REGIONAL CHARACTERISTICS ABOUT HOUSEHOLD FINANCIAL ASSETS: TRANSITION PROCESS AND EFFECT OF ECONOMIC INEGRATION BY THE EURO

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ABSTRACT

*B**ased on the information of household financial assets in OECD countries, we investigate the transition process and the effect of economic integration by the introduction of the euro. The research in the paper effectively uses some methods of multivariate analysis. The analysis result indicates that the introduction of the euro tends to induce a regional disparity with the property of "bipolarization" and a typical pattern of regional gap expansion. In addition, such distortion would become large and spread out gradually in the near future. With several exceptions, there exist the opposite effects in the causal relationship between most country groups and the other specific countries. As the specifically categorized three groups, the Eurozone countries obviously have an opposite effect to the non-Eurozone and non-EU countries from a viewpoint of causal relationship. In particular, the recent decreasing trend of that effect suggests the progress of an assimilation phenomenon in those areas.*

JEL Classifications: F36, F37, G11, R11, R13

Keywords: household financial assets, euro, economic integration, areal specialization

1. Introduction

Research Background and Motive

In general, household financial assets deeply reflect the situation of the living standard and economic strength in each region. Based on the existing data, the ratio of each category or item of assets tends to be consistent regardless of time progress. Usually that trend also continues for a considerably long period if there is no strong socioeconomic shock. Consequently, it would serve as a robust and effective statistical indicator showing the state of financial asset balance.

On one hand, changes in socioeconomic trend and political systems often become further influential factors: For example, the formation process of financial assets would be considerably transformed by a structural change of monetary system. In fact, that trend has significantly fluctuated for these ten years by reflecting the influence of the euro. Currently the various impacts of the euro are spreading over wide areas in Europe and are permeating even everyday consumption habits and life styles in Eurozone countries.

The regional analysis about the household financial assets is an important topic not only for international finance but also for regional economics. For example, the amount of individual financial assets in the countries investigated in the paper reaches to over even 200% of GDP, which is a very huge value. In the balance of (international) payments, generally the influence of individual financial assets which directly constitute the capital account balance is significantly large. That is, the trend of financial assets has strong impact on not only the stock but also the flow of the funds which occurred in the capital account balance or in the balance of (international) payments during a certain period of time. Thus it has a strong impact on both of the balances of monetary flow and stock in each country. In other words, it suggests that the balance of financial asset by households may determine the direction of future financial trends and even significant policies including economic integration in regions. Thus it is very important to identify how the transition process of financial assets by the introduction of the euro influences the economic integration of Eurozone when predicting the future expansion and a new trend in Europe. Namely, the regional trends of economic integration including monetary policies in future Europe would be effectively evaluated by the change and transition process of relationship between countries in terms of the financial asset balance.

Nevertheless, there are not many papers which specifically mention the regional characteristics concerning the household financial assets and study those correlation and causal relationship derived by economic integration. In fact, the previous work about the household financial assets highly applying multivariate analysis is very rare, and most are the research reports by mainly bank-affiliated organizations which use typical descriptive statistics and regression analysis; generally those methods are often not appropriate enough for statistically detecting a causal relationship in a strict sense. Under such a circumstance, therefore it would be worthwhile to present a new viewpoint gained by some useful techniques of multivariate analysis including structural equation modeling this time.

The purpose of the paper is as follows: It is to clarify the causal relationship of the phenomena caused by the introduction of the euro since that launch around the year 2000 and also identify the correlation between those countries caused by the influence of the euro from the view point of regional integration. The causal relationship between the classified groups as Eurozone, non-Eurozone and non-EU countries is also investigated. The paper aims at explaining the regional structure (mechanism) of such complicated financial matters in European countries to suggest future direction of economic integration by the euro.

The structure of the paper is as follows: In the introduction section, background and research motive are stated. In the second section, an overview of the euro is given. In the third section, a selected literature review is briefly mentioned. In the fourth section, the data and methods of analysis are succinctly explained. In the fifth section, the main results based on a series of statistical analyses are shown. In the final section, concluding remarks including a summary are stated.

2. Overview of the Euro

2.1 Some Merits and Objectives

Currently, the euro becomes the second largest reserve currency following the US dollar. It is also the second most traded currency in the world. The introduction of the euro has a positive influence on the affiliated countries of Eurozone. For example, such influence is usually expected to promote trading by providing the proper business environment to business enterprises in the area. Moreover, that reduces transaction costs and risks for exchanging currencies and helps expanding existing economic blocs: As a matter of fact, that remarkably increases the mobility of goods, service, capital, and the labor force of various markets. It is also able to stabilize price levels of consumer goods and services which differ in the markets of many countries.

According to an optimum currency area theory in economics by Mundell (1961), an optimum currency area is defined as a specific region which is able to maximize economic efficiency or benefits; in fact, the use of single currency in the specific areal zone can decrease its existing and potential costs. An ideal goal for the future euro is to form such an optimal area. From a viewpoint of regional integration, that also helps integrating many areas by sharing a common currency, or promoting direct economic integration. Theoretically, a monetary union is the second strongest regional integration in five steps of classifications by Balassa (1961). Consequently, this step is on the way to the strongest regional integration which means complete economic and political integration as a final stage, and the impact of this step is much stronger than the impact of simple market integration. Therefore, the role of the euro as a monetary union is also very important for attaining the complete economic integration of European regions.

2.2 Some Demerits and Problems

In general, it is frequently discussed that a single currency system spoils the effectiveness of monetary policy of each country; it is because that system often causes a loss of management functions required to control the economic fluctuations by spoiling market liquidity.

Specifically, the euro may impede the proper management of government expenditure and the adjustment of market interest rates in each country. That might lose almost the proper management of aggregate demand management policy including such monetary and fiscal policies. Furthermore, an asymmetric socioeconomic shock may arise by the shift of aggregate demand caused by the malfunction of aggregate demand policy when the appropriate control of that policy is insufficient. Since a single currency system like the euro easily falls into the malfunction of aggregate demand management policy, therefore the introduction of the euro would always have a high risk of the occurrence of regionally asymmetric shocks.

It should be also stated that generally a uniform macroeconomic policy for two or more countries is difficult to solve the problems of regional disparities regarding a long-term investment of business enterprise or a high price of commodity and unemployment rate.

In addition, the Stability and Growth Pact (SGP) obliges Eurozone countries to maintain financial balance in the condition that the deficit must not exceed 3% of GDP in single fiscal year and that the amount of public debts must not exceed 60% of GDP. Virtually these restrictions will become a heavy burden to some countries when they implement their fiscal policies.

2.3 Current Situation: Some Examples

On one hand, Cabinet Office of Japan (2012) points out the European economic conditions and financial situations in recent years as follows: Regarding the recent Eurozone debt crisis, it is clear that some asymmetric shocks have occurred only in the specific countries in the euro area. The free circulation and timely transfer of any product, labor capital, and trade should be taken into consideration as a preferable remedy for such a situation; however, the political and economic system in the present Eurozone has not been ready for overcoming the severe current situation yet.

In addition, Cabinet Office of Japan (2012) reports positive or negative effects in some specific countries by the present euro currency system as follows: Regarding the transition of the current account balance in the Eurozone, the current account balance surplus has increased in Germany and the Netherlands after the introduction of the euro, while the current account balance deficit has swollen in Spain, Italy, and Greece. Currently the imbalance of the current account balance in the euro area is a chronic phenomenon. While Germany and the Netherlands have made the considerable amount of surplus since the introduction of the euro, the ratios of net external assets to GDP have decreased further in Spain, Portugal, and Greece. The imbalance of capital markets has also increased with expanding the imbalance of current account balance in the Eurozone.

Actually the improper check and malfunction of adjustment system for overall Eurozone countries has led to the insufficient management of undesirable business trends in countries such as the Southern Europe. Consequently, that would be a cause of economic imbalances in euro area countries and of their subsequent expansion; see Cabinet Office of Japan (2012), and others. Therefore, the recent Eurozone debt crisis might have been unavoidable under such a situation.

In addition, the frequent imbalance of the flow and stock of individual financial assets in Portugal probably may induce the imbalance of the current account balance of its own country from a viewpoint of asset allocation, and the economic performance in monetary markets might become unstable as a result. That is the obviously different situation from the cases of Italy and Spain. Consequently, they would be phenomena peculiar to those countries.

3. Literature Review

Here we concisely review the previous literature concerning some subjects of financial aspects of economic integration, which particularly focuses on the matter of the euro, EMS (European Monetary System) and EMU (Economic and Monetary Union).

Baldwin (2006) reviews the "Rose effect"; that effect means a country in EMU tends to trade inside EMU area compared to the case of outside non-EMU area. The consensus estimate shows the amount of 5 to 10 % of trade has increased at the intra-Euro area. The paper also discusses the "Rose effect" in European countries and suggests some empirical tests which are useful to evaluate the economic mechanisms in the related arguments.

Bartram and Karolyi (2006) investigates the effect of the introduction of the euro in 20 countries including Japan and the United States. The paper examines the relationship between the lower stock return volatility, market risk exposures and foreign exchange rate risk exposures. It also shows that the reduction in market risk is not necessarily the result of changes in technical matters such as a task of financial leverage. In addition, it suggests that the changes in markets and foreign exchange rate generally depend on the mixture effect of various industry and regional characteristics.

Lane and Wälti (2006) indicates the euro has given a considerable impact to the current EMS to establish a financial integration; above all, the changes in securities markets are conspicuous. It also indicates that the

financial integration by EMU has induced a fairly large macroeconomic impact. However, some problems are still left behind: For example, especially a political barrier in the retail and corporate banking sectors still noticeably remains.

Bartram et al. (2007) analyzes the degree of dependence concerning the impact of the introduction of the euro. The market dependence in the Eurozone is observed in some countries including France, Germany, the Netherlands, Italy, and Spain.

Based on a sample of 22 countries in the period of 1999-2007, Aristovnik and Čeč (2009) examines whether the euro has a potential for overcoming the US dollar as a leading reserve currency.

Komaki and Iizuka (2010) comments about the effect of business cycle in EMU of the euro area; it points out whether some unique factors cause the co-movement of business cycles and how some restrictions on monetary and fiscal policies impact such business cycles in that area.

Worthington and Higgs (2010) measures the degree of financial integration in European Union equity markets. The VAR methods, the variance decompositions, and other procedures are used to evaluate international capital allocations and market efficiencies. The results mention the existence of equilibrium and causal relationships between the markets.

EIU special report (2011) points out the following: The deviation in the economic performance of Eurozone countries will increase in the near future. Such circumstances will become a real barrier for the monetary policy in the euro area when the European Central Bank (ECB) controls financial markets. Under the condition that there is no improvement of external competitiveness in peripheral countries, it will become harder to execute a single monetary policy, and it will also unavoidably induce another imbalance.

Sousa and Lochard (2011) points out that EMU has increased the intra-EMU FDI (Foreign Direct Investment) by an average of about 30 percent. It also suggests that EMU helps promoting FDI within the Eurozone; that result is examined by some sensitivity tests, and is actually stable. Moreover, it indicates that EMU countries are inclined to invest more in non-EMU countries since the introduction of the euro. In addition, some other papers also point out that the effect of the euro significantly contributes for the growth of physical investment; see Dvorak (2007), for example.

Singh and Pattanaik (2012) investigates the mechanism of dynamic interaction between monetary policies and asset prices in the case of India by using mainly VAR models. It suggests the complexity of the relationship between asset price mechanism and regular monetary policies, and it also implies that micro and macro-prudential policies would be more appropriate especially at the time of asset price bubbles.

4. Model

4.1 Data Structure

All the analysis in the paper is based on the data of "National Accounts at a Glance" in the OECD iLibrary as of January 2014 (see the references of the paper for details). Furthermore, we choose 20 European countries from the OECD member countries due to the availability and compatibility of the data for analysis. Those countries are classified into four regional groups by the classification of the United Nations as below:

・Eastern Europe (Czech Republic, Hungary, Poland, Slovak Republic);

・Northern Europe (Estonia, Denmark, Finland, Norway, Sweden, the United Kingdom);

・Southern Europe (Greece, Italy, Portugal, Spain);

・Western Europe (Austria, Belgium, France, Germany, the Netherlands, Switzerland).

In addition, the household financial assets used in the paper is classified into Currency and deposits (*CD*), Securities other than shares (*SOS*), Loans (*LON*), Shares and other equity (*SOE*), Insurance technical reserves (*ITR*), and Other accounts (*OA*).

4.2 Methods of Analysis

Some statistical methods are combined to obtain the results as exact as possible. Firstly, the well-known Location Quotient technique to evaluate the contrast of the regional characteristics and their properties: That evaluates the degree of regional specialization with respect to a specific item such as financial assets. The calculation formula is as follows.

$$LQ_{ij} = \frac{X_{ij}/X_{i.}}{X_{.j}/X_{..}}, \quad X_{i.} = \sum_{j=1}^{m} X_{ij}, \quad X_{.j} = \sum_{i=1}^{n} X_{ij}, \quad X_{..} = \sum_{j=1}^{m} X_{.j} = \sum_{i=1}^{n} X_{i.}, \quad i = 1,2,3,\cdots,n, \quad j = 1,2,3,\cdots,m$$

where LQ_{ij} is Location quotient for region i and sector j, n is the total number of regions, and m is that of sectors. For more details of Location Quotient, see Hoover and Giarratani (1999), Ishii et al. (2002), and others.

In addition, "Multidimensional scaling (MDS)", "hierarchical cluster modeling", and "structural equation modeling" are used for analyzing the degree of similarity and clustering, and identifying the causal relationship between some groups of countries; those statistical techniques are briefly explained as below.

・Multidimensional scaling is one of the statistical methods for the dimension reduction technique of data; high dimensional data can be projected on low dimensional ones (usually two or three dimensions) to indicate visually the similarity of the structure of data. Based on the information of statistical distance, it is also able to show the spatial relationship (or the spatial location information) of data described in a coordinates plot.

・Cluster analysis is a multivariate method which groups data on the basis of the similarity and pattern in the data structure. In general, that analysis is roughly guided by the following two categories: One is the method of supervised learning which depends on an external reference criterion. Another is the method of unsupervised learning which does not have such a criterion. Cluster modeling is one of the exploratory approaches for the latter, and it is roughly divided into two types further: hierarchical modeling and non-hierarchical modeling. By evaluating the degree of similarity based on the Cophenetic matrix created on the process of analysis, the hierarchical cluster method hierarchically builds relationship between data clusters one by one in each step. It usually shows a result by the graph output of dendrogram. In order to evaluate the change by time progress regarding the data clustering process for multi-stages, the hierarchical type has been adopted for this paper. All the analysis uses the information of the distance evaluated by Ward's method which is one of the computational techniques for hierarchical cluster modeling.

・Structural equation modeling (SEM) is a statistical method which can consider the causal relationship between two or more variables. An analyst can build a model to identify the causal relationship involved in causal assumptions intricately: This means that an analyst can set up a model flexibly for the purpose of expressing complicated principle and phenomenon. It is also called covariance structure analysis (CSA) because the information of the variance and covariance of observed variables in a model is used. All factor analysis and regression analysis is considered as an application of SEM technique. Usually the goodness of fit for SEM is evaluated by some appropriate statistical indicators like RMSEA, CFI, AGFI, and others. In order to evaluate mutual effects between observed variables solely and directly, no latent variable is used in the models this time. In addition, all the analysis is based on the maximum likelihood method.

5. Results

5.1 Features of Regional Specialization

The left-hand side figure in Figure 1 shows the difference of LQ values between 2000 and 2010. The right-hand side figure in Figure 1 is the scatter plot of which the horizontal axis is for the LQ values and of which the vertical axis is for those differences of 2000-2010. For convenience' sake, the scale conversion of LQ values is carried out so that the origin in the plot is set to (0, 0).

From the results, all categories of Poland, Norway, Estonia, and some others are noticeable for those values of changes. In addition, the numbers of countries which take remarkable large values are restrictive in all categories. In particular, there are some countries which have significantly large values of *LON* and *OA*. On the other hand, some countries have conspicuous changes of the values for *SOS* and *CD*: Those are the one of the most significant features concerning the areal specialization. Thus some unique trends regarding the choice behavior of household financial assets are observed more frequently in the countries of Eastern Europe and Northern Europe. It is virtually considered to be a result of reflecting uniquely their political and economic regimes, cultures, customs, and other regional factors.
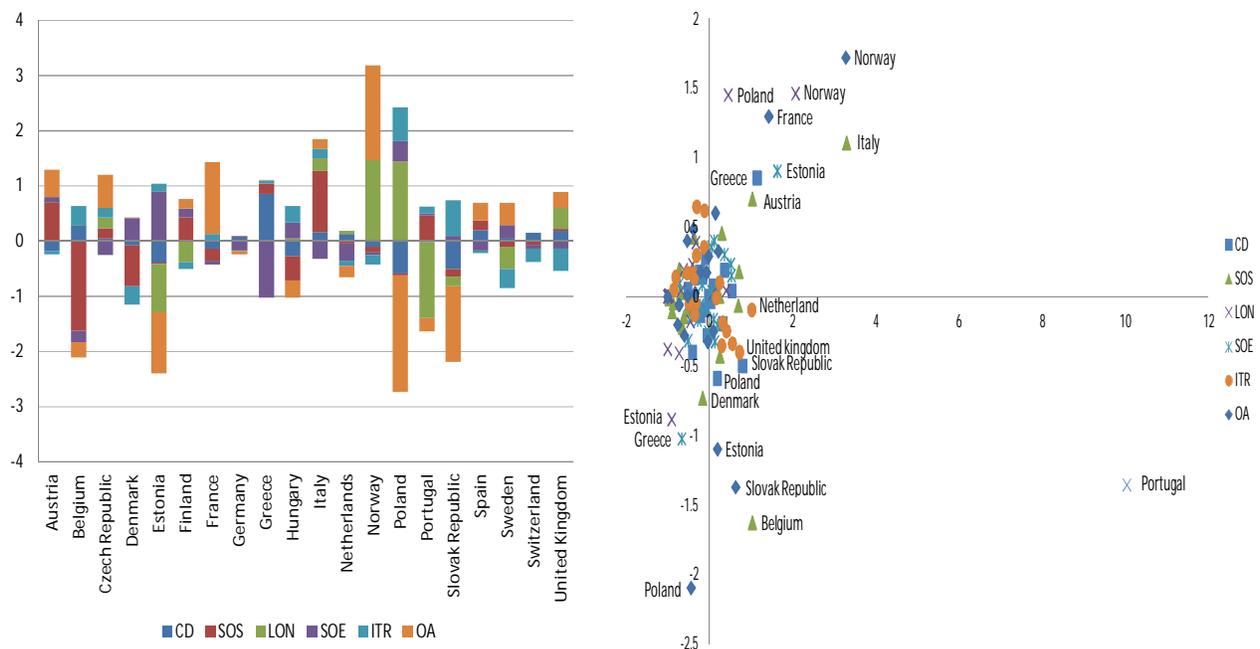

Figure 1. Change in LQ (left) and its regional distribution (right) in 2000-2010

5.2 Similarity, Clustering, and Causal Relationship by Country

5.2.1 Similarity

Figure 2 shows the degree of similarity evaluated by MDS. Some remarkable findings are as follows:
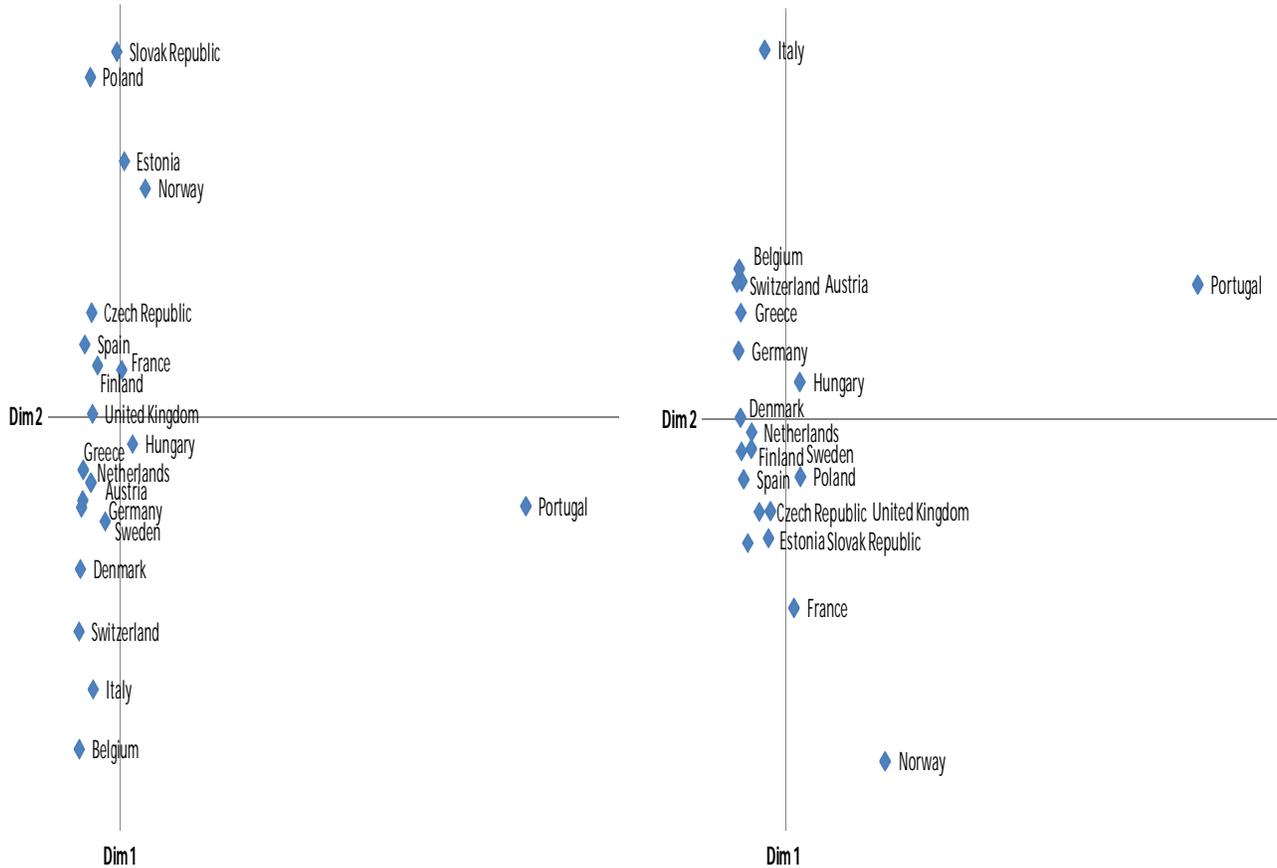

Figure 2. MDS plots of LQ in 2000 (left) and 2010 (right)

The positioning of some countries in Figure 2 is remarkably characteristic in the both of 2000 and 2010. Particularly Portugal is quite unique probably due to its large value of *LON*. Regarding the spatial relationship (or the information of spatial location), it might be hard to find a clear trend or pattern from only the result of Figure 2 though most of the countries have a moderate level of similarity on the whole.

5.2.2 Clustering

The following Figure 3, 4, and 5 describe the clustering process and structure identified by a hierarchical cluster analysis. Some regional characteristics are shown to indicate important viewpoints for the latter part of analyses:
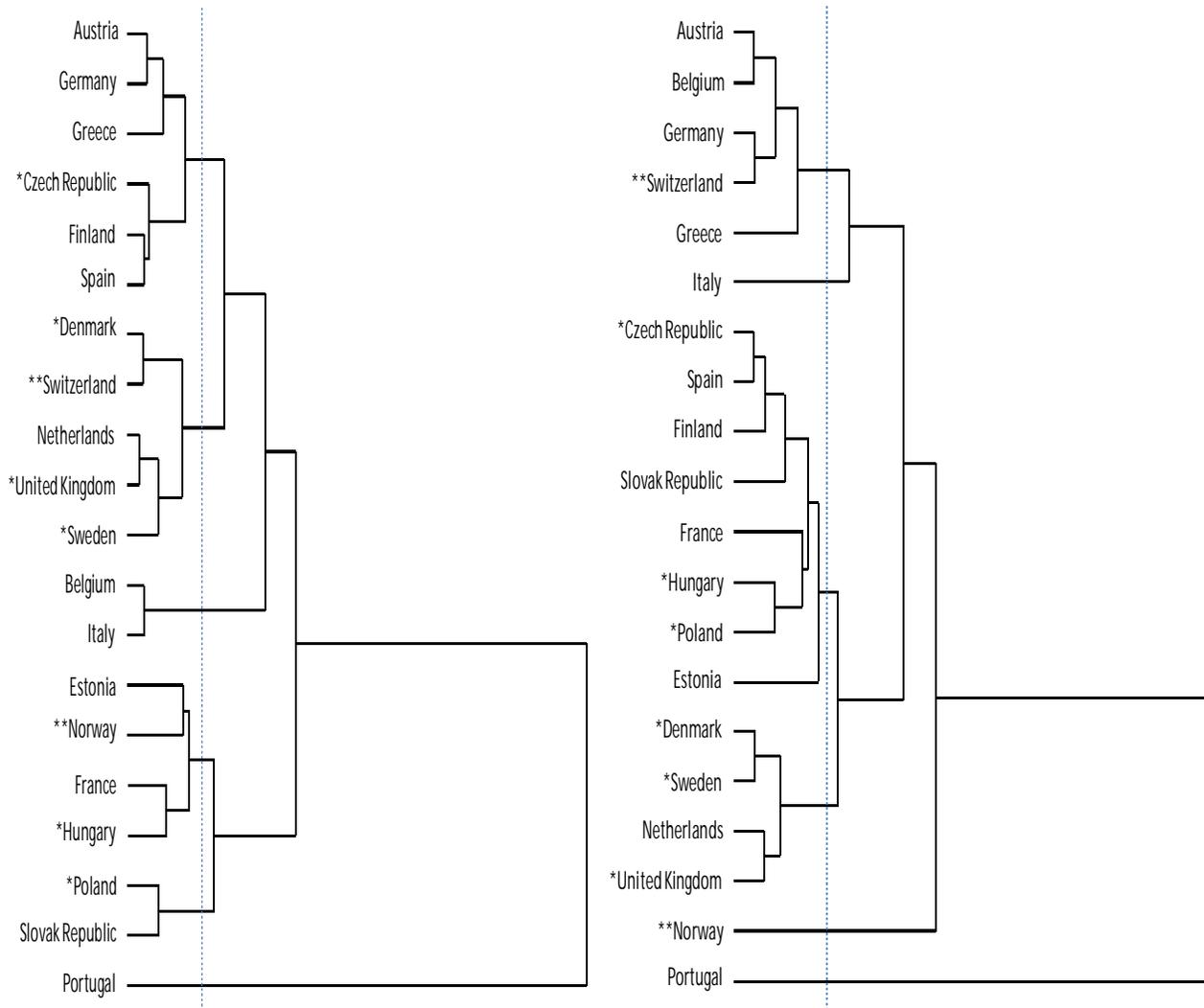
Figure 3. Dendrogram of LQ in 2000 (left) and 2010 (right)

* Member of EU without introduction of the euro

** Member of Non-EU

As shown in Figure 3, the following fact is important; the data are grouped into fewer clusters in 2010 compared to the case of the year 2000 even if the dendrograms are evaluated by an arbitrary branching level. Actually that makes the result consistent and robust and hence draws a further stable conclusion. It shows the tendency of countries classified into the group of larger size between 2000 and 2010 (the average 3.80 countries per group in 2000, and the average 5.67 countries per group in 2010). In other words, a large number of groups in 2000 have been reorganized into a small number of groups by 2010. As a result, it turns out that the reorganization process of groups in recent years tends to produce a simpler and clearer regional disparity than before.
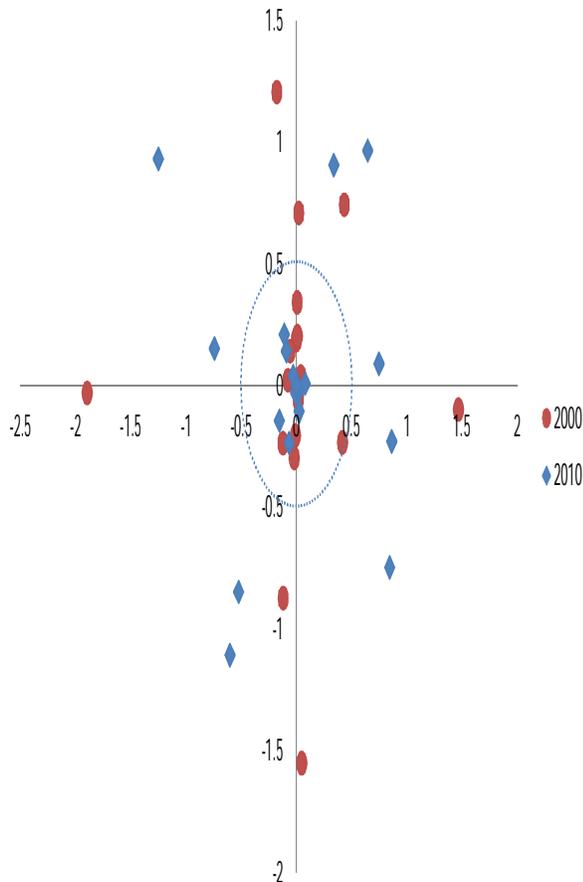
Figure 4. MDS plot based on
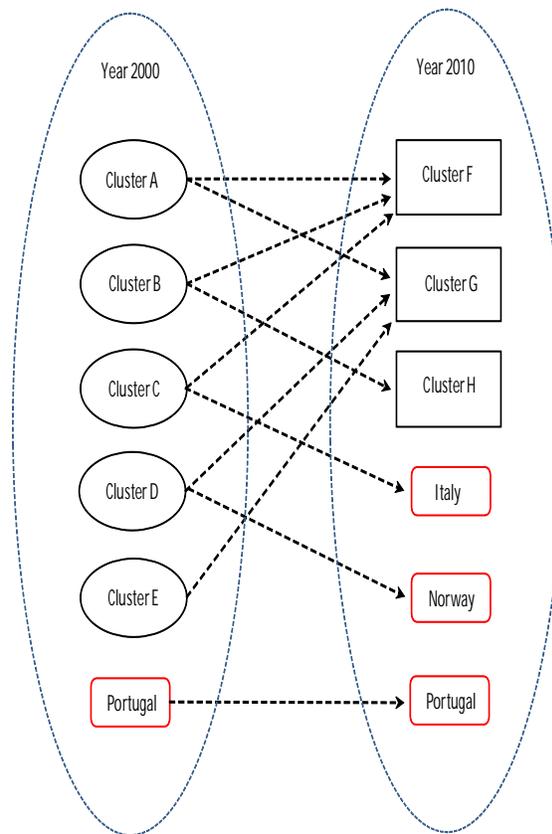**Cophenetic matrix of cluster analysis**

Figure 5. Diagram of
clustering process (2000-2010)

The plot of Figure 4 represents the calculation result of the Cophenetic matrix based on the previous cluster analysis. That stands for the degree of similarity obtained from the information of distance between the data. It shows that the concentration tendency around the origin (0, 0) in 2000 is stronger than that in 2010. The countries with the high degree of similarity tend to gather towards the center considerably in 2000, and that trend in 2010 becomes weaker than that in 2000. That implies a certain kind of dispersion tendency in recent years. In other words, those results suggest the relief of concentration tendency or an overall smoothing phenomenon (or an assimilation tendency) in the period of 2000-2010. Compared with 2000 (the early stage of introduction of the euro), actually the clustering process based on similarity has been reorganized by 2010, and some specific countries drop out of their initial groups of the year 2000 and tend to be isolated in these ten years: While some specific countries drop out of their initial groups or are isolated, overall the other ones are integrated into fewer groups than the past case (see Figure 5). Hence, it implies that a kind of "bipolarization" (an assimilation or integration tendency, and an isolation or separation tendency) in regional disparity process is virtually advancing in a decade.

5.2.3 Causal Relationship

The following Figure 6 shows the causal relationship between clusters by SEM from the results of the cluster analysis.

In Figure 6, the countries included in each group are the following:

The list of clusters in 2000

・Cluster A (Austria, Germany, Greece, Czech Republic, Finland, Spain);

・Cluster B (Denmark, Switzerland, the Netherlands, Sweden, the United Kingdom);

・Cluster C (Belgium, Italy);

・Cluster D (Estonia, Norway, France, Hungary);

・Cluster E (Poland, Slovak Republic).

The list of clusters in 2010

・Cluster F (Austria, Belgium, Germany, Switzerland, Greece);

・Cluster G (Czech Republic, Spain, Finland, Slovak Republic, France, Hungary, Poland, Estonia);

・Cluster H (Denmark, Sweden, the Netherlands, the United Kingdom).

In addition, all the model performance is statistically significant enough from the outcome of the goodness of fit as below.
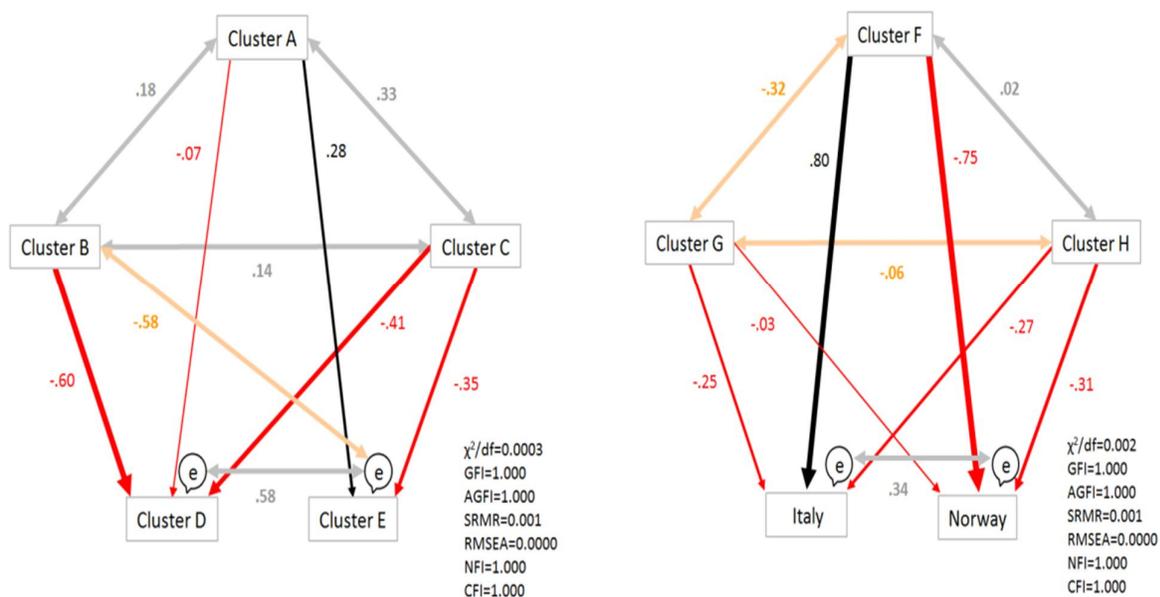

Figure 6. Causal relationship by SEM in 2000 (left) and 2010 (right)

Most of the passes in the diagrams of the figures show the opposite signs, which suggest the direction of causal relationship between the passes.

On the whole, the distinction among groups in 2010 regarding the (+) and the (-) values becomes clearer than that in 2000 with some exceptions. For example, the causal relationship between the specifically isolated countries (Italy and Norway) and Cluster F has become significantly strong in comparison to the others in 2010. Based on the outcome of the above causal relationship, it implies that the influence by the euro tends to enlarge the regional gap between the groups. That is, it will cause a "bipolarization" phenomenon as illustrated by the previous cluster analysis and also clearly promote a typical pattern of regional gap expansion.

In addition, a grouping process often brings a certain kind of concentration, agglomeration, and spatial dependence phenomenon. As a result, it will cause another macroeconomic imbalance and distortion among countries. Currently EMU in Europe is on the way to the further advanced regional integration and is rapidly expanding to the peripheries of the current member nations. Therefore, such disparity or distortion will become larger than the ongoing one and spread out gradually with high probability if the current situation does not change a lot in the future.

5.3 Causal Relationship between Eurozone, non-Eurozone, and non-EU countries

In contrast to the analysis by country in the previous section, here we particularly investigate the causal relationship between the regional groups classified as *Eurozone*, *non-Eurozone*, and *non-EU*. In Figure 7, the countries which belong to *Eurozone* in EU are designated as Group I, and those of *non-Eurozone* in EU are denoted as Group J, and the countries of *non-EU* are as Group K. The list of the countries included in each group is the following:

・ Group I (Austria, Belgium, Estonia, Finland, France, Germany, Greece, Italy, the Netherlands, Portugal, Slovak Republic, Spain);

・ Group J (Czech Republic, Denmark, Hungary, Poland, Sweden, the United Kingdom);

・ Group K (Norway, Switzerland).

The features of causal relationship are similarly investigated by means of SEM. The main result is illustrated by the following figures. In addition, all the model performance is statistically significant enough from the results of the goodness of fit.
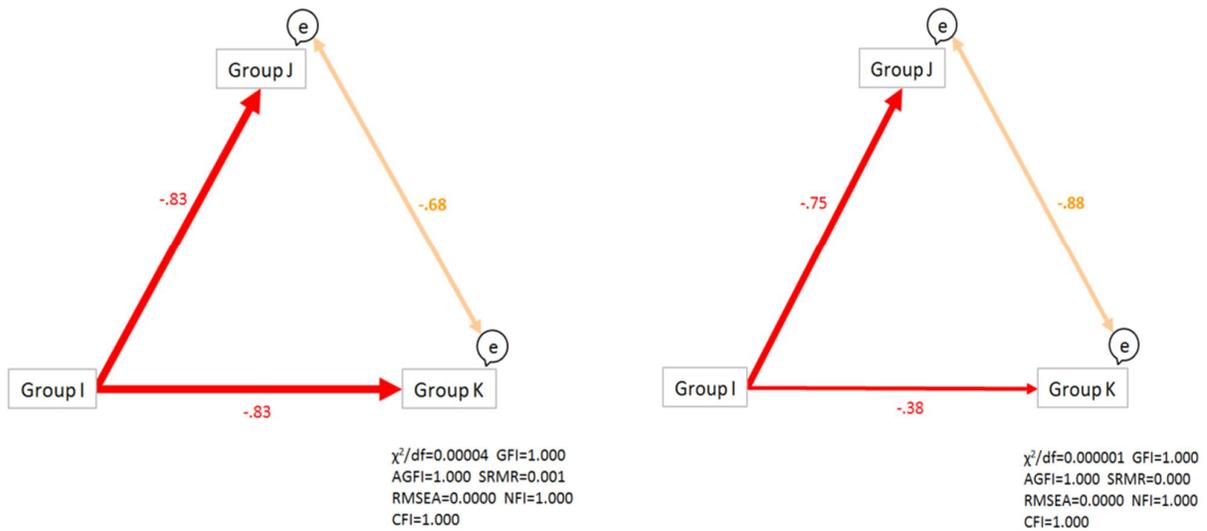
Figure 7. Relationship of regional group by SEM in 2000 (left) and 2010 (right)

From the outcome in the figures, all the passes in the diagrams show the causal relationships with minus signs; that is, it turns out that *Eorozone* has a definitely opposite effect to *non-Eorozone* and *non-EU*. Since the (-) value of each pass coefficient is decreasing in recent years, it implies that *Eurozone* tends to yield less opposite effects to *non-Eorozone* and *non-EU* in the current condition. It also suggests that a kind of assimilation tendencies (or a smoothing phenomenon) is obviously advancing in those areas since the introduction of the euro. That is, it implies that the introduction of the euro promotes a regional assimilation and/or integration tendency about countries in the wide areas of Europe as categorized by the above three groups. Finally, the change of the relationship between *Eurozone*, *non-Eurozone*, and *non-EU* for these ten years is expressed intelligibly by the diagram of Figure 8.
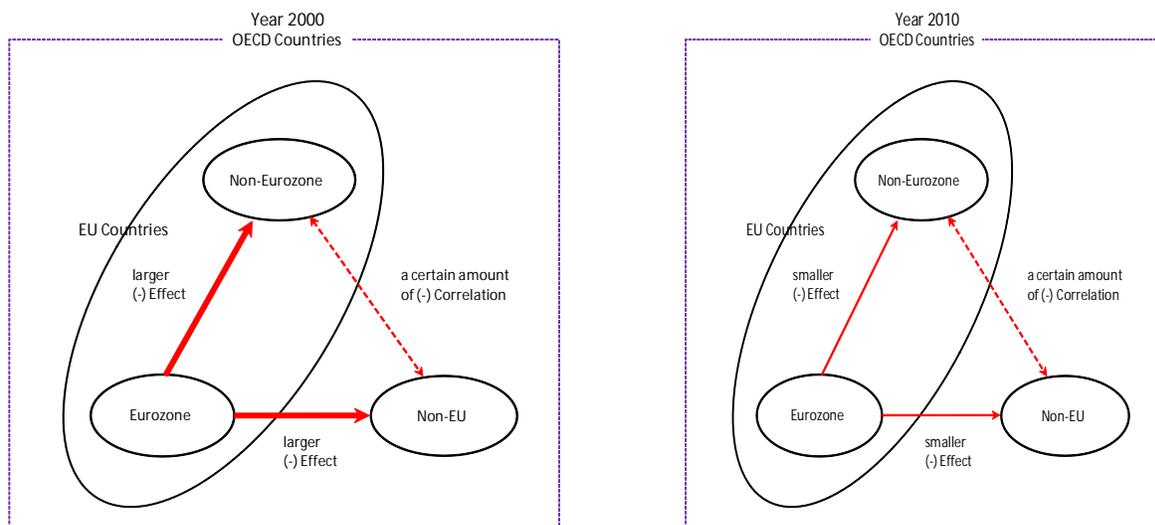

Figure 8. Diagram of causal relationship

6. Concluding Remarks

The paper has discussed the influence of the euro, the trend of expansion of Eurozone, and the potential of further progress in economic integration by focusing on the regional comparisons with respect to the household financial assets of European countries. Some interesting features have been extracted, and main findings are summarized as follows:

・The regional disparity of household financial assets will cause the distortion of the capital account balance and the current account balance in the balance of (international) payments: Since the imbalance of current account balance is a cause of the European debt crisis in recent years, this phenomenon of regional disparities would be also highly correlated to that debt crisis.

In addition, overall the gaps of the current account balance of Eurozone countries are in clear expansion trends since the introduction of the euro; the same trends also have been detected in capital markets. As a matter of fact, it is checked that the trends of individual financial assets almost coincides with the above trends by referring to existing statistics: As mentioned in the latter part of the paper, it shows that the tendency of areal specialization in financial assets has obviously given a certain kind of influence to the capital markets of Eurozone and to the expansion of regional disparities in the period of 2000-2010.

・From the result by country, the effect of the euro shows a kind of "bipolarization" (an assimilation or integration tendency, and an isolation or separation tendency) in regional disparity process in a decade. On one hand, that effect indicates simply a kind of assimilation tendencies (or a smoothing phenomenon) according to the result analyzed by a group unit with respect to *Eurozone*, *non-Eurozone*, and *non-EU*.

Regarding a series of above results, however, future empirical studies should continue scrutinizing the related arguments to obtain a much more determinate conclusion.

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