Figure 2. The views on trade integration effects

On the other hand, Krugman (1993) argues that higher trade integration leads to a higher specialization under the assumption of decreasing transport costs. Because of the economies of scale, higher integration leads to a regional concentration of industrial activity. As a result, asymmetric shocks are more likely to occur in the future (since the output is less diversified) and bring extra costs to monetary union. The problem with Krugman's view is that it implicitly assumes that regional concentration of industry will not cross the borders of the countries that formed the union, while borders will be less relevant in influencing the shape of these concentration effects. If so, then asymmetric shock is not country specific and floating exchange rate variation could not be used to deal with asymmetric shocks anyway. Lower costs of production factors outside of the industrial centers can be expected to form, too. If monetary union is successfully implemented and considered as credible, then a further boost of convergence among countries can be expected. Eliminating trade barriers, there will be trade creation in the countries of the monetary union. Meanwhile it is possible that monetary union would be more closed to the outside world, so using flexible exchange rates can be appropriate. This makes it simpler to cope with symmetric shocks. Developments of macroeconomic theory in the last 30 years (Lucas critique) spurred a further development of OCA theory. First attempts to model OCA theory were made in the 1990s (Horvath and Komarek 2002).

The criteria of the optimum currency area functioning

Frankel and Rose (1998) show that the higher the trade integration, the higher the correlation of business cycle among countries. Furthermore, they emphasize that business cycle and trade integration are inter-related and endogenous processes to establishing a currency union. Thus, they demonstrate that countries may fulfill the OCA criteria ex post, although they did not fulfill them ex ante. Monetary union entry raises trade linkages among the countries and this causes the business cycle to be more symmetric among the participants of the union. The arguments of Frankel and Rose (1998) lead to a conclusion that the costs of implementing common currency are relatively low. However, there are some doubts on the validity of the endogenous OCA criteria. In a theoretical model Hallett and Piscitelli (2001) show that the validity of endogenous OCA hypothesis is uncertain and dependent to a large extent on the structural convergence in the beginning phase of the monetary union. Without the sufficient structural convergence, implementing common currency would cause greater divergence (Komarek, Cech, Horvath 2003).

Countries experiencing symmetric shocks or high trade linkages tend to have stable exchange rates. In other words the more the OCA criteria among the countries are fulfilled, the lower should be the exchange rates variability among considered countries. Under this assumption the exchange rate variability could be estimated by the equation:

$$SD(e_{ij}) = a + \beta_1 SD(\Delta y_i - \Delta y_j) + \\ + \beta_2 DISIM_{ij} + \beta_3 TRADE_{ij} + \beta_4 SIZE_{ij} \quad (1)$$

$SD(e_{ij})$ measures the volatility of bilateral nominal exchange rates, $SD(\Delta y_i - \Delta y_j)$ captures the asymmetric shocks at national level, $TRADE_{ij}$ is the proxy for intensity of trade linkages, $DISIM_{ij}$ assesses the asymmetric shocks at industrial level and $SIZE_{ij}$ measure the size of the economy and assess utility from maintaining own currency (Horvath and Komarek 2003). These four variables represent basic OCA criteria and it is believed that the lower the volatility of exchange rates is among countries, the more they are prepared to join the monetary union.

Bayoumi and Eichengreen (1998) suggest how to calculate relevant variables: "where $SD(e_{ij})$ is the standard deviation of the change in the logarithm of the end year bilateral exchange rate between countries i and j, $SD(\Delta y_i - \Delta y_j)$ is the standard deviation of the difference in the logarithm of real output between i and j, $DISIM_{ij}$ is the sum of the absolute differences in the shares of agricultural, mineral, and manufacturing trade in total merchandise trade, $TRADE_{ij}$ is the mean of the ratio of bilateral exports to domestic GDP for the two countries, and $SIZE_{ij}$ is the mean of the logarithm of the two GDP's measured in U.S. dollars"[8] (Eichengreen and Bayoumi 2006).

When calculating variable $SD(e_{ij})$ Horvath (1990) uses data from IFS-IMF[9], the data for $SD(\Delta y_i - \Delta y_j)$ were calculated from World Bank, $TRADE_{ij}$ was calculated using the data from Directions of Trade – IMF and World Bank, variable $DISIM_{ij}$ was calculated with the use of the data from Monthly Statistics of Foreign Trade OECD and $SIZE_{ij}$ from the World Bank data. When putting together the data matrix Horvath followed the advice of Bayoumi and Eichengreen (1997 and 1998), this allowed him to compare the results for different time periods. Bayoumi and Eichengreen (1997 and 1998) find little evidence that more open economy tends to fix its currency. The analysis takes into account all the relationships between each of the economies. The expected signs of explanatory variables are as follows: the exchange rate volatility is expected to depend positively on business cycle, dissimilarity in the commodity structure of export, and negatively on the trade linkages. The expected sign of the openness is theoretically indeterminate (Horvath 2003).

The alternative tool to estimate the criteria of optimum currency area functioning is Theil's inequality index which is simpler and clearer than OCA index. Theil's inequality index (Theil 1961) is a measure of the degree to which one time series (X_i) differs from another (Y_i). The index is computed as

$$U = \frac{\sqrt{\frac{1}{n}\sum (X_i - Y_i)^2}}{\sqrt{\frac{1}{n}\sum X_i^2} + \sqrt{\frac{1}{n}\sum Y_i^2}} \qquad (2)$$

The score returned by the Theil this test is $1 - U$ for consistency. U varies from 0 to 1 with 1 meaning maximum disagreement. The Theil's test performs a point-by-point matching of the two time series (e.g. GDP, inflation, current account fluctuation of two countries or regions). If the lengths of reference and actual data do not match, a warning is issued, and only the number of pairs corresponding to the length of the shortest one is used (Theil 1961).

The main purpose of Theil index calculations is the analysis of structural similarity between two economies. If the maximum structural agreement (e.g. between Lithuania and Euro zone countries) is estimated it means the perfect preparation of Lithuania to join the European Monetary Union.

When analyzing the preparation of Lithuania to adopt the euro the OCA theory is suitable tool but it must be assessed skeptically with some circumstances:

- the high exchange rate asymmetry of Euro zone and Lithuania occurred in 1994 – 2002 because of litas and U.S. dollar pegging;
- the international researches of the common currency adoption in Lithuania were traditionally made using statistical data of manufacturing sector (including the costs of energy sector). Historically the energy sector was directly governed by Moscow, so the economic activity of it was not a business cycle indicator (the energy sector was mostly political issue) (Vetlov 2004).

There are several aspects which must be included in modeling of common currency adoption possibilities in Lithuania:

- the financial crisis in Russia in 1998 which caused the decline in exports to East;
- drastic finance consolidation in 1999 – 2000;
- the expectations of EU membership which caused the income growing of inhabitants;
- the lending boom started in 2002;

Figure 3. The main reasons of possible dissimilarity of economic structure between Lithuania and Euro zone

Concerning OCA theory it was mentioned that countries in a monetary union should experience macroeconomic shocks that are correlated with those experienced in the rest of the union. According to Kuodis and Vetlov (2002) and Vetlov (2004) research Lithuania has more comprehensive monetary policy impact mechanism. It helps to react more broadly and quickly to all macroeconomic shocks than Euro zone does (Vetlov 2004).

Consider the circumstances and aspects mentioned above it is possible to shape a multifunctional practical model involving OCA and Theil indexes to assess the real convergence condition of Lithuania to join Euro zone. Noteworthy that so far there were no narrow

[8] From 2000 in the case of calculating OCA indices for EU countries the euro is more suitable.

[9] The International Financial Statistics (IFS) database of the Statistics Department of the International Monetary Fund.

research done about statistical economic symmetry in Lithuania and Euro zone. Therefore no detailed findings could be obtained on this subject.

Conclusions

1. Countries can benefit from higher trade integration, which leads to the more effective allocation of resources. Frankel and Rose (1998) show that the higher the trade integration, the higher the correlation of business cycle among countries. Countries that are highly integrated with each other, with respect to trade and other economic relationships, are more likely to constitute an optimum currency area.
2. In case to assume the necessity to adopt the common currency it is essentially to analyze Mundell's model of the shifts in demand between two countries. Any kind of macroeconomic shocks effects could possibly be mitigated in the area with single currency area with the OCA characteristics.
3. The existence of OCA criteria (high labor mobility, high correlation of business cycles, etc.) makes monetary independence less necessary. The OCA area theory tries to answer an almost prohibitively difficult question: what is the optimal number of currencies to be used in one region. This theory determines the conditions that countries should satisfy to make a monetary union attractive, i.e. to ensure that the benefits of the monetary union exceed its costs.
4. The more of OCA criteria are fulfilled among the countries, the lower should be the exchange rates variability among considered countries. The exchange rate variability could be estimated by the econometric expression, specifically the OCA index.
5. The alternative tool to estimate the criteria of the optimum currency area functioning is the Theil's inequality index. Theil's inequality index is a measure of the degree to which one time series differs from another (GDP, inflation, current account fluctuation of two countries or regions).
6. When analyzing the preparation of Lithuania to adopt the euro the OCA theory is suitable tool but it must be assessed skeptically with some circumstances.
7. The main purpose of integrated OCA and Theil index model would be the analysis of structural economic similarity between Lithuania and Euro zone. If the maximum structural agreement estimated it means the implementation of the real convergence criteria and perfect preparation of Lithuania to join the European Monetary Union.

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