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**FLEXIBILITY IN EUROPEAN WAGE STRUCTURE AND ITS  
IMPLICATIONS FOR EUROPEAN UNEMPLOYMENT**

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IMPLICATIONS FOR EUROPEAN UNEMPLOYMENT**

**by**

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# **Flexibility in European Wage Structure and its Implications for the European Unemployment**

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This dissertation, titled “Flexibility in European Wage Structure and its implications for the European Unemployment,” studies the problem of high rates of unemployment in Europe during the last few decades through the optic of European wage behavior. It examines the European wage structure – within and between European countries – to find out factors that drive wages and thereby, unemployment rates in European countries. A conventional view of European problem of high unemployment argues that European wages are explained by cross-country differences in certain labor market policies and institutions, and that the policies and institutions at the country-level are the principal source of the problem. This dissertation argues instead that European wages are explained by differences in macroeconomic performances and in levels of international competitiveness between countries and also between sectors within the countries, and by certain continental and global level factors, and that a full understanding of the effects of those factors is necessary to explain the European problem

of high unemployment. By applying numerical techniques, namely a combination of cluster analysis and discriminant function analysis, this dissertation finds that European wages are driven by factors pointed out by the dissertation, which also explain the high rates of unemployment in Europe over the last few decades.

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# **Chapter 1: Motivation and Introduction to the Dissertation**

## **1.1 INTRODUCTION**

Unemployment is a waste of human resource that reduces the aggregate output of an economy. It not only adversely affects the economy at an aggregate level, but also affects the lives of the unemployed by forcing them to incur economic, social as well as psychological costs. The unemployed face loss of income and a decline in their general well-being relative to those who are employed. Over time, unemployment erodes the human capital of the unemployed, and they lose the hope of being needed to participate in economic activities. Therefore, in public policy research, it is essential to examine the causes of unemployment and prescribe policies that are effective in reducing unemployment and making the lives of the people better.

During the Great Depression of the 1930s, economies faced the problem of mass unemployment. Thereafter, from the 1950s to the early 1970s, the developed world experienced high growth rates combined with low levels of unemployment and stable inflation rates. This period of successful macroeconomic performance is described by the economic historian Maddison (1991) as the “Golden Age”. From the “Golden Age” until the oil crises of the seventies, unemployment in Europe (and other OECD<sup>1</sup> countries) remained practically non-existent; since the oil crises, it increased episodically but persistently during the eighties and the nineties, and maintained high levels in the 2000s.

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<sup>1</sup> OECD refers to Organization for Economic Co-operation and Development.

Evolution of high rates of unemployment in several European countries (and other OECD nations) during the last few decades emerged as an intractable problem and a leading policy-concern for academicians and policymakers as well as organizations such as the OECD and the IMF<sup>2</sup>. Researchers developed theoretical and empirical frameworks to explain the problem. Since the nineties, typical explanation shifted toward blaming the European welfare state – specifically, certain labor market policies and institutions – for the problem; the mantra for reducing European unemployment became rolling back the European welfare state by reforming labor market policies and institutions.

Unemployment rates that were low in the past became intractable in the years after 1973. This intractability indicates failure on the part of policy-making. Over the years, reforming labor market policies and institutions has not proven to be effective in keeping unemployment rates at low levels, or, reducing the higher rates in European and other OECD countries. Since in the field of public policy, research should be directed toward areas where past policies have proven to be ineffective, this dissertation studies the problem of European unemployment.

Policy recommendations to reform labor market policies and institutions for reducing unemployment in Europe rely on a huge volume of empirical studies. Although huge in volume, these studies lack diversity in their general theoretical and methodological approaches. These studies assume that in European countries, labor market policies and institutions make wages rigid and thereby, increase unemployment rates. In their general methodological approach, these studies exclusively focus on

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<sup>2</sup> IMF refers to the International Monetary Fund organization.

country-level analysis – examining the effects of country-specific policies and institutions on country-specific unemployment (or some measure of employment) rates. Also, these studies use similar or identical data measures of the policies and institutions that are well-known for their poor quality and unreliability; as a result, their findings lack robustness even across minor changes in model specification. In spite of these fundamental problems, these studies dominate both the mainstream academia and the policy field.

This dissertation reviews the fundamental problems associated with the existing empirical studies on European problem of high unemployment. This dissertation develops and employs an entirely different approach to studying the problem of high unemployment. This dissertation recognizes that European countries are economically interdependent, and hence, the sources of their unemployment-problem are not confined within each country, but may span across their national borders. Therefore, this dissertation focuses on searching for sources beyond the borders – transnational sources. For the search, this dissertation first departs from the country-level approach of the existing studies and employs a continental-level approach. In its approach, it examines European wage behavior, by treating European countries as integrated, and searches for factors explaining the behavior to draw implications for European problem of high unemployment. The continental-level examination of European wage behavior of this dissertation is conducted by using a couple of numerical methodological tools in an innovative manner to account for certain important aspects, which have been overlooked by existing studies in explaining European problem of high unemployment.

## 1.2 GENERAL APPROACH OF CROSS-COUNTRY EMPIRICAL STUDIES

Empirical studies that dominate the economic literature on Europe's high unemployment problem perform country-level analysis from a microeconomic perspective. These studies posit that the sources of the problem lie with each country's certain "employment-unfriendly" labor market policies and institutions, which make labor markets – wages – rigid (Scarpetta, 1996; Nickell, 1997; Elmeskov *et al.*, 1998; IMF, 2003; Belot and van Ours, 2004; Nickell *et al.*, 2005; Baccaro and Rei, 2005; Bassanini and Duval, 2006; Griffith *et al.*, 2007; Fiori *et al.*, 2007; Rovelli and Bruno, 2008), particularly unable to adjust approximately to macroeconomic and supply-side shocks (Blanchard and Wolfers, 2000; Bertola *et al.*, 2001; Fitoussi *et al.*, 2000), and hence, raise the unemployment rates. The underlying hypothesis of this explanation is popularly known as the *labor market flexibility* (LMF) hypothesis, and the researchers advocating this hypothesis are called LMF theorists. The theoretical basis of this hypothesis resides in classical and neoclassical economic principles. In order to reduce unemployment in Europe, the LMF theorists prescribe *flexibilization* of wages (and the labor market) by reforming labor market policies and institutions in the form of cutting down minimum wages, reducing or eliminating unemployment benefits and the strictness of employment protection legislation and weakening the bargaining powers of trade unions. In other words, the LMF theorists prescribe deregulation of the labor market so that the determination of wage and employment levels is left with the fates of the labor market supply and demand forces. In the recent years, some LMF theorists have also prescribed deregulating the product market in order to facilitate labor market

deregulation, and to reduce unemployment in general (Nicoletti and Scarpetta, 2005; Griffith *et al.*, 2007; Fiori *et al.* 2007).

The general empirical approach of studies advocating the LMF hypothesis is performing cross-country econometric analysis for the estimation of the effects of various labor market policies and institutions on the unemployment (or some measure of the employment) rate across European (and other OECD) countries. The LMF theorists consider labor market policies and institutions such as the unemployment benefits entitlement, the duration of benefits, the unemployment benefits replacement rate, employment protection legislation, union density, union coverage, the centralization and coordination of wage bargaining, and the tax wedge to be “employment-unfriendly”, that is, increasing unemployment. They consider active labor market policies to be “employment-friendly”, enhancing employment. Therefore, in their empirical models, the LMF theorists hypothesize to find a negative effect of the active policies on the unemployment rate and a positive effect in case of each of the “employment-unfriendly” policies and institutions.

In the estimation of effects of policies and institutions on unemployment (or employment) rate, studies focus not only on estimating the direct effects of policies and institutions, but also on estimating the effects of changes in policies and institutions over time, the combined effects of two different policies and institutions, the combined effects of policies and institutions with economic shocks, the combined effects of the changes in policies and institutions over time with the shocks, and the combined effects of the labor policies and institutions with product market policies and institutions. In general, the

studies mainly focus on the effects of labor market policies and institutions in one form or the other, which indicates a lack of diversity in their general approach.

Many theorists criticize the empirical studies of the LMF theorists for using low quality data measures of labor market policies and institutions in their analyses, and also, for some methodological problems associated with their analyses (Akerlof *et al.*, 2000; Arestis and Mariscal, 2000; Atkinson, 2001; Baker *et al.* 2004; Baker *et al.* 2005; Garcilazo, 2005; Galbraith, 2006; Howell *et al.*, 2007; Oswald, 1997; Mitchell, 2003). The labor market policies and institutions, whose data measures are generally used for analysis, are highly qualitative in nature, incorporating intricate designs and structures. Although LMF theorists and the OECD (Layard *et al.* 1991, 1994; Nickell, 1997; Blanchard and Wolfers, 2000; Belot and van Ours, 2004; OECD, 2006) have devoted considerable efforts to constructing and improving the measures over time, the accuracy of the measures to represent their actual counterparts remains dubious, even under generous assumptions of objectivity. And, in spite of profound criticisms, the use of the measures remains popular.

Besides the studies advocating the LMF hypothesis, there exists a small group of studies which examine the European high unemployment problem from a macroeconomic perspective (Solow, 1994; Baker and Schmitt, 1999; Palley 2001, 2004; Galbraith and Garcilazo, 2004; Garcilazo, 2005; Arestis and Sawyer, 2006; Galbraith, 2006). These studies blame the anti-inflationary and demand-constrained policy choices made by European countries in the seventies and the eighties, and the similar policy choices adopted by European countries in the late 1980s and 1990s to enter the European Union (EU), followed by the adoption of the euro for the problem. The underlying

hypothesis of these studies is known as the *macroeconomic policy* (MP) *hypothesis*<sup>3</sup>, which relies on Keynesian theory. Advocates of the MP hypothesis call for sustained expansionary macroeconomic policies in European countries to lower their unemployment rates.

Majority of the empirical studies advocating the MP hypothesis perform cross-country analysis in which they estimate the effects of country-specific macroeconomic variables such as GDP, interest rate, inflation rate, and variables measuring economic interdependence, such as exposure to international trade, on country-specific unemployment (or employment) rates. Some of these studies also, incorporate labor market policies and institutions in their empirical models to show that the estimated effects of the policies and institutions on unemployment are not robust; and, for this, these studies use poor data measures of the policies and institutions. Garcilazo (2005) however, captures the effects of labor market policies and institutions, without using the poor quality measures. In a two-way fixed-effects panel regression model, he controls for the effects of country-specific labor market policies and institutions by country-fixed effects. And, his findings do not support the LMF hypothesis, but the MP hypothesis.

### **1.3 GENERAL APPROACH OF THE DISSERTATION**

In the context of the study of European unemployment, the basic proposition of LMF theorists is that countries with stricter labor market policies and institutions should have more rigid wages, and thereby, higher rates of unemployment, than the countries

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<sup>3</sup> Palley (2001, 2004) calls this hypothesis the “macroeconomic policy” hypothesis.



with less stricter ones. Stated differently, this proposition implies that differences in relative wage rigidities – due the differing effects of cross-country labor market policies and institutions – across European countries explain the cross-country differences in unemployment rates. Here, relative wage rigidities imply that countries with similar labor market policies and institutions experience similar changes in wages over time and hence, less or no variations in relative wages across them, and countries with dissimilar labor market policies and institutions face dissimilar wage changes, and hence, greater variations in relative wages across them. The foundation of the LMF theorists' proposition can be attributed to their shared *a priori* commitment to viewing European countries and their labor markets as separate and autonomous entities – one country, one labor market –, unaffected by changes taking place elsewhere. But in reality, European countries are not separate; they are economically integrated and interdependent and have been so for a long time.

This dissertation argues that economic interdependence between European countries is one fact, which when taken into consideration, can generate meaningful implications for the European problem of high unemployment. The reason for this is that, due to interdependence, effects of changes taking place in one country spill over to other countries. When one European country experiences changes in certain policies (such as changes in tax rates or government expenditure or interest rates) or changes in macroeconomic variables (such as investment, exports, imports), employment and wage levels of that country changes due to a direct effect and that of other countries change due to transmitted or indirect effects. Due to the differing rates of policy-induced or endogenous changes in macroeconomic variables across the countries, the employment

and wage levels of the countries fluctuate differently, leading to variations in the relative employment and wage levels between them. Apart from the effects of country-specific policies or macroeconomic variables, changes in continental or global environment (such as fluctuations in bilateral exchange rate or an oil price shock or a global financial crisis) also affect the interdependent economies and their employment and wage levels, leading relative employment and wage levels to vary across countries. This dissertation names the variables that depict policies or macroeconomic variables of one country relative to that of the other or the variables related to the continental and global environment as *transnational variables*. These variables may take forms such as relative investment, relative taxes, relative exports, world crude oil price, bilateral exchange rate, and relative migration rate. This dissertation argues that because of the interdependence between European countries, a better and more meaningful explanation of European cross-country differences in unemployment rates requires taking account of the effects of transnational variables. Therefore, this dissertation shifts from the LMF theorists' country-level approach and takes a pan-European or continental-level approach to capture the effects of transnational variables on European unemployment.

Variability in relative wages across European countries, led by transnational variables, implies the presence of relative wage flexibilities across the countries. Countries with similar labor market policies and institutions may face dissimilar changes in their wages due to the effects of transnational factors, and hence, variations in the relative wages between them, or to say, relative wage flexibilities between them. LMF theorists, who exclusively focus on relative wage rigidities, neglect these flexibilities because they do not look for sources affecting relative wages and relative unemployment

rates beyond the frontiers of each nation. But, as discussed above, if European countries are viewed as integrated economies, relative wages flexibilities may be found between the countries and these flexibilities, and thereby, variations in relative employment or unemployment rates across the countries may be explained by transnational variables. Therefore, to determine whether high rates of European unemployment is explained by labor market policy and institutional variables or by transnational variables, this dissertation examines the nature of European wage structure across integrated Europe and checks whether there exists relative wage rigidities or flexibilities. This dissertation tests the nature of the European wage structure, or, stated differently, the nature of relative wages in Europe, without imposing any theoretical preconditions – employing an *atheoretic* approach – and allowing the wage data to reveal how the relative wages actually behave in Europe. This *atheoretic* approach is unlike that of the LMF theorists in which it is *a priori* assumed that labor market policies and institutions make wages rigid. From the study of European wage structure, this dissertation answers its first research question that is: *What is the nature of European wage structure over time? How rigid or flexible is it?*

This dissertation constructs a continental-level data set of annual rate of change of average wage for 255 European country-sectors (sectors of European countries) from multiple data sets of remuneration and employment of fifteen sectors of seventeen European countries to test the nature of European wage structure. For this test, the continental-level data set is subjected to cluster analysis and discriminant function analysis (DFA), which firstly group the 255 country-sectors into one or more clusters on the basis of maximum similarities (and dissimilarities) in their average wage changes

over time, followed by discriminating maximally between the clusters. Therefore, country-sectors showing similar patterns of average wage changes or similar wage behaviors over time cluster together, while those displaying dissimilar behaviors form separate clusters. The analyses are performed multiple times on progressively smaller sets of the original set of 255 country-sectors to take account of maximum possible patterns of similarities (or dissimilarities) in average wage changes that persist across the country-sectors. Cluster structures, obtained from the analyses, render testing the LMF hypothesis without the necessity of using the poor quality data measures of policies and institutions. This is because, if countries (and their sectors) with similar labor market structures (say the Nordic countries, which have similar labor market policies and institutional structures defined by Nordic social policy model, or the Continental countries, which have similar labor market policies and institutional structures defined by Continental social policy model) cluster together, it indicates that the countries display similar patterns of wage movements over time because of their similar labor market structures, supporting the LMF hypothesis. Therefore, if clustering supports the LMF hypothesis, it implies that relative wages are rigid across European countries and the problem of unemployment may be attributed to labor market policies and institutions. However, if clustering does not reveal any meaningful pattern, nothing is implied about the nature of relative wages and thereby, about fluctuations in European unemployment rates. And, if clustering reveals patterns that do not confirm the LMF hypothesis, but seem meaningful, it indicates that relative wages are flexible across the clusters, which may be explained by transnational factors as argued by this dissertation.

After the test of the European wage structure, this dissertation searches for the variables explaining the relative wage behaviors across European country-sectors. In case the test indicates relative wage flexibilities to persist across clusters, this dissertation develops a methodology to identify whether or not transnational factors explain the flexibilities. For this, it extends the DFA from the test of over-time European wage structure, and develops another analysis to search for transnational sources that may explain the flexibilities. It selects a set of macroeconomic, demographic and labor market variables, which theoretically affect wages and employment rates, and uses the variables to construct multiple transnational variables, which theoretically explain variations in relative wages and employment rates across countries. The transnational variables are then subjected to a kind of forensic analysis and tested for their degree of associations with the relative wage flexibilities across clusters. The study of European wage structure, and the search for sources that may explain relative wage rigidities or flexibilities observed in the wage structure answers the second research question of this dissertation, which is: *What are the factor(s) that lead to flexibility (or rigidity) in European wage structure?* In case of observed relative wage flexibilities in European wage structure, once transnational variables displaying high and significant associations with the relative wage flexibilities are identified, theoretical arguments are used to explain why and how those variables explain variations in relative employment (or unemployment) rates across European countries. Therefore, from the test of the nature of relative wages and the search for the sources explaining the nature, this dissertation answers its final research question that is: *Why and how do the factor(s) that lead to flexibility (or rigidity) in*

*European wage structure explain the evolution of unemployment in European economies during the last few decades?*

This dissertation takes an approach different from that of the cross-country studies, and investigates the relationship between relative wage variations (rigidities or flexibilities) and changes in unemployment rates. With this approach, the goal of this dissertation is to better understand the evolution of high and differential rates of unemployment across European countries during the last few decades.

#### **1.4 OVERVIEW OF THE DISSERTATION**

The second chapter of this dissertation presents a review of facts, theories, and empirical studies and their shortcomings associated with the evolution of European unemployment since the last few decades. The third chapter provides the logic behind studying the nature of European wage structure for drawing implications for the European problem of high unemployment. The fourth chapter constructs a continental-level data set and uses it for testing the nature of the European wage structure. This chapter also describes cluster analysis and discriminant function analysis that are used for the test, and reports the findings from the test. The fifth chapter extends the previous chapters' analyses and searches for transnational factors that may explain the nature of the European wage structure. After identifying the factors, this chapter explains theoretically why and how the factors also explain the fluctuations of unemployment rates across European countries and Europe as a whole. The sixth chapter presents the general findings of this dissertation and prescribes a series of policy recommendations to reduce European unemployment.

## Chapter 2: Literature Review

### 2.1 INTRODUCTION

This chapter reviews the economic literature on European problem of high unemployment of recent decades. Section 2.2 of this chapter presents the empirical facts concerning the evolution of unemployment in European countries over the last few decades. Section 2.3 presents various theories of unemployment and their explanations of wage behavior, which are employed by researchers in explaining the causes of high rates of European unemployment. Section 2.4 presents a review of changes in Europe's macroeconomic environment, and thereby, shifts in theoretical explanations of Europe's high unemployment problem since the 1970s. Section 2.5 reviews some empirical studies that blame labor market – wage – inflexibility brought by the characteristics and defects of certain country-specific labor market policies and institutions for Europe's unemployment problem. This argument of the studies is based on a hypothesis called the *labor market flexibility* (LMF) hypothesis. Studies advocating this hypothesis dominate the economic literature on European high unemployment problem. Section 2.6 reviews some empirical studies by a smaller group of researchers who hold bad macroeconomic policy choices made by European countries in the last few decades responsible for their high unemployment problem. Section 2.7 discusses the shortcomings of the empirical studies that advocate the LMF hypothesis. Section 2.8 introduces the idea of studying Europe's high unemployment problem from a pan-European perspective, and looking beyond the national frontiers for the sources of the problem, which are largely ignored by studies dominating the literature on the problem.

## 2.2 EVOLUTION OF EUROPEAN UNEMPLOYMENT – EMPIRICAL FACTS

Unemployment in Europe was very low from the end of the Second World War until the first oil crisis in 1973. It started rising after the crisis and continued to increase in the eighties and the nineties, displaying considerable heterogeneity across European countries. In recent years, unemployment rates in some European countries have stabilized relative to the past two decades, but even today unemployment remains the greatest policy-concern of Europe.

Several countries of Europe experienced very high rates of unemployment over the past few decades. Table A.2.1 presents the five-year average rate of unemployment from 1960 to 2004, and the annual unemployment rate from 2005 to 2007 for seventeen European countries and the United States<sup>[4][5]</sup>. It can be observed from the table that during the five-year periods 1960-64, 1965-69 and 1970-74, unemployment rates were low in European countries. After the first oil crisis of 1973, during the period 1975-79, Ireland's average unemployment rate went above 8 percent and the average unemployment rates of a number of European countries such as Belgium, Denmark, Spain, and Portugal crossed 6 percent. In 1980-84, after the second oil crisis of 1979, there was a sharp rise in the average unemployment rates of most of the European countries. The average unemployment rates of Denmark, France, Italy, and UK exceeded

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<sup>4</sup> Unemployment rate is defined as the number of unemployed persons as a percentage of total labor force. Total labor force includes civilian labor force as well as labor force employed in the armed forces. This definition of unemployment rate (unemployed, civilian labor force, total labor force) conforms to the International Labor Organization's guidelines. Under the guidelines, persons of working age who, in a specified period, are without work and are both available for and are actively seeking work are defined as unemployed. The data on unemployment rate are collected from household labor force surveys.

<sup>5</sup> The unemployment rate presented in the table A.2.1 represents the number of unemployed persons as a percentage of civilian labor force.



8 percent, while that of Belgium, Ireland, and the Netherlands crossed 10 percent. During that period, Spain experienced an average unemployment rate above 15 percent. From the 1980s until the end of the 1990s, Belgium, France, Ireland, Italy, Spain, the Netherlands, and UK experienced very high average unemployment rates. Since 2000, the high average rates of unemployment stabilized for many European nations, but the rates still remain at much higher levels compared to the levels of the sixties and the seventies. In 2007, Germany, Greece, Spain, and Portugal experienced unemployment rates above 8 percent, Belgium above 7 percent and Italy, Finland, and Sweden above 6 percent. France's rate of unemployment in 2007 is not yet provided by the source of data, but in 2006 the rate was above 9 percent.

Compared to European countries, the US's experience of unemployment has been quite modest since 1960, which is evident from Table A.2.1. Like European countries, before the oil crises, the US's average rate of unemployment was low. After the first crisis, it went above 7 percent and after the second one, it crossed 8 percent. But after the mid of the 1980s, average unemployment rate of the United States remained closer to 6 percent till the mid of the 1990s, and since 1995 till 2007, it stabilized at rates closer to 5 percent. It is also evident from Figure B.2.1, which displays the annual trends of standardized unemployment rates<sup>6</sup> of seventeen European countries and the United States from 1970 to 2008 (first two quarters of 2008), that over the years the United States has performed better in terms of employment than many European nations.

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<sup>6</sup> Standardized unemployment rate (the OECD's definition) is defined as the number of unemployed persons as a percentage of the civilian labor force. The OECD calculates it by adjusting each nation's data on unemployment to a common conceptual ground in order to provide a better basis for international comparison of unemployment rates.

Theorists advocating the *labor market flexibility* (LMF) hypothesis describe that actual unemployment is composed of cyclical unemployment<sup>7</sup> and structural unemployment<sup>8</sup>. They hold that macroeconomic policies are only effective in reducing the cyclical part, but not the structural one. Structural unemployment, which arises from structural factors of an economy such as demographic composition of the labor force, labor market policies and institutions, and not by cyclical factors, they say can only be reduced by structural reforms. The theorists say that changes in the structural unemployment rate component represent changes in long-run equilibrium unemployment rate, which they represent by theoretical concepts of long-run equilibrium unemployment rate such as natural rate of unemployment (NRU) or non-accelerating inflation rate of unemployment (NAIRU)<sup>9</sup> (OECD, 1994b, Chap.2, pg.66). Since both NRU and NAIRU are theoretical concepts, they lack direct measures. Therefore, the theorists use theoretical constructs of NRU or NAIRU as proxy measures of the structural unemployment rate.

In the context of European unemployment, theorists advocating the LMF hypothesis propose that the structural unemployment rate tracks the actual unemployment rate quite closely (OECD, 1994b, Chap.2 pg.66). Therefore, to reduce the overall unemployment rate effectively, they propose reducing the structural unemployment rate

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<sup>7</sup> Cyclical unemployment is defined as the unemployment that arises as a result of cyclical changes in the economy such as recession, recovery, growth and decline, along the business cycle.

<sup>8</sup> Structural unemployment is the unemployment that occurs as a result of continuous structural changes in an economy. The structural changes cause mismatch between the job seeking unemployed and the jobs available to them in terms of skills, regional location, or some other dimension. The number of jobs may be equal to the number of unemployed, but the unemployed may lack the skills needed for the jobs available to them, or they are not in the region where the available jobs match their skills.

<sup>9</sup> The concept of a natural rate of unemployment rate (NRU) was introduced by the monetarists and was later used by new classical theorists as well as new Keynesians (calling it NAIRU- non-accelerating inflation rate of unemployment), with variations in their respective underlying assumptions and models.

first. The theorists blame labor market policies and institutions for producing structural rigidities in European labor markets, and in turn, increasing the structural unemployment rate. They therefore, prescribe labor market reforms to reduce the structural unemployment rate, and thereby, the actual unemployment rate in Europe.

Figures B.2.2-B.2.19 present the trends of actual unemployment rate<sup>10</sup> and structural unemployment rate<sup>11</sup> of Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, Austria, the Netherlands, Portugal, Finland, Sweden, UK, Norway, Switzerland, and the United States, respectively, from 1970 to 2008 (1991 to 2008 in the case of Germany). The figures show that there exists a significant gap between actual unemployment rates and structural unemployment rates for the European countries and the United States, which raises concern over the idea of reducing structural unemployment to reduce the actual one. Over the years, viewing the gap, LMF theorists proposed an alternative explanation saying that because of persistence of unemployment – *hysteresis* (present rates of equilibrium unemployment may depend on past rates of actual unemployment) – structural unemployment rate cannot track the actual one closely (OECD, 1994b, Chap.2, pg.67). And, they started looking for structural factors that lead to the *hysteresis* in European countries.

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<sup>10</sup> Actual unemployment rate plotted in the figures is defined as the number of unemployed as a percentage of total labor force.

<sup>11</sup> Structural unemployment rate plotted in the figures represents NAIRU measure calculated by the OECD.

### 2.3 THEORIES OF UNEMPLOYMENT AND THEIR EXPLANATIONS OF WAGE BEHAVIOR

With the evolution of rising rates of unemployment in European countries since the seventies, researchers developed various theoretical and empirical frameworks to examine the sources of the evolution. All these frameworks appear to have theoretical roots in one or more theories of unemployment viz. the classical theory, Keynesian theory, the monetarist theory, the new classical theory and the new Keynesian theory.

Classical theory<sup>12</sup> of unemployment is based on the workings of the classical labor market, which comprises a labor demand and a labor supply schedule. These schedules are described by two classical postulates. The first postulate is described as “*wage (real) equals the marginal product of labor*” (Keynes 1936, Chap.2, pg.5), which defines the labor demand schedule. It implies that labor demand depends on labor productivity, which equals real wage rate; therefore, when real wage falls, labor demand, and thereby, employment increases. The second postulate, on the other hand, is described as “*utility of the wage for any given volume of employed labor is equal to the marginal disutility of that amount of employment*” (Keynes 1936, Chap.2, pg.5), which defines the labor supply schedule. It implies that labor supply depends on the willingness of workers to put additional hours of work in response to changing wage rates, such that when real

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<sup>12</sup> Classical theory emerged in the 19th century as a revolution against the earlier body of economic doctrine called the mercantilism. It attacked the two tenets of mercantilism, (i) *bullionism* (the belief that the wealth and power of a nation depends on its stock of precious metals, and (ii) necessity of state action for the development of a capitalist system. Contrary to the mercantilists, the classical theorists (i) emphasized the role of real factors in determining real variables such as output and employment as opposed to monetary factors, and (ii) stressed the role of free market (*laissez faire* economy) and the self-adjusting tendencies of the markets (along with optimizing tendencies of the economic agents) in the absence of state control, which they considered to be unnecessary and harmful. Adam Smith, David Ricardo, W.S. Jevons, J.S. Mills, Jean-Baptiste Say, and Alfred Marshall are considered as the classical theorists.

wage increases, labor supply increases. Both labor demand and labor supply schedules are, therefore, functions of the real wage. And, their intersection determines the labor market equilibrium – the equilibrium levels of employment and real wage – at which full employment is attained.

Classical theory assumes real wages to be perfectly flexible in a labor market and all the participants of the market – employers and employees – to have perfect information about the wages. This assumption of perfect flexibility of real wages ensures full employment at classical labor market equilibrium. Unemployment prevails only when real wages fail to adjust – remain rigid – to equate labor supply to labor demand, or in other words, to permit the labor market to clear. Real wage rigidity, according to classical theory, occurs due to laborers' refusal or inability to accept a real wage equivalent to their marginal productivity, where the refusal or inability may be enforced by legislation, or imposed by social practice, or may result from collective bargaining agreement enforced by trade union negotiations, or because of slow response to changes, or occur as a result of mere human obstinacy (Keynes, 1936, Chap.2, pg.6).

With the assumption of perfect wage flexibility, Classical theory allows only two possible types of unemployment to prevail in an economy, which are frictional unemployment and voluntary unemployment. The frictional unemployment occurs due to normal turnover of labor; when workers are temporarily between jobs due to reasons such as they leave present jobs to search for new and better ones, older workers retire and leave the labor force while the younger ones enter to take up their jobs and people reenter

the labor force<sup>13</sup>. The voluntary unemployment, on the other hand, arises as a result of downwardly rigid wages (real), where the rigidity arises because of reasons mentioned above. Therefore, making wages flexible, and that too downwardly, is the classical theory's solution for reducing voluntary unemployment.

Keynesian theory<sup>14</sup> originated as a revolution against the classical theory. Keynes, in the very beginning of his *General Theory* (Keynes, 1936), rejected the foundation of the classical labor market that is the classical labor supply schedule, and tried to shift the determination of employment and wage levels away from the classical labor supply-demand mechanism (Keynes, 1936, Chap.2, pg.8). He rejected the classical labor supply schedule or the second postulate of the classical theory on two different grounds. Firstly, Keynes rejected the postulate saying that it is “*not theoretically fundamental*” because it fails to describe the way in which workers actually behave. He pointed out that the postulate implies workers care only for their absolute or nominal wage rates, but in fact, workers also care for their relative wages because they are concerned about their wage-position relative to that of the other workers (Keynes, 1936, Chap.1, pg.7-15). Therefore, according to Keynes, when real wages of the workers are cut by means of reducing their money (nominal) wages, the workers who face the wage-cuts may resist the money wage reductions because the wage-cuts deteriorate their relative wage-positions compared to that of those who face no such wage-cuts. However,

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<sup>13</sup> Begg, Fischer, and Dornbusch (2000, Chap.27) describe frictional unemployment as “the irreducible minimum level of unemployment in a dynamic society”.

<sup>14</sup> During the Great Depression of 1930s, the classical theory was unable to explain mass unemployment. In 1936, Keynesian theory (Keynes, 1936) originated by rejecting the beliefs of the classical theory and explaining the causes for the prevailing mass unemployment at that time and prescribed a cure for the affliction.

if the cuts in real wages are undertaken by means of increasing consumer price level, workers may remain indifferent to the rise in general price level because the rise in general price level affects the real wages of all the workers equally keeping their relative wage-positions unchanged. This explanation of workers' response to changes in real wages is the Keynesian explanation of relative wage rigidity.

Secondly, Keynes rejected the second postulate on a ground, which he said is “*a more fundamental objection*”. He argued that the postulate implies that reductions in money wages decrease real wages, but in fact, cuts in money wages do not ensure fall in real wages. The reason for this that he presented is that decrease in money wage reduces price level almost in same proportion, which keeps real wage (ratio of money wage to price) unchanged<sup>15</sup>

Keynes, in his theory of unemployment, asserted that equilibrium level of employment and real wage rate are not determined by labor market supply and demand forces; rather, levels of employment and wages are determined by the level of aggregate demand (or effective demand) for the products that workers produce. This aggregate demand or effective demand, he explained, flows from factors such as consumption and investment demands (also, from other factors such as net export demand, net government expenditure), which in turn depend on variables such as marginal propensity to consume, interest rate and marginal efficiency of capital<sup>16</sup>. Therefore, according to the Keynesian

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<sup>15</sup> Keynes proposed this argument using Marshall's theory that prices are governed by marginal costs, which in turn are governed by money wages (costs of labor). Therefore, change in money wages will cause prices to change (almost in the same proportion).

<sup>16</sup> The variables marginal propensity to consume and marginal efficiency of capital are described in Keynes' *General Theory* (1936).

theory of unemployment, output, employment and wage are determined by the components of aggregate demand – consumption, investment, government expenditure, taxes, exports and imports – in the economy.

Based on his theory of unemployment, Keynes also rejected the classical belief<sup>17</sup> that fully flexible real wages ensure full employment equilibrium. He asserted that since the volume of employment and the volume of aggregate (or effective) demand are uniquely correlated (Keynes, 1936, Chap.19, pg.257-260), changes in real wages will not affect employment levels if effective demand (or the determinants of its components) remains unchanged. In this context, Keynes stated that “*reduction in money-wages will have no lasting tendency to increase employment except by virtue of its repercussions either on propensity to consume for the community as a whole, or on a schedule of marginal efficiencies of capital, or on the rate of interest*” (Keynes, 1936, Chap.19 pg. 262). In the Chapter nineteen of the *General Theory*, Keynes presented a list analyzing the repercussions of reduction in money-wages on marginal propensity to consume, marginal efficiency of capital, interest rate, terms of trade etc., which he said will not have lasting effects on employment level (Keynes, 1936, Chap.19, pg.262-265).

Unlike the classical theory, Keynesian theory of unemployment does not blame wage rigidity for unemployment. Keynesian theory rather, introduced a concept of

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<sup>17</sup> Keynes (1936, Chap.19, pg.257) described the underlying argument of the classical belief as: a reduction in money wages will ceteris paribus stimulate demand by diminishing the price of the finished product, and will therefore, increase output and employment up to the point where the money wage reduction that the labor has agreed to accept is just offset by the diminishing marginal efficiency of labor occurring from the increased production of output (from a given equipment).



involuntary unemployment<sup>18</sup>, which is said to occur when workers are willing to work at the going wage rate but cannot find jobs because of insufficient effective demand in the economy. And, to reduce involuntary unemployment, Keynesian theory proposed expansionary demand policies implemented by means of an active role played by the government or the state.

To the Keynesian framework, in the 1960s, Samuelson and Solow (1960) added a relation known as the Phillips curve, which states that inflation and unemployment are inversely related. The relation is mathematically expressed as:

$$\Delta P_t = \alpha - \beta U_t \quad (2.1)$$

In the above equation,  $\Delta P_t$  is the inflation rate (rate of change of price) at time t,  $\alpha$  represents labor productivity growth,  $\beta$  is a positive coefficient, and  $U_t$  is the unemployment rate at time t. During the sixties, the Phillips curve relation led policymakers to choose between possible combinations of levels of inflation and unemployment. The relation however, collapsed when in the late sixties, and in the early seventies, the US economy faced stagflation – a combination of high inflation and high unemployment – showing non-negative relation between inflation and unemployment rates. With the collapse of the Phillips curve, monetarist theory emerged as a revolution against the Keynesian theory.

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<sup>18</sup> Keynes defined involuntary unemployment as: “Men are involuntarily unemployed, if in the event of a small rise in the price of wage-goods relatively to the money-wage, both the aggregate supply of labor willing to work for the current money-wage and the aggregate demand for it at that wage would be greater than the existing volume of employment” (Keynes 1936, Chap.2, pg.15).

Monetarists' theory of unemployment is similar to that of the classical theory in which labor market equilibrium is determined by the supply-demand mechanism of the labor market. The monetarists separated between a short-run and a long-run determination of the labor market equilibrium. In the short-run, they asserted that change in inflation rate, resulting from a change in money supply<sup>19</sup>, affect real wage rate, which in turn affects employment level. According to the monetarists (Friedman, 1968), workers demand for real wages on the basis of their expectation<sup>20</sup> for inflation in the coming production period. If actual inflation is lower than what is expected by the workers, the employers pay actual real wage above the expected real wage of the workers. This leads employers to layoff workers and increase unemployment. Similarly, if actual inflation is more than what is expected, employers pay actual real wage rate below the expected real wage of the workers. It is then that the employers find it cheaper to hire additional workers, and they employ more, which increases employment. Therefore, according to the monetarists' theory of unemployment, as long as monetary authorities keep changing money supply, inflation rate fluctuates, making both real wage and employment (or unemployment) levels to fluctuate. The monetarists' relationship between inflation rate (actual and expected) and unemployment is represented by Friedman's expectations-augmented short-run Phillips curve relation, which is expressed as:

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<sup>19</sup> For the monetarists, inflation is a monetary phenomenon, and monetary authorities make money supply to rise (or fall), consequently causing inflation (or deflation).

<sup>20</sup> Monetarists assume that inflation expectations are made adaptively based on all the information available from the past periods.

$$\Delta P_t = \alpha - \beta U_t + \lambda E(\Delta P_t) \quad (2.2)$$

where  $0 \leq \lambda \leq 1$ . This equation is obtained by introducing an expected inflation component in equation (2.1).

Over time, monetarists argue that inflation rate stabilizes, and therefore, workers' inflation, and thereby, wage expectations are realized, that is, actual and expected real wage equate. Hence, in the long-run, with the stabilization of inflation rate, real wage and employment rates also stabilize, and the labor market clears corresponding to the long-run equilibrium real wage rate (the real wage rate at which actual and expected real wage equate). The only unemployment that remains in the long-run is voluntary unemployment, arising from voluntary friction, and/or structural changes. The monetarists named the long-run equilibrium rate of unemployment as the natural rate of unemployment (NRU)<sup>21</sup> at which inflation rate remains unchanged and wage expectations realize (Friedman, 1968, Phelps, 1968). And, according to the monetarists, even if actual unemployment drifts away from the NRU, say due to short run fluctuations in money supply, sooner or later inflation and real wage expectations are realized and the actual rate gravitates toward its natural rate. The NRU can be derived from the equation (2.2) by replacing  $\Delta P_t = E(\Delta P_t)$  – in the long-run, expected inflation equals actual inflation – in it. Assuming  $\lambda = 1$ , that is, change in expected inflation is reflected one-for-one in wages in equation (2.2), and solving it for the NRU yields the expression for NRU as:

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<sup>21</sup> The level of output corresponding to NRU is called the natural rate of output.

$$U^* = -\frac{\alpha}{\beta} \quad (2.3)$$

In the backdrop of stagflation in the United States, the new classical theory emerged to study macroeconomics by using neoclassical – microeconomic – framework. Classical theory being the forerunner of the neoclassical theory, the new classical theory of unemployment is similar to the classical one. Like in the classical labor market, labor supply and demand forces determine the equilibrium in the new classical labor market. And, the only possible unemployment that may exist in equilibrium is either frictional or voluntary. The new classical theorists also named the equilibrium unemployment rate as the natural rate of unemployment (NRU), but they differentiated it from the monetarists' NRU, asserting that their NRU is attained not only in the long-run, but also in the short-run. They eliminated the difference between the short-run and the long-run labor market equilibrium by their assumption of rational expectations<sup>22</sup>, that is, by assuming that all economic agents make rational forecasts (about prices and wages), using all the information available from the present as well as the past. Assuming the economic agents to make forecasts or expectations rationally, the new classical theorists assert that the agents are able to realize any anticipated change in the economy, which lead wage (and/or price) expectations to fluctuate, and hence, revise their expectations to match with the actual ones. Therefore, the rational expectations assumption ensures equilibrium at the natural rate, both in the short run and the long run. And, in case an unanticipated change occurs in the economy, and expectations are not realized, the employment level

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<sup>22</sup> The concept of rational expectation was originated by John F. Muth (1961).

deviates from the NRU, but soon economic agents realize the change and correct their forecast errors the employment level returns to the NRU.

The new classical theory, like the classical theory, assumes that equilibrium in the labor market is always attained under perfectly flexible wages. When labor demand shifts (say due to technological change) or labor supply changes (say due to change in some demographic factor) and the real wages adjust appropriately, the labor market clears and equilibrium is attained. Only when wages are rigid, unemployment prevails.

New Keynesian theory emerged as a response to the new classical theory. Like the new classical theorists, the new Keynesians build macroeconomic models using neoclassical framework. The new Keynesians assume economic agents to make expectations rationally, but they assume imperfectly competitive market, where prices and wages are not perfectly flexible to ensure market clearance.

The new Keynesian theory of unemployment differentiates between short-run and long-run determination of wages and employment levels in a labor market. Their short-run theory is Keynesian, in which they assert that employment is determined by aggregate demand and its components. Unemployment arises due to changes in the aggregate demand components, and is cyclical in nature. Therefore, short-run unemployment, according to the new Keynesians, can be reduced by fiscal and monetary policies. Also, the new Keynesians ascertain that involuntary unemployment can prevail in the economy (Layard *et al.*, 1991, Chap.1, pg.11), which is unlike the new classical theorists, who reject the conceptual validity of involuntary unemployment (Galbraith and Darity, 1994, Chap.8, pg.250). The new Keynesian long-run theory of unemployment is however, classical in nature. The long-run theory is known as the non-accelerating

inflation rate of unemployment (or NAIRU) theory. The new Keynesian NAIRU is often assumed to be synonymous with the new classical NRU, (Ball and Mankiw, 2002), but theorists point out fundamental differences between the NAIRU and the NRU (Stockhammer, 2007).

The new Keynesian labor market comprises a price-setting schedule, analogous to the new classical labor demand schedule, and a wage-setting schedule, analogous to the new classical labor supply schedule, which depict the bargaining claims made by employers and workers, respectively (Layard *et al.*, 1991, Chap.1, pg.12). The price-setting schedule depends on the market power of the employers (firms), while the wage-setting one depends on factors such as labor market policies and institutions – also known as wage-push factors – which influence the wage claims made by the workers. The new Keynesian labor market equilibrium is attained when the claims of both the employers and workers are met, where the equilibrium level of real wage rate is the rate desired by both the wage-setters and the price-setters, and that real wage rate determines the equilibrium level of employment. The new Keynesian equilibrium rate of unemployment is known as the NAIRU at which corresponding claims of the workers and employers are met, their price and wage expectations are realized, and inflation rate remains stable. Therefore, according to the new Keynesians, long-run NAIRU equilibrium in the labor market is not determined by market clearance, like NRU, but by the balance of power between workers and employers (Stockhammer, 2007).

New Keynesian theorists do not assume wage (and price) to be perfectly flexible. Rather, they developed theories to show how optimal behavior of economic agents in imperfectly competitive markets imply lesser wage flexibility in response to changes in

aggregate demand and supply than in the case of competitive markets. The new Keynesian theorists developed multiple theories of wage rigidity including, the relative wage theory, the efficiency wage theory, the implicit contracts theory, and the “insiders”-“outsiders” theory to explain wage rigidity in imperfectly competitive markets (Galbraith and Darity, 1994, Chap.10, pg.304). Among those theories, the relative wage theory is the one which was originally proposed by Keynes (1936, Chap.2, pg.7-15) and is discussed above. New Keynesians retain Keynes’ basic argument and apply the theory to their labor market models to define one of the sources of wage rigidity.

Efficiency wage theory<sup>23</sup> argues that firms pay efficiency wage, which is over and above market-clearing wage, in order to elude higher levels of labor productivity. Because of asymmetries associated with employers’ information about worker’s productivity (and assuming that monitoring the workers is costly), paying efficiency wages appears profitable for the firms. Wage rigidity, under efficiency wage theory, occurs because the employers are unwilling to pay market-clearing levels in lieu of the risk of receiving inferior labor productivities, which compels workers, who cannot persuade employers to hire them at wages below efficiency wage, to remain unemployed.

Implicit contracts theory is based on the argument that workers prefer higher wages at the risk of unemployment over lower wages with job security. Wage rigidity,

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<sup>23</sup> The efficiency wage theory is pioneered by Akerlof and Yellen (1990). According to this theory firms chose to pay wages above the market-clearing level, called the efficiency wage, because of market imperfections that arise as a result of asymmetries associated with employers’ information about worker’s productivity. The employers pay efficiency wages (assuming that monitoring the workers is costly) for reasons such as: (a) to attract applicants with higher productivity, (b) to motivate hired workers to impart greater effort, (c) to discourage shirking because if workers are caught shirking they will face significant cost of losing such a high wage job, and (d) to improve the productivity of the workers by increasing their general well being (making them healthy). Therefore, it turns out to be profitable for the firm to pay wages above the market-clearing wage rate.

under implicit contracts theory, occurs because workers implicitly agree on a contract with their employers to obtain wages above market-clearing level in exchange for imparting the employers the freedom to fire them at the employers' convenience<sup>24</sup>. After getting fired, the workers are unable to bid for immediate jobs at lower wages because of the contract, and the only choice that they are left with is to wait for getting hired when the employers find hiring favorable.

“Insiders-outsiders” theory is concerned with the conflict of interest between “insiders”, who are employed, and “outsiders”, who are unemployed (or work in the informal and competitive sectors of the labor market). According to this theory, “insiders” enjoy job protection facilitated by labor turnover costs that their employers need to incur when they fire them, but the “outsiders” lack any such protection. Since the labor turnover costs elicit a sense of job protection to the “insiders”, they make higher wage claims without fearing for getting fired. In the face of say adverse labor demand shocks, if some “insiders” get fired, the remaining ones continue with their higher wage claims. They negotiate through unions to set wages above the market-clearing level (which may be society's standard fair wage), which the “outsiders” (unemployed members of the union or non-members) are unable to underbid because of threats of social sanctions. And, as a result, the “outsiders” continue to remain unemployed. Under this theory, wage rigidity, and thereby, unemployment is occurs due to higher wage claims made by the “insiders”.

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<sup>24</sup> Implicit contract theory presumes that because of the contract workers prepare themselves beforehand for the spells of unemployment using their high wage rates.



Theorists<sup>25</sup> who dominate the economic literature on European high unemployment problem apply principles of the new classical theory and the new Keynesian theories, both of which have roots in the classical and neoclassical theory, for their explanation of the problem. They argue that, high rates of European unemployment are due to factors related to the European welfare state – labor market policies and institutions such as unemployment benefits, employment protection legislation, and unionization – which influence workers’ wage demands and make wages downwardly rigid, and thereby, increase NRU or NAIRU. These theorists hold that unemployment benefits payments, on one hand, increase the wage claims of the “insiders”, and on the other hand, decrease the effectiveness of the unemployed “outsiders” to search for jobs, both of which increase unemployment. Employment protection legislation is said to increase unemployment not only by making firing of the “insiders” costly, but also by reducing the chances of the “outsiders” to get hired. Union power increases unemployment by allowing the “insiders” to negotiate for wages above market-clearing levels, and thereby, reducing the chance of the unemployed “outsider” to get employed. The theorists also blame these policies and institutions for generating long-term effects on unemployment leading to unemployment persistence. Therefore, they prescribe labor market reforms – reforming the policies and institutions – to make wages downwardly flexible, and thereby, reducing unemployment (NRU or NAIRU) in Europe.

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<sup>25</sup> These theorists are called as labor market flexibility (LMF) theorists because the underlying hypothesis of their explanation for European unemployment problem is called the labor market flexibility (LMF) hypothesis, which is discussed in Section 2.5.

In the explanation of the European high unemployment problem, only a few theorists apply Keynesian principles. These theorists<sup>26</sup> blame bad macroeconomic policy – anti-inflationary and austere fiscal policy – choices made by European countries in the past few decades for their problems of high unemployment. Based on Keynesian theory, they prescribe expansionary macroeconomic policies to generate effective demand, and consequently increase employment (and reduce unemployment) in European countries, and in Europe as a whole.

#### **2.4 MACROECONOMIC ENVIRONMENT AND THE EVOLUTION OF THEORETICAL EXPLANATIONS**

Since the rise of unemployment rates in European countries in the seventies, researchers and policymakers have put forward several explanations for the rise, which have shifted and evolved over time<sup>27</sup>. Initially, in the seventies, when unemployment rates started rising in a number of European countries explanations were directed toward examining the role of shocks including, oil price shocks and total factor productivity slowdown for leading to the rise. Europe (and the rest of the world) faced oil crises in 1973 and 1979, which led to world-wide increases in oil prices. Another shock that hit European nations during the seventies was the large decline in total factor productivity growth. Using a natural rate or NRU framework, researchers studied the role of shocks in explaining the rise of unemployment rates in European countries. They argued that, any adverse shock that increases the prices of factors of production other than that of labor

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<sup>26</sup> These theorists are called as macroeconomic policy (MP) theorists because the underlying hypothesis of their explanation for European unemployment problem is called the macroeconomic policy (MP) hypothesis, which is discussed in section 2.6.

<sup>27</sup> Blanchard (2006) reviews the shifts in the explanations since the 1970s.

requires a fall in wages in order to maintain equilibrium level of employment at the NRU. And, if wages do not fall, unemployment rate rises. Therefore, to restrict the increase in unemployment rates as a result of the oil shocks and total factor productivity shock, which increased the prices of factors of production other than labor, required a fall in wages. The researchers argued that European countries were hit by the adverse shocks after a period of growing labor militancy in the forms of “Events of May” in France in 1968, “Hot Autumn” in Italy in 1969, the wildcat strikes in Germany in 1969, and the end of dictatorships in Portugal and Spain in 1974 and 1975, which led to excessive wage demands by the workers, or in other words, made wages downwardly rigid. They, therefore, concluded that the downward rigidity of wages in the face of the shocks led to the rise of unemployment in Europe. In this context, Baker and Schmitt (1999) argue that if it is true that the events of labor militancy led to high wage demands, the capital share of income and the rates of return to capital should display a fall, or at least remain unchanged during the period of militancy or right after that. But, Baker and Schmitt (1999, table 2) present data on measures of capital share of income and return to capital for European countries, which show large increases in both measures since 1979. These empirical facts, therefore, cast doubt over the view that excessive power of the workers, in the face of the adverse shocks, led to the rise of unemployment in Europe.

Explanations based on the role of oil and total factor productivity slowdown shocks lost ground over the time once it was noted that unemployment rates continued to rise in Europe even in the eighties, much after the effects of the shocks were gone. Furthermore, the explanations seemed amiss when the United States displayed better performance than Europe in terms of unemployment, even after being hit by the same

shocks. Looking at the difference between the US's and Europe's employment performances, researchers started comparing the US economy with that of Europe to explain the difference. In the 1980s, Europe, the United States, and other OECD nations, in general, experienced shocks as a result of the spread of computer technology and increase in global competition. Theorists then began to argue that the spread of technology and trade increased the demand for highly skilled workers, while reducing the demand for the less-skilled ones in those countries, which led to the rise in unemployment rate in the countries. Using the natural rate framework, the theorists proposed fall in the wages of the less-skilled workers for increasing their labor demand. Comparing the United States with Europe, theorists argued that since in the US the wages of the less-skilled (those without a college degree) workers fell considerably during the eighties, therefore, the United States experienced lower rates of unemployment. And, since Europe showed no decline in the wages of its less-skilled workers, it experienced high rates of unemployment. This argument would have been true if the rise in European unemployment was concentrated among the less-skilled workers, but empirical facts do not support this argument. Baker and Schmidt (1999, table 3) pointed out that the ratio of the unemployment rate of less-educated workers to that of the college-educated ones in Europe is no greater than that in the United States. Also, the data on employment rates by education level reveal that the decline in European employment rates has remained similar across all skills and education levels (Nickell and Bell, 1995; Card, Kramer and Lemieux, 1996; Krueger and Pischke, 1997).

Unemployment rates continued to rise in the eighties reaching very high levels in countries such as France, Spain, Belgium, Ireland, UK, Italy, and the Netherlands, which

led researchers to not only explain the rise, but also the persistence of high rates of unemployment. Several explanations were proposed in the eighties to explain the persistence of unemployment. One explanation emphasized the dynamic role of capital accumulation in leading to the persistence of unemployment (Bruno and Sachs, 1985; Bean *et al.*, 1986). According to this explanation, long periods of adverse shocks lead to a decline in rate of capital accumulation, which decreases the number of jobs and thereby, restricts a quick decline in unemployment rates (Blanchard, 1991). A second explanation emphasized the role of certain labor market policies and institutions in leading to the persistence over time. Based on “insiders-outsiders” theory<sup>28</sup>, unions are said to set wages of the “insiders” over and above market-clearing levels (or making wages downwardly rigid) even in the face of adverse labor demand conditions, which hinders a quick return to NRU or NAIRU even when labor demand conditions improve, and thereby, lead to unemployment persistence or *hysteresis* (Blanchard and Summers, 1986). Some theorists emphasized that unemployment benefits payments reduce the effectiveness of the unemployed, who receive the benefits, to search for jobs and influence them to not to exit unemployment easily. This in turn, leads to the persistence. In this context, some theorists add that being unemployed for a long period of time not only reduces the morale of the unemployed to search for jobs, but also makes their skills obsolete over time, makes them appear less attractive to employers (Layard and Nickell, 1987). These effects make it difficult for the unemployed to exit unemployment. Bertola

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<sup>28</sup> The “insiders-outsiders” theory developed by Lindbeck and Snower (1989) and was first applied as a theory of unemployment by Gregory (1986) followed by Blanchard and Summers (1986) (Blanchard, 2006). A less extreme version of this theory is provided by Nickell and Wadhvani (1990).

(1990) emphasized the role of employment protection legislation in leading to persistence of unemployment. Bertola argued that employment protection legislation makes firing of workers costly for the employers, and therefore, discourages them to make new hires even when times are good because if they hire less during good times they will then have to fire less and incur less cost during bad times. Such behavior on the part of the employers, over time, leads to persistence of unemployment.

The early 1990s displayed high levels of unemployment in Europe, but considerably heterogeneous rates across European nations. While Ireland, the Netherlands, and UK experienced a decline in their unemployment rates, Denmark, Finland, and Sweden saw a sharp increase; while Austria, Portugal, and Norway maintained relatively low rates of unemployment, France, Spain, and Italy maintained very high rates. And, Germany began to face steadily increasing rates after reunification. These unemployment trends made the explanations based on shocks unpopular because, in the nineties, it was evident that the shocks of seventies and eighties cannot plausibly have effects then. Therefore, in the early nineties, the focus shifted entirely from the role of common shocks toward looking at the differences in labor market policies and institutions across European countries in explaining the differences in the trends of unemployment rates across those countries. Differences were also examined between the European countries and the United States (and other OECD countries).

In 1994, the OECD produced an influential report, the OECD *Jobs Study* (OECD, 1994a) that led researchers and policymakers to blame labor market policies and institutions for the high and heterogeneous rates of unemployment across European (and other OECD) countries. The report made a number of recommendations for reducing or

simply eliminating labor market policies and institutions. With the emergence of the report, the literature on Europe's high unemployment problem started getting flooded by a series of studies studying and examining the effects of country-specific labor market policies and institutions on the unemployment rates of European (and other OECD) countries (Scarpetta, 1996; Siebert, 1997; Haveman, 1997; Nickell, 1997; Elmeskov *et al.*, 1998; Blanchard and Wolfers, 2000; Bertola *et al.*, 2001; Fitoussi *et al.*, 2000; Belot and van Ours, 2004, Nickell *et al.*, 2005; Baccaro and Rei, 2005; Bassanini and Duval, 2006). These studies argued that certain labor market policies and institutions impede the appropriate labor market and wage adjustments, making the market and wages rigid, and thereby, increasing unemployment. And, in the case of European countries, they argued that over time, in the eighties and nineties, the labor market policies and institutions have grown to be more rigid relative to what they were in the sixties, which led to the rise in unemployment rates in those countries in the eighties and the nineties. They also added that the countries with more rigid labor market regulations – policies and institutions – and thereby, more rigid wages experienced higher rates of unemployment than those with less rigid labor market regulations. Therefore, to reduce unemployment in Europe, these studies recommended making wages (and labor market) flexible (downwardly) by means of reforming “unemployment-causing” labor market policies and institutions. As mentioned in Chapter One, these policies and institutions include the unemployment benefits entitlement, the duration of benefits, the unemployment benefits replacement rate, employment protection legislation, union density, union coverage, the centralization and coordination of wage bargaining, and the tax wedge.

In 2000, there came another shift in the explanation of European unemployment problem. Blanchard and Wolfers (2000) produced a study, which argued that labor market policies and institutions cannot be solely blamed for the rise in unemployment rates in European countries because these policies and institutions were present even when unemployment rates were low in those countries. They, rather, argued that the source of high unemployment is explained by a combination of common shocks and the labor market policies and institutions. They explained that when European countries were hit by common shocks, country-specific labor market policies and institutions restricted appropriate labor market (and wages) adjustments, which led to high rates of unemployment in those countries. And, in the face of shocks, countries with more rigid policies and institutions faced higher rates of unemployment than those with less rigid policies and institutions. With the emergence of Blanchard and Wolfers (2000) study, some theorists shifted their focus toward measuring the effects of macroeconomic shocks in the presence of labor market policies and institutions on unemployment rates, but others maintained the previous position. Although before Blanchard and Wolfers, Bruno and Sachs (1985) and Layard *et al.* (1991, Chap.9, pg.430-437) have emphasized the combined effects of shocks and institutions on unemployment, the study of Blanchard and Wolfers is considered to be the influential one. The underlying hypothesis of the explanations based on both the sole role of labor market policies and institutions and their role combined with common shocks is known as the *labor market flexibility* (LMF) hypothesis, which theoretically relies on classical and neoclassical economic principles. And, the theorists advocating the LMF hypothesis are called the LMF theorists.



In addition to the LMF theorists, another group of theorists emerged in the nineties who, contrary to the LMF hypothesis, argued that problem of European unemployment lies not with labor market policies and institutions, but with the demand constrained policy choices that were made by European countries in the eighties, and then prior to joining the European Union (EU) and adopting the euro, irrespective of their country-specific social and economic conditions. The underlying hypothesis of this argument is known as the *macroeconomic policy (MP) hypothesis*. The advocates of the MP hypothesis, called MP theorists, prescribe sustained expansionary macroeconomic policies across the European countries as the means to lower European unemployment.

Studies advocating the LMF hypothesis although face profound criticisms from many (Akerlof *et al.*, 2000; Arestis and Mariscal, 2000; Atkinson, 2001; Baker *et al.* 2004; Baker *et al.* 2005; Garcilazo, 2005; Galbraith, 2006; Howell *et al.*, 2007; Oswald, 1997; Mitchell, 2003), these studies, and their policy recommendations dominate the economic literature and the policy arena. In the recent years, in addition to the role of labor market policies and institutions, some LMF theorists have emphasized the role of product market regulations – policies and institutions – in explaining European high unemployment problem (Berger and Danninger, 2006; Bassanini and Duval, 2006; Amable *et al.*, 2006; Nicoletti and Scarpetta, 2005; Griffith *et al.*, 2007; Fiori *et al.*, 2007, Rovelli and Bruno, 2008). These theorists argue that since product market regulations increase the mark-up over prices, demand for products that the workers produce falls, and in turn, the demand for workers fall, leading to a rise in unemployment. Also, employers who enjoy product-market rents with the higher mark-ups, distribute parts of their product-market rents to the workers in the form of higher wages, which reduces labor

demand, and thereby, increases unemployment. These theorists argue that the benefits of labor market reforms have differed across European (and other OECD) countries because of the differences in their degrees of product market regulations. They, although, unanimously blame both labor and product market policies and institutions for the high rates of unemployment, some among them argue that product market deregulations reduce unemployment when the labor market policies and institutions are less rigid, or in other words, less regulated (Berger and Danninger, 2006; Bassanini and Duval, 2006; Amable *et al.*, 2006), while others argue that product market deregulations reduce unemployment more effectively when labor market regulations are high (Nicoletti and Scarpetta, 2005; Griffith *et al.*, 2007; Fiori *et al.*, 2007). The basic argument of the second group is that countries in which labor market regulations are high, wages are already quite above the market-clearing level and employment quite below its full employment level, hence, in those countries product market deregulations have greater potential to change wages and employment levels than in those in which labor market regulations are low. Therefore, even the current economic literature and policy field remain dominated by studies advocating the LMF hypothesis.

## **2.5 LABOR MARKET FLEXIBILITY HYPOTHESIS – REVIEW OF EMPIRICAL STUDIES**

Empirical studies supporting the *labor market flexibility* (LMF) hypothesis can be broadly classified into three groups. The first group solely blames the rigidities of labor market policies and institutions for the rise of unemployment rates in European countries (Scarpetta, 1996; Nickell, 1997; Elmeskov *et al.*, 1998; IMF, 2003; Belot and van Ours, 2004; Nickell *et al.*, 2005; Baccarro and Rei, 2005; Bassanini and Duval, 2006). The

second group holds external shocks responsible for the higher rates of unemployment in the countries with more rigid labor market policies and institutions and vice versa (Blanchard and Wolfers, 2000; Bertola *et al.*, 2001 and Fitoussi *et al.*, 2000). And, the third group in addition to the rigidities of labor market policies and institutions, also blames product market regulations for the higher rates of unemployment (Berger and Danninger, 2006; Bassanini and Duval, 2006 and Amable *et al.*, 2006; Nicoletti and Scarpetta, 2005 and Griffith *et al.*, 2007, Fiori *et al.*, 2007, Rovelli and Bruno, 2008). The general methodological approach of the three groups of studies is to estimate the effects of labor market policies and institutions, changes in those policies and institutions and interactions between them, interactions of policies and institutions with external shocks, and the interactions of change in policies and institutions with external shocks on unemployment rate (or employment rate). The third group of studies, in addition to estimating the effects of labor market policies and institutions, also estimates the effects of product market policies and institutions and their interactions with labor market policies and institutions on unemployment (or employment). A review of some of the notable studies advocating the LMF hypothesis is presented as follows:

**Scarpetta (1996)** aims to assess the effectiveness of labor market reforms prescribed by the OECD *Jobs Study* (OECD, 1994) for reducing European unemployment. For this purpose, Scarpetta examines the role of various labor market policies and institutions in (i) explaining differences in the levels of structural or “equilibrium” unemployment rate across fifteen to seventeen OECD countries during 1983-93, and (ii) leading to the persistence of unemployment in those countries during 1970-93. Scarpetta analyzes four models in which unemployment rate (total

unemployment rate, youth-unemployment rate, long-term unemployment rate, and non-employment rate) is used as a dependent variable, while various labor market policies and institutions, indicators of product market regulation and macroeconomic shock variables such as the real interest rate and terms-of-trade are included as independent variables. Due to the lack of direct measure(s) of product market regulation, Scarpetta employs a measure of openness to foreign trade (showing the degree of competitiveness to which domestic firms are exposed) and a proxy for pervasiveness of trade restrictions, representing degrees of product market competition. Scarpetta incorporates the pervasiveness of trade restrictions and an interaction between the pervasiveness of trade restrictions and the openness to foreign trade<sup>29</sup> in his models. In order to control for cyclical variations in the actual unemployment rate, he incorporates output gap in the models, which also renders computing the estimated effects of other explanatory variables on the structural portion of the actual unemployment rate. In order to account for the effects of labor market policies and institutions on persistence of unemployment, Scarpetta introduces lagged unemployment rate, whose coefficient is expressed as a function of labor market policy and institutional factors, as an exploratory variable in the models. From the estimation of the models, Scarpetta finds that: (a) both employment protection legislation and the unemployment benefits entitlements increase structural unemployment, and also lead to persistence of unemployment; (b) active labor market policies reduce unemployment; (c) the tax wedge has no effect on unemployment; (d) the

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<sup>29</sup> Scarpetta uses the interaction term because he argues that the effects of pervasiveness of same degrees of trade restrictions on employment or unemployment differ with the differences in degrees of openness to foreign trade.

highly centralized and decentralized bargaining systems are associated with low levels of unemployment, while the intermediate ones are associated with high levels of unemployment<sup>30</sup>; and (e) the pervasiveness of trade restrictions shows significant positive effect on unemployment rate only in one model specification. Both proxy measures of product market regulation otherwise show no significant effect on unemployment rate or youth unemployment rate in any model specification. However, both measures show significant and positive effect on long-term unemployment rate and also on non-employment rate. Based on the findings, Scarpetta concludes that labor market policies and institutions affect both the levels of structural unemployment as well as the speed with which labor markets adjust in the OECD countries, that is, persistence of unemployment. He also concludes that lack of foreign competition has significant effects on “the most vulnerable job seekers, if not on all those who are unemployed”.

**Nickell (1997)** tests the LMF hypothesis on a sample of twenty OECD nations over two six-year periods, viz. 1983-88 and 1989-1994. Nickell estimates a set of regression equations in which various labor market policy and institutional variables are regressed on a measure of unemployment (average rate of unemployment, long-term unemployment or short-term unemployment), which is included in log form. Other variables such as change in average inflation rate and dummy for the second time period are also incorporated in the equations as independent variables. From the analyses, Nickell finds that: (a) generosity of unemployment benefits when run indefinitely

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<sup>30</sup> This result confirms the hump-shaped hypothesis of Calmfors and Driffill (1988), which is discussed in Chapter 3. The hypothesis refers that highly centralized (co- operative) bargaining systems, such as Austria and Nordic countries, and totally decentralized (competitive) systems, such as US, are negatively associated with unemployment, while intermediate systems are positively associated with the same.

increases unemployment; (b) generous unemployment benefits combined with fixed benefits duration reduces unemployment; (c) high levels of unionization associated with collective bargaining and no coordination (high coordination) in bargaining increases (decreases) unemployment; (d) higher tax wedge increases unemployment; and (e) unlike Scarpetta (1996), there is no association between employment protection legislation and unemployment rate. From these findings, Nickell concludes that the basic LMF hypothesis is “too vague and probably misleading” because several labor market institutions that are held as the source of high unemployment do not display any observable effects on unemployment.

**Elmeskov, Martin and Scarpetta (1998)**, like Scarpetta (1996), assess the effectiveness of some of the recommendations of the OECD *Jobs Study* (1994). For this assessment, Elmeskov *et al.* estimate the effects of changes in various labor market policy and institutional variables on the changes in unemployment rates of OECD countries during 1983-95. The time period covered by Elmeskov *et al.* for their analysis is almost identical to that of Nickell (1997), but the former employs annual data while the latter uses data over two six-year time periods. Unlike, Scarpetta (1996) and Nickell (1997), Elmeskov *et al.* include interactions between labor market policy and institutional variables in their models. They perform this to test a hypothesis that institutions are interdependent and their impacts on unemployment are direct as well as indirect, that is, via affecting other institutional variables. The interaction terms include interaction between unemployment benefits and active labor market policies, between unemployment benefits and employment protection legislations, between employment protection legislations and the degree of centralization or coordination and between the

tax wedge and the degree of centralization or coordination. From their analyses, Elmeskov *et al.* find that: (a) unemployment benefits increase unemployment, while active labor market policies decrease it; (b) unlike Nickell (1997), employment protection legislation and unemployment are positively associated, and this association is concentrated in systems with intermediate levels of bargaining coordination; (c) unlike Scarpetta (1996), the tax wedge and unemployment are positively associated, and the association is concentrated in intermediate bargaining coordination systems. This finding is similar to that of Nickell (1997), but the impact size of the tax wedge on unemployment differs considerably across the two studies; (d) union density increases unemployment; and (e) systems with intermediate levels of coordination and centralization are associated with high rates of unemployment, while the highly coordinated and centralized bargaining systems, and highly decentralized and least coordinated systems are associated with lower levels of unemployment. But, the highly coordinated and centralized ones are associated with relatively lower unemployment rates than the decentralized and least coordinated ones.

The **Blanchard and Wolfers (2000)** study brought a shift in the test of LMF hypothesis from an estimation of the effects of labor market policies and institutions on unemployment to estimating their effects combined with macroeconomic shocks. Blanchard and Wolfers argued that the studies which consider the labor market policies and institutions to solely explain the high rates of unemployment in European (and other OECD) countries are flawed because the policies and institutions that are blamed in the eighties and the nineties were also present in the decades when unemployment rate was low. Pointing out the flaw associated with the studies, Blanchard and Wolfers stated that:

Explanations based solely on institutions also run however into a major empirical problem: many of these institutions were already present when unemployment was low (and similar across countries), and, while many became less employment-friendly in the 1970s, the movement since then has been mostly in the opposite direction. Thus, while labour market institutions can potentially explain cross country differences today, they do not appear able to explain the general evolution of unemployment over time (Blanchard and Wolfers, 2000, pg.C2).

Blanchard and Wolfers emphasized that adverse external shocks increase unemployment in countries whose labor market policies and institutions impede labor market adjustments. To analyze this explanation, Blanchard and Wolfers test the effects of interaction between institutions and macroeconomic shocks on unemployment rate. They perform their analysis on a sample of twenty OECD countries over eight five-year periods (and last two annual years) during 1960-96. In their first empirical model, Blanchard and Wolfers estimate the effects of various labor market policies and institutions, unobserved shocks common across countries, and institutions interacted with unobserved shocks on unemployment rate. From the estimation of the model, they find that: (a) an interaction of unobservable shocks with each policy and institutional variable such as the benefits replacement rate, the benefits duration, employment protection legislation, the tax wedge, and union density increases unemployment rate; (b) an interaction of unobservable shocks with active labor market policies, and with bargaining coordination decreases unemployment rate; and (c) union coverage has no significant effect on unemployment. From these findings, Blanchard and Wolfers conclude that macroeconomic shocks combined with sources of labor market rigidity explains both the rise in unemployment over the period between 1960 and 1996 and the cross-country variations in unemployment rates. Blanchard and Wolfers note that their findings are



sensitive to changes in specification because, in their model, when they replace certain policies and institutions such as the benefits replacement rate, employment protection legislation and the tax wedge by their alternative measures, the effects of the policies and institutions on unemployment that were significant before become insignificant. Other variations in the model specification such as the introduction of time-varying measure of institutions produced results which indicate a lack of robustness of their general findings.

**Bertola, Blau and Kahn (2001)** extend the work of Blanchard and Wolfers (2000) and, in addition, focus on capturing effects of demographic changes. Bertola *et al.* begin with a comparative analysis between the US and other OECD countries during 1960-96 in which they estimate the effects of macroeconomic shocks and a demographic variable that is youth population share (number of people between age 15-24 as a fraction of number of people 15 years or over) on unemployment rate. From their analysis, they find that the macroeconomic shocks and the demographic variable explain only a modest portion of the observed fall in the US unemployment rate compared to other OECD nations. To search for a full explanation, Bertola *et al.* add time-invariant labor market policy and institutional variables<sup>31</sup> and interactions of the variables with shocks to the same model and estimate their effects on unemployment rate. From the estimation, Bertola *et al.* find that: (a) taxes, the benefits duration and employment protection legislation increase unemployment; (b) the coordination of bargaining decreases unemployment; (c) the effects of the benefits replacement rate, union density, union

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<sup>31</sup> Bertola *et al.* use time-invariant institutional measures, like Blanchard and Wolfers (2000), because international differences in the policies and institutions are much greater than changes in the same over time within countries. Also, Blanchard and Wolfers found stronger results when they use time-invariant measures than when they used time-variant ones.

coverage and active labor market variables on unemployment are all insignificant in the majority of the regressions; (d) the interaction between institutions and shocks account for 48-63 percent of the difference between the US's and other OECD nations' unemployment rates during 1970-95; and (e) replacing macroeconomic shocks by common period shocks (represented by time dummies) and adding interactions of the period shocks with institutions shows that the interactions explain 77 percent of the divergence between the US's and other countries' unemployment rates.

The heterogeneity in the rates of unemployment in the eighties and the nineties across European countries (such as the Netherlands, Ireland, and UK experienced falling rates of unemployment, while others continued to face rising rates) led **Fitoussi *et al.* (2000)** to examine: (i) whether or not the credit of the fall in unemployment rates of the Netherlands, Ireland, and UK can be attributed to their adoption of structural reforms; and (ii) whether or not the failure of other countries to reduce their unemployment rates can be attributed to their failure to undertake such reforms. To examine (i) and (ii), Fitoussi *et al.* perform their analysis on nineteen OECD countries during 1960 to 1998. They begin their analysis with a model estimating the effects of variables such as world interest rate, rate of change in labor productivity, oil price, non-wage support (income from private wealth plus social spending) relative to labor productivity, rate of direct household taxes, rate of payroll taxes, rate of inflation, and lagged unemployment rate (to account for persistence of unemployment) on unemployment rate. In the model, Fitoussi *et al.*, further impose cross-country restrictions by constraining the effects of shocks to be identical across countries up to a factor of proportionality, which they capture by a sensitivity parameter. They do this to model the differences in the effects of shocks

across countries due to the differences in their degrees of real wage rigidity. The estimates of the sensitivity parameter are supposed to reveal that the extent to which shocks lead to unemployment are lowest in the countries that have relatively few labor-market rigidities. But, the results reveal otherwise – shocks lead to higher unemployment in the countries with lesser rigidities in the labor market – which is directly at odds with the LMF hypothesis.

To another model, Fitoussi *et al.* introduce labor market policy and institutional variables and estimate the extent to which differences in policy and institutional variables explain country fixed-effect and country-specific sensitivity parameter. From their estimation, Fitoussi *et al.* find that: (a) the benefits replacement ratio, union density, and union coverage have positive effects on the size of country-specific fixed effect, which implies that countries with higher degrees of these variables have higher unemployment; (b) the coordination of bargaining has a negative effect on the size of country-specific fixed effect, that is, on unemployment; (c) benefits duration and union density have positive effects on the size of country-specific sensitivity parameter, while the coordination of bargaining and active labor market policies have negative effects; and (d) the effects of the rest of the labor-market institutional variables are insignificant. Fitoussi *et al.*<sup>32</sup> conclude that these findings provide modest support to the labor-market rigidity view. Labor market policies and institutions can at least explain the persistence of unemployment in some nations, and the institutional reforms in the OECD countries can

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<sup>32</sup> Fitoussi *et al.* point out that Ireland succeeded in reducing unemployment rate with little or no reform of their labor market institutions.

only explain a small portion of the heterogeneity in unemployment rates across the countries.

The **IMF (2003)** study aims at answering “how well institutions explain the evolution of unemployment over time and between countries, and which institutions turn out to matter most and why?” For the IMF study, Baccarro and Rei (2005) comment that it is “the paper that perhaps provides the strongest evidence supporting the deregulatory view”. The IMF study performs econometric analysis on a sample of twenty OECD countries during the period 1960 to 1998. It estimates four panel regression models with country-fixed effects. In the first model, the IMF study estimates the effects of labor market policy and institutional variables<sup>33</sup> such as the benefits replacement ratio, employment protection legislation, the tax rate, union density, bargaining centralization, interaction between policy and institutional variables, and non-linear effects of institutional variables on unemployment rate. This study does not examine the effects of active labor market policies and unemployment duration because of lack of data. By adding additional independent variables, the IMF study obtains three additional models and analyzes those. The additional variables include lagged unemployment rate, interaction between lagged unemployment rate and institutions, measure of central bank independence<sup>34</sup>, interaction between the measure of central bank independence and bargaining coordination, macroeconomic shock variables such as productivity shock, trade shock and interest rate shock, country-specific time trends, and dummies to control

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<sup>33</sup> The IMF study uses data for labor market policies and institutions from an extended version of the “Labor Market Institutions Database” assembled by Nickell and Nunziata (2001).

<sup>34</sup> The central bank interdependence variable captures the degree to which monetary authority is able to resist political pressure to raise prices or cause inflation in an economy.

for the effects of German reunification and that of Finland's fall in trade with former Soviet Union in 1990 and 1991. From the estimation of the four models, the IMF study finds that: (a) the generosity of unemployment benefits increases unemployment via increasing unemployment persistence; (b) unionization or union density increases unemployment; (c) employment protection legislation increases unemployment, but this effect reduces with the increase in the degree of unionization; (d) the tax wedge increases unemployment, but this effect decreases with the increase in the degree of unionization; and (e) bargaining coordination generates opposite effects on unemployment, which does not allow to draw any general conclusion concerning its overall effect.

**Belot and van Ours (2004)** examine the LMF hypothesis by estimating the effects of labor market policies and institutions, and also the effects of interdependence (measured by the interactions) between the policy and institutional variables on unemployment. As mentioned above, Elmeskov *et al.* (1998) also include interactions between institutions as explanatory variables in their model, but Belot and van Ours include a comparatively wider set of interactions. Belot and van Ours particularly focus on three types of interactions between institutional variables which include: (i) an interaction between the labor tax rate and unemployment benefits, (ii) interactions between the level of wage bargaining and employment protection legislation, and (iii) an interaction between the level of wage bargaining and union density. Belot and van Ours estimate the effects of labor market policy and institutional variables, interacted

institutions and change in inflation rate on standardized unemployment rate<sup>35</sup> (and non-employment rate) for a sample of seventeen OECD countries over five-year periods between 1960 and 1996. In their model, they also, control for unobserved variation across countries and time-periods by including country fixed-effects and time fixed-effects, respectively. Belot and van Ours report results from seven regressions, four of which test only the direct effects of policy and institutional variables on unemployment and the last three include both the direct and the indirect (measured by the interacted institutions) effects. The results reveal that: (a) the unemployment benefits replacement rate, the tax rate, and union density increase unemployment and employment protection legislation and the bargaining coordination decrease it, when country and time fixed-effects are not included in the model. The finding that employment protection legislation decreases unemployment is contrary to the findings of Scarpetta (1996) and Elmeskov *et al.*(1998) as well as to the LMF hypothesis; (b) the results presented in (a) become insignificant once country fixed-effects and time fixed-effects are included in the model; (c) the interaction between the tax rate and the benefits replacement rate increases unemployment, which implies that the tax rate generates greater effects on unemployment rate in case the benefits replacement rate is high, and alternatively, the benefits replacement rate have greater effect on the unemployment rate in case the tax rate is high; and (d) the benefits replacement rate decreases unemployment when the interaction between the tax rate and the benefits replacement rate is included in the model.

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<sup>35</sup> The data of standardized unemployment rate that is used is measured by the OECD.

**Nickell *et al.* (2005)** examine how much of long-term variation in unemployment rates for twenty OECD nations over the period 1961 to 1995 is explained by the changes in their labor market policies and institutions. In their study, Nickell *et al.* test a null hypothesis, which is secular shifts in unemployment are explained by secular shifts in labor market policies institutions, and an alternative hypothesis, which is variation in long-term unemployment rates are explained by interaction between labor market policies and institutions and external macroeconomic shocks, and not by change in labor market policies and institutions. To test the null hypothesis, Nickell *et al.* estimate the effects of various labor market policy and institutional variables and interaction of those variables with shock variables (labor demand shock, total factor productivity shock, real import price shock, money supply shock and real interest rate) on unemployment rate. Nickell *et al.* also include one-period lagged unemployment rate and its interaction with employment protection legislation to take account of unemployment persistence, and dummies for country and time as explanatory variables in their model. From the estimation of the model, Nickell *et al.* find that: (a) employment protection legislation increases unemployment, especially by raising unemployment persistence; (b) the benefits systems raises unemployment; (c) union density has no significant effect on unemployment, but the rate of change of union density raises unemployment; (d) the tax rate increases unemployment, but in coordinated systems the tax rate decreases unemployment; (e) except for money supply shock, other observable shock variables show significant impact on unemployment.

To test the alternative hypothesis, Nickell *et al.* introduce interactions of labor market policy and institutional variables with unobserved shocks. They capture the

effects of the shocks by time dummies. The inclusion of the interaction terms makes their model a non-linear one. Hence, Nickell *et al.* perform a non-linear estimation. The findings reveal that interacted institutions with time-effects (or unobserved shocks) do not have any significant effect on unemployment. Hence, Nickell *et al.*, contrary to Blanchard and Wolfers' conclusion, conclude that not the interaction between institutions and unobserved shocks, but the changes in labor market policies and institutions solely explain the changes in unemployment rates across OECD nations.

**Baccarro and Rei (2005)** perform a time-series cross-section analysis on OECD countries during 1960-98 to examine whether or not systemic deregulation of national labor markets reduces unemployment rate. For their analysis they use a basic model that estimates the effects of various labor market policy and institutional variables, interaction between bargaining coordination and union density, interaction between bargaining coordination and the tax wedge, interaction between bargaining coordination and employment protection legislation, interaction between bargaining coordination and the benefits replacement rate, and interaction between bargaining coordination and central bank independence on unemployment rate. Baccarro and Rei begin their analysis by estimating a full static model using annual data, and arrive finally at their preferred model specification, which is a static fixed-effects model in first differences estimated by using five-year averaged data. The preferred model includes all the policy and institutional variables, no interacted institutions, and only interest rate as macroeconomic control. From the estimation of the preferred model, Baccarro and Rei find that: (a) all institutional variables have insignificant or negative effect on unemployment, except unionization rate, which has a significant and positive effect; and (b) real interest rates



and index of central bank independence have significant and positive effects on unemployment. Unlike, other studies testing the LMF hypothesis, Bacarro and Rei devote extreme attention toward the robustness of their findings. For this purpose, they explore both static and dynamic models using both annual and averages data series, and running numerous alternative techniques of estimation. Baccarro and Rei also, account for methodological problems that are generally associated with time-series cross-section analyses.

The **Bassanini and Duval (2006)**<sup>36</sup> study is one of the latest efforts of the OECD to reassess the recommendations of the OECD *Jobs Study* (1994). In this study, Bassanini and Duval estimate a static baseline model using data for twenty OECD countries over the period 1982-2003. The baseline model tests the effects of labor market policy and institutional variables, interacted institutions, macroeconomic shock variables (including, total factor productivity shock, terms-of-trade shock, interest rate shock and labor demand shock), and stringency of product market regulation (PMR) on unemployment rate. To measure the stringency of PMR, Bassanini and Duval use a PMR indicator only for non-manufacturing industries, which does not incorporate all the aspects of regulatory reforms affecting all sectors that have been undertaken by OECD countries in the past few decades. In their baseline model, Bassanini and Duval also include output gap variable to control for the cyclical effects of unemployment, and country and time dummies. Bassanini and Duval estimate seven baseline models from which they find that

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<sup>36</sup> The empirical analysis of Bassanini and Duval (2006) is presented in OECD's Employment Outlook of 2006 (OECD, Chap.7, 2006).

(a) employment protection legislation<sup>37</sup> had no significant effect on unemployment; (b) the benefits replacement rate, the tax wedge, and high corporatism increase unemployment; (c) in five out of seven estimations, effect of union density on unemployment is negative and insignificant, and for the rest two is positive, but significant in one and insignificant in the other; and (d) the stringent product market regulation increase unemployment.

**Berger and Danninger (2006)** examine the effects of product market as well as labor market policies and institutions on employment growth, but unlike Scarpetta (1996) and Bassanini and Duval (2006), Berger and Danninger explore the impacts of interactions between the product and labor market policy and institutional variables. They perform their analysis on OECD countries over a period from 1990 to 2004. Berger and Danninger use the OECD's six indicators of product market regulation (PMR), which capture different aspects of the regulation<sup>38</sup>. Berger and Danninger capture labor market regulation by the OECD's measure of strictness of employment protection legislation (EPL). In their model, Berger and Danninger estimate the effects of the PMR, the EPL and interaction between the EPL and the PMR on employment growth rate of employment. The interaction term is in the form of a dummy variable, which is set equal to unity if a country has above average product and labor market regulation and zero

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<sup>37</sup> Bassanini and Duval use the OECD's latest and truly annual series (and not an interpolated one) of the employment protection legislation, which is used for the first time.

<sup>38</sup> The six PMR indicators include aggregate regulation, administrative regulation, economic regulation, barriers to entrepreneurship, degree of state control, and barriers to trade and investment. The measures of the indicators are in the form of categorical variables such that each indicator takes a value of zero when entry is free, a value of six when competition is severely restricted and an intermediate value when entry is partially liberalized.

otherwise. From the estimation of the model, Berger and Danninger find that: (a) both product and labor market deregulation increase employment; and (b) the effect of deregulating one market on employment increases with the decrease in the regulation in the other market. Berger and Danninger conclude that labor market reforms generate greater employment growth rates if the product market is more competitive and product market deregulations generate greater employment growth rates when labor markets are less regulated. And based on the findings, they also conclude that the benefits of structural reforms have differed so much among OECD countries because of the differences in their degrees of product market regulation.

**Griffith *et al.* (2007)** examine the roles of both labor market and product market reforms in reducing unemployment rates in OECD countries over the eighties and the nineties. In their model, they estimate the effects of labor and product market regulations and an interaction between both on unemployment rate. They measure labor market regulations by the bargaining power of the workers (collective bargaining coverage and trade union membership), the tax wedge, employment protection legislation and the benefits replacement ratio. They use a measure of average firm profitability in an economy to represent product market regulation. Griffith *et al.* introduce one interaction between the average firm profitability and bargaining coverage and another interaction between the average firm profitability and union density. They do this to test whether or not production market deregulation reduces unemployment more when the union bargaining power is higher. In their model, Griffith *et al.* also control for other factors such as real exchange rate, change in inflation rate, output gap, and public sector employment rate. In order to check the robustness of their results, Griffith *et al.* perform

the same analysis by using employment rate as the dependent variable, instead of unemployment rate. From the estimation of their models, Griffith *et al.* find that: (a) the tax wedge and the benefits replacement rate increase unemployment rate; (b) the EPL shows no significant association with unemployment rate; (c) the product market reforms increase employment; and (d) the employment gains through product market regulations are higher when the bargaining strength of the unions are high. From these findings, Griffith *et al.* conclude that both labor and product market deregulation increase employment, but the increase from product market deregulation is greater when the labor markets are more rigid.

**Fiori *et al.* (2007)** examine the effects of both labor and product market regulations and their effects in combination on employment. In their study, Fiori *et al.* test whether product market deregulation generates greater beneficial employment effects when labor market is highly or lowly regulated, or in other words, test whether or not product and labor market deregulations are complements. They also test whether product market deregulation facilitates labor market deregulation by reducing workers' bargaining power, or in other words, whether or not product and labor market deregulation are substitutes. To perform these tests Fiori *et al.* employ harmonized annual data for twenty OECD countries from 1980 to 2003. They use employment protection legislation, gross benefits replacement rates, the tax wedge, a measure of unionism (combination of union density and coverage rate), and a measure of corporatism (combination of bargaining centralization and coordination) as indicators of labor market regulation. Fiori *et al.* include both domestic regulations and border barriers to construct

an indicator of product market regulation (PMR)<sup>39</sup>. They estimate the effects of the PMR indicator, the labor market regulation indicators and the interactions between the PMR and labor market regulations on employment and find that: (a) the product market deregulation increases employment; (b) high regulations in the labor market or high unionism reduce employment, which supports the LMF hypothesis; (c) the effect of interaction between product and labor market regulation on employment is significant and negative. From these findings, Fiori *et al.* conclude that labor and product market reforms increase employment and product market deregulation increases employment more in case labor market policies and institutions are stricter. Fiori *et al.* also note that the finding that product market deregulation facilitates labor market deregulation is an important one because in situations where it is politically difficult to reform labor markets, conducting product market deregulation will deregulate the labor market.

**Rovelli and Bruno (2008)** is the first study that tests the LMF hypothesis across twenty-seven European Union (EU) countries. Rovelli and Bruno examine whether or not the heterogeneity in employment outcomes across the twenty-seven EU countries are explained by differences in their labor market policies and institutions. Before performing their analysis, Rovelli and Bruno caution the readers that it is not possible to adequately control for reverse causality or endogeneity between employment outcome and policy and institutional variables, and for the unobserved effects of omitted variables. And

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<sup>39</sup> Fiori et al. (2007) use measures of domestic regulations in certain non-manufacturing sectors in the areas of public ownership of the firms, legal barriers to access markets and other barriers to entry related to market and industry structures to construct summary indicator for domestic PMR and restrictions on foreign direct investment to construct an indicator of border barriers. They combine the two indicators (the domestic PMR indicator and the indicator of border barriers) and create a summary measure of product market regulation.

hence, finding a positive association between generosity of policy and employment rate, should not be considered as causality running from the former to the latter. Instead, it should be considered as a *prima facie* evidence against a negative causation. Rovelli and Bruno also, mention that the hypothesis of positive causalities between generous policies and employment outcomes should be considered simply as “educated guesses” and the results of analyses should be considered as a structured description of the data.

For empirical analysis, due to the lack of data for the new EU members before 2000, Rovelli and Bruno use data for the period 2000 to 2005; they use data for two periods, 2000-02 and 2003-05. To test the LMF hypothesis, Rovelli and Bruno estimate the effects of labor market policy and institutional variables on employment rate. They use ratio of expenditure on active (and passive) labor market policies to GDP as a measure of labor market policy generosity. They use an index of employment rigidity (that they extract from World Bank’s “Doing Business Database”) as a measure of policy-induced rigidity. However, later on Rovelli and Bruno replace this index by the OECD’s measure of strictness of employment protection legislation (EPL). Rovelli and Bruno also incorporate the tax wedge, and an indicator of product market regulation (the OECD’s index of impediments to product market competition) as explanatory variables, and estimate their effects on the employment rate. In addition to the policy and institutional variables, Rovelli and Bruno also include a lagged GDP per capita variable, a dummy for cultural differences (Catholic or Orthodox) and its interaction with the measure of active labor market policies (ALMPs) and a measure of “pro-work” attitude and its interaction with the ALMPs measure. From their analyses Rovelli and Bruno find that: (a) the ALMPs and employment rates are positively and significantly associated,

which is found to hold that in case of countries that have higher “pro-work” attitude; (b) effect of interrelation between the ALMPs and culture is significant; (c) the passive policies and the employment rate are positively and significantly associated; (d) the EPL (or index of employment rigidity) and the employment rate are not significantly associated, (or weakly positively associated in case of few model specifications); (e) the introduction of the EPL in a model reinforces the positive effect of the ALMP measure on employment rate; (g) the tax wedge and the employment rate are not significantly associated; and (h) the product market regulation and the employment rate are negatively and significantly associated. From these findings Rovelli and Bruno conclude that lower degrees of rigidities in labor market institutions and in the product market institutions increase employment rates and the increase in expenditures on employment enhancing labor market policies, especially active labor market policies increases employment rates.

## **2.6 MACROECONOMIC POLICY HYPOTHESIS – REVIEW OF EMPIRICAL STUDIES**

Empirical studies supporting the *macroeconomic policy* (MP) hypothesis blame bad macroeconomic policies adopted by European nations for their high rate of unemployment. The MP theorists (Solow, 1994; Baker and Schmitt, 1999; Palley, 1998, 1999; Palley, 2001, 2004; Galbraith and Garcilazo, 2004; Garcilazo, 2005; Galbraith, 2006; Howell *et al.*, 2007) reject the LMF hypothesis and emphasize the role of European Central Bank’s (and of the Bundesbank before it) policy choices of maintaining stable inflation rates and that of the fiscal austerity imposed by the Maastricht criteria in explaining European high unemployment during the eighties and the nineties. In their empirical analyses, some MP theorists critically assess the LMF hypothesis, while others

test the effects of macroeconomic variables on unemployment (or employment) rate. A review of some of the empirical studies advocating the MP hypothesis (and rejecting the LMF hypothesis) is presented as follows:

**Baker and Schmitt (1999)** argue that the rise of European unemployment is due to the macroeconomic demand constrained policies – reducing inflation and maintaining fiscal austerity – adopted by European nations to join the European Union followed by adopting the euro. Baker and Schmitt say that because of economic interdependence – through international product market, international capital market and international exchange rate market – between European nations, the effects of the policy decisions made under the Maastricht Treaty quickly transmitted across national frontiers and led to the simultaneous rise in unemployment rates in European countries. In order to test their hypothesis, Baker and Schmitt estimate the effects of foreign economic growth on unemployment rate, where the measure of the foreign economic growth rate is weighted by each country's export share in GDP (that is, the percentage of an economy's GDP dependent on exports). The result shows that slow foreign growth is a major factor behind the rise in each country's unemployment rate.

**Baker *et al.* (2005)**<sup>40</sup> critically assess the LMF hypothesis. Firstly, Baker *et al.* present scatter plots displaying a direct relationship between unemployment rate and each “employment-unfriendly” labor market policy and institutional variable for twenty OECD countries over four five-year periods from 1980-1999. From the plots, they find that none of the relationships show a statistically meaningful association. Secondly,

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<sup>40</sup> Baker *et al.* (2005) is same as Baker *et al.* (2003).



Baker *et al.* critically review seven notable studies advocating the LMF hypothesis and conclude that the studies provide very weak empirical support for the LMF hypothesis. They point out that the ranges of the estimates of same policy and institutional variables vary widely across studies, indicating a lack of robustness of the findings. Also, they note that, in some studies, the impact sizes of policies and institutions seem implausible. Finally, Baker *et al.* perform their empirical test of the LMF hypothesis on twenty OECD countries over the period 1960-99. Using data on policy and institutional variables constructed by Nickell *et al.* (2005), Blanchard and Wolfers (1999), Belot and van Ours (2004) and some others, Baker *et al.* test the sensitivity of the Nickell (1997)'s model. Contrary to the results of the Nickell's study, in which all the policy and institutional variables had statistically significant and positive effect on unemployment rate except for the EPL, Baker *et al.* find none of the estimates to be statistically significant except for that of union density, which is significant only at 10 percent level. They also find the effect of the ALMPs to be insignificant. Baker *et al.* test another model in which they test the effects of policies and institutions and interacted policies and institutions on unemployment while controlling for country-fixed effects as well as time-fixed effects. The results from the estimation show very little support for the LMF hypothesis. They estimate the same model using the same data, but in one case they cover the period from 1960-84, when most of the rise in unemployment rate occurred, and in second case they cover the period 1980-99, when unemployment rates continued to diverge. The results from these models reinforce weak support for the LMF hypothesis.

In **Baker *et al.* (2004)** study, Baker *et al.* extend their critical assessment of the studies advocating the LMF hypothesis. They critically review two studies, Nicoletti and

Scarpetta (2002) and IMF (2003), which advocate the LMF hypothesis. They point out some serious methodological problems associated with the IMF study. Furthermore, they test the robustness of the results of the IMF study by estimating the IMF study's regression models after introducing some variations in the models. The estimation yields results very different from that of the IMF study. The results also show very weak or simply no support for the LMF hypothesis.

**Howell *et al.* (2007)** critically review studies such as Baccaro and Rei (2005) and Bassanini and Duval (2006) that advocate the LMF hypothesis. They present multiple scatter plots assessing a bivariate relationship of unemployment rate (or change in unemployment rate) with each labor market policy and institutional variable such as the gross benefits replacement rate, the net benefits replacement rate and the benefits duration (change in benefits duration). None of the plots display a positive association to show support for the LMF hypothesis. Howell *et al.* closely study effects of unemployment benefits system on unemployment rate. They conduct comprehensive Granger-causality tests to test the causality between the gross replacement rate (and each of its consecutive four lags) and unemployment rate over the period 1962-2004. The findings from the test, contrary to the LMF hypothesis, indicate that the causal relation runs from unemployment to benefits and not the other way round.

**Palley (2001, 2004)** argues that the high rates of European unemployment are not because of rigid, sclerotic European labor markets, but as a result of bad macroeconomic policy choices – the adherence to the natural rate theory, and thereby, adopting anti-inflation policies – and speculative exchange rate conditions due to flexible exchange rate system (like, Davidson (1998)). Palley also argues that the effects of bad policy choices

spread quickly via *trade-based spill-over effects* across European countries that led to a continent wide rising unemployment rate. To test his hypotheses, Palley begins with regressing two lagged unemployment rates on unemployment rate, in order to capture the effects of persistence of unemployment over time. From the regression results, he concludes that persistence of unemployment is a common feature of all the countries. Furthermore, Palley added various labor market institutional variables, followed by country-specific effects for Ireland and Spain (since, both of these countries experienced very high rates of unemployment during the period covered in the analysis), macroeconomic variables (such as current and lagged GDP growth, lagged real interest rate and change in inflation rate), measure of international trade exposure between European nations, measure of international trade exposure between the United States, and Canada, and country-specific dummies, to the basic model and ended up with six different models. From the estimation of the full model, Palley finds that (a) the estimates of all the macroeconomic variables, country specific dummies and the international trade exposure between European nations are correctly signed and significant at 1 percent level; (b) the estimates of the benefits replacement rate, the benefits duration, union density and employment protection legislation are all insignificant, while the estimate of tax wedge is significant only at 10 percent level; (c) active labor market policies and bargaining coordination lower unemployment, while union coverage increases it; and (d) the level of significance of each the estimates of the labor market policy and institutional variable change each time new variables are added to the model. Therefore, Palley (2001, 2004) concludes that the results show no support for the LMF hypothesis, and rather, supports the MP hypothesis.

**Garcilazo (2005)** examines the sources of high rates of European unemployment from three, regional, national and continental, perspectives. Using a fixed-effects panel regression model, Garcilazo tests the LMF hypothesis that European regions with lower relative wages and more wage inequality face less unemployment and vice versa. He tests the effects of regional wage inequality (and regional relative wages) on regional unemployment rate. Garcilazo incorporates country-fixed effects in his regional model in order to capture the effects of county-specific forces and time-fixed effects to capture the effects of continental-level forces. He mentions that the use of country-fixed effects allows controlling for the effects of labor market policies and institutions without using their low quality data measures. The findings of Garcilazo's study show that, contrary to the LMF hypothesis, wage inequality and unemployment are positively associated and relative wages and unemployment are associated negatively. The estimates of the country-fixed effects indicate capturing the effects of country-specific forces such as appreciation of the pound in the case of UK, reunification in the case of Germany, and emigration in the cases of Portugal and Greece. The estimates of the time-fixed effects indicate capturing the adverse effects on employment associated with the implementation of the Maastricht Treaty. Garcilazo, therefore, concludes that in Europe, high rates of unemployment cannot be reduced by labor market reforms, but by compressing wages (or reducing wage inequality) and increasing relative wages across European regions.

## **2.7 SHORTCOMINGS OF THE CROSS-COUNTRY EMPIRICAL STUDIES**

Policymakers and academicians who prescribe labor market reforms to reduce unemployment in European countries rely heavily on the findings of the empirical studies

produced by the LMF theorists. But the problems associated with the data and methodologies used by these studies raise great concerns over the reliance on their findings, and thereby, on the effectiveness of the policy recommendations that are proposed based on those findings. The data and methodological problems associated with those studies are discussed below.

### **2.7.1 Data Problems**

#### ***Problems with the Measures of Labor Market Policies and Institutions***

As mentioned before, the OECD's influential report (OECD, 1994) invited researchers to empirically test adverse effects of labor market policies and institutions on unemployment. To perform these tests, researchers demanded quantitative measures of the policies and institutions that could be used for econometric analyses. Since the policies and institutions are highly qualitative in nature, the creation of their quantitative measures required considerable subjective judgments. With the growing demand for quantitative measures of the policies and institutions, researchers started creating quantitative data series for the policies and institutions. Using their subjective judgments, they assigned quantitative (or numerical) scores to each policy and institutional variable and created their quantitative data series. Layard, Nickell, and various others pioneered in the creation of the data measures (Layard *et al.*, 1991; 1994 Nickell and Bell, 1994; and Nickell and Layard, 1997; Nickell, 1997). The OECD and some LMF theorists continued to devote considerable efforts over time to improve the quality of the data measures (Blanchard and Wolfers, 2000; Nickell and Nunziata, 2001; Nickell *et al.* 2002; Belot van Ours, 2004; and OECD, 2006). However, since the measures were created, their quality

and accuracy have remained open to question. Some criticize that the quantitative counterparts of the policies and institutions do not represent the qualitative – actual – policies and institutions accurately and cannot possibly do that, while others criticize the measures for being biased.

Atkinson and Micklewright (1991) criticize one of the early measures of unemployment benefits system, namely the unemployment benefits duration. They argue that the duration measure does not account for the variations in the actual institutional design of the benefits system that prevails across countries. The duration measure was renounced over time and studies began using a gross benefits replacement rate measure representing the generosity of the benefits system. This measure was created to incorporate both the levels of benefits payments and the duration of benefits. In recent years, the OECD has produced a measure of net replacement rate, which is said to be more appropriate than the gross measure. However, Howell *et al.* (2007) point out that even the net replacement rate measure, like the gross one, does not account for some critical features of the unemployment benefits system.

Garcilazo (2005) critically examines Nickell (1997)'s six-year averaged measures of union density, union coverage, and the degree of coordination, and also Belot and van Ours (2004)'s five-year averaged measures of union density, union coverage, the degree of centralization, and the degree of coordination. He points out that none of the measures captures the actual variations in those institutions, which exist across countries and across time.

Howell *et al.* (2007) discuss the unreliability of the measure of strictness of employment protection legislation (EPL). They mention that an early measure of the EPL

was constructed by the OECD for only two data points, one for the late eighties and another for the late nineties. Using the two data points, researchers created two additional data points, one for the early eighties and another for 1990-94, by the method of interpolation. Later on, Blanchard and Wolfers merged Lazear's measure of the EPL with that of the OECD's one and produced an EPL measure for five-year periods from the early sixties to the late nineties. Furthermore, Nickell *et al.* (2002, 2003) annualized the five-year periods series by interpolation. Recently, the OECD (OECD, 2006) has produced a more comprehensive data series of the strictness of the EPL, which is said to be a superior and a *truly* annualized series of the EPL, but since its construction involves subjective judgment, the accuracy of the EPL series remains questionable.

Blanchard and Wolfers (2000) criticize the data measures on labor market policy and institutional variables for being biased by stating that:

One must worry however that these results are in part the result of research Darwinism. The measures used by Nickell have all been constructed ex-post facto, by researchers who were not unaware of unemployment developments. When constructing a measure of employment protection for Spain, it is hard to forget that unemployment in Spain is very high... Also, given the complexity in measuring institutions, measures which do well in explaining unemployment have survived better than those that did not (Blanchard and Wolfers, 2000, pg.C22).

Howell *et al.* (2007) also point out that the LMF theorists who created the measures are the advocates of LMF hypothesis, and hence, when they assigned quantitative values to the policy and institutional variables, their judgments could possibly have been biased toward assigning such values which would confirm their hypothesis. They, therefore, conclude that such bias leads to the problem of self selection in the creation of the measures.

In spite of severe criticisms of the data measures of the labor market policies and institutions, even today the measures are widely used in empirical analyses, which is evident from the recent studies such as Bassanini and Duval (2006), Berger and Danninger, (2006), Griffith *et al.* (2007), Fiori *et al.* (2007) and Rovelli and Bruno (2008).

### ***Problems with the Measure of Unemployment***

The data series on unemployment used by empirical studies testing the LMF hypothesis are not without criticism. Howell *et al.* (2007) point out some of the problems with the data series on unemployment. They point out that with the over flow of empirical studies testing the LMF hypothesis, some empiricists started extending the period of coverage of their analyses by going back to even the sixties. Over such a long period of time, many countries have changed their national method of data collection; therefore, the historical consistency of the data series of unemployment rate starting from the sixties is questionable. Howell *et al.*, in this context, comment that there exists no data series on unemployment for most of the European nations, which is historically consistent and comparable across the nations even beginning from the seventies.

## **2.7.2 Methodological Problems**

### ***Lack of Robustness***

As mentioned earlier, the results of empirical studies supporting LMF hypothesis suffer from a lack of robustness. The lack of robustness is evident from the sensitivity of the estimates of labor market policy and institutional variables to both the changes in the



source of data and the changes in model specification. Baker *et al.* (2004, 2005) review some empirical studies advocating the LMF hypothesis, showing that changes in data source or in model specification not only change the magnitude and the sign of the estimates of policy and institutional variable considerably, but also their levels of significance across studies. This is also evident from the review of the studies presented in this dissertation in Sections 2.5 and 2.6. When Baker *et al.* (2005) tested the sensitivity of the models of Nickell (1997)'s study by using comparatively better (or say, a different) data series of policies and institutions, all estimates that were statistically significant in Nickell's study became statistically insignificant. And, when Baker *et al.* (2004) introduced minor variations in the IMF study's models and estimated those, the results were found to be notably different from that of the IMF study.

### ***Problem of Endogeneity or Reverse Causation***

Based on the LMF hypothesis, empirical studies hold that the generosity of unemployment benefits increases unemployment rate, while active labor market policies (ALMPs) decrease it. They therefore, test the effects of these policies on unemployment, expecting that the coefficient for unemployment benefits to be positive, while that of the ALMPs is negative. But Baker *et al.* (2004, 2005), Garcilazo (2005), Howell *et al.* (2007) argue that the estimates are flawed because there exists the possibility of reverse causation or endogeneity between these policies and the unemployment rate. The reverse causation arises in case of unemployment benefits and the ALMPs because in the face of rising unemployment rates, governments are likely to increase the generosity of unemployment benefits and/or increase their spending on the ALMPs, leading the causality to run from the policies to unemployment rate and not the other way round, as

suggested by the LMF theorists. In spite of the possibility of reverse causation, most of the studies do not even mention the possibility, let alone address it.

### ***Lack of Diversity in Methodological Approaches***

Empirical studies testing the LMF hypothesis lack diversity in their general methodological approaches. As is evident from the review of the empirical studies presented in Section 2.5, the studies unanimously perform econometric analyses to test the effects of policies and institutions on some measure of unemployment or employment at a national-level. These studies, in general, perform their analysis on European (and other OECD) countries using annual or five to six-year averaged series. And in spite of the poor quality of the data measures of the policies and institutions, they use those measures. The lack of diversity of these studies has led theorists to neglect important aspects of the European (and other OECD) economies that can generate better and meaningful explanations for the problem of European unemployment. This dissertation therefore, departs from the general approach of the existing studies and analyzes the problem of Europe's unemployment by developing and using certain numerical methodological tools.

## **2.8 STUDY OF UNEMPLOYMENT AT A CONTINENTAL LEVEL**

LMF theorists explain the high and heterogeneous unemployment rates across European countries by the differences in wage rigidity across the countries, which exist due to cross-country differences in labor market policy and institutional variables. Their focus on country-specific policy and institutional variables to explain the changes in country-specific unemployment rates reveals that the theorists consider each European

country (and its labor market) to be a separate entity unaffected by the changes taking place in other countries, when the fact is that they are not separate, but highly interdependent. As mentioned in Chapter One, due to economic interdependence between European countries, changes in transnational factors – international, continental or global factors – explain variations in relative employment (or unemployment) rates and relative wages across the countries. This dissertation recognizes that since European countries are interdependent, taking account of the effects of transnational variables may generate meaningful explanations for the variations in relative wages and relative employment (or unemployment) rates across European countries, which have been overlooked by the LMF theorists. Therefore, the prime goal of this dissertation is to study European problem of high unemployment from a continental-level, and not a country-level, perspective. Its basic approach for the study is to test whether relative wages between countries are rigid, as suggested by LMF theorists, or flexible, due to the effects of transnational variables, and thereby, determine the factors that explain the nature of relative wages, and thereby, explain fluctuations in unemployment rates across European countries.

## Chapter 3: Notion of “Wage Rigidity” and the Study of European Wage Structure

### 3.1 INTRODUCTION

Wage rigidity, since the 1990s, has been the central focus of mainstream academicians and policymakers, who advocate the *labor market flexibility* (LMF) hypothesis in the study of European problem of high unemployment. The advocates of the LMF hypothesis – the LMF theorists – state that certain labor market policies and institutions make wages rigid (downwardly), which hinders appropriate labor market adjustment, and thereby, increase unemployment. Therefore, to reduce unemployment, they prescribe reforming those labor market policies and institutions to eliminate wage rigidity and facilitate wage flexibility for ensuring unhindered labor market functioning, or in other words, to ensure labor market flexibility. Hence, the term “labor market flexibility”, coined by the LMF theorists, is often considered to be synonymous with “wage flexibility”. The following quotes show the emphasis of LMF theorists on the role of labor market policies and institutions in preventing labor market flexibility or wage flexibility.

All countries have experienced a shift in demand away from unskilled jobs towards more highly skilled jobs. In most countries where relative wages have been flexible (the United States, Canada, Australia), both the relative employment and unemployment rates of the unskilled changed little during the 1980s. In comparatively inflexible Europe, on the other hand, both relative employment and unemployment deteriorated (OECD, 1994a; Part I, pg. 23).

The OECD countries indeed show a wide range of labor market policy strategies as well as very different institutional settings that intervene in the functioning of the market (Scarpetta, 1996).

Empirical evidence emphasizes the importance of wage flexibility in reducing unemployment. Aggregate wage flexibility tends to neutralize adverse shocks to

aggregate labor demand, while relative wage flexibility helps attaining better matching of labor demand and supply across different groups (Scarpetta, 1996).

A country that institutionally prohibits flexible wages at the lower end can be expected to have a low percentage of employment in low-paid jobs (Seibert, 1997).

The combination of intensified competition in a global economy and of labor-saving technical progress requires flexibility in wages, but this flexibility is prevented by institutional conditions (Seibert, 1997).

Wage formation in the United States comes close to being a market process; it is decentralized, with low unionization and low coordination of wage changes across the economy. However, wage negotiations in European countries exhibit characteristics that move formation away from the market process (OECD, 1994): wages are often not determined on the firm level but on the industry level or even at the economy-wide level (Seibert, 1997).

...starting from a simple notion of an equilibrium in a classically clearing labor market, institutional arrangements can influence the clearing function of the labor market in basically three ways: by weakening the demand for labor, making it less attractive to hire a worker by explicitly pushing up the wage costs or by introducing a negative shadow price for labor; by distorting the labor supply; and by impairing the equilibrating function of the market mechanism (for instance, by influencing bargaining behavior) (Seibert, 1997).

...the equilibrium level of unemployment is affected first, by any factor which influences the ease with which unemployed individuals can be matched to available job vacancies, and second, by any factor which tends to raise wages in a direct fashion despite excess supply in the labor market. These factors often take the form of labor market institutions (Nickell *et al.* 2005).

The basic goal of the LMF theorists to reform policies and institutions is to weaken or simply eliminate the sources of wage rigidity or barriers to wage flexibility, and allow labor market forces – labor supply and labor demand – to clear the labor market. Section 3.2 describes various labor market policies and institutions, which act as barriers to wage flexibility in Europe. Section 3.3 reveals some sources of wage flexibility across economically interdependent European countries, which are neglected by the LMF theorists. Section 3.4 provides a brief outline of the methodological approach

of this dissertation to measure relative wage flexibility in Europe and determine the factors that lead to such flexibility.

### **3.2 BARRIERS TO WAGE FLEXIBILITY – LABOR MARKET POLICIES AND INSTITUTIONS**

Four institutional layers that the LMF theorists say affects labor market outcomes are: (i) the labor market mechanism of labor supply and demand adjustments via wage adjustment; (ii) the systems of wage determination and bargaining, which comprise the role of trade unions and the centralization and coordination of bargaining; (iii) the legal system of employment protection legislation that shields workers from uncertain risks; and (iv) the system of non-employment income, that is, unemployment benefits system. To reduce unemployment in Europe, LMF theorists call for reducing or eliminating the effects of the last three layers and impart the first layer the sole role to influence the outcomes. The OECD's influential report (OECD, 1994a, Part III, pg.43-49) proposed nine recommendations to reduce high rates of unemployment in European (and other OECD) countries, out of which the fifth, sixth, and ninth proposed enhancing the role of the first layer, while curtailing or eliminating the roles of the other layers. The fifth recommendation proposed making wages and labor costs flexible (downwardly) to enhance competition in the labor market and allow market forces to clear the labor market. The sixth and ninth recommendations targeted at limiting or simply eliminating employment protection legislation and unemployment benefits systems, respectively.

As mentioned in Chapter One, labor market policies and institutions that are considered by the LMF theorists as “employment-unfriendly” – generate adverse effects on employment rates – for European countries include: unemployment benefits

replacement rate, unemployment benefits duration, employment protection legislation, union coverage, union density, the centralization and coordination of bargaining institution and the tax wedge<sup>41</sup>. One set of policies, that is, the active labor market policies is however, considered by the LMF theorists to be “employment-friendly” policies. Therefore, they propose expanding the role of active policies to reduce unemployment, which is evident from the seventh recommendation of the OECD’s influential report<sup>42</sup>.

Labor market policies and institutions are not recent phenomena in the Europe. As a result of the lessons learned from the two World Wars, the Great Depression and the period of growth after the Second World War till the seventies, the policies and institutions emerged in the developed world in order to generate benefits on both efficiency and equity grounds. In this context, Howell (2005) states that:

The Great Depression helped teach the lesson that too much inequality, economic insecurity, and lack of access by large parts of the population to basic needs such as food, health and safety, housing, and education can cripple economic efficiency. The case for a healthy, safe, decently housed, and adequately educated workforce – all of which requires some minimal level of income, which in turn requires employment and insurance against job loss – can be traced back to Alfred Marshall’s *Principles of Economics* (1890) and even further back to Adam Smith’s *Wealth of Nations* (1776) (Howell, 2005, Chap.1, pg. 8).

The policies and institutions were adopted to benefit the people and the economy as a whole. Unions and collective bargaining aimed at raising workers’ voice and encourage

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<sup>41</sup> The “employment-unfriendly” policies and institutions are also referred as the “usual suspects” (Nickell *et al.*, 2005), which all the LMF theorists unanimously suspect to cause rising unemployment rates in Europe.

<sup>42</sup> The seventh recommendation of OECD’s report (OECD, 1994a, Part III, pg.43-49) proposes to expand and enhance the role of active labor market policies, contrary to what it recommends for the passive ones.

stability in industrial relations. Unemployment insurance and other non-employment income assistance financially aided workers during their times of need, and also facilitated them to search for jobs. Employment protection legislation protected workers from sudden and unfair dismissals. But, in spite of the several benefits associated with these policies and institutions, the LMF theorists rarely mention them.

The rest of this section provides a discussion of unemployment benefits system, the system of wage determination and bargaining institution, employment protection legislation, the labor tax wedge and active labor market policies. Among these policies and institutions, the unemployment benefits system, the systems of wage determination and bargaining, and the employment protection legislation are considered as the barriers to wage flexibility by the LMF theorists. Although employment protection legislation is primarily said to influence employment flexibility, the LMF theorists describe that in a way it may also make wages rigid.

### **3.2.1 Unemployment Benefits System**

Unemployment benefits are the payments that are made by the government to support the unemployed. These payments not only meet the immediate financial needs of the unemployed, but also aid them financially while they search for the right job that matches their skill-sets and not take up the first job available to them. By aiding the unemployed to search for jobs efficiently, the benefits payments also help the employers by enabling them to find employees with skills that they are looking for.

Unemployment benefits system came into existence in Europe in the 1800s. In 1832, the foundry men's union in Britain established the first unemployment insurance



(UI) system; in 1892, the typographers' union created the UI fund in Sweden. These primordial systems were provided by trade unions. In 1901, the first *public* UI system, known as the 'Gent-system', was introduced in a Belgian town called Gent. Under this system, union-administered UI funds received public support in the form of government subsidies. Germany, Britain, France, and the Nordic countries (except Sweden) adopted the Gent-system during the pre-World War I period. However, in 1911 Britain replaced the system by a compulsory UI system. By the end of the First World War several European countries adopted a compulsory UI system. Among the Nordic countries, Norway introduced its compulsory UI system in 1938, and only Denmark, Finland, Sweden, and Iceland maintained the Gent-system. Belgium, over the time, moved to an intermediate system administered by unions, but with compulsory membership (Holmlund, 1998).

With the evolution and persistence of high rates of unemployment rate in Europe during the last few decades, economists searched for the contributions of structural factors of the labor market for the evolution and persistence. In this search, the generosity of unemployment benefits was picked as a prime factor<sup>43</sup>. Labor economists used frameworks provided by the job search theory of the seventies to empirically investigate the effects of unemployment benefits on the outcomes of the labor market. The framework of the natural rate theory of unemployment further enabled them to

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<sup>43</sup> Not only the economists of the recent decades, but also the economists of the interwar period such as A.C. Pigou, John Hicks, Edwin Cannan, Henry Clay, Eli Hecksher and Gustav Cassel have commented about the effects of unemployment insurance policies on the labor market. The earlier economists argued that the unemployment benefits payments raise wage pressure by strengthening the bargaining position of the unions. They also argued that such payments also affect job-search behavior and the duration of unemployment (Holmlund, 1998).

empirically assess the effects of the generosity of unemployment benefits on the natural (or structural) rate of unemployment.

### ***Effects on the Labor Market – Wage and Employment***

LMF theorists consider the generosity of unemployment benefits to be a barrier to wage flexibility. They state that the generosity of unemployment benefits affects wages in ways that generate upward wage pressure and restrict wage flexibility. LMF theorists describe a number of ways in which unemployment benefits affect wage, unemployment and unemployment persistence, which are: (i) unemployment benefits payments increase the reservation wage of the unemployed, which makes them reluctant to accept a job at a wage below their reservation wage; therefore, while they receive benefits, the unemployed maintain their reservation wage and prefer not to exit unemployment. In this context, Siebert (1997, pg.51) states that: “....a higher reservation wage traps the beneficiaries in unemployment and impairs the market clearing role of wages.” The higher reservation wage is also said to raise the floor of the wage structure, which prices the less-skilled out of the market; (ii) unemployment benefits payments reduce the cost of becoming unemployed, and hence, encourage the employed “insiders” to take the risk of getting fired and raise their wage claims. Also, knowing that unemployment benefits aid the unemployed beneficiaries, the employed “insiders” push their wage demands up without considering that their wage claims reduce the chances of the unemployed to get hired; and (iii) unemployment benefits payments support the unemployed financially, and hence, reduce their incentive to search for jobs or take up a job – given the option to remain unemployed and receive a low income in the form of benefits or to take up a full-time job and earn an income above the level of benefits, unemployed beneficiaries may

prefer the former and not search for jobs or take up a job until the benefits payments flow in – which increases unemployment. If the duration of benefits payments is long, the unemployed people who choose to remain unemployed lose the incentive to work over time, which makes them reluctant to exit unemployment quickly; therefore, longer duration of benefits payments increases the duration of unemployment or in other words causes unemployment persistence. Also, remaining unemployed for a long time, due to longer duration of the benefits payments, makes the skills of the unemployed obsolete, and the unemployed lose their chances of getting hired (because employers are aware of the fact that longer duration of unemployment depreciates human capital). Therefore, longer duration of benefits causes unemployment persistence.

Contrary to the LMF theorists, who argue that the generosity of the unemployment benefits payments increases unemployment and also leads to unemployment persistence, there exist a number of others who contend that there is no such relationship between benefits payments and unemployment. Baker *et al.* (2004) argue that the cause-and-effect relationship between the unemployment benefits and unemployment is not in the direction that the LMF theorists' suggest, but rather in the opposite direction. The reason they provide for this is that in an economy, in the face of rising unemployment, government reacts by increasing the generosity of the unemployment benefits. Therefore, they point out that studies which test the effect of the generosity of the unemployment benefits on unemployment face the problem of reverse causation, which makes their findings unreliable.

Long ago, Atkinson and Micklewright (1991) pointed out that the general economic models, which test the effects of unemployment benefits' incentives are not

reliable because those models fail to take account of the detailed benefits entitlement conditions, benefits administration and other institutional factors related to the unemployment benefits system. Also, they provided an argument, which is contrary to that of the LMF theorists, that unemployment benefits do not affect the level of unemployment, but only the composition of unemployment. Atkinson and Micklewright explained their argument by saying that, if the unemployed “outsiders” refuse to take up jobs (because they are receiving benefits payments) it does not necessarily imply that the unemployment level increases, because the jobs refused by some are taken by others. Therefore, according to Atkinson and Micklewright, the refusals only change the composition of unemployment, not its level; this change in composition is known as “composition effect”.

Holmlund (1998) argues that the adverse effects of the generosity of the unemployment benefits on unemployment level and unemployment persistence, as proposed by the LMF theorists, are limited or offset by the effects of the generosity of the unemployment benefits in increasing inflows into employment. He describes that people who do not qualify as beneficiaries, may prefer to work over remaining unemployed because holding a job qualifies them as beneficiaries. Therefore, the generosity of unemployment benefits encourages the unemployed to take up jobs, which reduces both the unemployment level as well as the unemployment persistence. And, this effect is known as “entitlement effect”.

### ***Measurement***

The generosity of unemployment benefits of a country depends on the type(s) of unemployment benefits system(s) that exists in that country. In Europe, unemployment

benefits system exists in various forms such as: the unemployment insurance (UI) system; the unemployment assistance (UA) system; the guaranteed income (GI) system; and the cash-benefit (KAS) system. The UI system provides benefits payments to only those unemployed who meet the designated criteria of eligibility of the system to receive the payments<sup>44</sup>. The UA system provides financial assistance to only those unemployed who qualify for the given criteria of eligibility to receive the assistance<sup>45</sup>. The GI system guarantees a basic minimum income to a person or a family, where the level of benefits entitlement is means-tested, that is, the income(s) received by other members of the family is deducted from the benefits entitlement. And, the KAS system, which is called a “cash” benefit system, exists only in Sweden, which provides benefits mainly to those who are not insured. It is also extended to those who do not meet the unemployment benefits requirements. And, this system runs for only a limited duration (OECD, 1994b, Chap.8, pg.172-173).

In Europe, Austria, Germany, Portugal, and Spain, have both the UI and UA systems. Ireland, UK, the Netherlands, Belgium, Denmark, and Finland have the UI and

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<sup>44</sup> Under the UI system, the level of benefits entitlement depends on three factors, which are: (i) the duration of benefit, which varies from a few months to a few years and it ceases to exist beyond its duration; (ii) the record of earlier employment; and (iii) earnings in previous job. The level of benefits, typically, ranges between 40 to 80 per cent of the earnings, up to a ceiling. There are however, exceptions to the generalization of the UI system. For example, in Belgium, the duration of benefits is unlimited for heads of the household and single people; in UK, the level of benefits is unrelated to previous earnings; and in a number of other countries the duration of benefits varies by age, family circumstances, and the level of entitlement decreases with the increase in the duration of spell (OECD, 1994b, Chap. 8, pg.172-173).

<sup>45</sup> Under the UA system, the level of entitlement: (i) is unrelated to earnings from previous job and not conditional on earlier employment record; (ii) is means-tested, that is., the income received by other members of the family are deducted from the benefits; and (iii) has no limit on its duration of receipt. There are, however, exceptions to the generalization of the UA system. For example, in countries such as Austria, France, Germany, Portugal, and Spain, the UA benefits are extensions of their UI benefits. Hence, in those countries the benefits become conditional on earlier employment record. In the case of Austria and Germany, the benefits are also related to previous earnings and in case of Portugal and Spain the benefits are limited in duration (OECD, 1994b, Chap.8, pg.172-173).

GI systems. Greece, Switzerland, and Norway have only the UI system. Sweden has the UI and KAS (it is Sweden's "cash" (non-contributory but limited duration) benefits systems. And France has the UI, UA and GI systems (OECD, 1994b, Chap.8, pg.172-173). The presence of multiple benefits systems and the complexity incorporated within each system makes the construction of measures for unemployment benefits both difficult and misleading. However, the OECD provides its measures.

Unemployment benefits system comprises four aspects, which are: (i) the level of benefits entitlement; (ii) the duration of benefits entitlement; (iii) the coverage of the system; and (iv) the strictness with which the system operates. Data measures are available for the first two aspects, but there are no comprehensive measures for the last two (Nickell *et al.* 2005). The level of benefits entitlement is represented by a benefits replacement rate measure, which is a ratio of unemployment benefits to the previous wage income (after tax). The duration of benefits entitlement is represented by the number of years for which a representative unemployed worker is eligible for benefits receipts. However, with the increase in the recognition of the complexity of each nation's criteria for eligibility, such as the criterion of assessing previous work experience, contributions and age, the duration measure has been largely abandoned since the late 1990s. The OECD recognized that the rules (and their enforcement) covering both the eligibility and the duration are critical elements of the benefits system, and hence, the OECD provided a measure of the benefits replacement rate, which they supplemented with a measure of the proportion of unemployed eligible for the benefits. This measure is called the gross replacement rate, which is available across a number of family types,

income levels and different durations of unemployment<sup>46</sup>. This measure came to be used extensively after the late 1990s. In the recent years, the OECD has produced a measure of net replacement rate, which takes account of the unemployment compensation after taxes and various family and housing related benefits, and is often preferred over the gross replacement rate measure.

### **3.2.2 Systems of Wage Determination and Bargaining**

The systems of wage-setting and bargaining include components viz. (i) union density and union coverage, (ii) bargaining centralization, and (iii) bargaining coordination. LMF theorists assert that these components affect wages and employment significantly. The components restrict the responsiveness of wages to the changes in labor market conditions, which impedes labor market adjustments. Hence, the components of the systems are considered by the LMF theorists as barriers to wage flexibility.

#### **Union Density and Union Coverage**

Union density and coverage refer to the degrees to which wages are determined collectively. Union density is defined as the proportion of workers who are the members of the trade unions. Although union density refers to the degree of unionization, it does not provide sufficient evidence of the power of the unions (or workers). The reason for

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<sup>46</sup> Gross benefits replacement rate is constructed by using: (i) three periods during the unemployment spell of a person with a long record of previous employment. These periods are: (a) the first year, (b) second and third year, and (c) fourth and fifth years, of unemployment; (ii) three family and income situations, which are: (a) a single person, (b) a married person with a dependent spouse, and (c) a married person with a spouse in work; and (iii) two different levels of previous earnings that are (a) average earnings and two-thirds of average earnings (OECD, 1994b, Chap. 8, pg. 172-173).

the lack of evidence is that, in many countries, especially European countries, not only the union members, but also the non-union members are covered by the terms and conditions of trade union contracts. Wage agreements made under such contracts are extended administratively to the non-union members, and the extension laws fill the gap between the density and the coverage. Thus high rate of union coverage generates spillover effects of high union power of the unionized sectors on the non-unionized ones.

Union density and union coverage vary considerably across the European countries. France, which has the lowest union density of around 10 percent, has a union coverage of around 95 percent, which is one of the highest levels. In the UK, union density and coverage have declined since the 1980s when extension laws were abolished. The Scandinavian countries have however, maintained high and stable union density and coverage over time (Nickell *et al.* 2005).

### ***Effects on the Labor Market – Wage and Employment***

Union density and coverage represent the bargaining power of the employed “insiders”. LMF theorists argue that unions bargain, on behalf of the “insiders” for setting wage above the market clearing level. The wage-setting restricts wages to fall below the level that is set by the unions and the market does not clear. Hence, unionization makes wages downwardly rigid, resulting into unemployment. LMF theorists, however, argue that such an adverse effect of unionization on unemployment is nullified by the characteristics of the bargaining system viz. bargaining-centralization and bargaining-coordination.



### ***Measurement***

Union density is measured by the number of trade union members as a percentage of all wage and salary earners. And union coverage is measured by the percentage share of employees covered by collective contracts. Both measures are presented in percentage terms.

### **Bargaining Centralization**

Wage bargaining in an economy takes place at a plant, a firm, an industry or an aggregate economy-wide level, and the centralization of the bargaining refers to the level at which the bargaining takes place. The system in which plants, firms and industries (or sectors) negotiate separately over wages represents a decentralized system. The system in which only a few large organizations and unions cooperate and bargain represents a centralized system. And, the system in which bargaining takes place at levels somewhere between the levels of a decentralized and centralized systems, that system represents an intermediate system.

### ***Effects on the Labor Market – Wage and Employment***

LMF theorists assert that the level of bargaining centralization affects employment (or unemployment) via its influence on wage bargaining. Tarantelli (1986) and Bruno and Sachs (1985) argue that in centralized systems, since wage bargaining takes place at a national level and in a cooperative manner, those systems allow the economy to respond to any adverse shock in a more consistent and co-operative way than the decentralized systems. Therefore, they conclude that high level of centralization offsets the adverse effect of unionism on employment (or unemployment). Calmfors and Driffill (1988) however, stress that the relationship between the level of bargaining

centralization and labor market outcomes is not linear, rather hump-shaped. They argue that both highly centralized (co-operative) bargaining systems, such as the systems of Nordic countries, and fully decentralized (competitive) systems, such as the system of the United States, generate positive effects on employment, which nullify the negative effects of the unionism. They say that in decentralized systems markets are competitive, and hence, wages remain downwardly flexible. However, LMF theorists unanimously agree that intermediate systems, found in continental European countries, generate negative employment effects.

### ***Measurement***

LMF theorists have provided measures for the level of bargaining centralization, which are ranks assigned to countries on basis of the subjective judgments of the theorists. In Europe, bargaining does not take place at a single level, but at multiple levels where an agreement of a higher level sets the floor for lower-level agreements. The presence of multiple bargaining levels makes it difficult to determine the level that is predominant in a nation, which complicates the classification of (ranking of) different systems into broad categories. Still, LMF theorists rank the countries and use those ranks to estimate the effects of degree of centralization on unemployment.

### **Bargaining Coordination**

Bargaining coordination refers to the extent to which decisions taken by trade unions and employers' federations at different bargaining levels are concerted in order to facilitate strategies that are beneficial for both. It refers to the degree of consensus between the employers and the unions in a collective bargaining system, irrespective of the level at which the bargaining takes place.

### ***Effects on the Labor Market – Wage and Employment***

LMF theorists assert that highly coordinated bargaining systems, like the highly centralized systems, offset the adverse effects of unionism on unemployment. They argue that high levels of coordination restrain the wage claims of the employed “insiders”, and thereby, lower downward wage rigidity, which generates positive effects on employment. In many discussions, often the distinction between coordination and centralization is not clear, but one should note that under the former, while bargaining wider implications for employment are taken into consideration and the latter only indicates the level at which bargaining takes place.

### ***Measurement***

LMF theorists produce measures for bargaining coordination, which are ranks assigned to each country. Like the bargaining centralization system, the system of coordination is also complicated. LMF theorists, however, produce ranks to classify each country’s coordination system into broad groups. The ranks represent the degrees of inter-firm coordination and that of the inter-union coordination in the process of wage bargaining and also a sum of both.

### **3.2.3 Employment Protection Legislation**

Employment protection legislation (EPL) refers to the regulations concerning *hiring* and *firing* of an employee. The *hiring* related regulations include: (a) rules favoring disadvantaged groups; (b) lowering contracting costs by setting general rules and standards; and (c) encourage on-the job training and human capital formation, and thereby, increasing the productivity and earnings of the employed “insiders”. And, the

regulations related to *firing* include: (a) reducing arbitrary dismissal of the workers, (b) giving notification before dismissing an employee in order to allow the employee to engage in a job search before getting laid-off; (c) mandating severance pay<sup>47</sup>; and (d) extending special requirements for collective dismissals and part-time work schemes. The EPL<sup>48</sup>, not only benefits the employees by protecting them against job related insecurities, but also benefits the employers (OECD, 1994b, Chap.6, pg.69). It benefits the employers indirectly by leading them toward making better hires; since the EPL limits the freedom of the employers to fire via firing regulations and labor adjustment costs, the employers are encouraged to make better hires.

### ***Effects on the Labor Market – Wage and Employment***

LMF theorists assert that the strictness of the EPL generates adverse effects on the labor market by increasing unemployment and contributing toward unemployment persistence. They describe a number of ways in which the EPL affects the labor market, which are: (i) the strictness of the EPL increases labor turnover costs of the employers by imposing layoff costs due to severance pay on them, which they have to incur when they fire someone. The labor adjustment costs, on one hand, make it difficult for the employers to fire someone when market conditions are unfavorable and, on the other make the employers leery of hiring additional employees or create new jobs even when the market conditions turn favorable. The costs discourage employers to make additional

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<sup>47</sup> Severance pay is the pay an employee receives when they are laid off or they retire. It includes other benefits such as health insurance, payment for unused leave or vacation etc. in addition to employee's remaining regular pay.

<sup>48</sup> The OECD Jobs Study (OECD, 1994b, Chap.6, pg.73) report presents a list of arguments in favor of employment protection regulation and also arguments countering those arguments in favor.

hires because if they increase hires, they will have to face the difficulty in reversing their decisions when the market conditions worsen. The strictness of the EPL therefore, reduces employment flexibility in the labor market via increasing labor adjustment costs. It also lowers the demand for labor and hence, increases unemployment by discouraging employers to employ. However, Siebert (1997, pg. 49), in this context, argues that such an adverse effect of labor adjustment costs on hiring decisions (on labor demand) is reduced if the employers are able to adjust the wages or the working-hour downward. But, if strictness of the EPL is combined with downward wage rigidity, adverse effects of the EPL on unemployment cannot be lowered; (ii) the effects of high labor adjustment costs, due the strictness of the EPL, affect the decision of the employers to make hires even in the long run, which therefore, lead to over-time persistence of unemployment; and (iii) the strictness of the EPL reduces the fear of the employed “insiders” to get fired by providing them protection against dismissals. This loss of fear increases the wage claims of the “insiders” making wages rigid. Due to this effect of the EPL on wage rigidity, it is also held as a barrier to wage flexibility.

### ***Measurement***

Measure of the EPL is constructed on basis of subjective judgments on each country’s strength of the legal framework governing hiring and firing. Blanchard and Wolfers developed a measure of the EPL in a major project on employment protection, undertaken by the OECD in 1999. This measure was an updated measure over the one developed by Grubb and Wells (1993). The newer measure included more dimensions of employment regulation than the Grubb and Wells’ measure. Blanchard and Wolfers produced two data points for the EPL measure and from those two data points, finally

yearly data points were created by the method of interpolation. In 2004, OECD (2004) provided a *truly* annual data series for the EPL, which is considered to be superior to all the previously existing series of the EPL<sup>49</sup>.

### **3.2.4 Labor Tax Wedge**

A labor tax wedge is described as the wedge between producers' wage, which is the cost of labor to the employers, and consumption wage, which is the net income (net of direct and indirect taxes) of the workers. Payroll taxes, which are the taxes that employers pay on the number of employees they employ, represent the cost of labor to the employer. The employers' social security contributions, which are a part of the producers' wage, are paid by the employers to the government. Income taxes and employees' social security contributions, which are a part of the consumption wage, are paid by income earners from their income. Consumption taxes, which are also a part of the consumption wage, are the indirect taxes that are indirectly paid by the consumers when they purchase goods and services. Therefore, the labor tax wedge is created by including payroll taxes, income

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<sup>49</sup> The calculation of the OECD's 2004 measure of the EPL involves the use of eighteen basic items, which are measured in terms of: (i) units of time, such as days (used in measuring say, delay involved before notice can start; length of notice period; severance pay; length of trial period etc.); (ii) an ordinal scale, say, from 0-3 or 0-4, (used in measuring say, notification procedures; definition of justified or unfair dismissal; valid cases for use of fixed-term contracts; definition of collective dismissal etc.); (iii) a number, (used for say, representing the maximum number of successive fixed term contracts); (iv) a yes or a no, (used for say, depicting restrictions on number of renewals). Each of the basic items is measured by means of the qualitative judgments of both workers and employers. On basis of the subjective judgments of the workers and employers a numerical strictness score, from 0-6, is assigned to each of the different items, such that a lower score represents lower level of strictness and a higher score represents a greater level of strictness. Once the scores for the eighteen items are obtained, they are normalized and classified into three indicators of the EPL. These indicators are: (1) employment protection of regular workers against individual; (2) regulation of temporary forms of employment, and (3) specific requirements for collective dismissals.

taxes, indirect taxes and social security contributions of the employees' and employers'. And, any change in one or more of these taxes and contributions changes the tax wedge.

### ***Effects on the Labor Market – Wage and Employment***

LMF theorists assert that taxes on labor and social security contributions – components of the labor tax wedge – affect labor market in many ways. An increase in the payroll taxes increases the cost of labor to the employers, and hence, reduces the employers' demands for labor, which in turn raises unemployment. An increase in income taxes and social security contributions reduces the return that is earned from working, which influences the workers to enjoy more leisure and work less, leading to depress labor supply. An increase in consumption or indirect taxes reduces the purchasing power of the income earned from working. Therefore, the increase in consumption taxes affects labor market decisions in the same manner as the direct taxes.

LMF theorists do not consider the labor tax wedge to be a barrier to wage flexibility. They, however, assert that a rise in the tax wedge in a country increases its unemployment level if the wages are rigid, where the wage-rigidity may occur due to the effects of the barriers to wage flexibility that are mentioned above (or due to some other factors). An increase in payroll taxes (and/or an increase in employers' social security contributions), which increases the tax wedge, increases the burden of cost to the employers. LMF theorists argue that the effect of the increased cost burden reduces labor demand, leading to unemployment, until the burden is not shifted from the employer' on to the workers. They further argue that, the shift requires downwardly flexible wages, which may be restrained by the barriers to wage flexibility or other sources of wage rigidity such as implicit contracts or efficiency wages. Therefore, in case the wages are

not flexible and an increase in cost burden of the employers cannot be reduced, an increase in labor tax wedge increases the unemployment especially of the low-paid or minimum wage workers, because their wages cannot be lowered further.

### ***Measurement***

A measure of the labor tax wedge is represented by a sum of payroll tax, income tax and employee' plus employer' social security contributions expressed as a percentage of total labor costs, which include gross earnings and social security contributions of the employers. The OECD uses an average production worker's average tax rates for personal income tax, indirect tax and employers' and employees' social security contribution (calculated in the OECD's *The Tax and Benefit Position of Production Workers*) to create the measure of the labor tax wedge.

### **3.2.5 Active Labor Market Policies**

Active labor market policies (ALMPs) are a set of labor market policies, which encompass a wide range of labor market activities such as employee training plus professional development, job-counseling, job-creation via subsidized employment, and enhancing matching between workers and jobs through job assistance program. The basic aim of these activities is to provide active assistance to the unemployed to improve their chances of getting employed. Unlike the passive supports provided by unemployment benefits system, the ALMPs directly assist reemployment. Therefore, as mentioned above, LMF theorists consider the ALMPs to increase employment.

In Europe, active labor market policies have been around since the 1960s and have evolved since then. In the sixties, the active policies, which were called "active



manpower policies”, were designed for addressing the needs of a fast-growing economy (OECD, 1964). However, with the change in economic, and specifically, in labor market conditions in the 1970s and the 1980s, a change in the role of ALPMs’ was called for. It was then, the focus of the ALMPs shifted toward addressing the problem unemployment. In 1992, the OECD Labor Ministers recognized the role of ALMPs in reducing unemployment and recommended shifting labor market expenditures toward active measures in order to improve the quality of the labor force, mobilize labor supply, and improve job search process.

### ***Effects on the Labor market – Wage and Employment***

LMF theorists assert that the ALMPs affect employment (or unemployment) and wages in many ways, which are: (i) the ALMPs, through the Public Employment Service (PES) and retraining programs increase the effectiveness of matching between job seekers (and their skill-sets) and jobs, which increases employees’ job efficiency. The increase in job efficiency leads to increased labor productivity, which in turn increases labor demand, and thereby, reduces unemployment; (ii) the ALMPs assist in maintaining an effective supply of a labor force; the PES, the retraining programs and others encourage the unemployed including the long-term unemployed to not to leave the labor force, and thereby, maintain effective supply of labor. The effective supply increases competition in the labor market, and hence, reduces wage pressure; (iii) the ALMPs, like unemployment benefits, also increase wage pressure by reducing the fear of loss of income associated with unemployment, and the risk of long-term unemployment. This adverse effect of the ALMPs on wage pressure is, however, is said to be countered by the effects of the ALMPs on reducing wage pressure that is mentioned in (ii).

## ***Measurement***

Public expenditures on labor market programs are distributed between passive and active measures. Government's commitment in the form of its expenditure on the ALMPs represents the measure of the ALMPs. Due to the problem of reverse causality between unemployment and the expenditure on the ALMPs, some studies use government expenditure on the ALMPs per unemployed person relative to GDP per capita as an instrumental measure of the total expenditure on the ALMPs (Layard *et al.* 1991, 2005; Scarpetta, 1996).

### **3.3 NEGLECTED SOURCES OF WAGE FLEXIBILITY – THE TRANSNATIONAL DIMENSION**

When LMF theorists view European countries as independent and isolated entities, they find relative wage rigidities, explained by cross-country labor market policies and institutions, influencing rise and fall of unemployment rates across the countries. But what happens when one views European nations from a pan-European perspective? This dissertation answers that the scenario changes, relative wages become flexible and employment (or unemployment) rates fluctuate differently across countries, not because of the effects of country-specific labor market policies and institutions, but because of international-, continental- and global-level factors.

European countries are integrated and economically interdependent via channels namely international trade, international capital and financial market, and international foreign exchange market.<sup>50</sup> Through these channels, effects of economic changes of one

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<sup>50</sup> Baker and Schmitt (1999) also discuss on the three channels that interconnect European economies.

country are felt by others – as a result of conscious policy choices or endogenous changes in macroeconomic factors of a country, employment and wage levels of not only that country, but also that of those interconnected with it change. Also, due to the integration of European countries at a global level, changes in global-level factors impact the economies of all the integrated countries, influencing their employment and wage levels. Therefore, because of the integration of European countries at international, continental and global levels, cross-country (international or continental) factors and global-level factors lead to a rise or fall in wages and employment or unemployment rates across European nations. These cross-border factors and the global-level factors are named in this dissertation as transnational variables.

International trade is one channel that transmits the effects of economic changes taking place in one country to its trading partners. When one or more components of international trade, viz. exports and imports of goods and services, change in one country, the impacts of the change is felt not only by that country, but also by its trading partners. Therefore, employment (or unemployment) and wage levels of all the countries change, but with different magnitudes. The changes reflect changes in relative employment (or unemployment) rates and relative wages across the countries. These changes in relative wages display relative wage flexibilities across the countries. Therefore, transnational sources related to international trade, such as exports (or imports) of one country relative to that of the others, explain both the flexibilities in relative wages and fluctuations in relative unemployment rates across countries.

European countries have remained largely dependent on international trade especially inter-European trade from a long period of time. In order to enhance trade

across nations, European countries have been involved in abolishing trade barriers between them long before the formation of the European Union (EU). International organizations such as European Economic Community and European Free Trade Association emerged in Europe to enable free trade between their member countries. The European Economic Community (EEC), which is also known as the Common Market in the UK, was established under the Treaty of Rome signed in 1957 in order to economically integrate countries such as Belgium, France, Italy, Germany, Luxembourg, and the Netherlands. In 1973, Denmark, Ireland, and UK, in 1981, Greece, and in 1986, Spain and Portugal, joined the EEC. Later when the EU was created, the EEC was absorbed within EU. In 1960, European countries that were either denied or chose not to join the EEC created a free trade bloc called the European Free Trade Association (EFTA)<sup>51</sup> in order to liberalize trade between its member countries. The EFTA member states also conducted free trade with a number of other countries under jointly concluded free trade agreements. With the formation of the European Union, all the trade barriers are eliminated between the EU members. Because of the efforts of enhancing cross-country trade, international trade has always remained an important channel integrating European countries and making them economically interdependent. Therefore, transnational variables related to international trade, especially inter-European trade, such as relative exports or imports of goods and services (exports and imports of goods and

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<sup>51</sup> UK, Denmark, Norway, Sweden, Austria, Switzerland, and Portugal originally formed the EFTA. In 1961, Finland entered the EFTA as an associate member and became a full member in 1986. The UK and Denmark in 1973 and Portugal in 1986, left EFTA and joined the EEC. Austria, Switzerland and Finland left the EFTA in 1995 and joined the EU. In 1970, Iceland, and in 1991, Liechtenstein, joined the EFTA. Currently, Norway, Switzerland, Iceland and Liechtenstein form the EFTA.

services of one country relative to that of another) remain an important source of relative wage flexibilities and variations in relative unemployment rates across European nations.

Trade-related transnational variables are sources of relative wage flexibilities not only between countries, but also between sectors, within a country. When the imports of goods and services of a trading country increase (decrease), sectors producing import-competitive products face adverse (favorable) effects on the demand for their products. Such effects therefore, lead to changes in the employment and wage levels of those sectors relative to that of those which experience different or no effects at all. Similarly, when the exports of goods and services increase (decrease), sectors producing export-products find it favorable (unfavorable) for the demand for their products, and thereby, for their employment and wages levels relative to that of those which are differently or not affected by the changes in the exports. Hence, changes in international trade components emerge as sources of relative wage flexibilities and variations in relative employment rates across two or more sectors within a trading nation.

A second channel that interconnects the economies of two or more European nations is the international market of capital and financial items. This international market runs on transactions of capital and financial items - assets and liabilities - across countries in the forms of inflows and outflows of foreign direct investments (FDI), portfolio investments, and other investments in domestic and foreign assets across the countries<sup>52</sup>. The inflows and outflows of the FDI or multinational investments<sup>53</sup> involve

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<sup>52</sup> FDI represent investments in foreign assets in order to gain an ownership or control of at least 10% over a business located abroad. Portfolio investment represents investment in foreign stock and bonds or other financial assets, where the investors do not possess active control over the securities, unlike FDI. Other investment includes transaction of currencies and bank deposits in the foreign exchange market.

one economy investing in the assets of another, which affects both the economies, but differently. When a country receives inflows of FDI, its investment goes up, and thereby, its employment and wage levels also rise. Because of such favorable effects of FDI, countries compete against one another to attract multinational investments. They offer incentives in the forms of supplying cheap and skilled labor force, lowering taxes, improving sales opportunity, and providing advantageous location for business to multinational investors in order to influence them to invest in their country instead of in others. The inflows of FDI in one country increase the employment and wage levels of that country relative to that of the others. These effects on employment and wages lead to relative wage flexibilities (changes in relative wages) and fluctuations in relative employment (or unemployment) rates across countries. Even across the sectors of a nation, when one sector receives FDI and others do not, the employment and wage levels of the former rises relative to that of the latter ones. And, this leads to relative wage flexibilities and changes in relative employment levels across the sectors within a country.

European countries appear as substitutes as well as competitors to the multinational investors for their investments. Countries which take measures to attract

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<sup>53</sup> In the book *The World is Flat* (Friedman, 2005, Chap.1, pg.9), Thomas Friedman describes three eras of Globalization out of which he describes the second era “Globalization 2.0”, that he says lasted from 1800 to 2000, as the era during which multinational companies shrank the world into a size small. He adds that during the second era, multinational companies acted as key agents and changed the world. The expansion of the Dutch and English joint-stock companies and the Industrial Revolution pioneered the evolution of multinationals that went global for markets and labor. In the recent decades, an explosion in the growth of multinational companies has surpassed the growth of world trade. This led globalization to be described as the growth of multinational companies rather than growth of trade. Therefore, FDI or multinational investment is now a major channel that interlinks two or more economies.

FDI enjoy rising employment rates and wages relative to that of the others. Therefore, changes in FDI-related transnational variables such as relative investment or relative FDI (investment or FDI of one country relative to that of other) or relative taxes (since, changes in taxes influence the inflows and outflows of FDI) across European countries make relative wages flexible and lead to variations in relative unemployment rates across the countries.

Besides the FDI, inflows and outflows of other instruments of the international capital and financial market also affect the employment and wage levels of the countries that participate in the market. These instruments include portfolio investments and other inter-country assets investments. When one country changes its tax rates or interest rates or its bilateral exchange rate changes, the change influences the volume of portfolio investments or other investments flowing in and out of that country. Investors invest (buy stocks and bonds and other financial assets) in the countries which impose lower taxes on interest rates or dividends or offer higher interest rates on the investment assets or experience currency appreciations (because foreign investors prefer to hold assets valued in a stronger currency than in a weaker one). A surplus of net inflows (inflows minus outflows) of financial investments (portfolio or others) in a country increases effective demand including consumption and investment of that country relative to that of those who face no or a different amount of net inflows. The changes in effective demand components across countries affect relative employment and wage levels across those countries. Therefore, the portfolio and other investments-related transnational variable such as relative investment or relative consumption or relative interest rates or relative

taxes therefore, explain relative wage flexibilities and fluctuations in relative employment rates across countries.

The international market of foreign exchange is a third channel that interlinks countries participating in the market. The foreign exchange market is the world's largest and most liquid financial market in which currencies and bank deposits are traded across countries by currency speculators, banks, central banks, multinational companies, governments and financial institutions. Changes in the volume of the transactions of currencies and bank deposits of the countries that are involved in the transactions affect their foreign currency reserves, and thereby, their exchange rates. The fluctuations in exchange rates affect the components of international trade as well as international capital and financial market. Change in the exchange rate of a country due to the appreciation (depreciation) of its currency affects its exports and imports via making its exports relatively expensive (cheaper) and its imports relatively cheaper (expensive) in the international trading market. When exports become relatively expensive, domestic exporters face adverse effects of the appreciation, which reduces the employment and wage levels of the exports-producing sectors. Unlike the exporters, the producers of import-substituting products experience benefits from the appreciation because appreciation makes imported products expensive, reducing their demand, and thereby, increasing the demand for the domestically produced import-substituting products. Currency appreciations (or depreciations) also affect the economy by affecting the prices of imported products such as crude oil and raw materials. Appreciations decrease the prices of the imported products, which in turn generates beneficial effects on the domestic production of goods and services.



Appreciations or depreciations of currencies also affect inflows and outflows of FDI and of other international investments in capital and financial assets. By making labor expensive in an appreciating country, appreciations can lead to outflows of FDI. However, by making the currency stronger, appreciations can attract inflows of portfolio investments or investments in other assets. All these effects of changes in exchange rate via appreciations or depreciations affect the employment and wage levels of the countries whose exchange rate changes. The effects of the changes are also transmitted to all the other countries that are linked to that country via the channels. Therefore, transnational variables related to exchange rates, such as bilateral exchange rate or relative consumer price index, explain variations in relative employment and relative wage across countries.

Western European currencies were pegged with the US dollar under the Bretton Woods fixed exchange rate system until 1970. But with the breakdown of the Bretton Woods system in the early 1970s, the exchange rate system became a floating one. In European exchange rate market, under the floating exchange rate system, the supply and demand of the foreign currencies determined the exchange rate, the depreciation and appreciation of currencies remained unhindered and exchange rates became volatile. The volatility created an uncertain environment for exporters, importers, domestic producers, multinational investors and other participants of the foreign exchange market across European countries. Exchange rates fluctuated without regulation leading to fluctuations in relative employment rates and wages across the European countries. Until 1999, the volatility persisted, but the initiation of the euro ended it to a great extent. Today, exchange rate volatility persists only between the British pound, the Swiss franc, the Scandinavian currencies that remain outside the euro zone, and the currencies of a

number of accession countries. Therefore, effects of changes in bilateral exchange rates still exist to some extent across European countries.

### **3.4 MEASUREMENT OF WAGE FLEXIBILITY AT A CONTINENTAL LEVEL**

The previous section of this chapter describes that across European countries transnational factors lead to relative wage flexibilities, and also explain the fluctuations in relative unemployment rates because of the economic interdependence between the countries. LMF theorists, however, assert that relative wages are not flexible, but rigid across European countries because of labor market policies and institutions. For them, the variations in relative wages (and thereby, in relative unemployment rates) across the European countries are explained only by the differences in their labor market policies and institutions. This dissertation therefore, begins with a methodological analysis of testing the nature of European wage structure in order to find out whether relative wage variations across European nations display flexibility, which may be explained by transnational factors, or rigidity, explained by labor market policies and institutions. This dissertation performs the test at a continental-level, by treating European countries as integrated countries. It does so to find out from the data whether European countries appear as separate entities, as assumed by LMF theorists, or as interdependent economies, as proposed by this dissertation, in terms of their nature of wages. And, knowing the nature of wages, from it, this dissertation explains the evolution of unemployment in European countries over the last few decades. The empirical test is presented in the next chapter of this dissertation.

## **Chapter 4: Toward Measurement of Relative Wage Flexibility in Europe**

### **4.1 INTRODUCTION**

This chapter presents the methodological approach of measuring flexibility (or rigidity) in European wage structure. The findings of this chapter answer the first research question of this dissertation that is “*What is the nature of European wage structure over time? How rigid or flexible is it?*” Section 4.2 provides a description of construction of a pan-European or a continental-level dataset of average wage that is used for measuring relative wage flexibility in Europe. Section 4.3 describes the analytical approach of testing the relative wage flexibility. It explains two multivariate analytic tools, namely cluster analysis and discriminant function analysis, which are used for the test. In addition, this section also talks about the uniqueness, the advantages and the limitations of the analytical approach of this dissertation. Section 4.4 presents multiple levels of analyses and their results concerning the measurement of relative wage flexibility. The final section, Section 4.5, provides the implications and the conclusions drawn from the results of the analyses of Section 4.4.

### **4.2 DATA DESCRIPTION**

To examine the nature of European wage structure from a pan-European perspective, this dissertation examines the patterns of changes in average wages of a number of European country-sectors (sectors of a country) over time to find out whether the patterns displays relative rigidities or flexibilities across the country-sectors. To conduct the examination at a pan-European or a continental-level, this dissertation

constructs a continental-level data set of average wage. For the construction of the dataset, data on remuneration and employment<sup>54</sup> are obtained from the *Cambridge Econometrics Database*<sup>55</sup>. The data on remuneration and that on employment are available for fifteen sectors of seventeen European countries over a period of twenty-six years, from 1980 to 2005, in which no data points are missing. The seventeen European countries<sup>56</sup> for which the sectoral-level data on remuneration and employment are available include: Belgium, Germany, Denmark, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal, Finland, Sweden, UK, – the fifteen original European Union (EU) countries – Norway, and Switzerland. And the fifteen sectors<sup>57</sup> of each of the seventeen countries for which the data on remuneration and employment are available include: (i) agriculture, forestry and fishing; (ii) mining and energy supply; (iii) food, beverages and tobacco manufacturing; (iv) textiles and clothing manufacturing; (v) fuels, chemicals, rubber, and plastic products manufacturing; (vi) electronics manufacturing; (vii) transport equipment manufacturing; (viii) other manufacturing; (ix) construction; (x) wholesale and retail; (xi) hotels and restaurants; (xii) transport and communications; (xiii) financial services; (xiv) other market services, and (xv) non-market services.

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<sup>54</sup> The data on remuneration are measured in millions euro and the data on employment are given in thousands.

<sup>55</sup> The Cambridge Econometrics database draws data from the official data available at European and national levels. As mentioned in the database, the data undergo a substantial process of updating and quality checks in order to improve their consistency, timeliness and coverage. The database also announces that their data can be used to make comparisons across cities/regions/countries, to analyze trends over time.

<sup>56</sup> Acronyms of the seventeen countries are presented in Table A.4.1.

<sup>57</sup> Acronyms of the fifteen sectors are presented in Table A.4.2.

To construct a continental-level data set of average wage from the datasets of remuneration and employment of seventeen countries, the datasets are pooled. The pooling yields one single panel data set for remuneration and another for employment for Europe as a whole (that is, Europe composed of the seventeen countries mentioned above). Each of the two resultant data sets consists of 6,630 cells including 255 (17 countries \* 15 sectors) rows and 26 (years from 1980 to 2005) columns. Each cell of the data set of remuneration and of employment respectively represents the remuneration and the level of employment of a particular sector of a particular country for a particular year. From the two pan-European data sets of remuneration and employment, further, a panel data set of average remuneration (hereafter called average wage) is constructed by dividing each cell component of the remuneration data set by the corresponding cell component of the employment data set. The resultant data set of average wage consists of 6,630 cells including 255 (17 countries \* 15 sectors) rows and 26 (years from 1980 to 2005) columns, like that of the data sets of remuneration and employment. From the data set of average wage, finally, a data set of annual rate of change of average wage is computed by calculating the annual rate of change of average wage for each of the 255 cases (where a case represents a sector of a country or a country-sector) over the period from 1980 to 2005. The final data set on over-time average wage changes consists of 6,375 cells arranged in 255 rows, representing the 255 country-sectors, and 25 columns, representing the time period from 1980-81 to 2004-05. This data set represents the data on over-time annual rate of change of average wages of 255 European country-sectors, or said differently, a continental-level data on over-time average wage changes (or average wage movements or average wage behaviors).

### 4.3 METHODOLOGY – A FOUR-PART ANALYSIS

The basic methodological approach of this dissertation begins with a study the European wage structure, or in other words, a test of how relative wages behave in Europe. Once the behavior is known – relative wages are flexible (or rigid) – the factors that may be explaining the flexibility (or rigidity) are determined. Relative wage rigidities, and thereby, differential rates of unemployment across European countries are already proposed by LMF theorists to be explained by labor market policies and institutions. Therefore, if rigidities are found, LMF theorists' proposition is said to be supported and both the rigidities and the evolution of differential rates of unemployment across European countries are attributed to the policies and institutions. But in case flexibilities are found, sources specifically transnational sources that may explain the flexibilities are searched. Once the sources are found, using theoretical arguments, it is explained how the sources also explain the evolution of unemployment in Europe.

The methodological approach of this dissertation can be broadly categorized into a four-part analysis, which includes *grouping*, *discrimination*, *repetition of grouping*, and *discrimination* and *forensic identification*. The *grouping* groups 255 European country-sectors into a smaller and manageable number of clusters or groups based on similarities (and dissimilarities) in their respective average wage movements over time. The *discrimination* tests whether or not the European country-sectors are classified into clusters as predicted by *grouping*, and it also yields one or more functions of between-group variations, which discriminate maximally the over-time average wage movements between the predicted clusters. The *repetition of grouping and discrimination* involves removing higher level's between-group wage variations and repeating the *grouping* and

*discrimination* to capture variations within-groups at further levels. And, finally, the *forensic identification* finds out the factors that may be explaining the between-group variations across the clusters obtained from the repetitive performances of *grouping* and *discrimination*. This chapter presents the first three parts of the methodology. The next chapter, Chapter Five, presents the fourth and final part of the methodology.

#### **4.3.1 Grouping – Cluster Analysis**

Cluster analysis<sup>58</sup> is a multivariate exploratory data analysis tool, which is generally used to develop taxonomies. Given information on a set of characteristics (or variables) of a number of cases, a cluster analysis sorts the cases and classifies them into groups or clusters on basis of similarities (or dissimilarities) in their characteristics. The clusters are formed in such a manner that the cases within a cluster constitute maximum similarities in their characteristics, while the characteristics of the cases in separate clusters differ maximally. A cluster analysis, therefore, reduces a given number of cases into a small number of clusters or groups. It is generally used at the exploratory phase of a research, hence, there is neither any *a priori* hypothesis that is tested, nor there is any role for statistical significance testing.

This dissertation uses cluster analysis to examine relative wage flexibility (or rigidity) in European wage structure. There are a number of methods of clustering<sup>59</sup> such as k-means clustering, two-way clustering, and hierarchical clustering. Out of these methods, this dissertation employs the hierarchical clustering method for its analysis. It

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<sup>58</sup> Cluster Analysis was first used by Tryon (1939).

<sup>59</sup> The various methods of clustering can be found in <http://www.statsoft.com/textbook/stcluan.html>.

does not use the k-means clustering method because this method requires hypothetical information on the number of clusters prior to running the analysis, which is not available in the case of this dissertation's analysis. It also does not use the two-way joining method because this method requires clustering in two ways, that is, clustering both cases, row-wise, and variables, column-wise, simultaneously, which is not the objective of this dissertation's analysis.

Hierarchical clustering method displays grouping results in a tree-plot or diagram, which shows how close or how distant cases are in terms of the magnitude of similarities or dissimilarities in their characteristics or in their values of criterion variables. The formation of the tree-diagram requires firstly, measuring distances between the characteristics (or values of the criterion variables) for each possible pair of cases in order to assign them into same cluster or separate clusters, and secondly, measuring the distances between two or more clusters. In order to measure the distances between the values of the criterion variables for each possible pair of cases, a Euclidean distance measure is used in this study. This distance measure is not applicable when two variables between which distance is to be measured are measured in different scales. This criterion of non-applicability is not of a concern in this study because here the values of rate of change of average wages are represented in same scale, which is in percentage terms. In order to measure the distance between the clusters, a Ward's clustering rule is employed, because it is generally considered to be very efficient (Ward, 1963). The reason for the efficiency of the rule is that it evaluates the distances calculated by Euclidean measure between clusters and minimizes the Euclidean distance between any two clusters that are formed at each step by using an analysis-of-variance approach.



This dissertation applies cluster analysis – hierarchical clustering method – on the 255 European country-sectors’ data on annual rate of change of average wages from 1980-81 to 2004-05. It does so to measure relative wage flexibilities (or rigidities) across the country-sectors over the period. Using a Euclidean distance measure, this clustering method computes the distances (or closeness) between the values of criterion variables (that is, between the rates of change of average wages over twenty-five year period) of each possible pair of cases out of the 255 cases, or, of each case with that of the rest of the cases. And, using Ward’s rule, the clustering method progressively assigns cases showing minimal distances between one another to a single cluster and those showing greater distances to separate clusters. Therefore, in this exercise, the clustering method minimizes within-group distances, while maximizing between-group distances.

#### **4.3.2 Discrimination – Discriminant Function Analysis**

Discriminant function analysis (DFA) is a multivariate analytic technique which when applied in combination with a cluster analysis tests whether not cases are classified into clusters as predicted by the cluster analysis, and also determines one or more functions that discriminate maximally between two or more clusters obtained from the cluster analysis. For a given number of cases classified into two or more clusters, and given the data on two or more criterion variables (also called, discriminating variables) for those cases, which classify the cases into the clusters by a cluster analysis, a DFA estimates the contribution of each of those variables in optimally classifying the cases into the clusters. Therefore, where cluster analysis only answers the question, “*how cases*

*are organized into clusters?” a DFA answers the question, “how cases are best organized into clusters and how do the clusters differ?”*

A DFA is analogous to a multiple regression analysis in which a set of independent variables are regressed on a categorical dependent variable to estimate regression coefficients. Each estimated (standardized) coefficient shows the partial contribution of its corresponding independent variable in predicting the categorical dependent variable. In case of a DFA, the variable representing the grouping or classification of the cases into clusters is analogous to the categorical dependent variable of the multiple regression analysis, and the criterion or discriminating variables of the cases are analogous to the independent variables of the multiple regression analysis. DFA uses the maximum likelihood method to estimate one or more sets of coefficients of the discriminating variables. Each estimated coefficient of a particular set shows the partial contribution of the corresponding discriminating variable for classifying each case into a particular cluster. In the case of DFA, each set of estimated coefficients forms a linear function of the discriminating variables, which is called a discriminant function or a canonical score. The discriminant function is expressed in a linear functional form as:

$$L_i = c + a_1 * x_{i1} + a_2 * x_{i2} + \dots + a_n * x_{in} \quad (4.1)$$

In the equation (4.1), the  $L_i$  variable is the discriminant function or the canonical score for the  $i^{\text{th}}$  case. It is a linear combination of all the discriminating variables,  $x_j$ 's. The  $a_j$ 's are unstandardized discriminant coefficients, also called the partial coefficients of the  $x_j$ 's. Each  $a_j$  represents the partial contribution of its corresponding  $x_j$  variable in predicting the given classification or grouping of the cases or assigning given cases into

given categories or clusters, controlling for the contributions of the rest of the  $x_j$  variables.

The discriminant function(s) of equation (4.1) is expressed in terms of standardized coefficients as:

$$L_i = b_1 * x_{i1} + b_2 * x_{i2} + \dots + b_n * x_{in} \quad (4.2)$$

In equation (4.2), the  $b_j$ 's are the standardized coefficients and they represent the standardized partial contributions of  $x_j$ 's in classifying given cases into given clusters. If the cases are classified into  $k$  number of clusters, DFA estimates  $k-1$  sets of coefficients or  $b_j$ 's (and also  $a_j$ 's) and hence,  $k-1$  sets of discriminant functions or canonical scores. The DFA uses each set of  $b_j$ 's to calculate the value of the canonical score ( $L_i$ ), corresponding to a particular discriminant function, for each case, such that using the  $b_j$ 's corresponding to the first discriminant function, the values of the first canonical score for all the cases are calculated. Similarly, using the  $b_j$ 's corresponding to the second discriminant function, the values of the second canonical score for all the cases are calculated and so and so forth.

It is evident from equations (4.1) and (4.2) that the discriminant function (or a canonical score) represents a linear combination of the discriminating variables. The contributions from each discriminating variables assign cases into clusters optimally, or said differently, discriminate optimally between clusters, such that the first discriminant function discriminates maximally between the clusters, the second function discriminates maximally after controlling for the first function and so and so forth. Therefore, each discriminant function or canonical score represents a dimension along which the clusters are discriminated maximally where the dimensions are orthogonal (uncorrelated) to each

other. The orthogonal nature of the dimensions means that the contributions of the discriminating variables corresponding to a discriminant function in discriminating across clusters do not overlap with the contributions corresponding to other discriminant functions. Corresponding to each discriminant function, DFA yields an eigenvalue, which shows the ratio of importance of the discriminant function in discriminating between clusters. The relative importance of each eigenvalue is presented in terms of percentage of variance explained by its corresponding discriminant function.

In the analysis of this dissertation, cluster analysis produces clusters across the 255 European country-sector cases. From the cluster analysis, clustering-information, that is, which case lies in which cluster, is taken and added as an additional column in the 255 country-sectors' over-time average wage change data set. A discriminant function analysis<sup>60</sup> is performed on that data set to find out whether or not the cases are classified into clusters as predicted by the cluster analysis and how the predicted clusters are discriminated maximally. The DFA yields discriminant functions or canonical scores, which represent dimensions along which the clusters obtained from the cluster analysis, are discriminated maximally. In the analysis of this study, the functional form of the discriminant function, with standardized coefficients, is expressed as:

$$L_i = b_1 * x_{i1} + b_2 * x_{i2} + \dots + b_n * x_{in} \quad (4.3)$$

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<sup>60</sup> A recent alternative to a discriminant function analysis (DFA) is a logistic or a multinomial logistic analysis, which is, in general, preferred over the DFA because the DFA relies on more restrictive assumptions. In the analysis of this dissertation, the number of observations (255) is not large enough compared to the number of independent variables (25), because of which application of a multinomial logistic analysis is not feasible. Hence, DFA appeared as the preferred analytic tool for the analysis of this dissertation. Moreover, since in this analysis, it is required to combine a multivariate tool that is cluster analysis with another tool to determine cluster discrimination, it seems logical to combine one multivariate analytic tool with another multivariate tool that is the DFA.

Equation (4.3) is identical to equation (4.2), but in equation (4.3)  $i = 1, 2, \dots, 255$  for the 255 European country-sectors. The  $x_j$  represents the  $j^{\text{th}}$  discriminating variable that is the annual rate of change in average wage in  $j^{\text{th}}$  year, where  $j=1, 2, \dots, 25$  for the twenty-year time period from 1980-81 to 2004-05.

#### **4.3.3 Repetition of Grouping and Discrimination – Multilevel Analysis**

The data analysis of this dissertation, mentioned above, starts with a cluster analysis followed by a DFA on 255 European country-sectors. Galbraith (1998, Chap.6-9, pg.89-167) and Calistri and Galbraith (2001, Chap.5, pg.92-105) have also used methodological techniques similar to the one mentioned above, that is, performing cluster analysis followed by a DFA<sup>61</sup>, but this dissertation advances over their techniques. It does so by developing and adding an innovative method of applying cluster analysis and DFA on European country-sectors multiple times. In the multiple applications of the two analyses, each time, between-cluster wage variations obtained from an application of the two analyses at a level are removed and the analyses are repeated on those cases which were clustered together in that level. The basic idea of the repetition is to examine wage-variations across the cases that remained clustered together concealing wage-variations between them at that level. To elaborate further, when the analyses are applied on 255 country-sectors, small and large clusters are obtained. By removing the country-sectors belonging to smaller clusters (here, a smaller cluster refer to the one which comprises such a small number of country-sectors that it is not feasible and meaningful to apply

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<sup>61</sup> Galbraith and Lu (2001) describe the use of cluster analysis and discriminant function analysis as a research tool.

cluster analysis and DFA on those country-sectors), the analyses are repeated at a further level separately on the country-sectors of each of the larger clusters (here, larger cluster refers to the one that confines such a number of county-sectors that it is feasible and meaningful to apply cluster analysis and DFA on those country-sectors). The application of cluster analysis and DFA are repeated multiple times in an identical manner, that is, each time the country-sectors of only the larger clusters are subjected to further analysis and those of the smaller ones are dropped out. The logic behind repeating the analyses multiple times goes as follows: when cluster analysis and DFA are performed on the set of 255 country-sectors, relative wage variations – flexibilities (or rigidities) – are obtained only across a few subsets of the original set and finer degrees of flexibilities (or rigidities) across the country-sectors of a single cluster remain undiscovered. This dissertation argues that all information on patterns of over-time average wage changes is not revealed by a single cluster analysis and DFA. The magnitude of the forces explaining the relative wage variations (flexibilities or rigidities) across the clusters in an analysis might be overshadowing the magnitude of factors that may explain relative wage variations across the country-sectors, which in that analysis belong to a single cluster (showing no wage variations). So, the question arises: *how to discover the hidden relative wage structures or hidden relative wage flexibilities (or rigidities)?* This dissertation answers that by repeating the analyses multiple times on larger clusters until clusters large enough to render for further analyses appear. This repetition of cluster analysis and DFA multiple times therefore, represents repetition of the analyses on progressively smaller country-sector sets of the original set of 255 country-sectors, which renders

examining relative wage variations at the smallest possible level of *disaggregation* of the original set.

The multilevel approach of this dissertation, mentioned above, is first of its kind. Looking carefully, it shows a similarity with fractal geometry. In the case of fractal geometry, the fractal objects appear to comprise complexity within them. But, once one begins to view the object by magnifying it at finer levels, information about its parts, that is, each part approximately or probabilistically resembles the original object, is revealed. In the case of the test of nature of European wage structure of this study, the original object is the data set of 255 cases (country-sectors). The data set appears large and complex, concealing information on relative wage variations across the 255 cases. When cluster analysis and DFA are applied on the original object, sub-sets (parts) of the original set become visible. Removing some sub-sets and repeating the cluster analysis and DFA on the others reveals greater information on the nature of wages across the cases and progressively the complexity of the original set is reduced.

The first three parts of the methodology of this dissertation that are *grouping*, *discrimination*, and *repetitions of grouping and discrimination* find how the average wages of 255 European country-sectors change or move over time. One application of the cluster analysis followed by a DFA on a number of country-sectors represents an analysis of a particular level in this dissertation. In case of an analysis of a particular level, when country-sectors that show very similar over time average wage movements cluster together (and those which show dissimilar movements cluster separately), a number of possible clustering results along-with their respective implications may be found, which include: (i) all the country-sectors, subjected to the analysis, cluster together into a single

cluster. In such a case, the clustering indicates that there is no difference in the over-time average wage changes across European countries and also across their sectors. This also means that there are no visible (measurable) degrees of relative wage flexibilities, explained by transnational variables, or rigidities, explained by labor market policies and institutions, across the countries; (ii) country-sectors cluster into two or more clusters, which are sector-specific, for example, manufacturing sectors of different countries, cluster together or market services sectors of different countries cluster together. In such a case, the sector-specific clustering indicates that relative wages are not rigid across countries because of the effects of cross-country labor market policies and institutions; rather, relative wages are flexible across sectors, which may be due to the effects of transnational variables; (iii) country-sectors cluster into two or more country-specific clusters, for example, one or more countries form one cluster and separate out from other countries. In such a case if it is found that countries that have similar labor market policies and institutions cluster together and the countries with very differentiated policies and institutions cluster separately, the clustering indicates that there exist relative wage rigidities across the countries, which may be due to the effects of labor market policies and institutions. But, in case countries with much differentiated policies and institutions cluster together, it indicates that there exist relative wage flexibilities across countries, which may be explained by transnational variables. When relative wage flexibilities are found, this dissertation performs the fourth part of its analysis that is *forensic identification* in order to identify whether or not transnational variables explain the relative wage flexibilities.



#### 4.3.4 Advantages and Limitations of the Methodology

There are a number of advantages of the methodological approach of this dissertation. They are: *Firstly*, the exploratory analysis of examining relative wage flexibility (or rigidity) allows the data to reveal whether relative wages are rigid or flexible in Europe, without *a priori* assuming, like the usual cross-country empirical studies, that wages are rigid because of labor market policies and institutions. Thus the exploratory analysis allows examining the nature of European wages from an unbiased perspective. *Secondly*, the results from the analysis of this study allows examining whether or not labor market policies and institutions explain relative wage variations (relative wage rigidities) across European country-sectors, without the necessity of using poor quality and unreliable quantitative measures of those policies and institutions. This is because, in the analysis, if sectors of countries with similar labor market policies and institutions, that is, sectors of countries whose labor market policies and institutions are characterized by same social policy model (Nordic model or Anglo-Saxon model or Continental model or Mediterranean model<sup>62</sup>) show similar over-time average wage behaviors, it indicates that, as suggested by LMF hypothesis, policies and institutions of European countries explain wage rigidity, and thereby, also the trend of their unemployment rates. But, if the results of the analysis show otherwise, the hypothesis is not supported. *Thirdly*, the continental-level approach of this study allows examining the effects of transnational variables, such as bilateral exchange rates, relative exports, relative imports, and relative taxes, on relative wage variations across European country-

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<sup>62</sup> The labor market structures under each social policy model of Europe are described in Section 4.5 of this chapter.

sectors, and thereby, theoretically explaining their effects on changes in relative unemployment rates across European countries because theoretically wage and employment or unemployment rate are related, and factors associated with wage changes are also, associated with changes in employment or unemployment rates. *Finally*, the methodological approach of this dissertation permits examining the effects of unlimited numbers of transnational variables on relative wage variations, and hence, on variations in relative employment or unemployment rates across European countries. This is an advantage over the methodological approaches of the cross-country studies because the econometric models of those studies statistically permit estimation of the effects of only a limited number of independent variables on employment or unemployment rates. This is because, in order to maintain the statistical power of the econometric analysis, given the number of observations the number of independent variables cannot exceed a certain count.

Besides the advantages, there are also certain limitations of the methodology of this dissertation. They are: *Firstly*, The application of cluster analysis and DFA requires a large comprehensive data set over a considerably long period of time to generate economically meaningful clusters. Similarities of average wage changes over a short period of time may not reveal any economically meaningful result. Also, for the cluster analysis and DFA, data set should not have even a single missing data. *Secondly*, adding additional years of data into the data set may change the results, and thereby, the implications may change. However, in this regard, this dissertation argues that the changes in the results will generate findings which would remain economically meaningful with respect to the longer period of time. *Finally*, the findings from the

forensic identification part do not reveal whether transnational factors that explain relative wage variations actually increase or decrease wages across countries (country-sectors). But, this limitation is overcome theoretically because based on theoretical arguments it can be said how a transnational variable affects wages across countries. Moreover, the prime objective this dissertation is to examine whether or not transnational variables explain relative wage variations (flexibilities) across European countries and not examining whether they increase or decrease the wages across countries.

#### **4.4 MEASUREMENT OF RELATIVE WAGE FLEXIBILITY – ANALYSES AND FINDINGS**

The test of nature of the European wage structure, or, in other words, the test of relative wage flexibility (or rigidity) begins with applying cluster analysis and DFA on the over-time average wage change data of 255 European country-sectors. This analysis is the analysis at Level One. From this analysis, one large cluster comprising 241 country-sectors is obtained. Cluster analysis and DFA is repeated on the 241 country-sectors, which is the analysis at Level Two. From the analysis of Level Two, two large clusters, each comprising 108 country-sectors are obtained, each of which are further subjected separately to cluster analysis and DFA at a third level or say Level Three. Therefore, at the third level, two separate analyses are performed. The first analysis of Level Three yields a large cluster consisting 60 country-sectors and the second analysis yields one comprising 69 country-sectors. Cluster analysis and DFA are again performed separately on the 60 country-sectors and on the 69 country-sectors at a fourth level, which represent the first analysis of Level Four and the second analysis of level four, respectively. The six analyses of the four levels are presented below:

#### 4.4.1 Relative Wage Flexibility at Level One<sup>63</sup>

In Level One, cluster analysis is performed on the over-time average wage change data of 255 country-sectors or cases. The analysis yields three well-defined clusters. Table A.4.3 presents the information on the components of each of the three clusters. The table shows that Cluster 1 is a huge cluster comprising 241 out of 255 cases. Cluster 2 comprises only seven sectors, which include the manufacturing sectors and the agricultural, forestry, and fishing sectors of Greece. Cluster 3 also comprises only seven sectors, which include the mining and energy supply sector, the manufacturing sectors and the agricultural, fishing, and forestry sector of Portugal. Using the clustering information (that is which country-sector belongs to which cluster) a DFA is performed on the 255 cases. The DFA yields two discriminant functions or canonical scores such that the first canonical score separates the three clusters maximally along one dimension and the second canonical score separates them maximally along a second dimension. The eigenvalue of each canonical score are presented in Table A.4.9, where each eigenvalue represents the importance of its corresponding canonical score in separating the clusters maximally. Figure 4.1 below shows how the three clusters found in Level One are separated maximally along the two dimensions.

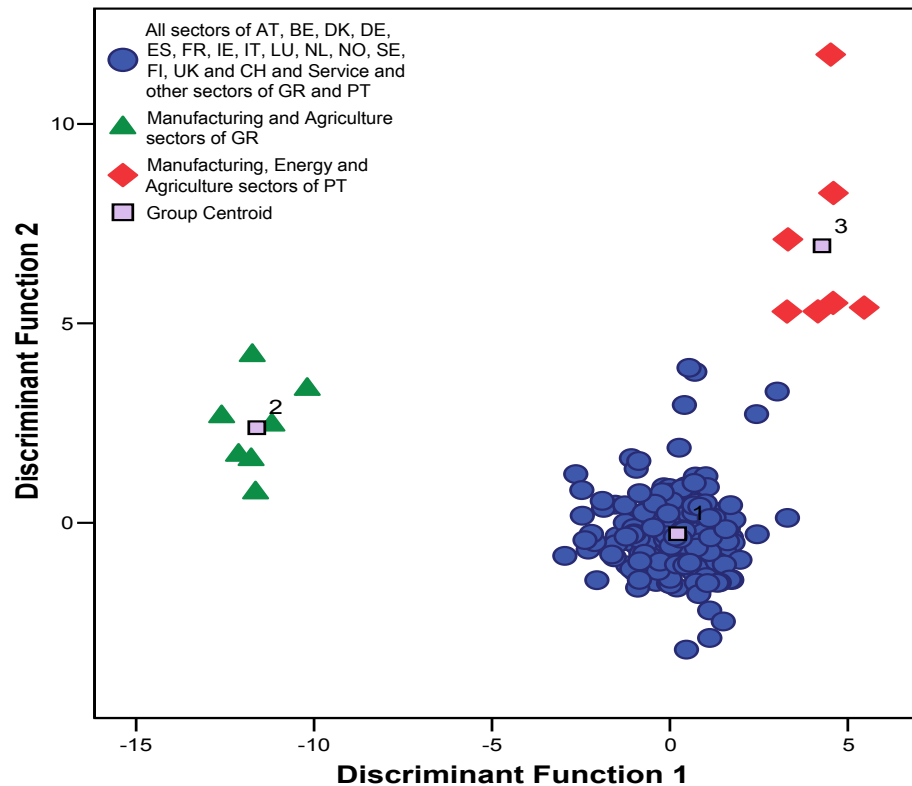
The findings from the analysis of Level One reveal that along the first dimension, over-time average wage changes of the sectors of Greece's cluster, Cluster 2, are different from that of the sectors of all the other countries as well as from that of the rest

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<sup>63</sup> In the case of each analysis at four levels, each cluster is named by a number such that if an analysis yields three clusters, one cluster is named as Cluster 1, another cluster is named as Cluster 2 and the last cluster is named as Cluster 3.

of its sectors that are in Cluster 1. Similarly, along the second dimension, the over-time average wage changes of the sectors of Portugal of Cluster 3 are different from that of the sectors of all the other countries as well as from that of the rest of its sectors that are in Cluster 1.

Figure 4.1 Canonical Score Plots from Level 1's Discriminant Function Analysis<sup>64</sup>



At Level One, Cluster 1 comprises 241 cases including sectors of all the seventeen European countries. This dissertation argues that factor(s) that separates Greece's cluster from Cluster 1 and Cluster 3 and factor(s) that separates Portugal's

<sup>64</sup> In Figures 4.1 to 4.6, group centroid for each cluster represents the mean of the discriminant functions (canonical scores) of the country-sectors of each cluster.

cluster from Cluster 1 and Cluster 2 might be overshadowing the effects of factor(s) that may separate the country-sectors which are clustered together in Cluster 1. To find out whether or not there exists further cluster structures or variations in over-time average wage movements across the 241 cases of Cluster 1, country-sectors of Greece's cluster and that of Portugal's cluster are removed from the data set of 255 cases and cluster analysis followed by DFA are performed identically once again, but only on the data set of 241 cases of Cluster 1. This is the analysis at Level Two.

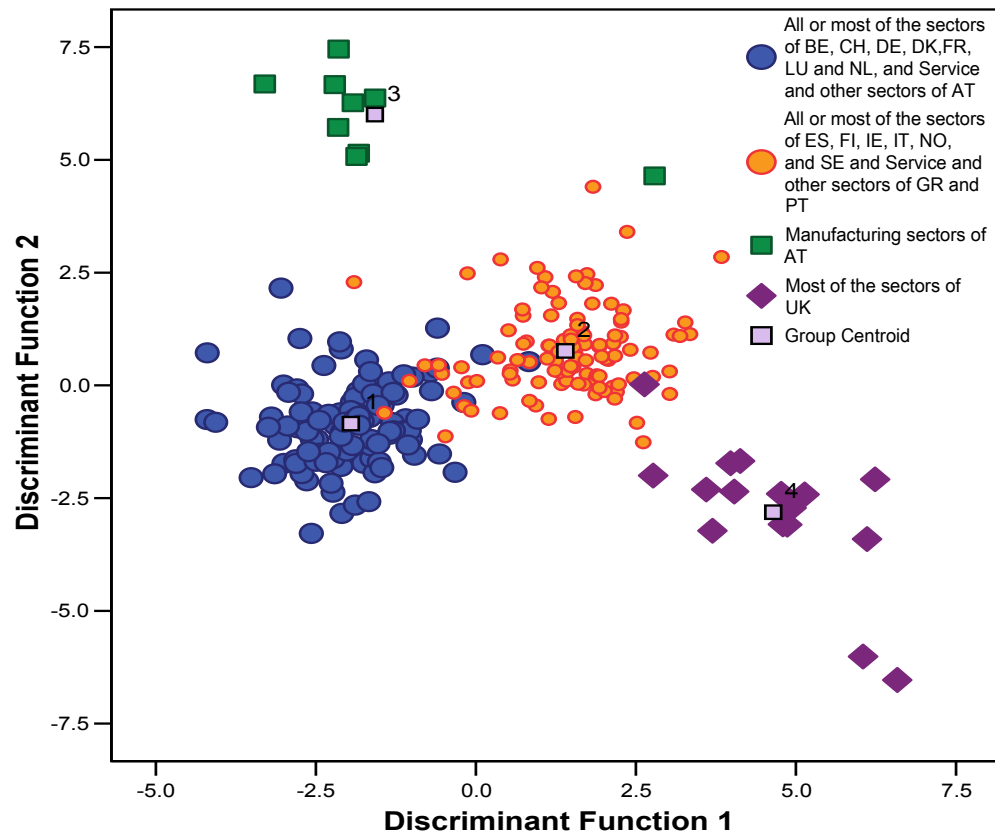
#### **4.4.2 Relative Wage Flexibility at Level Two**

In Level Two, cluster analysis is performed on 241 cases of Level One's Cluster 1. The analysis yields four clusters, whose cluster-details (components of the clusters) are provided in Table A.4.4. The table shows that Cluster 1 and Cluster 2 are two large clusters comprising 108 cases each. Cluster 1 includes the mining and energy supply sector, the construction sector, and the market and non-market services sectors of Austria, all or most of the sectors of Belgium, Switzerland, Germany, Denmark, France, the Netherlands, 11 out of 15 sectors of Luxembourg and six miscellaneous sectors. Cluster 2 consists of all or most of the sectors of Spain, Finland, Ireland, Italy, Norway, Sweden, the mining and energy supply sectors, the construction sector, and the services (both market and non-market) sectors of Greece, the services (both market and non-market) sectors of Portugal, three sectors of Denmark, three sectors of Luxembourg, and three miscellaneous sectors. Cluster 3 comprises the manufacturing sectors of Austria, and three miscellaneous sectors. And, Cluster 4 consists of 14 out of 15 sectors of UK, and two miscellaneous sectors. The DFA on the 241 cases, grouped into four clusters, yields

three canonical scores or dimensions, whose eigenvalues are presented in Table A.4.10.

Figure 4.2 below shows how the first two canonical scores separate the four clusters along their respective dimension.

Figure 4.2 Canonical Score Plots from Level 2's Discriminant Function Analysis



The findings from the analysis of Level Two show that over-time average wage changes of the sectors of UK's cluster, that is, Cluster 4, are different from that of the country-sectors of Cluster 1, Cluster 2, and Cluster 3, along the first dimension. And, along the second dimension, over-time average wages movements of the sectors of Austria of Cluster 3 are different from that of the country-sectors of Cluster1, Cluster 2, and Cluster 4.

Since Cluster 1 and Cluster 2 comprise a large number of cases, that is 108 cases, they are subjected to further analyses at a third level. However, since the clusters are already differentiated at Level Two, two separate analyses are performed on the cases of each of the two clusters.

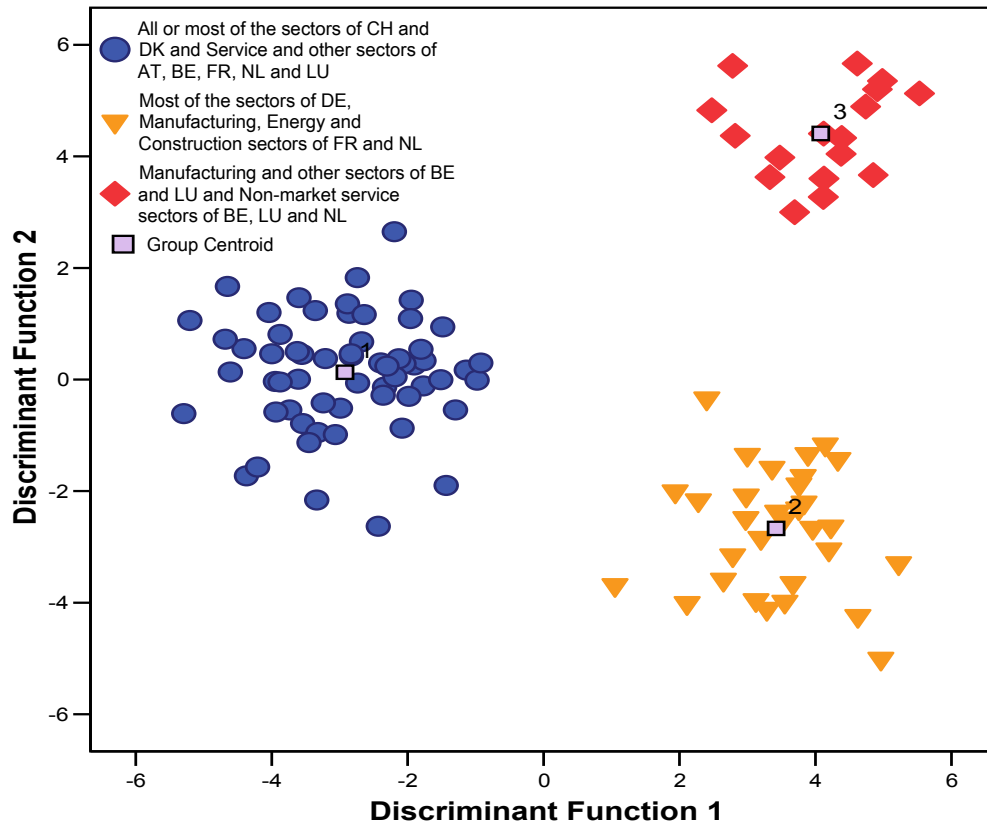
#### **4.4.3 Relative Wage Flexibility at Level Three – First Analysis**

In third level's first analysis, cluster analysis is on 108 country-sectors of Cluster 1 of Level Two. The analysis yields three clusters. The components of the three clusters are presented in Table A.4.5, which reveals that Cluster 1 consists of 60 cases that include the mining and energy supply sector, the construction sector, and the market and non-market service sectors of Austria, the construction sector and the market service sectors of Belgium, the agriculture, fishing, and forestry sector and the market services sectors of the Netherlands, three market services sectors of Luxembourg, the market and non-market services sectors of France, all the sectors of Switzerland, 11 out of 15 sectors of Denmark, and two miscellaneous sectors. Cluster 2 consists of the mining and energy supply sector, the manufacturing sectors, and the construction sector of France, the mining and energy supply sector and the manufacturing sectors of the Netherlands, 12 out of 15 sectors of Germany, and three miscellaneous sectors. And Cluster 3 consists of the manufacturing sectors and the mining and energy supply sector of Belgium, the manufacturing sectors, the construction sector and the non-market services sector of Luxembourg and the non-market services sector of the Netherlands. DFA performed on the 108 cases yields two canonical scores or dimensions, whose eigenvalues are



presented in Table A.4.11. Figure 4.3 below displays how the three clusters are discriminated along the two dimensions.

Figure 4.3 Canonical Score Plots from Level 3's First Discriminant Function Analysis



The results from Level Three's first analysis show that over-time average wage changes are differentiated predominantly across sectors within-country. The over-time average wage changes of the sectors of France of Cluster 1 are different from that of its sectors of Cluster 2, along the first dimension. Also, along the first dimension, the over-time average wage changes of the Netherlands' sectors of Cluster 1 are different from that of its sectors of Cluster 2. Also, over time average wage movements of Belgium's sectors of Cluster 1 are different from that of its sectors of Cluster 3, along the first

dimension. The findings also reveal discrimination of over-time average wage changes between countries, for example, between the sectors of Austria, Switzerland, and Denmark of Cluster 1 and the sectors of Germany and the Netherlands of Cluster 2, along the first dimension; across the sectors of Austria, Switzerland, and Denmark of Cluster 1 and the sectors of Belgium and Luxembourg of Cluster 3, along both the first and the second dimensions; and across the sectors of Belgium and Luxembourg of Cluster 3 and the sectors of Germany and the Netherlands of Cluster 2, along the second dimension.

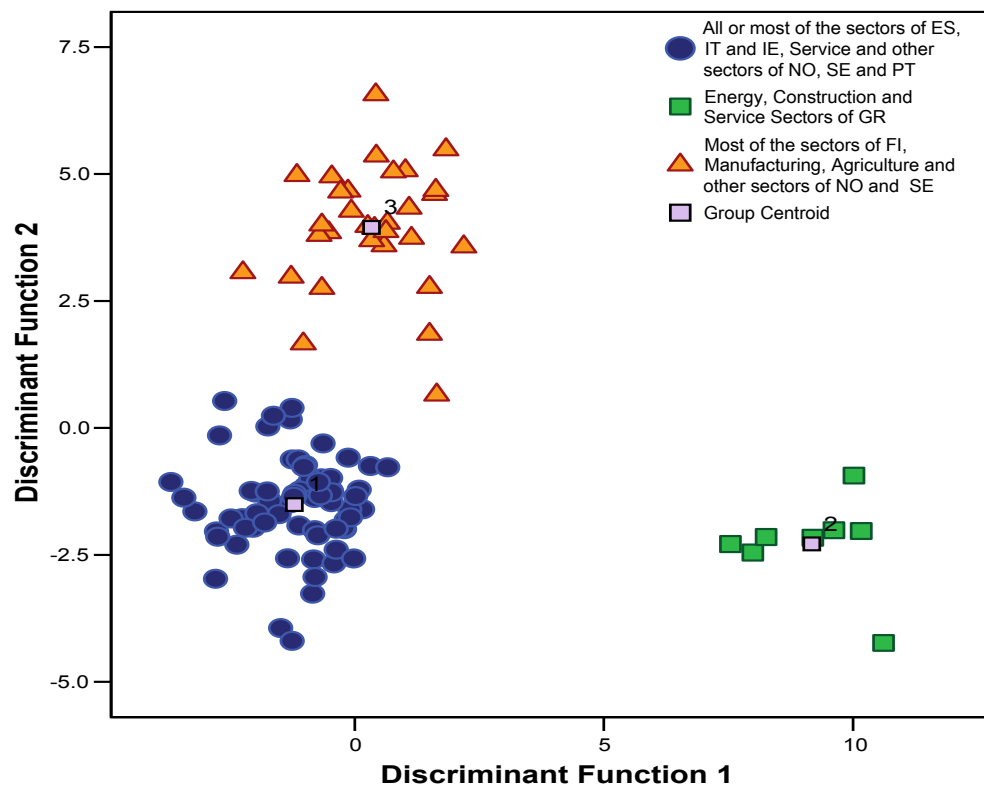
#### **4.4.4 Relative Wage Flexibility at Level Three – Second Analysis**

Cluster analysis in Level Three's second analysis is on 108 cases of Cluster 2 of Level Two. The analysis yields three clusters, whose cluster components are shown in Table A.4.6. The table shows that Cluster 1 consists of 69 cases, which include the market and non-market services sectors of Norway, Sweden, and Portugal, all the sectors of Italy, 14 out of 15 sectors of Spain, 13 out of 15 sectors of Ireland, three sectors of Luxembourg, and five miscellaneous sectors. Cluster 2 consists of the mining and energy supply sector, the construction sector, and the market and non-market services sectors of Greece. And, Cluster 3 comprises 12 out of 15 sectors of Finland, 9 out of 15 sectors of Norway, and the manufacturing sectors, the construction sector, and the agricultural, forestry, and fishing sector of Sweden. The DFA on the 108 cases yields two canonical scores, whose eigenvalues are provided in Table A.4.12. Figure 4.4 below shows how the three clusters are discriminated along the two dimensions.

The results from Level Three's second analysis display variations in over-time average wage movements across sectors within-country. Along the second dimension,

over-time average wages changes of the sectors of Norway and Sweden of Cluster 1 are different from that of their sectors in Cluster 3. However, there are also variations across countries such as between the sectors of Italy, Spain, Ireland, and Portugal of Cluster 1 and the sectors of Greece of Cluster 2, along the first dimension, and across the sectors of Italy, Spain, Ireland, and Portugal of Cluster 1 and the sectors of Finland of Cluster 3, along the second dimension.

Figure 4.4 Canonical Score Plots from Level 3's Second Discriminant Function Analysis



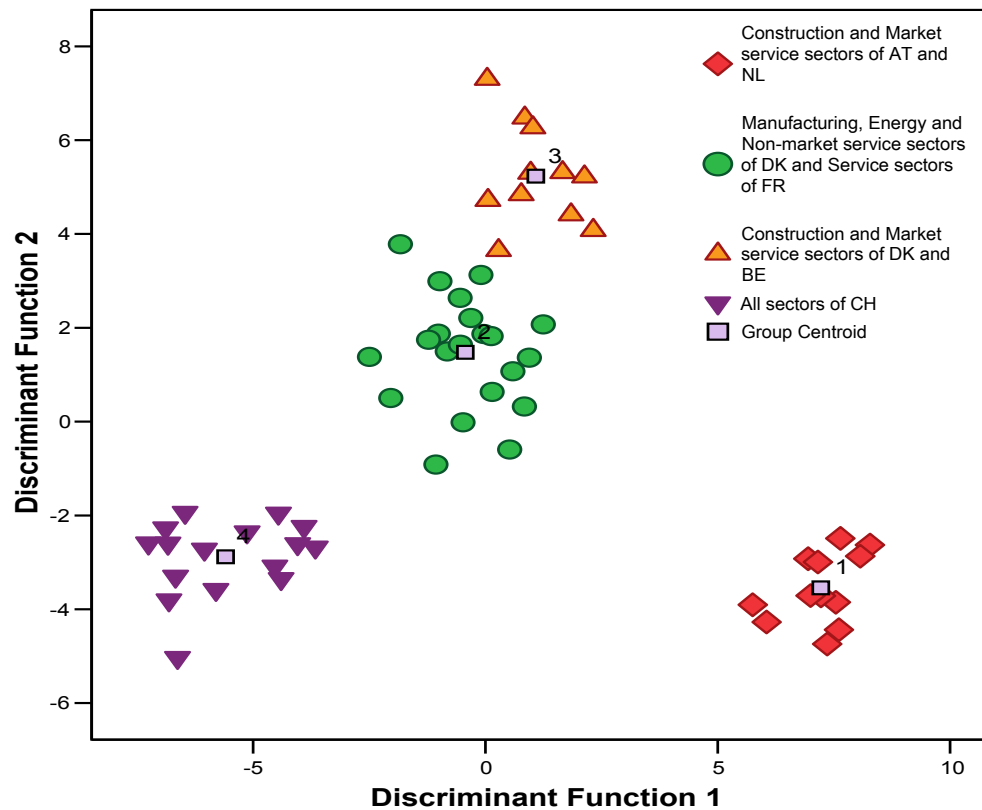
#### 4.4.5 Relative Wage Flexibility at Level Four – First Analysis

The first analysis of Level Four is on 60 cases of Cluster 1 of Level Three's first analysis. The cluster analysis on the 60 cases yields four clusters, whose cluster-details

are given in Table A.4.7. The table displays that, Cluster 1 consists of the market services sectors of Austria and the Netherlands, and also the construction sector of Austria. Cluster 2 comprises five sectors of Denmark (mostly manufacturing), the market and non-market services sectors of France, three market services sectors of Luxembourg, two market services sectors of Belgium, the mining and energy supply sectors and the non-market services sectors of Austria, and two miscellaneous sectors. Cluster 3 consists of the construction sector and the market services sectors of Denmark and the construction sector and two market services sectors of Belgium, and two miscellaneous sectors. And, Cluster 4 consists of all the sectors of Switzerland and a couple of miscellaneous sectors. The DFA on the 60 cases yields three canonical scores, whose eigenvalues are presented in the Table A.4.13. Figure 4.5 below shows how the clusters are discriminated along the first two scores or dimensions.

The findings from Level Four's first analysis display relative wages variations across sectors within-country. For example, over-time average wages movements of the sectors of Denmark of Cluster 2 are different from that of its sectors of Cluster 3, along the second dimension, and over-time average wages changes between the sectors of Belgium of Cluster 1 and that of its sectors of Cluster 2 are different, along the second dimension. Relative wage variations are also seen across countries in this analysis, for example, across the sectors of Switzerland of Cluster 4 and the sectors of other countries in Cluster 1, along the first dimension, and across the sectors of Switzerland of Cluster 4 and the sectors of the countries of Clusters 2 and of Cluster 3, along the second dimension.

Figure 4.5 Canonical Score Plots from Level 4's First Discriminant Function Analysis

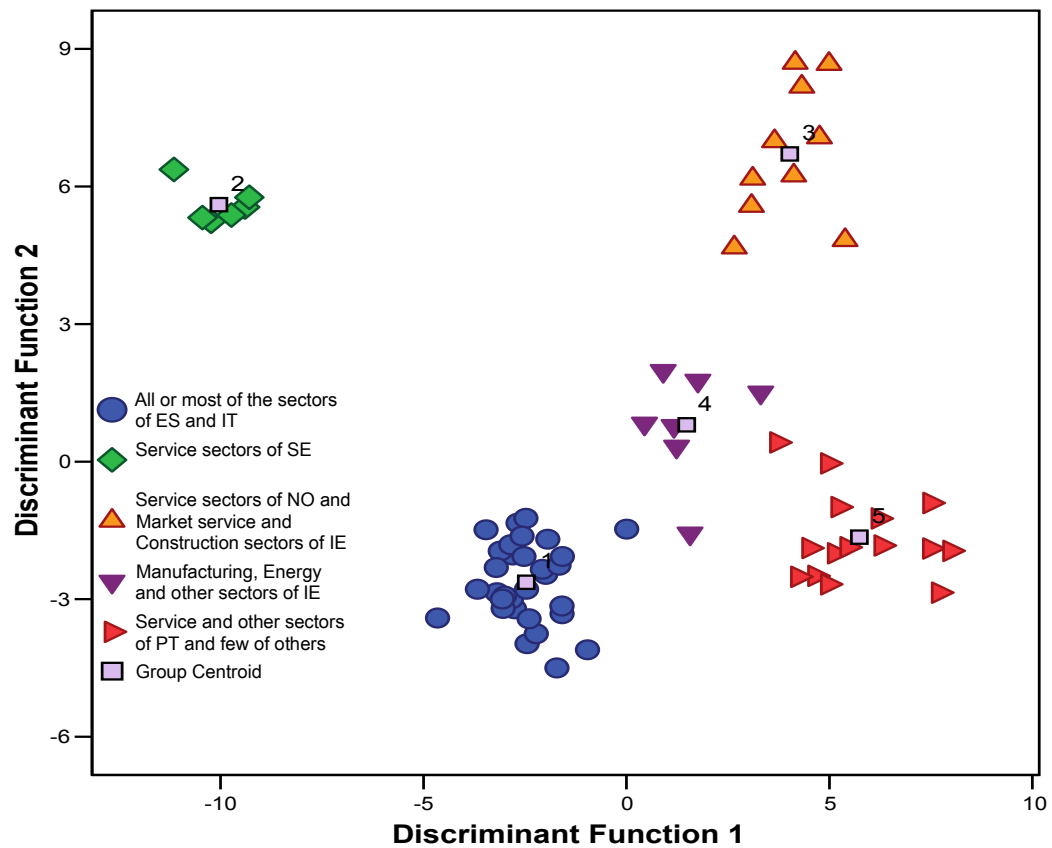


#### 4.4.6 Relative Wage Flexibility at Level Four – Second Analysis

The second analysis of Level Four is on 69 cases of Cluster 1 of Level Three's second analysis. The cluster analysis on the 69 cases yields five clusters, whose cluster-details are presented in Table A.4.8. The table shows that Cluster 1 consists of all the sectors of Italy and 14 out of 15 sectors of Spain. Cluster 2 consists of the market and non-market services sectors of Sweden. Cluster 3 consists of the market and non-market services sectors of Norway and the construction sector and three market services sectors of Ireland. Cluster 4 consists of the mining and energy supply sector, the manufacturing sectors, and the financial services sector of Ireland. Cluster 5 consists of the market and

non-market services sectors of Portugal, the wholesale and retail services sector and the non-market services sector of Ireland, two manufacturing sectors of Denmark, couple of market services sectors of Luxembourg, and two miscellaneous sectors. DFA on the 69 cases yields four canonical scores of dimensions, whose eigenvalues are given in Table A.4.14. Figure 4.6 below displays how the five clusters are discriminated along the first two dimensions.

Figure 4.6 Canonical Score Plots from Level 4's Second Discriminant Function Analysis



The results of Level Four's second analysis show variations in over-time average wage changes across sectors within-country. For example, over-time average wage changes of the sectors of Ireland of Cluster 3 are different from that of its sectors of

Cluster 4 and also from that of its sectors of Cluster 5, along the second dimension. The findings also reveal variations across countries, for example, across the sectors of Sweden of Cluster 2 and the sectors of Norway of Cluster 3, along the first dimension, across the sectors of Sweden of Cluster 2 and the sectors of Portugal of Cluster 4, along the first as well as second dimensions, and also across the sectors of Norway of Cluster 3 and the sectors of Portugal of Cluster 4, along the first dimension.

#### **4.5 IMPLICATIONS AND CONCLUSIONS**

The four levels of analyses, presented above, show over-time differences in the patterns of average wage changes, or, in other words, show that there exist relative wage variations across European country-sectors (across sectors within-country and across countries). As mentioned before in this chapter, if sectors of European countries with similar labor market policies and institutions cluster together and those with differentiated labor market policies and institutions cluster separately, it indicates that the relative wage variations between the clusters may be explained by differences in labor market policies and institutions across the countries belonging to separate clusters, which is the basic argument of LMF hypothesis. And, then, the relative wage variations are said to display relative wage rigidities across countries (or country-sectors). However, if European countries with differentiated labor market policies and institutions cluster together, the LMF hypothesis is not supported. And, as argued before in this chapter, if the cluster structures display meaningful patterns of relative wage variations that do not support the LMF hypothesis, the relative wage variations are said to display relative wage

flexibilities across the clusters. And, it also indicates that transnational variables may explain the flexibilities across the country-sectors of separate clusters.

Ferrera (1998) and Beori (2000) define four social policy models prevailing in European countries during the last part of the 20<sup>th</sup> century. These models are: the Nordic model, the Anglo-Saxon model, the Continental model, and the Mediterranean model. The Nordic model's features that are related to the labor market include: generous unemployment benefits generating compressed wage structures; presence of powerful trade unions' in the workplace and their involvement in the bargaining, which ensure limited wage disparities; highly developed and variety of active labor market policies; and high tax rates with considerable tax wedges. Denmark, Finland, and Sweden from the European Union (EU) are said to follow the features of this model. Also Norway, which is not an EU member, is classified as a Nordic model. The Netherlands shows mixed features of the Nordic and the Continental models, but over time it has moved toward the Nordic one. Hence, the Netherlands is classified as a Nordic model.

The Anglo-Saxon model includes UK and Ireland. This model's features that are related to the labor market are characterized half-way between Europe and the United States. The features include: weak employment protection legislation; strict eligibility criterion for the recipients of unemployment benefits who are forced to actively search for employment in order to receive the benefits; low levels of unionization; and a wide dispersion in wages between the very low pay and the very high salaries.

The Continental model prevails in Austria, France, Germany, Belgium, and Luxembourg. The features of this model that are related to the labor market include: extensive insurance-based unemployment benefits implying transfer on unconditional



entitlements, which are said to increase the disincentives of the unemployed to search actively for jobs; falling trade union membership rates, but the influence of the unions are maintained artificially by the extension of collective bargaining agreements to non-union members, much beyond the presence of the unions; and a relatively low income-disparity. Switzerland is said to have features somewhere between the Anglo-Saxon model and the Continental Model.

The Mediterranean model's features related to the labor market include: strict employment protection legislation; a relatively low coverage of unemployment benefits; strong influence of the unions that is preserved artificially by extending collective bargaining coverage agreements; and rigid wage bargaining structure in the formal economy, which generates a highly compressed wage structure. This model prevails in Greece, Italy, Spain, and Portugal.

The four social policy models define four separate degrees of rigidities (generosity and strictness) of the labor market policies and institutions. Countries belonging to the same model hence, have similar labor market policies and institutional structures. Therefore, according to the proposition of the LMF theorists, countries belonging to the same model should display similar wage behaviors over time. In the test of nature of European wage structure, if countries belonging to the same model display similar relative wage behaviors over time and cluster together, the LMF hypothesis is supported, or else, it is not.

### **Implications**

In Level One, countries following four different models show similar over-time average wage changes, or, in other words, show no relative wage variations, and cluster

together in Cluster 1. This finding does not show support for the LMF hypothesis. Furthermore, at this level, all the sectors of Greece and Portugal do not show similar over-time average wage changes – some sectors of Greece and that of Portugal separate out from rest of their sectors – that again do not support the LMF hypothesis. This is because, according to the hypothesis, labor market policies and institutions explain the relative wage variations across the sectors of different countries, which follow different models, and not across the sectors of same country.

In Level Two, sectors of Anglo-Saxon UK separate from the sectors of rest of the countries. Looking at this, an LMF theorist may say that this finding shows support for the LMF hypothesis, but in fact, it does not because at this level, sectors of Anglo-Saxon Ireland neither clusters with the sectors of Anglo-Saxon UK nor separately, but clusters with the sectors of Mediterranean Greece, Portugal, Spain, and Italy and Nordic Finland, Sweden, and Norway. This clustering also shows that Mediterranean countries and Nordic countries cluster together, which is contrary to the LMF hypothesis. Also, in this level, sectors of Continental Austria, Belgium, Germany, France, and Luxembourg cluster with the sectors of Nordic Denmark and Netherlands and sectors of Anglo-Saxon with Continental Switzerland. All these clustering do not support the LMF hypothesis. The result showing relative wage variations across the sectors of Austria of Cluster 1 and Cluster 3 also does not support the LMF hypothesis.

Like the findings of previous levels, findings from Level Three's first analysis do not support the LMF hypothesis. This is because, the findings at this level's analysis show differences in over-time average wage changes across the sectors of same country, such as across the sectors of France, across the sectors of the Netherlands, and across the

sectors of Belgium. This level also shows that sectors of Continental Austria, Belgium and France are clustered with sectors of Nordic Denmark and Netherlands and with sectors of Anglo-Saxon with Continental Switzerland. Also, in Cluster 2 of this level, sectors of Continental Germany and France are clustered with the sectors of Nordic Netherlands. These cross-country clustering do not support the LMF hypothesis.

The second analysis of Level Three separates sectors of Mediterranean Greece from the sectors of other countries. This finding does not support the LMF hypothesis because in this level, sectors of Mediterranean Spain, Italy and Portugal, instead of clustering separately or clustering with the sectors of Greece, cluster with the sectors of Anglo-Saxon Ireland and sectors of Nordic Norway and Sweden. At this level, looking at the sectors of Nordic Finland, Norway and Sweden clustered together in Cluster 3, an LMF theorist may argue that the LMF hypothesis holds, but the hypothesis is rejected because some sectors of Nordic Norway and Sweden cluster with sectors of Mediterranean Spain, Italy, and Portugal, and not with their rest of the sectors and also, not with the sectors of Nordic Finland.

The first analysis at Level Four separates sectors of Anglo-Saxon with Continental Switzerland from the rest of the countries. Viewing this, an LMF theorist may argue that their hypothesis is supported. However, in this case, the LMF hypothesis would be supported when the sectors of Switzerland are separated from the sectors of Continental countries clustered together and from the sectors of Nordic countries clustered together. But at this level, the sectors of Switzerland separate out from the sectors of Continental Austria clustered with Nordic Netherlands, and from the sectors of Nordic Denmark clustered, not with the sectors of Nordic Netherlands, but with the

sectors of Continental Austria, Belgium, France, and Luxembourg. And, these clustering features clearly do not support the LMF hypothesis.

In Level Four's second analysis, sectors of Mediterranean Spain and Italy separate out from the sectors of the rest of countries. This finding would support the LMF hypothesis if the sectors of Mediterranean Spain and Italy are separated from the sectors of Nordic Norway and Sweden and from the Anglo-Saxon Ireland. But the findings reveal that sectors of Nordic Norway are separated from the sectors of Nordic Sweden and clustered with the sectors of Anglo-Saxon Ireland. Also, it is evident at this level that sectors of Anglo-Saxon Ireland cluster separately and display relative wage variations across its sectors. Some sectors of Ireland cluster with the sectors of Nordic Norway in one cluster and with the sectors of Mediterranean Portugal, in another. Also, in this level, the sectors of Mediterranean Portugal are clustered with few sectors of Nordic Denmark, Anglo-Saxon Ireland, and Continental France and Luxembourg, and not with the sectors of Mediterranean Spain and Italy. Therefore, the findings of Level Four's second analysis do not support the LMF hypothesis.

### **Conclusion**

The results of the analyses of the four levels do not support the LMF hypothesis. The analyses do not find that the differences in over-time average wage changes or relative wage variations across country-sectors are explained by cross-country differences in labor market policies and institutions. Therefore, it may be concluded that cross-country labor market policies and institutions neither explain the relative wage variations across countries in each analysis, nor can thereby explain the differences in the evolution of high rates of unemployment across the European countries, as proposed by the LMF

theorists. In the four levels, the relative wage variations across the country-sectors therefore, do not imply relative wage rigidities, but imply relative wage flexibilities. As mentioned in section 3.3, transnational variables lead to relative wage variations – referred as relative wage flexibilities – both within countries (between sectors within each country) and between countries that are economically interdependent like European countries. Therefore, the relative wage variations across the country-sectors (grouped in clusters) in the four levels of analyses may be attributed to transnational variables. From the explanations presented in Section 3.3 of Chapter Three, this dissertation argues that transnational variables not only may explain relative wage variations but also the fluctuations in relative employment or unemployment rates across countries. Hence, transnational variables explaining relative wage flexibilities across European countries should explain the evolution of heterogeneous rates on unemployment across European countries. To determine whether or not transnational variables explain the relative wage variations across European country-sectors in each of the four levels of analyses, this dissertation performs another methodological analysis, which is presented in the next chapter.

## **Chapter 5: Toward a Search for Sources of Relative Wage Flexibility in Europe – A Forensic Identification**

### **5.1 INTRODUCTION**

It is evident from Chapter Four that relative wages are not rigid both within and between European countries. The discussion presented in Section 3.3 of Chapter Three already describes why and how transnational variables lead to variations in relative wages – defined as relative wage flexibilities – and in relative employment rates both across economically interdependent countries (and also, across their sectors). Therefore, the sources of relative wage variations or flexibilities between European country-sectors found in Chapter Four may be transnational variables. This chapter focuses on identifying whether or not transnational variables are associated with the flexibilities across the European country-sector clusters in the four levels of analyses of Chapter Four. Section 5.2 selects a number of variables, which are theoretically associated with both wages and employment rates, and whose transnational counterparts are associated with variations in relative wage and employment (or unemployment) rates across interdependent economies (and also, across their sectors). Section 5.3 describes how using those variables their transnational counterparts are created so that the associations of the transnational variables with the relative wage variations across clusters can be tested. It also describes the methodology that is developed specifically to examine the associations. Section 5.4 presents the analyses of identifying “forensically” the sources of the relative wage variations at the four levels presented in Chapter Four. And, finally, Section 5.5 presents the implications and conclusions of the findings obtained in Section 5.4. This chapter answers the final two research questions of this dissertation, which are: “*What are the*

*factor(s) that lead to flexibility (or rigidity) in European wage structure?” And, “Why and how do the factor(s) that lead to flexibility (or rigidity) in European wage structure explain the evolution of unemployment in European economies during the last few decades? The previous chapter already found that the European wage structure is not rigid, but flexible. Hence, this chapter searches for the sources explaining the flexibility, and theoretically explains how those sources also explain the evolution of European unemployment.*

## **5.2 POSSIBLE SOURCES OF RELATIVE WAGE FLEXIBILITY**

The relative wage variations across European country-sectors found in the four levels of analyses of Chapter Four imply that labor market policies and institutions do not explain the variations, as suggested by the LMF theorists, and hence, it is concluded that the policies and institutions also cannot explain the high and differential rates of unemployment across European countries. So, if labor market policies and institutions do not explain the variations in relative wages across European country-sectors, what factors might explain them? According to the discussion of Section 3.3, the factors may be transnational variables – international-, continental- and global-level variables. As Section 3.3 mentions, transnational variables explain both relative wage variations as well as fluctuations in relative unemployment rates across economically interdependent European countries. This explanation is based on Keynesian theory of unemployment, which is presented in Section 2.3 of Chapter Two. This Chapter focuses on identifying whether or not transnational variables are associated with relative wage flexibilities at the four levels of analyses to draw implications for Europe’s unemployment problem.

Identification of transnational variables that may explain relative wage flexibilities across European country-sector clusters requires examining associations of transnational variables with the flexibilities. Given the relative wage flexibilities or variations of the four levels of analyses of Chapter Four, only transnational variables are needed for the examination of the associations. Since transnational variables theoretically affect relative wages and relative employment rates within and between countries, they can be constructed by using data on variables that affect wages and employment rates. Theories presented in Section 2.3 suggest several such variables. Based on the theoretical suggestions, this study selects a number of macroeconomic, demographic, and labor market variables. The list of the variables<sup>65</sup> include: (i) investment; (ii) household expenditure; (iii) gross domestic product (GDP); (iv) government net lending; (v) government net lending as a percentage of GDP; (vi) total direct taxes; (vii) taxes on income and profits as a percentage of GDP; (viii) indirect taxes; (ix) taxes on goods and services as a percentage of GDP; (x) total tax revenue as a percentage of GDP; (xi) social security contributions received by government; (xii) social benefits paid by government; (xiii) exports in goods and service; (xiv) imports in goods and services; (xv) net exports in goods and services; (xvi) trade in goods and services as a percentage of GDP; (xvii) bilateral exchange rate; (xviii) consumer price index (CPI); (xix) nominal oil price; (xx) real oil price; (xxi) net migration; (xxii) share of youth (age-group 15-24) in population; (xxiii) female civilian labor force participation rate; (xxiv) male civilian labor force participation rate; (xxv) all-person civilian labor force participation rate; (xxvi)

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<sup>65</sup> The description of each of these variables is given in the glossary of this dissertation.



employment rate of youth (age between 15 to 24); (xxvii) male employment rate; (xxviii) female employment rate; and (xxix) total employment rate<sup>66</sup>.

Factors such as investment, consumption, government expenditure, taxes, exports, and imports are demand-side factors, which according to Keynesian theory influence employment levels and wages in an economy. Keynesian theory asserts that investment, consumption, government expenditure and exports increase output, employment and wages, while increases in taxes and imports decrease the same. Since European countries are integrated and interdependent, the effects of changes in one or more of these factors, due to exogenous policy decisions or endogenous economic reasons, in one country are felt by others. These direct and indirect effects on more than one country influence relative employment and wage levels across those countries. The overall effects of changes in demand-side variables across countries are also captured by changes in the relative GDP of the countries.

The government's net lending variable in the list represents government deficits, which is government expenditure less government revenue. The effects of changes in government expenditure can result from changes in one or more of its components, which include government investments, government consumption expenditure, social benefits paid by government and others forms of payments made by government; while the effects of changes in government revenue can be brought by changes in one or more of its components that includes taxes, social security contributions and other forms of payments received by government. Therefore, changes in one or more of these components of

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<sup>66</sup> Civilian labor force participation rate variables are included because in the case of many countries the data on the employment rates are missing.

government expenditure and revenue across countries in Europe can bring fluctuations in relative employment and relative wages of the countries. And, in countries, where the share of government's net lending or of taxes in GDP is high, changes in net lending or in taxes will generate greater impacts on their employment and wage levels relative to that of those countries with lesser share.

Changes in the components of international trade such as exports and imports of goods and services across European countries also bring changes in their relative employment and wage levels. Since international trade in goods and services is a major channel through which the countries are economically interdependent, impacts of the trade variables generate important implications for changes in relative employment and relative wages across European countries. And, the greater the importance of international trade for an economy, the greater are the effects of the changes in exports and imports on the employment rates and wages of that economy relative to that of the others.

Factors such as bilateral exchange rate and relative consumer price index (CPI) represent the international competitiveness of a nation. Compared to bilateral exchange rate, relative CPI represents real exchange rate, which accounts for both the changes in market exchange rates and the variations in relative price levels. Fluctuations in bilateral exchange rate or in the CPI indicate changes in a country's price competitiveness (in both prices of goods and services and in labor, in nominal and real terms) in the international market, which affect inflows of multinational investments, inflows of other international capital and financial investments and most importantly, trade factors such as exports and imports of goods and services. Hence, changes in these international competitiveness

factors bring fluctuations in relative employment and relative wages of European countries.

Crude oil price is a global factor whose fluctuations impact all the economies around the world. However, the fluctuations affect oil exporting countries and oil importing countries differently. Rise in oil price is beneficial for oil exporting countries, such as Norway in Europe, and detrimental to the oil importing ones. In an oil-exporting nation, a rise in crude oil price increases the revenue collected from exporting oil, which generates demand in its economy and thereby, raises employment and wage levels. In an oil importing country, on the other hand, the rise in oil price generates detrimental effects, leading to a fall employment and wage levels. Since crude oil is a basic input of production, an increase in oil price increases the cost of production, which in turn induces a fall in employment levels and wages. Also, the increase in cost of production raises the general price level, reducing the purchasing power of the people, which in turn reduces consumption demand, and thereby, employment and wages in the oil importing economy. Therefore, change in oil price changes relative employment and wage levels of the countries.

People often migrate from one country to another in search of jobs. In theory, it is generally asserted that most of those who migrate are predominantly low-waged workers, who do so in search of jobs with higher wages. So, what factors lead to emigration and immigration? From a Keynesian perspective, countries experiencing higher growth, rising employment and rising wages experience positive net migration while the countries facing lower growth, falling employment and falling wage experience negative net migration.

In any economy, the youth and the female working groups generally represent the low-wage groups. Hence, increase in the youth or female employment rates are associated with decrease in relative wages. But increase in male employment rate (or total employment rate) is associated with increase in relative wages. From a Keynesian perspective, an increase in demand in the economy increases the employment rates for all and also increases wages in general.

From the perspective of LMF theorists, whose arguments rely on classical and neoclassical economic principles, employment and wages are not driven by demand; rather, changes in wages lead to changes in employment levels and thereby in demand-side factors viz. investment, consumption, exports, imports and also GDP. For an LMF theorist, components of government expenditure and revenue affect wages or induce a decrease in the incentive to work, and hence, generate negative impacts on employment. For example, increase in government-paid social benefits are said to reduce the gap between wages and benefits, which decreases the incentive of the unemployed beneficiaries to look for a job or take up one. Increase in social security contributions made by employees are said to reduce the take-home pay, and thereby, the gap between pay and unemployment benefits. The smaller gap raises reservation wages of the employees, inducing them to increase wage claims. Therefore, from the perspective of an LMF theorist, increase in social benefits, social contributions, etc. affect wages and increase unemployment.

Effects of fluctuations in bilateral exchange rate, relative consumer price index and in crude oil prices on employment, from the perspective of an LMF theorist, are dependent on wages. The changes in these factors are said to affect labor demand, for

example, appreciation of bilateral exchange rate make labor expensive for a multinational investor reducing their demand for the labor of the appreciating country; appreciation also makes exports expensive in the international market leading to a fall in exports, and hence, a fall in labor demand of the appreciating nation. Also, rise in crude oil price, which increase the cost of production, decreases labor demand. From the perspective of an LMF theorist, in the face of a fall in labor demand, if the wages do not fall the level of employment falls.

From the perspective of LMF theorists, migration is driven by wages. High-wage countries experience greater rates of immigration than the low-wage ones. But the effect of increases in immigration on employment depends on the flexibility of wages. If wages are downwardly flexible, unemployment is low not only for the immigrants, but also for the youth, female and male working groups.

For an LMF theorist the change in variables such as investment, exports, GDP, exchange rates, CPI, migration, employment rates of the European countries is associated with change in employment or unemployment rate, which in turn is associated with change in wage. And, in the context of Europe, the wage changes turn are explained by labor market policies and institutions. But, it is evident from the test of nature of European wage structure that the patterns of relative wage changes across European country-sectors are not explained by the policies and institutions. Hence, from the perspective of an LMF theorist, changes transnational variables such as relative investment, relative exports, relative GDP, bilateral exchange rates, relative CPI, relative migration, relative employment rates between European countries should not be associated with the relative wage variations across European country-sectors, which are

not explained by labor market policies and institutions. But, if it is found otherwise, that is, changes in these transnational variables show high and statistically significant associations with relative wage variations, it will imply that transnational variables seemingly explain the relative wage variations. And, relying on the arguments of this dissertation presented above in this section and also in Section 3.3, which are based on Keynesian theory of unemployment, it will be concluded that those transnational variables also explain the high and differential rate of unemployment across European countries.

### **5.3 DATA AND METHODOLOGY**

In order to identify factors associated with relative wage flexibilities across European country-sector clusters, this dissertation uses data on several macroeconomic, demographic and labor market variables listed in the previous section. It develops a methodological technique to test the associations of these variables (their transnational counterpart) with the relative wage variations across the clusters. The description of the data and methodology are presented below.

#### **5.3.1 Data Description**

The data on macroeconomic, demographic, and labor market variables, mentioned above, are annual time series from 1980 to 2005 for the seventeen European countries, which are included in the analysis of this dissertation. The data on investment, household expenditure, and gross domestic product (GDP) are obtained from the Cambridge Econometrics database. There are no missing data in these annual time series. The

investment data are available at the sectoral-level, that is, for the fifteen sectors of all the seventeen European countries. In the four levels of analyses, in many cases, a number of sectors of a country cluster separately from the rest of its sectors, displaying relative wages flexibilities across sectors. The sectoral-level data on investment allows testing whether or not the flexibilities across the sectors are explained by changes in relative investments across those sectors. Also, the data allow testing whether or not the flexibilities across the sectors of two or more countries are explained by changes in relative investments across those sectors of the two or more countries.

The data on macroeconomic, demographic and labor market variables, excluding, the data on investment, household expenditure, and GDP, nominal and real oil prices, are extracted from the OECD database. In the annual time series for total direct taxes, indirect taxes, social security contributions received by government, social benefits paid by government, government net lending, and share of government net lending in GDP, data points are missing for Germany, Luxembourg, and Switzerland. In case of the time series for exports of goods and services, imports of goods and services, and net exports of goods and services, data points are missing for Germany, and in case of the time series for employment rates - female, male, total, and youth of age-group 15 to 24 – data points are missing for countries including, Austria, Belgium, Denmark, Greece, Ireland, Luxembourg, Switzerland, and UK. Therefore, to proxy for the male, female, total and youth employment rates data in case of these countries, data on male, female, all-person civilian labor force participation rates, and share of youth in total population are used, respectively. The nominal and real oil price data are obtained from the *CountryWatch*

Energy Forecast website. The oil prices represent the prices of crude oil expressed in US dollar per barrel of crude oil.

To identify sources explaining relative wage flexibilities across European country-sector clusters, the data on each variable from the list<sup>67</sup> are used to construct data on transnational variables. The transnational variables take forms of relative variables such as exports of one country in one cluster relative to that of another country in another cluster or government expenditure of one country in one cluster relative to that of another country in another cluster or investment of certain sectors of a country in one cluster relative to that of the sectors of another country in another cluster. Once the data series on relative variables (from 1980-2005) are constructed, those series are converted into their annual rate of change series (from 1980-81 to 2004-05), which are then used for the identification of sources explaining relative wage flexibilities.

### **5.3.2 Methodology – Construction of *Pseudo* scores from Canonical Scores and Forensic Identification of Sources of Relative Wage Flexibility**

In Chapter Four, six analyses performed in four levels, show how seventeen European countries and their sectors are separated on the basis of maximal variations in their patterns of average wage movements from 1980 to 2005. In each analysis, the discriminant function analysis (DFA) produced one set of standardized coefficients corresponding to each of the canonical scores. The coefficients represent the contribution of annual rate of change of average wage of each country-sector in a particular year to

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<sup>67</sup> In the case of nominal oil price and real oil price, no relative variables are calculated. These variables are world crude nominal and real oil prices, whose rate of change may be associated with relative wage changes over time. Therefore, these variables are converted into their rate of change form and used for the analysis.



discriminate maximally across country-sector clusters, or, in other words, to assign each country-sector into a specific cluster. This dissertation argues that the sets of coefficients, which appear like arbitrary measures, depict meaningful variables (more specifically, rate of change in variables), which explain the patterns of average wages changes of country-sectors over the years that assign the country-sectors into specific clusters. In order to identify which variable(s) do each set of coefficient depict, variables from the list, mentioned in Section 5.2, are subjected to an analysis, which is developed by extending the results from each of the DFA of the four levels of Chapter Four.

A canonical score from the DFA of four levels represents a dimension along which clusters are maximally separated. Therefore, the set of coefficients corresponding to a canonical score represents a factor(s) associated with relative wage flexibilities across clusters along the dimension represented by the canonical score. As mentioned in Chapter Four, the first two canonical scores maximally discriminate across clusters along two orthogonal dimensions. This dissertation focuses on the first two dimensions or canonical scores and investigates which transnational variable(s) the set of coefficients corresponding to each of the two canonical scores represent.

Equation (4.3)<sup>68</sup> of Section 4.3 represents the functional form of a canonical score in terms of its standardized coefficients. In matrix form, the equation of the canonical score is expressed as:

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<sup>68</sup> The functional expression of a canonical score is:  $L_i = b_1 * x_{i1} + b_2 * x_{i2} + \dots + b_n * x_{in}$ , where the  $b_j$ 's are standardized coefficients showing the partial contribution of independent variables (that are annual rate of change of average wage of each year) in classifying a particular case into a particular cluster.

$$L = X * b \text{ or, } \begin{bmatrix} L_1 \\ \vdots \\ \vdots \\ \vdots \\ L_m \end{bmatrix} = \begin{bmatrix} x_{11} & x_{12} & \dots & \dots & x_{1n} \\ x_{21} & \dots & \dots & \dots & \vdots \\ \vdots & \dots & \dots & \dots & \vdots \\ \vdots & \dots & \dots & \dots & \vdots \\ x_{m1} & \dots & \dots & \dots & x_{mn} \end{bmatrix} \begin{bmatrix} b_1 \\ b_2 \\ \vdots \\ \vdots \\ b_n \end{bmatrix} \quad (5.1)$$

In equation (5.1), L is a column vector of the canonical score, which is of m\*1 dimension. The m in the dimension represents the number of cases (country-sectors) that are included in the analysis, which yields the canonical score. For example, in case of the four levels of analyses, at Level One m equals 255, at Level 2 m equals 241 and so and so forth. Therefore, m varies from one analysis to another. The column vector b represents the vector of standardized coefficients corresponding to the canonical score. The dimension of each b vector is n\*1, where n equals the number of years, which is 25 for the twenty-five year period from 1980-81 to 2004-05. The X matrix represents the matrix of annual rate of change of average wages for the m cases (country-sectors) over n years. Therefore, the dimension of X is m\*n, that is, m\*25.

In order to identify which variables the standardized coefficients of each canonical score might be depicting, this study develops a methodological analysis by extending the DFA performed at each of the analyses at the four levels. Each set of standardized coefficients, corresponding to each canonical score, are the coefficients of annual rates of change of average wages for twenty-five years. Therefore, each set of standard coefficients (b<sub>j</sub>'s) by construction represent a set of year-to-year coefficients, or, said differently, represent a constructed time-series. To find out which variable(s) each set of b<sub>j</sub>'s might be depicting, each set is replaced by annual time series of transnational variables that are constructed from the list of variables. But before replacing the b<sub>j</sub>'s by

an annual time series of each transnational variable, each annual time series is converted into its annual rate of change series because each set of  $b_j$ 's take negative or positive values, depicting values akin to rate of change values.

From each variable from the list, data series for transnational variables are constructed. The transnational variables are then converted into their rate of change series and replaced in the place of the  $b_j$  coefficients in the canonical score equation one-after-another. Solving the equation for each transnational variable, a *pseudo* score corresponding to each variable is computed. To elucidate further, the  $b$  vector in the equation (5.1) is replaced by a  $p$  vector, such that the  $p$  vector represents a time-series of rate of change of a transnational variable. After the replacement, the matrix multiplication of the  $X$  matrix with the  $p$  vector yields a column vector  $P$ , which is analogous to the  $L$  vector (or canonical score). The  $P$  vector is named as a *pseudo* score. In matrix form, the equation of a *pseudo* score is expressed as:

$$P = X * p \text{ or, } \begin{bmatrix} P_1 \\ \vdots \\ \vdots \\ \vdots \\ P_m \end{bmatrix} = \begin{bmatrix} x_{11} & x_{12} & \dots & \dots & x_{1n} \\ x_{21} & \dots & \dots & \dots & \vdots \\ \vdots & \dots & \dots & \dots & \vdots \\ \vdots & \dots & \dots & \dots & \vdots \\ x_{m1} & \dots & \dots & \dots & x_{mn} \end{bmatrix} \begin{bmatrix} p_1 \\ p_2 \\ \vdots \\ \vdots \\ p_n \end{bmatrix} \quad (5.2)$$

In the case of each analysis at the four levels, multiple *pseudo* scores are calculated by using multiple transnational variables corresponding to each of the first two canonical scores. After that, correlation coefficient between a canonical score and each of its corresponding *pseudo* scores are calculated. The transnational variable for which its corresponding *pseudo* score shows the highest and statistically significant magnitude of association with the canonical score, that variable is identified as the factor best

associated with relative wage flexibilities across the clusters along the dimension represented by the canonical score. In this way, the candidate transnational variables best associated with relative wage flexibilities in each of the four levels are obtained.

#### **5.4 PSEUDO SCORES *VIS-À-VIS* CANONICAL SCORES – ANALYSES AND FINDINGS**

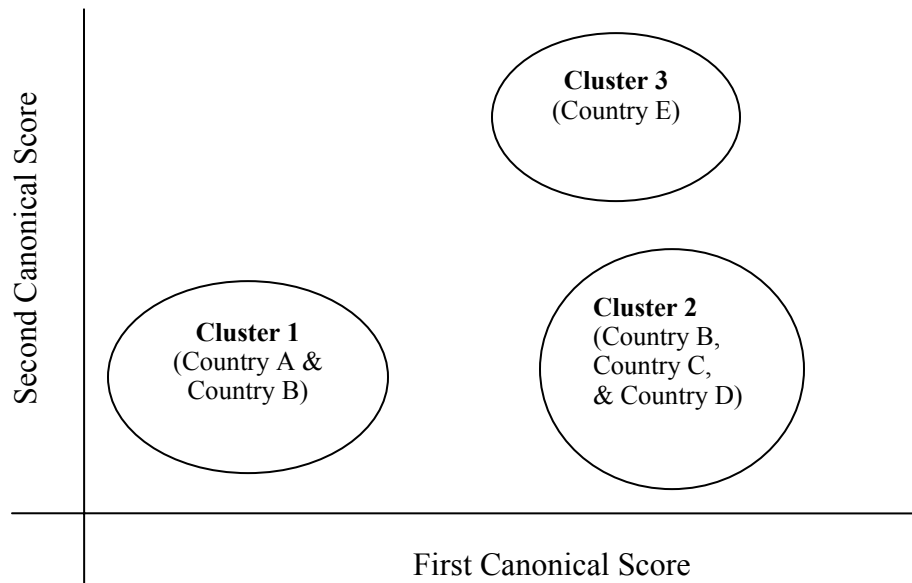
This section presents four levels of analyses in each of which transnational variables which show the highest magnitude of associations with cross-cluster relative wage flexibilities are identified. In order to explain how analysis or analyses in each of the four levels are performed in general, a hypothetical example is presented below.

##### **5.4.1 Pseudo score Analysis – Hypothetical Example**

Suppose a test of nature of wage structure, similar to one of the analyses of the four levels presented in Chapter Four, is performed on a number of sectors of five countries say, Country A, Country B, Country C, Country D and Country E. Also, suppose that the analysis produces three clusters such that Cluster 1 comprises sectors of Country A and some sectors of Country B, Cluster 2 comprises sectors of Country C, Country D and the rest of the sectors of Country B, and Cluster 3 comprises sectors of Country E. Suppose that DFA shows that Cluster 1 is discriminated maximally from the Cluster 2 and Cluster 3 along the first dimension (first canonical score) and Cluster 3 is discriminated maximally from Cluster 1 and Cluster 2 along the second dimension (second canonical score). The cluster-discrimination is represented in figure 5.1, which is shown below. Suppose theory suggests that two variables viz. Variable X and Variable Y affect wages. Therefore, the variables X and Y are used to test for their associations with

relative wage variations across the three clusters, along the two dimensions represented by the two canonical scores.

Figure 5.1 Hypothetical Example of Cluster Discrimination



In the hypothetical example, along the first dimension, Cluster 1, comprising sectors of Country A and some sectors of Country B, is separated from Cluster 2 and also from Cluster 3. To find out which variable, out of X and Y, may be best associated with the relative wage variations or flexibilities across the clusters, one cluster say, Cluster 1, is selected as a reference cluster and the variations are examined across the clusters with reference to the components of Cluster 1. With Cluster 1 as the reference cluster, relative wage variations are examined (i) between Country A of Cluster 1 and each of the countries of Cluster 2, that is Country C, Country D and Country B, and Country E of Cluster 3; and (ii) between Country B of Cluster 1 and each of the countries of Cluster 2,

that is Country C, Country D and Country B of Cluster 2, and Country E of Cluster 3. In order to examine which variable is best associated with the relative wage variations in the cases of (i) and (ii), variables X and Y are tested. In the case of (i), with reference to Country A of Cluster 1, Variable X and Variable Y are used to construct relative variables such as: (a) ratio of Variable X of Country A to that of Country C (of Cluster 2); (b) ratio of Variable X of Country A to that of Country D (of Cluster 2); (c) ratio of Variable X of Country A to that of Country B (of Cluster 2, since some sectors of B lies in this cluster); and (d) ratio of Variable X of Country A to that of Country E (of Cluster 3). Similarly, the Variable Y is used to construct analogous relative variables.

In the case of (ii), with reference to Country B of Cluster 1, again the X and Y variables are used to construct relative variables such as: (a) ratio of Variable X or Y of Country B to that of Country C (of Cluster 2); (b) ratio of Variable X or Y of Country B to that of Country D (of Cluster 2); and (c) ratio of Variable X or Y of Country B to that of Country E (of Cluster 3). Assuming that the data on Variable X is available as an aggregate measure for each country (like, GDP of a country or exports of a country), relative variable is not constructed using Variable X; rather, Variable X is used as it is (that is, in aggregate form) to examine its association with relative wage variations between sectors of Country B of Cluster 1 and sectors of Country B of Cluster 2. But assuming that the data on Variable Y is available sector-wise for each country (like, the investment variable used in this study, whose data is available for each country-sector), the relative variables for Variable Y are constructed to examine their associations with relative wage variations between sectors of Country B of Cluster 1 and sectors of each of the countries in Cluster 2 and also of Country E of Cluster 3.

Once relative variables are constructed, each set of relative variables – one set corresponding to Variable X and another set corresponding to Variable Y – are used to compute a set of *pseudo* scores. In order to do this, first, the data series of each relative variable is converted into its data series of annual rate of change, and then the latter is replaced in the place of the standardized coefficients in the first canonical score's equation. The equation is solved and one *pseudo* score corresponding to each relative variable is obtained. Once a set of the *pseudo* scores are obtained corresponding to each of the X and Y variables, a correlation coefficient is calculated between each *pseudo* score and the first canonical score. The relative variable corresponding to which the correlation coefficient between its *pseudo* score and the first canonical score is of the greatest magnitude<sup>69</sup> and is also statistically significant, that variable is identified as the prime factor that seemingly explains relative wage variations across the countries under examination along the first dimension. In this way, the major factors explaining relative wage variations between each country of the reference cluster, Cluster 1, and that of each country of Cluster 2 and of Cluster 3 are identified along the first dimension.

In order to find out major factors that seemingly explain relative wage variations across each country of Cluster 1 and the Cluster 2 as a whole, a mean of absolute values of all the correlation coefficients associated with all the countries of Cluster 2, corresponding to each relative variable are calculated. The means are then compared

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<sup>69</sup> When examining the degree of association, only the magnitude and not the sign of the correlation coefficients are taken into consideration. The reason for this is that in case the numerator and the denominator of a relative variable (ratio) is reversed, the sign of the correlation coefficient changes, but the magnitude remains the same. In other words, in case the reference country is changed, the sign of the correlation coefficients are reversed, but the magnitude remains the same. Since, here the aim is to find the best association between the changes and not whether the association is negative or positive, the absolute values of the correlation coefficients are taken into consideration.

across the variables. The variable corresponding to which the magnitude of the mean is the highest, that variable is identified as the major factor seemingly explaining relative wage variations across a country of Cluster 1 and the Cluster 2 as a whole. Since, in this example, Cluster 3 comprises the sectors of only Country E, the factor best associated with relative wage variations across a country of Cluster 1 (Country A or Country B) and Country E, is held as the major factor seemingly explaining relative wage variations across the country of Cluster 1 and Cluster 3 as a whole.

Along the second dimension of the hypothetical example, Cluster 3, comprising only the sectors of Country E, is discriminated from Cluster 1 and also, from Cluster 2. To find out which variable out of Variable X and Variable Y is best associated with relative wage variations between the clusters along the second dimension, an analysis identical to the one of the first dimension is performed. Cluster 3 is selected as a reference cluster and relative variables are constructed accordingly, and those relative variables are subjected to constructing *pseudo* scores. After that, correlations between each *pseudo* score and the second canonical score is computed. The correlations are examined to identify the factors best associated with relative wage variations between Country E of Cluster 3 and each of the countries of Cluster 1 and Cluster 2. In order to find out the sources that may explain relative wage variations between Cluster 3 and Cluster 1 as a whole, a mean of the absolute values of all the correlation coefficients associated with all the countries of Cluster 1 is computed corresponding to each relative variable. The means are compared across the variables and the variable corresponding to which the mean is highest, that variable is identified as the major factor that seemingly explains relative wage variations across Cluster 3 (Country E) and Cluster 1 as a whole.



To identify the sources of relative wage variations, or to say the sources of relative wage flexibilities across the clusters obtained at each of the six analyses of four levels, analyses analogous to the hypothetical example's analysis are performed at each of the four levels. The analyses and their findings at the four levels are presented below:

#### **5.4.2 *Pseudo* score Analysis at Level One**

At Level One, to find out factors best associated with relative wage variations along the first dimension Greece's cluster is selected as the reference cluster and *pseudo* score analogous to the first canonical score are computed by using relative variables, which are constructed from each of the variables mentioned in the list in Section 5.2. After that, correlations between each of the *pseudo* scores and the first canonical score are calculated. Table A.5.1 (Part I and Part II) presents the correlations. The top four correlations corresponding to individual countries are highlighted in the Table A.5.1 (Part I and Part II). The variables corresponding to these correlations represent the four factors that are best associated with relative wage flexibility across Greece and each of the individual countries of Cluster 1 and Cluster 3.

Along the second dimension of Level One's analysis, Portugal's cluster is selected as the reference cluster and a *pseudo* score analysis analogous to the one explained in the hypothetical example is performed. The correlations between each of the *pseudo* scores and the second canonical score are presented in Table A.5.2 (Part I and Part II). The top four correlations corresponding to individual countries are highlighted in Table A.5.2 (Part I and Part II). The variables corresponding to these correlations

represent the four factors that are best associated with relative wage flexibility across Portugal and each of the individual countries of Cluster 1 and Cluster 2.

Along the first dimension, to find out the source of relative wage flexibility across Greece's cluster and Cluster 1 as a whole, a mean of the correlations associated with all the countries of Cluster 1 is calculated corresponding to each relative variable. And, in order to determine the source of relative wage flexibility between Greece's cluster and Portugal's cluster, all the correlations associated with Portugal are compared across all the relative variables. The means of the correlations and the correlations are presented in Table A.5.1 (Part I and Part II).

Table 5.1 Four Major Sources of Relative Wage Flexibility in Level One<sup>70</sup>

Dimension	Reference Country	Relative to Cluster	Major Sources: Transnational Factors			
			1	2	3	4
1	Greece of Cluster 2	Cluster 1	Investment (0.597)	Share of Trade in goods and services in GDP (0.573)	Share of Taxes on goods and services in GDP (0.423)	Consumption (0.300)
		Portugal's Cluster 3	Investment (0.725)	Share of Trade in goods and services in GDP (0.594)	Male labor force participation rate (0.565)	Social Security Contributions (0.535)
2	Portugal of Cluster 3	Cluster 1	Indirect Taxes (0.531)	Social Security Contributions received by government (0.516)	Social Benefits paid by Government (0.486)	CPI (0.485)
		Greece's Cluster 2	Indirect Taxes (0.684)	Bilateral Exchange Rate (0.660)	Share of Government Net Lending in GDP (0.650)	Government Net Lending (0.626)

<sup>70</sup> In Tables 5.1-5.6, the figures in parentheses show the magnitude of associations of the corresponding variable with relative wage flexibility across two clusters.

Similarly, along the second dimension, means of correlations are calculated to find out the source of relative wage flexibility across Portugal's cluster and Cluster 1. And, the correlations associated with Greece are compared across all the variables to find out the source of relative wage flexibility across Portugal's cluster and Greece's cluster. The means of the correlations and the correlations are presented in Table A.5.2 (Part I and Part II).

Examining the magnitude of correlations and that of their means in Table A.5.1 (Part I and Part II) and Table A.5.2 (Part I and Part II), a summary of the findings from Level One's *pseudo* score analysis is presented in Table 5.1 of this section. The table shows the four factors that show the four highest magnitudes of associations with relative wage variations across each of the reference clusters and other clusters along the first and second dimensions. These factors can be identified as the major four sources of relative wage flexibilities across clusters in Level One.

#### **5.4.3 *Pseudo* score Analysis at Level Two**

Along the first dimension of Level Two's analysis, UK's cluster is chosen as the reference cluster and *pseudo* score analysis is performed. The correlations between each of the *pseudo* scores and the first canonical score are presented in Table A.5.3 (Part I and Part II). In Table A.5.3 (Part I and Part II), the top four correlations corresponding to individual countries are highlighted, and the variables corresponding to these correlations represent the four factors that are best associated with relative wage flexibility across UK and each of the individual countries of Cluster 1, Cluster 2, and Cluster 3.

Table 5.2 Four Major Sources of Relative Wage Flexibility in Level Two<sup>71</sup>

Dimension	Reference Country	Relative to Cluster	Major Sources: Transnational Factors			
			1	2	3	4
1	UK's Cluster 4	Clusters 1, 2 and 3	Share of Trade in goods and services in GDP (0.641)	Bilateral Exchange Rate (0.633)	Nominal Oil Price (0.595)	GDP (0.511)
		Cluster 1 (BE, DK, DE, FR, LU, NL, AT, CH)	Share of Trade in goods and services in GDP (0.817)	Bilateral Exchange Rate (0.741)	Nominal Oil Price (0.595)	Exports (0.574)
		Cluster 2 (GR, ES, IE, IT, PT, FI, SE, NO)	Nominal Oil Price (0.595)	GDP (0.560)	Bilateral Exchange Rate (0.526)	Net Migration (0.515)
		Austria's Cluster 3	Share of Trade in goods and services in GDP (0.724)	Bilateral Exchange Rate (0.696)	GDP (0.695)	Imports (0.634)
2	Austria of Cluster 3	Clusters 1, 2 and 4	Indirect Taxes (0.593)	GDP (0.571)	CPI (0.599)	Male labor force participation rate (0.539)
		Cluster 1 (BE, DK, DE, FR, LU, NL, AT of Cluster 1, CH)	CPI (0.549)	GDP (0.523)	Bilateral Exchange Rate (0.515)	Indirect Taxes (0.506)
		Cluster 2 (GR, ES, IE, IT, PT, FI, SE, NO)	Indirect Taxes (0.694)	CPI (0.643)	GDP (0.615)	Male labor force participation rate (0.599)
		UK's Cluster 4	Share of Taxes on goods and services in GDP (0.712)	Male labor force participation rate (0.655)	GDP (0.592)	Indirect Taxes (0.582)

At Level Two, along the second dimension, Austria's cluster is selected as the reference cluster and *pseudo* score analysis is performed. Table A.5.4 (Part I and Part II)

<sup>71</sup> The acronyms of countries used in Table 5.1-5.6 are given in Table A.4.1.

presents the correlations between each of the *pseudo* scores and the second canonical score. The top four correlations for individual countries that are highlighted in Table A.5.4 (Part I and Part II). The variables corresponding to those correlations represent the four factors that are best associated with relative wage flexibility across Austria and each of the individual countries of Cluster 1, Cluster 2, and Cluster 4.

To find out the sources of relative wage flexibilities across clusters along the two dimensions, means of absolute values of the correlations are computed, which are presented in Table A.5.3 (Part I and Part II) and Table A.5.4 (Part I and Part II). Comparing the magnitude of correlations and that of their means in these tables, a summary of the findings from Level Two's *pseudo* score analysis is presented in Table 5.2 of this section. In Table 5.2, the four factors that show the highest four magnitudes of associations with relative wage variations across each of the reference clusters and other clusters along the first and second dimensions are presented. These factors can be identified as the prime four sources of relative wage flexibilities across clusters in Level Two.

#### **5.4.4 First *Pseudo* score Analysis at Level Three**

Along the first dimension of Level Three's first analysis, Cluster 2 comprising sectors of Germany, France, and the Netherlands is selected as the reference cluster and treating each country of Cluster 2 as a reference country *pseudo* score analysis is conducted. Tables A.5.5, A.5.6, and A.5.7 present the correlations between each of the *pseudo* scores and the first canonical score when the reference countries are Germany, France, and the Netherlands, respectively. In the tables, the top four correlations are

highlighted corresponding to individual countries. The variables corresponding to these correlations represent the four factors that are best associated with relative wage flexibility across each of the reference country of Cluster 2 and each of the individual countries of Cluster 1 and Cluster 3.

Along the second dimension of Level Three's first analysis, Cluster 3 comprising sectors of Belgium and Luxembourg is chosen as the reference cluster. Treating each country of Cluster 3 as a reference country, *pseudo* score analysis is performed. Tables A.5.8 and A.5.9 present the correlations between each of the *pseudo* scores and the second canonical score when the reference countries are Belgium and Luxembourg, respectively. In the tables, the highest four correlations corresponding to individual countries are highlighted. The variables corresponding to these correlations represent the four factors that are best associated with relative wage flexibility between each reference country of Cluster 3 and each of the individual countries of Cluster 1 and Cluster 2.

To find out the sources of relative wage flexibilities across clusters along the two dimensions, means of absolute values of the correlations are computed, which are presented in Tables A.5.5 to A.5.9. Looking at the magnitude of correlations and that of their means in the Tables A.5.5 to A.5.9, a summary of the findings from Level Three's first *pseudo* score analysis is presented in Table 5.3 of this section. In Table 5.3, the four factors that show the top four magnitudes of associations with relative wage variations across each of country of the reference cluster and other clusters along the first and second dimensions are presented. These factors can be identified as the major four sources of relative wage flexibilities across each country of the reference cluster and other clusters in Level Three's first analysis. In Table 5.3, the factors that are common

sources of relative wage flexibilities between each of the countries of the Cluster 2 and each of the other clusters can be identified as the sources of relative wage flexibilities between Cluster 2 (including, Germany, France, and the Netherlands) as a whole and each of the other clusters, along the first dimension. Similarly, the common sources corresponding to each of the countries of Cluster 3 (including, Belgium and Luxembourg) can be identified as the sources of relative wage flexibilities between Cluster 3 as a whole and each of the other clusters, along the second dimension.

Table 5.3 Four Major Sources of Relative Wage Flexibility in Level Three's First Analysis

Dimension	Reference Country	Relative to Cluster	Major Sources: Transnational Factors			
			1	2	3	4
1	Germany of Cluster 2	<b>Clusters 1 (BE, DK, FR, LU, NL, AT and CH) and 3 (BE and LU)</b>	Employment rate of youth (0.476)	Consumption (0.447)	GDP (0.424)	Youth Population Share (0.393)
		<b>Cluster 1</b>	Youth Population Share (0.435)	Consumption (0.422)	GDP (0.412)	Female labor force participation rate (0.345)
		<b>Cluster 3 (BE and LU)</b>	Youth Population Share (0.487)	Female labor force participation rate (0.366)	Consumption (0.364)	Male labor force participation rate (0.346)
1	France of Cluster 2	<b>Cluster 1 (BE, DK, LU, NL, AT and CH)</b>	Investment (0.618)	Employment rate of youth (0.588)	Female labor force participation rate (0.550)	Imports (0.540)
		<b>Cluster 1</b>	Investment (0.607)	Employment rate of youth (0.585)	Female labor force participation rate (0.551)	Imports (0.525)
		<b>Cluster 3 (BE and LU)</b>	All-person labor force participation rate (0.673)	Female labor force participation rate (0.661)	Imports (0.656)	Investment (0.638)

Dimension	Reference Country	Relative to Cluster	Major Sources: Transnational Factors			
			1	2	3	4
1	Netherlands of Cluster 2	Cluster 1 (BE, DK, FR, LU, AT and CH)	Youth Population Share (0.462)	Women's Employment Rate (0.448)	Share of Taxes on income and profits in GDP (0.422)	Employment rate of youth (0.419)
		Cluster 1	Employment rate of youth (0.584)	Youth Population Share (0.433)	Women's Employment Rate (0.410)	Share of Taxes on income and profits in GDP (0.408)
		Cluster 3 (BE and LU)	Youth Population Share (0.462)	Share of Government Net Lending in GDP (0.461)	Government Net Lending (0.461)	Share of Taxes on income and profits in GDP (0.442)
2	Belgium of Cluster 3	Clusters 1 and 2	Bilateral Exchange Rate (0.527)	Share of Trade in goods and services in GDP (0.501)	CPI (0.478)	Youth Population Share (0.442)
		Cluster 1	Bilateral Exchange Rate (0.524)	Share of Trade in goods and services in GDP (0.504)	CPI (0.501)	Real Oil Price (0.439)
		Cluster 2 (DE, FR and NL)	Share of Trade in goods and services in GDP (0.594)	Share of Taxes on goods and services in GDP (0.520)	CPI (0.490)	Indirect Taxes (0.450)
2	Luxembourg of Cluster 3	Clusters 1 and 2	Share of Taxes on goods and services in GDP (0.553)	Bilateral Exchange Rate (0.535)	Investment (0.477)	Real Oil Price (0.439)
		Cluster 1	Share of Taxes on goods and services in GDP (0.535)	CPI (0.529)	Bilateral Exchange Rate (0.520)	Investment (0.460)
		Cluster 2 (DE, FR and NL)	Share of Taxes on goods and services in GDP (0.613)	Investment (0.456)	CPI (0.453)	Share of Trade in goods and services in GDP (0.448)



#### 5.4.5 Second *Pseudo* score Analysis at Level Three

Along the first dimension of Level Three's second analysis, Cluster 2 consisting Greece's sectors is selected as the reference cluster and *pseudo* score analysis is performed. The correlations between each of the *pseudo* scores and the first canonical score are presented in Table A.5.10, in which the top four correlations corresponding to individual countries are highlighted. The variables corresponding to these correlations represent the four factors that are best associated with relative wage flexibility across Greece and each of the individual countries of Cluster 1 and Cluster 3.

Along the second dimension of Level Three's second analysis, Cluster 3 comprising sectors of Finland, Sweden, and Norway of Cluster 3 is chosen as the reference cluster. With reference to each country of the reference cluster, *pseudo* score analysis is performed. Tables A.5.11, A.5.12, and A.5.13 provide the correlations between each of the *pseudo* scores and second canonical score when the reference countries are Finland, Sweden, and Norway, respectively. In the tables, the four highest correlations corresponding to individual countries are highlighted. The variables corresponding to these correlations represent the four factors that are best associated with relative wage flexibility across each country of the reference cluster and each of the individual countries of Cluster 1 and Cluster 2.

To find out the sources of relative wage flexibilities across clusters along the two dimensions, means of absolute values of the correlations are computed, which are presented in Tables A.5.10 to A.5.13. Examining the magnitude of correlations and that of their means in Table A.5.10 to A.5.13, a summary of the findings from Level Three's second *pseudo* score analysis is presented in Table 5.4 of this section.

Table 5.4 Four Major Sources of Relative Wage Flexibility in Level Three's Second Analysis

Dimension	Reference Country	Relative to Cluster	Major Sources: Transnational Factors			
			1	2	3	4
1	Greece of Cluster 2	Clusters 1 and 3	Share of Trade in goods and services in GDP (0.466)	Youth Population Share (0.413)	Share of Total Tax Revenue in GDP(0.353)	Total Direct Taxes (0.338)
		Cluster 1	Youth Population Share (0.474)	Share of Trade in goods and services in GDP(0.452)	Share of Total Tax Revenue in GDP(0.348)	Total Direct Taxes (0.333)
		Cluster 3	Share of Trade in goods and services in GDP (0.430)	Share of Total Tax Revenue in GDP(0.368)	Youth Population Share(0.329)	Net Migration (0.313)
2	Finland of Cluster 3	Clusters 1 and 2	Bilateral Exchange Rate (0.694)	Net Migration (0.584)	Net Exports (0.582)	CPI (0.507)
		Cluster 1	Bilateral Exchange Rate (0.698)	Net Migration (0.566)	Net Exports (0.562)	CPI (0.511)
2	Sweden of Cluster 3	Clusters 1 and 2	Social Benefits paid by government (0.541)	Investment (0.539)	CPI (0.528)	Net migration (0.473)
		Cluster 1	CPI (0.530)	Social Benefits paid by government (0.527)	Investment (0.509)	Indirect Taxes (0.451)
2	Norway of Cluster 3	Clusters 1 and 2	Bilateral Exchange Rate (0.561)	CPI (0.510)	Share of Trade in goods and services in GDP(0.481)	Social Benefits paid by government (0.476)
		Cluster 1	Bilateral Exchange Rate (0.556)	CPI (0.518)	Share of Trade in goods and services in GDP (0.510)	Indirect Taxes (0.492)

Table 5.4 shows the four factors that show the greatest magnitudes of associations with relative wage variations (i) across the reference cluster (Greece's cluster) and other clusters along the first dimension, and (ii) across each of country of the reference cluster

and other clusters along the second dimensions. The factors in the case of (i) can be identified as the four major sources of relative wage flexibilities across the reference cluster and other clusters along the first dimension. And, the factors in the case of (ii) can be identified as the four major sources of relative wage flexibilities between each of the country of reference cluster and other clusters along the second dimension. In Table 5.4, the common sources of relative wage flexibilities corresponding to each of the countries of Cluster 3 can be identified as the sources of relative wage flexibilities between Cluster 3 (including, Finland, Sweden and Norway) as a whole and each of the other clusters, along the second dimension.

#### **5.4.6 First *Pseudo* score Analysis at Level Four**

Along the first dimension of Level Four's first analysis, Cluster 1 comprising Austria's sectors and the Netherlands' sectors is selected as the reference cluster and *pseudo* score analysis is conducted. Tables A.5.14 and A.5.15 present the correlations between each of the *pseudo* scores and the first canonical score when Austria and the Netherlands are the reference countries, respectively. The top four correlations corresponding to individual countries are highlighted in the tables, where the variables corresponding to these correlations represent the four factors that are best associated with relative wage flexibility across each country of the reference cluster and each of the individual countries of Cluster 2, Cluster 3, and Cluster 4.

Along the second dimension of Level Four's first analysis, Cluster 3 comprising sectors of Belgium and Denmark is selected as the reference cluster and *pseudo* score analysis is performed. Tables A.5.16 and A.5.17 provide the correlations between each of

the *pseudo* scores and the second canonical score when Denmark and Belgium are treated as the reference country, respectively. In the tables, the top four correlations corresponding to individual countries are highlighted, and the variables corresponding to these correlations represent the four factors that are best associated with relative wage flexibility across Denmark and each of the individual countries of Cluster 1, Cluster 2, and Cluster 4.

Table 5.5 Four Major Sources of Relative Wage Flexibility in Level Four's First Analysis

Dimension	Reference Country	Relative to Cluster	Major Sources: Transnational Factors			
			1	2	3	4
1	Austria of Cluster 1	DK, CH, FR and BE of Cluster 2, 3, and 4	Social Security Contributions received by government (0.746)	Bilateral Exchange Rate (0.711)	GDP (0.679)	CPI (0.605)
		DK and BE of Cluster 3	CPI (0.876)	Bilateral Exchange Rate (0.857)	Social Security Contributions received by government (0.689)	GDP (0.669)
		DK, FR and BE of Cluster 2	Bilateral Exchange Rate (0.851)	CPI (0.850)	Social Security Contributions received by government (0.746)	GDP (0.704)
1	Netherlands of Cluster 1	DK, CH, FR and BE of Cluster 2, 3, and 4	Bilateral Exchange Rate (0.732)	CPI (0.678)	Female labor force participation rate (0.625)	Women's Employment Rate (0.605)
		DK and BE of Cluster 3	Bilateral Exchange Rate (0.864)	CPI (0.819)	Net Exports (0.767)	Exports (0.624)
		DK, FR and BE of Cluster 2	Bilateral Exchange Rate (0.859)	CPI (0.805)	Female labor force participation rate (0.642)	Net Migration (0.605)

Dimension	Reference Country	Relative to Cluster	Major Sources: Transnational Factors			
			1	2	3	4
2	Denmark of Cluster 3	AT, NL and CH of Clusters 1 and 4	Indirect Taxes (0.456)	Share of Taxes on goods and services in GDP (0.446)	Share of Government Net Lending in GDP (0.442)	Government Net Lending (0.442)
		AT and NL of Cluster 1	Indirect Taxes (0.456)	Government Net Lending (0.442)	Share of Government Net Lending in GDP (0.442)	Share of Taxes on goods and services in GDP (0.366)
2	Belgium of Cluster 3	AT, NL and CH of Clusters 1 and 4	Share of Taxes on goods and services in GDP (0.524)	Investment (0.408)	Social Benefits paid by government (0.407)	Total Direct Taxes (0.405)
		AT and NL of Cluster 1	Investment (0.462)	Share of Taxes on goods and services in GDP (0.417)	Social Benefits paid by government (0.407)	Total Direct Taxes (0.405)

To find out the sources of relative wage flexibilities across clusters along the two dimensions, means of absolute values of the correlations are computed, which are presented in Tables A.5.14 to A.5.17. Comparing between the magnitude of correlations and that of their means in Table A.5.14 to A.5.17, a summary of the findings from Level Four's first *pseudo* score analysis is presented in the Table 5.5 of this section. The table displays the four factors that show the top four magnitudes of associations with relative wage variations across each country of the reference cluster and the rest of the clusters along the first and second dimensions. These factors can be identified as the four major sources of relative wage flexibilities across each country of the reference cluster and the rest of the clusters at Level Four's first *pseudo* score analysis. In Table 5.3, the factors that are common sources of relative wage flexibilities corresponding to each country of

Cluster 1 (including, Austria and the Netherlands) can be identified as the sources of relative wage flexibilities between Cluster 1 as a whole and each of the other clusters, along the first dimension. And, similarly, the common sources corresponding to each of the countries of Cluster 3 (including, Denmark and Belgium) can be identified as the sources of relative wage flexibilities between Cluster 3 as a whole and each of the other clusters, along the second dimension.

#### **5.4.7 Second *Pseudo* score Analysis at Level Four**

Along the first dimension of Level Four's second analysis, Cluster 2 comprising Sweden's sectors is selected as the reference cluster and *pseudo* score analysis is performed. Table A.5.18 presents the correlations between each of the *pseudo* scores and the first canonical score. In the table, the highest four correlations corresponding to individual countries are highlighted. The variables corresponding to these correlations represent the four factors that are best associated with relative wage flexibility between Sweden and each of the individual countries of Cluster 1, Cluster 3, Cluster 4, and Cluster 5.

Along the second dimension of Level Four's second analysis, firstly, Cluster 2 comprising Sweden's sectors of Cluster 2 is selected as the reference cluster and *pseudo* score analysis is performed. The correlations between each of the *pseudo* scores and the second canonical score are presented in Table A.5.19, in which the top four correlations corresponding to individual countries are highlighted. The variables corresponding to these correlations represent the four factors best associated with relative wage flexibility

across Sweden and each of the individual countries of Cluster 1, Cluster 4 and Cluster 5, along the second dimension.

Along the second dimension of Level Four's second analysis, also, Cluster 3 comprising sectors of Norway and Ireland is treated as the reference cluster and *pseudo* score analysis is conducted by treating Norway as the reference country. The correlations between each of the *pseudo* scores and the second canonical score are presented in Table A.5.20, in which the top four correlations corresponding to individual countries are highlighted. The variables corresponding to these correlations represent the four factors that are best associated with relative wage flexibility across Norway and each of the individual countries of Cluster 1, Cluster 4, and Cluster 5.

To find out the sources of relative wage flexibilities across clusters along the two dimensions, means of absolute values of the correlations are computed, which are presented in Tables A.5.18 to A.5.20. Looking at the magnitude of correlations and that of their means in Table A.5.18 to A.5.20, a summary of the findings from Level Four's second *pseudo* score analysis is presented in the Table 5.6 of this section. The table shows the four factors that show the four highest magnitudes of associations with relative wage variations across (i) Sweden's cluster and rest of the other clusters along the first dimension, (ii) Sweden's cluster and rest of the other clusters along the second dimension, and (ii) Norway of Cluster 3 and the rest of the clusters along the second dimensions. These factors can be identified as the four major sources of relative wage flexibilities across clusters at Level Four's second *pseudo* score analysis.

Table 5.6 Four Major Sources of Relative Wage Flexibility in Level Four's Second Analysis

Dimension	Reference Country	Relative to Cluster	Major Sources: Transnational Factors			
			1	2	3	4
1	Sweden of Cluster 2	ES, IT, IE and PT of clusters 1, 4, and 5	Social Security Contributions received by government (0.803)	Real Oil Price (0.585)	Share of Government Net Lending in GDP (0.571)	Share of Trade in goods and services in GDP (0.571)
		ES and IT of Cluster 1	Social Security Contributions received by government (0.794)	Indirect Taxes	Real Oil Price (0.585)	Share of Government Net Lending in GDP (0.578)
		NO and IE of Cluster 3	Employment rate of youth (0.798)	Female labor force participation rate(0.796)	Total Employment Rate (0.769)	Women's Employment Rate (0.756)
		PT of Cluster 5	Social Security Contributions received by government (0.803)	Share of Trade in goods and services in GDP (0.803)	Indirect Taxes (0.745)	Social Benefits paid by government (0.702)
2	Sweden of Cluster 2	ES, IT, IE and PT of clusters 1, 4, and 5	Real Oil Price (0.469)	Consumption (0.453)	Nominal Oil Price (0.446)	Investment (0.444)
		ES and IT of Cluster 1	Share of Total Tax Revenue in GDP (0.511)	Share of Taxes on goods and services in GDP (0.502)	Consumption (0.500)	GDP (0.474)
		PT of Cluster 5	Exports (0.671)	Share of Taxes on goods and services in GDP (0.504)	Total Employment Rate (0.456)	Real Oil Price (0.469)
2	Norway of Cluster 3	ES, IT, IE and PT of clusters 1, 4, and 5	Total Direct Taxes (0.710)	Share of Taxes on income and profits in GDP (0.653)	Share of Total Tax Revenue in GDP (0.608)	Indirect Taxes (0.504)
		ES and IT of Cluster 1	Total Direct Taxes (0.758)	Share of Taxes on income and profits in GDP (0.640)	Indirect Taxes (0.616)	Share of Total Tax Revenue in GDP (0.612)
		PT of Cluster 5	Total Direct Taxes (0.766)	Exports	Share of Total Tax Revenue in GDP (0.644)	Indirect Taxes (0.614)



## 5.5 IMPLICATIONS AND CONCLUSIONS

For an LMF theorist, in Europe, changes in transnational variables should not be associated with relative wage variations that are not explained by the cross-country differences in labor market policies and institutions. But the findings from the four levels of analyses presented in the previous section, contrary to the LMF theorists' argument, reveal strong and highly significant associations of several transnational variables with relative wage variations between European country-sector clusters, or to say between European countries and also, between their sectors. These findings therefore, support the argument of dissertation, which is transnational variables explain relative wage variations across European country-sectors. Therefore, in Tables A.5.1 to A.5.20, the variables corresponding to the top four correlations associated with individual countries can be identified as the four major sources of relative wage flexibility across a country from the reference cluster and each of the individual countries from the rest of the clusters. The variables corresponding to the top four means are the four prime sources of relative wage flexibilities across clusters.

Table 5.1 presented in the previous section reveals that at Level One, transnational variables related to investment, importance of trade in goods and services in GDP, share of indirect taxes in GDP, and consumption are seemingly the major sources of relative wage flexibilities between Greece's cluster and the rest of clusters. Also, in this level, transnational variables related to international competitiveness (bilateral exchange rate and relative CPI), indirect taxes, government deficits and their share in GDP, social security contributions received by government, and social benefits paid by government appear as the prime sources of relative wage flexibilities across Portugal's

cluster and the rest of the clusters. From Table A.5.1 (Part I), it can be said that transnational variables related to investment and importance of trade in goods and services in GDP are seemingly the major sources of relative wage flexibilities across sectors of Greece of Cluster 2 and Cluster 3. And, Table 5.2 (Part II) reveals that transnational variables related to government deficit and exports and imports of goods and services are seemingly the prime sources of relative wage flexibilities between Portugal's sectors of Cluster 3 and its sectors of Cluster 1.

Table 5.2 shows that in Level Two, the major apparent sources of relative wage flexibilities between UK's cluster and the other clusters are transnational variables related to importance of trade in goods and services, exports and imports of goods and services, bilateral exchange rate, nominal oil price, and net migration. In this second level, transnational variables related to indirect taxes and their share in GDP, GDP, international competitiveness (relative CPI and bilateral exchange rate), and civilian labor force participation of males are appear to be the prime sources of relative wage flexibilities between Austria's cluster and the rest of the clusters. And, Table A.5.4 (Part I) shows that transnational variables related to all-person civilian labor force participation rate, consumer price index, social benefits, and social contributions are apparently the major sources of relative wage flexibilities across Austria's sectors of Cluster 3 and its sectors of Cluster 1.

Table 5.3 presents that in Level Three's first analysis, transnational variables related to population share of the youth, their employment rate, consumption, GDP, and female and male civilian labor force participation rates appear to be the prime sources of relative wage flexibilities between Germany's sectors of Cluster 2 and the rest of the

clusters<sup>72</sup>. In the same analysis, transnational variables related to investment, imports of goods and service, youth-employment rate, and female labor force participation rate seem to be the major sources of relative wage flexibilities between France's sectors of Cluster 2 and the rest of the clusters. Also, in the same analysis, transnational variables related to youth's share in the population and their employment rate, share of direct taxes in GDP, government deficits and their share in GDP, and women's employment rate are apparently the major sources of relative wage flexibilities between the Netherlands's sectors of Cluster 2 and the rest of the clusters. Examining the major sources corresponding to Germany, France, and the Netherlands in Table 5.3, the sources that are common for the three countries appear to be employment rate of the youth, youth's population share and labor force participation rate of female. These transnational variables can be identified as the factors best associated with relative wage variations between Cluster 3 (comprising, sectors of Germany, France, and the Netherlands) and the rest of the clusters, along the first dimension.

Table A.5.6 reveals that, in Level Three's first analysis, transnational variables related to investment, youth's population share, and exports and imports of goods and services appear as the prime sources of relative wage flexibilities across the sectors of France in Cluster 2 and in Cluster 1. And, Table A.5.7 shows that the apparent sources of relative wage flexibilities across the sectors of the Netherlands in Cluster 2 and in Cluster

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<sup>72</sup> It should be noted here that in the case of Germany, the data on several variables are missing. Therefore, in case the data on all the variables included in the analysis would have been available, there could have been differences in these results that is other relative variables could have appeared as major sources.

1 are transnational variables related to exports and imports of goods and services, youth's population share, and indirect taxes.

Along a second dimension of Level Three's first analysis, Table 5.3 reveals that transnational variables related to international competitiveness (bilateral exchange rate and relative CPI), the importance of trade in goods and services in GDP, oil price and indirect taxes and their share in GDP are seemingly the major sources of relative wage flexibilities between Belgium's sectors of Cluster 3 and the rest of the clusters. And, transnational variables related to the share of indirect taxes in GDP, investment, international competitiveness (bilateral exchange rate and CPI), oil price, and importance of trade in goods and services in GDP appear to be the major sources of relative wage flexibilities between Luxembourg's sectors of Cluster 3 and the rest of the clusters. Looking at the major sources corresponding to Belgium and Luxembourg in Table 5.3, the sources that are common for the two countries appear to be bilateral exchange rate, CPI, importance of trade in GDP and share of indirect taxes in GDP. These transnational variables can be identified as the factors best associated with relative wage variations between Cluster 3 (comprising, sectors of Belgium and Luxembourg) and the rest of the clusters, along the second dimension.

In the case of Level Three's second analysis, Table 5.4 reveals that transnational variables related to the importance of trade in goods and services in GDP, youth's share in the population, direct taxes, and the share of total tax revenue in GDP, and net migration are apparently the prime sources of relative wage flexibilities between Greece's cluster and the rest of the clusters. In the same analysis, along the second dimension, the seemingly major sources of relative wage flexibilities across Finland's

sectors of Cluster 3 and the rest of the clusters are transnational variables related to bilateral exchange rate, CPI, net migration, and net exports of goods and services. The prime sources of relative wage flexibilities between Sweden's sectors of cluster 3 and the rest of the clusters appear to be transnational variables associated with CPI, social benefits paid by government, investment, net migration, and indirect taxes. And, transnational variables related to bilateral exchange rate, CPI, importance of trade in goods and services in GDP, investment, and indirect taxes appear to be the prime sources of relative wage flexibilities between Norway's sectors of Cluster 3 and the rest of the clusters. Looking at the major sources corresponding to Finland, Norway, and Sweden in Table 5.4, the sources that are common for the three countries appear to be bilateral exchange rate and CPI. These transnational variables can be identified as the factors best associated with relative wage variations between Cluster 3 (comprising, sectors of Finland, Norway, and Sweden) and the rest of the clusters, along the second dimension.

Table A.5.12 reveals that transnational variables related to net migration, GDP, direct taxes, and social security contributions are seemingly the prime sources of relative wage flexibilities across the sectors of Sweden in Cluster 3 and in Cluster 1. And, Table A.5.13 shows that the major sources of relative wage flexibilities between Norway's sectors of Cluster 3 and of Cluster 1 appear to be transnational variables related to CPI, direct and indirect taxes, and social benefits paid by government.

Table 5.5 reveals that in Level Four's first analysis, transnational variables associated with international competitiveness (bilateral exchange rate and CPI), social security contributions received by government, and GDP appear as the major sources of relative wage flexibilities between Austria's sectors of Cluster 1 and the rest of the

clusters. And the prime sources of relative wage flexibilities between the Netherlands's sectors of Cluster 1 and the rest of the clusters appear to be transnational variables associated with international competitiveness (bilateral exchange rate and relative CPI), labor force participation rate of females and their employment rate, exports and net exports of goods and services, and net migration. Examining the major sources corresponding to Austria and the Netherlands in Table 5.5, the sources that are common for the two countries appear to be bilateral exchange rate and CPI. These transnational variables can be identified as the factors best associated with relative wage variations between Cluster 1 (comprising, sectors of Austria and the Netherlands) and the rest of the clusters, along the first dimension.

In Level Four's first analysis, along a second dimension, transnational variables related to indirect taxes and their share in GDP, and government deficits and their share in GDP are seemingly the major sources of relative wage flexibilities between Denmark's sectors of Cluster 3 and the rest of the clusters. And the major sources of relative wage flexibilities between Belgium's sectors of Cluster 3 and the rest of the clusters appear to be transnational variables related to investment, share of indirect taxes in GDP, direct taxes, and social benefit payments made by government. Looking at the major sources corresponding to Denmark and Belgium in Table 5.5, the sources that are common for the two countries appear to be variables related to share of indirect taxes in GDP. These transnational variables can be identified as the factors best associated with relative wage variations between Cluster 3 (comprising, sectors of Denmark and Belgium) and the rest of the clusters, along the second dimension.

Table 5.6 shows that, in Level Four's second analysis, transnational variables associated with social security contributions, share of government deficits in GDP, social benefits paid by government, real oil price, importance of trade in goods and services in GDP, various employment rates (of youth, women and total) and female labor force participation rate are apparently the prime sources of relative wage flexibilities between the Sweden's cluster and the rest of the sectors, along the first dimension. Along the second dimension, transnational variables related to oil price, consumption, investment, GDP, and share of taxes (total, direct and indirect) in GDP appear as major sources of relative wage flexibilities across the Sweden's cluster and the rest of the clusters. And, in the same analysis, along the second dimension, transnational variables associated with direct and indirect taxes and their share in GDP seem to be the prime sources of relative wage flexibilities between Norway's sectors of Cluster 3 and the rest of the clusters.

It is evident from the above discussion of this section that at each of the four levels, transnational factors seemingly explain the relative wage flexibilities between European countries, and also between sectors within the countries. These transnational factors are related to: macroeconomic variables such as investment, consumption, taxes, other government revenues, government expenditures; variables related to international competitiveness such as bilateral exchange rate and consumer price index; global factor such as crude oil price. In Sections 3.3 and 5.2, it is argued that in economically interdependent economies such as European countries, transnational variables explain changes in relative employment or unemployment rates along with explaining change in relative wages both between sectors within-country and between countries. Therefore, based on the theoretical arguments presented in those sections and looking at the findings

of this chapter, it can be said that the apparent transnational sources of relative wage flexibilities between European countries (and between sectors within-country) explain variations in relative employment or unemployment rates in those countries. And, it can be concluded that the high and differential rates of unemployment in European countries are explained by the cross-country differences in their levels of macroeconomic performance (represented by macroeconomic variables), levels of international competitiveness, and by global-level factors. It can also be concluded that the transnational variables related to demographic factors and labor market variables show strong and highly significant association with relative wage flexibilities between European countries and also between sectors within-country because these transnational variables are influenced by the macroeconomic performance of the countries. The effects of the identified sources of relative wage flexibilities on the unemployment rates of the European countries are dependent on the policy-choices made by each country and also by the European Union. Hence, this dissertation makes certain policy recommendations to reduce the differential and high rates of unemployment in Europe. The policy recommendations are presented in the next chapter.



## **Chapter 6: General Findings and Policy Recommendations**

This chapter summarizes the general findings from all the chapters of this dissertation in its first section and proposes a series of policy recommendations, based on the general findings, in its second section.

### **6.1 GENERAL FINDINGS**

The literature on the study of European problem of high unemployment is dominated by studies performing country-level analysis, focusing exclusively on country-specific sources of the problem namely labor market policies and institutions. These studies hold national labor market policies and institutions responsible for making wages rigid, and thereby, increasing unemployment rates and also leading to persistence of high rates of unemployment in European countries. The second chapter of this dissertation, which reviews the literature, finds that mainstream academia as well as the policy field remains dominated by the notion of “wage rigidity”. Theorists from the academia and the policy field argue that differences in labor market policies and institutional structures across European countries explain the differences in the degrees of wage rigidities, and hence, the heterogeneous rates of unemployment across those countries. These theorists are known as “labor market flexibility” (LMF) theorists.

The second chapter finds that, LMF theorists, in their empirical analyses, test the effects of labor market policy and institutional variables on unemployment (or employment) rates using cross-country econometric models. While reviewing the empirical studies of the LMF theorists, the second chapter finds a lack of diversity in the

methodological approaches of those studies. This is because, in most of the cases, the newer studies build their models on the existing ones. Moreover, all the studies use quantitative data measures of labor market policies and institutions, which remain under profound criticisms. LMF theorists have constructed the data measures to represent qualitative labor market policies and institutions quantitatively. And, since the policies and institutions are complex and involve intricacies in their designs, the accuracy of their quantitative counterparts in capturing their actual nature by some numerical or categorical scores remains doubtful.

Chapter Three examines the “notion of wage rigidity”, which is popular in the literature on the study of Europe’s high unemployment problem. This chapter recognizes that since the LMF theorists have treated each European country as an isolated entity, their focus has remained on county-specific sources of wage rigidity or barriers to wage flexibility, which are labor market policies and institutions. This chapter argues that when one views European countries as integrated and economically interdependent countries from a continental perspective, the sources of the problem of high unemployment are directed toward transnational factors. The chapter explains that transnational factors, which imply international, continental and global factors, such as relative investment, relative trade in goods and services, relative taxes, bilateral exchange rates, and world crude oil price, impact relative wages and relative employment (or unemployment) rates across interdependent economies like European nations. Therefore, in the study of the problem of high unemployment in Europe, a change in perspective from country-level to a continental-level is needed in order to capture the effects of transnational variables on wages and unemployment rates. Chapter Three explains that when Europe is viewed from

a country-level perspective, like the LMF theorists do, relative wages appear rigid across European countries because of the cross-country differences in labor market policies and institutional structures. But if Europe is viewed from a continental-level perspective, relative wages appear flexible due to the effects of transnational factors. Therefore, Chapter Three advocates examining the nature of European wage structure and test whether relative wages are actually rigid or flexible in Europe and from there draw implications for Europe's high unemployment problem.

Chapter Four develops a unique methodological approach to study the nature of European wage structure. Without imposing any theoretical preconditions, it tests whether the European wage structure is rigid or flexible. For this, it constructs and uses a continental-level data set of average wages of 255 European country-sectors over the period 1980-2005. It applies two multivariate techniques, namely cluster analysis and discriminant function analysis, to test the nature of the European wage structure. The uniqueness of the methodology comes from the multiple repetitions of the two analyses on progressively smaller numbers of European country-sectors, which is done in order to capture the nature of wage structure across smallest possible groups of European country-sectors. This chapter finds that the multiple repetitions render six analyses at four levels – two analyses at the third and the fourth levels and one at each of the other two levels. From the four levels of analyses, Chapter Three finds that relative wages are not rigid across European countries. Rather, there exist considerable relative wage flexibilities both within and across the countries. This is because, this chapter finds that in each analysis of the four levels, European countries with quite varied labor market policies and institutional structures cluster together, indicating similar over-time average wage

changes. And, sectors of countries with similar labor market structures, that is, sectors of countries whose labor market policies and institutions are characterized by same social policy model (Nordic model (Denmark, Finland, Sweden, Norway, and the Netherlands) or Anglo-Saxon model (UK and Ireland) or Continental model (Austria, Belgium, France, Germany, and Luxembourg) or Mediterranean model (Greece, Portugal, Italy, and Spain)) do not show similarities in their average wage changes. In other words, labor market policies and institutions of the European countries fail to explain the similarities in the over-time wage behaviors of the countries with varied labor market policies and institutions, and also, to explain the differences in the over-time wage behaviors across countries with similar labor market policies and institutions. In the first level, all of Europe, except for few sectors of Greece and Portugal show similar wage behaviors over-time. In the second level, Nordic countries cluster with Mediterranean countries such as Greece, Portugal, Spain, and Italy, showing no measurable differences in their respective over time pattern of wage movements. At this level, in another cluster, Continental countries such as Austria, Belgium, Luxembourg, and Germany cluster with Nordic Denmark and the Netherlands and Anglo-Saxon with Continental Switzerland, showing similarities in their respective over time patterns of wage changes. Similarly, in both third and fourth levels, countries with varied labor market policies and institutional structures show similar wage behaviors over time and cluster together. Chapter Four also finds that in each analysis of the four levels, sectors of a single country show differences in their over-time wage behaviors. All these findings do not support the argument of the LMF theorists, and labor market policies and institutions fail to explain the variations in relative wage behaviors across European country-sectors. Therefore, Chapter Four

concludes that the variations in average wage changes – relative wage flexibilities – across the European country-sectors may be explained by transnational factors.

Chapter Five searches for factors that may explain the relative wage flexibilities across European country-sector clusters obtained in Chapter Four. This chapter examines which transnational variables out of a list of variables appear as the sources of the relative wage flexibilities. For this, the associations of a number of transnational variables with the relative wage flexibilities are examined. Chapter Five finds that transnational factors associated with variables such as investment, taxes, government expenditure and revenues, trade in goods and services, GDP, bilateral exchange rate, consumer price index, crude oil price, migration, employment rates and labor force participation rates are strongly and statistically significantly associated with relative wage flexibilities across European countries (and also across sectors within the countries). Based on the findings, Chapter Five concludes that the heterogeneous rates of high unemployment across European countries can be explained by the differences in the macroeconomic performance and the levels of international competitiveness of the countries, which are influenced by macroeconomic policies adopted by each country and also by the European Union. This chapter also concludes that the high rates of unemployment of each country can also be explained by the performance of the continental and global economy.

## **6.2 POLICY RECOMMENDATIONS**

Policy recommendations for reducing unemployment rates in European countries that remain popular in the mainstream academia and in the policy field are associated with reforming labor market policies and institutions. The proposed reforms would

reduce or eliminate unemployment benefits and employment protection legislations, abolish minimum wages, weaken unions and decentralize wage bargaining system. Although the reforms have failed to show evidence in reducing unemployment over the years, they are still widely accepted and proposed.

The prime objective of labor market policies and institutions is to protect workers from distress and miseries which are brought by bad economic situations. Eliminating the protections by means of labor market reforms therefore, raises concern for the welfare of the workers. Contrary to the widely accepted view that reforming labor market policies and institutions will reduce unemployment in Europe, this dissertation finds that those policies and institutions do not apparently explain the evolution of unemployment in Europe. Therefore, reforming policies and institutions does not appear to be a solution to reducing high rates of European unemployment. The reforms may instead of reducing unemployment weaken the European social welfare system, which will increase poverty and bring greater miseries into the lives of the people. Also, reforms such as reducing or eliminating unemployment benefits and employment protection legislation, and abolishing minimum wage instead of reducing unemployment rates, may increase it by means of reducing consumer expenditure, and thereby, effective demand in the economy. Hence, *the first recommendation of this dissertation is that labor market policies and institutions should not be reformed. Rather, policies should be directed toward maintaining a strong social welfare system.*

The formation of the European Union (EU) formally integrated several European countries, politically as well as economically. The prime goal of economic integration is to reduce economic differences between the EU countries and equalize their levels of

development. To achieve this goal, the EU guaranteed freedom of movement of goods, services, capital and labor across the EU countries. For this, the EU abolished the barriers to trade in goods and services and to the mobility of labor and capital across the countries. In Europe, people often migrate from one country to another in search for jobs paying better wages. Also, this dissertation finds that in many cases, differences in migration rate between countries are associated with the differences in their wage-changes. Although, the EU has unrestricted labor-mobility between countries, it still remains restricted to some extent because of multiple reasons, one of which includes the differences in social welfare systems across countries. Due to the differences in social welfare systems, when a worker shifts from one country to another, he or she loses the social benefit transfers that he or she is entitled to receive in the former country. The loss of benefits due to the shift restricts the mobility of labor across the EU nations. Therefore, *the second recommendation of this study is that the social welfare systems across EU countries should be integrated in order to facilitate labor mobility, and thereby, achieve the goal of economic integration.*

The formation of the EU aimed at removing economic differences, and the initiation of euro ended the exchange rate differences among the European economic and monetary union (EMU) nations. However, differences remain in other spheres, which lead to differences in the levels of international competitiveness, and thereby, in the economic conditions of the nations. The EU and EMU countries differ in their infrastructure, level of investment in research and development, and taxation, all of which make one county more competitive internationally than the others. Countries that are more competitive are able to attract greater multinational investments than those which

are less competitive. And, the differences in the inflows of multinational investment across countries lead to the differences in their economic conditions. This dissertation also finds that differences in variables related to international competitiveness are associated with the difference in wages, and thereby, can be said to be associated with differences in employment rates across European countries. Therefore, *the third recommendation of this study is that individual countries, especially the poorer and high unemployment countries that lack appropriate level of international competitiveness, should direct policies toward improving their infrastructure and increasing their level of investment in research and development and higher education to reduce their unemployment rates and improve their economic conditions.*

With the formation of the EMU, the monetary and fiscal policies of the EMU nations<sup>73</sup> were integrated. The Stability and Growth Pact (SGP)<sup>74</sup> integrated the fiscal criteria for the EMU countries, but there persist differences in the tax systems of the countries. The share of taxation (including, direct and indirect taxes) and social security contributions in GDP vary widely across European countries. The differences in the tax systems make some countries tax havens relative to others. And, combined with the unrestricted mobility of capital across countries, the differences in taxation across them create an environment of tax competition in Europe. Countries which appear tax havens

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<sup>73</sup> The eurosystem that comprises the European Central Bank and the European System of Central Banks implements the monetary policies in the EMU nations.

<sup>74</sup> In order to support the inflationary target of the EMU, fiscal discipline was called for. For this purpose the Stability and Growth Pact (SGP) was adopted in 1997. Under the SGP, the government's ability of individual countries was controlled by means of imposing fiscal criteria that include: maintaining an annual budget deficit of below or equal to 3% of GDP and maintaining a public debt below or around 60% of GDP.



receive greater inflows of capital compared to others, which increases the differences in the economic conditions of the countries. This study also finds that differences in taxes and social security contributions are strongly associated with the differences in the wages (and thereby, can be said to be associated with differences in employment rates) across European countries. Therefore, *the fourth recommendation of this study is that the tax systems across the EMU countries should be integrated in order to eliminate tax competition, which will not only improve the international competitiveness of the poorer and high unemployment countries, but also mitigate economic differences between the countries.*

This dissertation finds strong association between the differences in the macroeconomic performance across European countries and the differences in their wage changes, and thereby, can also be said to be associated with the difference in changes in their employment rates. This indicates that countries that face lower demand have lower wages and lower levels of employment. Therefore, to increase employment rate or to reduce unemployment rate in European countries, policies should be directed to improve macroeconomic performance of the countries. Under the integrated monetary policy, the prime goal of the EMU is to maintain price stability and control inflation, which is set over and above any other goal. The integrated fiscal policy, implemented under the SGP, also targets controlling inflation over and above any other goal. To control inflation, the SGP imposes restraints on government spending, which impedes government's role in reducing unemployment. This study also finds that differences in government spending and revenues across European countries are strongly associated with the difference in wage changes, and thereby, can be said to be associated with the differences in

unemployment rates across countries. Therefore, *the final recommendation of this dissertation is that policies should be directed toward generating effective demand and achieving full employment in European countries, and the full employment policies should be accompanied by active labor market policies and policies increasing the enrollment in higher education, which will not only reduce overall unemployment rates, but also youth and female unemployment rates.*

This study concludes that the solution to the problem of European unemployment lies not with reforming the labor market policies and institutions, but with implementing full employment policies and strengthening social welfare systems rather than weakening them. Labor market reforms, which are recommended for the original EU members, are also extended to the accession countries, which are relatively economically backward. Since, labor market reforms can worsen the well being of the welfare dependents without increasing employment in the economy, reforms should not be imposed on the new EU members. Rather, in the new member nations of the EU, policies should be directed toward improving the infrastructure, enhancing international competitiveness, and implementing expansionary macroeconomic policies for achieving full employment goals in order to improve the economic conditions of those nations.

Based on Washington Consensus (Williamson, 1989), international organizations such as the World Bank and the IMF recommend labor market reforms to improve employment and output growth in developing countries. The results of this study indicate that labor market reforms should not be adopted as a generalized solution to economic problems in any country because when the research perspective is broadened, the solutions to the problems may be found elsewhere. Hence, it is hoped that the results of

this study will motivate other researchers to analyze economic problems of any country from a broader perspective and to remain open to look for alternative solutions, instead of being biased by any existing generalized solution.

The results of this study are generated from a novel methodological approach, which is developed exclusively to study the European problem of high unemployment from a broader perspective. The approach helps to capture the effects of economic interdependence and integration across European countries in studying the problem and therefore, generates more meaningful results. It is therefore, hoped that the approach of this study will motivate other researchers to explore, develop and employ diversified methodological techniques in the analysis of any research problem, instead of employing methodologies that are commonly used. It is also hoped that the relationship between transnational variables, employment rates and wages, which is found in this study, will motivate researchers to further explore the relationship in the set-up of other economically interdependent countries.

## APPENDIX TABLES AND FIGURES

Table A.2.1 Five-Year Average Rate of Unemployment<sup>75</sup>, 1960-2007<sup>[76]</sup><sup>[77]</sup>

	1960-64	1965-79	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005	2006	2007
United States	5.72	3.85	5.40	7.03	8.31	6.23	6.59	4.93	5.20	5.08	4.62	4.62
Belgium	2.21	2.26	2.23	6.50	11.53	11.21	10.82	11.71	7.54	8.44	8.25	7.46
Denmark	1.85	1.22	1.46	6.64	9.72	6.62	9.13	6.28	5.11	5.02	4.10	4.01
Germany	0.73	0.97	1.07	3.78	5.92	6.42	6.72	8.97	8.79	11.22	10.36	8.69
Greece	5.34	5.21	2.69	1.92	5.72	7.54	8.52	10.65	10.24	9.63	8.75	8.09
Spain	1.41	1.63	2.51	6.05	15.87	19.95	19.63	20.03	11.71	9.19	8.54	8.29
France	1.42	2.09	2.78	5.10	8.21	10.34	10.63	11.77	9.51	10.02	9.14	
Ireland	5.35	5.19	6.01	8.47	11.81	16.49	14.71	9.63	4.21	4.26	4.39	4.56
Italy	4.72	5.63	5.84	6.98	8.79	11.59	10.90	11.75	9.26	7.81	6.85	6.15
Luxembourg				0.50	1.24	1.45	1.49	2.38	2.19	3.10	3.07	3.03
Austria	2.04	1.83	1.25	1.87	3.16	3.44	3.63	4.05	4.11	5.17	4.75	4.42
Netherlands	0.57	1.10	1.93	5.46	10.10	9.81	6.92	5.41	3.65	5.20	3.91	3.18
Portugal	2.38	2.64	2.47	6.97	7.87	7.04	5.06	6.10	5.25	7.66	7.70	8.03
Finland	1.40	2.52	2.15	5.07	5.14	4.65	10.93	12.88	9.20	8.42	7.73	6.86
Sweden	1.58	1.79	2.24	2.00	3.18	2.36	6.03	9.01	5.72	7.78	7.07	6.16
United Kingdom	1.52	1.71	2.49	4.66	9.70	9.80	8.98	7.19	4.97	4.61	5.38	5.27
Norway	1.11	0.94	1.26	1.87	2.61	2.99	5.68	4.08	4.00	4.64	3.46	2.53
Switzerland	0.03	0.01	0.00	0.41	0.54	0.68	2.53	3.50	3.26	4.30	3.87	3.50

<sup>75</sup> Here Unemployment rate is measured as a percentage of civilian labor force.

<sup>76</sup> For the years 2005 to 2007, the rates of unemployment are annual.

<sup>77</sup> Source: OECD Database

Table A.4.1 Acronyms for Countries

Acronym	Country
BE	BELGIUM
DK	DENMARK
DE	GERMANY
GR	GREECE
ES	SPAIN
FR	FRANCE
IE	IRELAND
IT	ITALY
LU	LUXEMBOURG
NL	NETHERLANDS
AT	AUSTRIA
PT	PORTUGAL
FI	FINLAND
SE	SWEDEN
UK	UNITED KINGDOM
NO	NORWAY
CH	SWITZERLAND

Table A.4.2 Acronyms for Sectors

Acronym	Sectors
Ag	Agriculture, Forestry and Fishing
ce	Mining and Energy Supply
da	Food, Beverages and Tobacco
dbc	Textiles and Clothing
dfgh	Fuels, Chemicals, Rubber and Plastic Products
dl	Electronics
dm	Transport Equipment
do	Other Manufacturing
f	Construction
g	Wholesale and Retail
h	Hotels and Restaurants
i	Transport and Communications
j	Financial Services
k	Other Market Services
ns	Non-Market Services

Table A.4.3 Cluster-Details of Level 1's Analysis

Cluster 1								Cluster 2	Cluster 3
AT ce	DE ce	FI ce	IE ce	NL ce	SE ce	CH ce	LU ce	GR da	PT ce
AT da	DE da	FI da	IE da	NL da	SE da	CH da	LU da	GR dbc	PT da
AT dbc	DE dbc	FI dbc	IE dbc	NL dbc	SE dbc	CH dbc	LU dbc	GR dfgh	PT dfgh
AT dfgh	DE dfgh	FI dfgh	IE dfgh	NL dfgh	SE dfgh	CH dfgh	LU dfgh	GR dl	PT dl
AT dl	DE dl	FI dl	IE dl	NL dl	SE dl	CH dl	LU dl	GR dm	PT dm
AT dm	DE dm	FI dm	IE dm	NL dm	SE dm	CH dm	LU dm	GR do	PT do
AT do	DE do	FI do	IE do	NL do	SE do	CH do	LU do	GRAg	PTAg
AT f	DE f	FI f	IE f	NL f	SE f	CH f	LU f		
AT g	DE g	FI g	IE g	NL g	SE g	CH g	LU g		
AT h	DE h	FI h	IE h	NL h	SE h	CH h	LU h		
AT i	DE i	FI i	IE i	NL i	SE i	CH i	LU i		
AT j	DE j	FI j	IE j	NL j	SE j	CH j	LU j		
AT k	DE k	FI k	IE k	NL k	SE k	CH k	LU k		
AT ns	DE ns	FI ns	IE ns	NL ns	SE ns	CH ns	LU ns		
ATAg	DEAg	FI Ag	IE Ag	NL Ag	SE Ag	CH Ag	LU Ag		
BE ce	DK ce	FR ce	IT ce	NO ce	UK ce	ES ce	GR ce		
BE da	DK da	FR da	IT da	NO da	UK da	ES da	GR f		
BE dbc	DK dbc	FR dbc	IT dbc	NO dbc	UK dbc	ES dbc	GR g		
BE dfgh	DK dfgh	FR dfgh	IT dfgh	NO dfgh	UK dfgh	ES dfgh	GR h		
BE dl	DK dl	FR dl	IT dl	NO dl	UK dl	ES dl	GR i		
BE dm	DK dm	FR dm	IT dm	NO dm	UK dm	ES dm	GR j		
BE do	DK do	FR do	IT do	NO do	UK do	ES do	GR k		
BE f	DK f	FR f	IT f	NO f	UK f	ES f	GR ns		
BE g	DK g	FR g	IT g	NO g	UK g	ES g	PT dbc		
BE h	DK h	FR h	IT h	NO h	UK h	ES h	PT f		
BE i	DK i	FR i	IT i	NO i	UK i	ES i	PT g		
BE j	DK j	FR j	IT j	NO j	UK j	ES j	PT h		
BE k	DK k	FR k	IT k	NO k	UK k	ES k	PT i		
BE ns	DK ns	FR ns	IT ns	NO ns	UK ns	ES ns	PT j		
BEAg	DKAg	FR Ag	IT Ag	NO Ag	UK Ag	ES Ag	PT k		
							PT ns		

Table A.4.4 Cluster-Details of Level 2's Analysis

Cluster 1				Cluster 2			Cluster 3	Cluster 4
AT ce	DE ce	FR ce	NL ce	ATAg	GR ce	LU ce	AT da	UK ce
AT f	DE da	FR da	NL da	BE k	GR f	LU h	AT dbc	UK da
AT g	DE dbc	FR dbc	NL dbc	DK dbc	GR g	LU k	AT dfgh	UK dbc
AT h	DE dfgh	FR dfgh	NL dfgh	DK dl	GR h	NO ce	AT dl	UK dfgh
AT i	DE dl	FR dl	NL dl	DKAg	GR i	NO da	AT dm	UK dl
AT j	DE dm	FR dm	NL dm	ES ce	GR j	NO dbc	AT do	UK dm
AT k	DE do	FR do	NL do	ES da	GR k	NO dfgh	DEAg	UK do
AT ns	DE f	FR f	NL f	ES dbc	GR ns	NO dl	LUAg	UK f
BE ce	DE g	FR g	NL g	ES dfgh	IE ce	NO dm	UK k	UK g
BE da	DE h	FR h	NL h	ES dl	IE da	NO do		UK h
BE dbc	DE i	FR i	NL i	ES dm	IE dbc	NO g		UK i
BE dfgh	DE j	FR j	NL j	ES do	IE dfgh	NO h		UK j
BE dl	DE k	FR k	NL k	ES f	IE dl	NO i		UK ns
BE dm	DE ns	FR ns	NL ns	ES g	IE dm	NO j		UKAg
BE do	DK ce	IEAg	NLAg	ES h	IE do	NO k		BEAg
BE f	DK da	LU da	NO f	ES i	IE f	NO ns		FI ns
BE g	DK dfgh	LU dbc	PT f	ES k	IE g	NOAg		
BE h	DK dm	LU dfgh	SE ce	ES ns	IE h	PT dbc		
BE i	DK do	LU dl		ESAg	IE i	PT g		
BE j	DK f	LU dm		FI da	IE j	PT h		
BE ns	DK g	LU do		FI dbc	IE k	PT i		
CH ce	DK h	LU f		FI dfgh	IE ns	PT j		
CH da	DK i	LU g		FI dl	IT ce	PT k		
CH dbc	DK j	LU i		FI dm	IT da	PT ns		
CH dfgh	DK k	LU j		FI do	IT dbc	SE da		
CH dl	DK ns	LU ns		FI f	IT dfgh	SE dbc		
CH dm	ES j			FI g	IT dl	SE dfgh		
CH do	FI ce			FI h	IT dm	SE dl		
CH f				FI i	IT do	SE dm		
CH g				FI j	IT f	SE do		
CH h				FI k	IT g	SE f		
CH i				FIAg	IT h	SE g		
CH j				FRAg	IT i	SE h		
CH k					IT j	SE i		
CH ns					IT k	SE j		
CHAg					IT ns	SE k		
					ITAg	SE ns		
						SEAg		

Table A.4.5 Cluster-Details of Level 3's First Analysis

Cluster 1				Cluster 2		Cluster 3
AT ce	CH ce	FR g	DE f	DE ce	FR ce	BE ce
AT f	CH da	FR h	DE ns	DE da	FR da	BE da
AT g	CH dbc	FR i	DK ce	DE dbc	FR dbc	BE dbc
AT h	CH dfgh	FR j	DK da	DE dfgh	FR dfgh	BE dfgh
AT i	CH dl	FR k	DK dfgh	DE dl	FR dl	BE dl
AT j	CH dm	FR ns	DK do	DE dm	FR dm	BE dm
AT k	CH do	NL dm	DK f	DE do	FR do	BE do
AT ns	CH f	NL g	DK g	DE g	FR f	BE ns
BE f	CH g	NL h	DK h	DE h	IEAg	LU da
BE g	CH h	NL i	DK i	DE i	NL ce	LU dbc
BE h	CH i	NL j	DK j	DE j	NL da	LU dfgh
BE i	CH j	NL k	DK k	DE k	NL dbc	LU dl
BE j	CH k	NLAg	DK ns	DK dm	NL dfgh	LU dm
LU g	CH ns	SE ce	ES j	NO f	NL dl	LU do
LU i	CHAg			PT f	NL do	LU f
LU j					NL f	LU ns
						NL ns

Table A.4.6 Cluster-Details of Level 3's Second Analysis

Cluster 1					Cluster 2	Cluster 3		
ES ce	IT ce	IE ce	PT dbc	LU ce	GR ce	FI da	SE da	NO ce
ES da	IT da	IE da	PT g	LU h	GR f	FI dbc	SE dbc	NO da
ES dbc	IT dbc	IE dbc	PT h	LU k	GR g	FI dfgh	SE dfgh	NO dbc
ES dfgh	IT dfgh	IE dfgh	PT i	NO g	GR h	FI dl	SE dl	NO dfgh
ES dl	IT dl	IE dl	PT j	NO h	GR i	FI dm	SE dm	NO dl
ES dm	IT dm	IE do	PT k	NO i	GR j	FI do	SE do	NO dm
ES do	IT do	IE f	PT ns	NO j	GR k	FI g	SE f	NO do
ES f	IT f	IE g	SE g	NO k	GR ns	FI h	SEAg	NOAg
ES g	IT g	IE h	SE h	NO ns		FI i	ATAg	
ES h	IT h	IE i	SE i	FI f		FI j	DKAg	
ES i	IT i	IE j	SE j	FRAg		FI k		
ES k	IT j	IE k	SE k	BE k		FIAg		
ES ns	IT k	IE ns	SE ns			IE dm		
ESAg	IT ns	DK dbc						
	ITAg	DK dl						



Table A.4.7 Cluster-Details of Level 4's First Analysis

Cluster 1	Cluster 2		Cluster 3	Cluster 4
AT f	DE ns	LU g	BE f	CH ce
AT g	DK ce	LU i	BE g	CH da
AT h	DK da	LU j	BE i	CH dfgh
AT i	DK dfgh	AT ce	DK f	CH dl
AT j	DK do	AT ns	DK g	CH dm
AT k	DK ns	BE h	DK h	CH do
DE f	FR g	BE j	DK i	CH f
NL g	FR h	CH dbc	DK j	CH g
NL h	FR i		DK k	CH h
NL i	FR j		ES j	CH i
NL j	FR k		NLA g	CH j
NL k	FR ns			CH k
				CH ns
				CHAg
				FI ce
				SE ce

Table A.4.8 Cluster-Details of Level Four's Second Analysis

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
ES ce	IT ce	SE g	NO g	IE ce
ES da	IT da	SE h	NO h	IE da
ES dbc	IT dbc	SE i	NO i	IE dbc
ES dfgh	IT dfgh	SE j	NO j	IE dfgh
ES dl	IT dl	SE k	NO k	IE dl
ES dm	IT dm	SE ns	NO ns	IE do
ES do	IT do		IE f	IE j
ES f	IT f		IE h	
ES g	IT g		IE i	
ES h	IT h		IE k	
ES i	IT i			
ES k	IT j			
ES ns	IT k			
ESAg	IT ns			
FI f	ITAg			
	LU ce			

Table A.4.9 Eigenvalues from Level 1's Analysis

Discriminant Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	4.29	73.237	73.236	0.901
2	1.57	26.763	100	0.781

Table A.4.10 Eigenvalues from Level 2's Analysis

Discriminant Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	4.18	51.07	51.07	0.898
2	2.49	30.54	81.61	0.845
3	1.50	18.39	100	0.775

Table A.4.11 Eigenvalues from Level 3's First Analysis

Discriminant Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	11.03	67.69	67.69	0.9575
2	5.26	32.31	100	0.917

Table A.4.12 Eigenvalues from Level 3's Second Analysis

Discriminant Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	7.42	53.30	53.30	0.939
2	6.49	46.70	100	0.930

Table A.4.13 Eigenvalues from Level 4's First Analysis

Discriminant Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	20.40	57.40	57.40	0.976
2	11.26	31.68	89.07	0.958
3	3.88	10.92	100	0.892

Table A.4.14 Eigenvalues from Level 4's Second Analysis

Discriminant Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	22.89	50.17	50.17	0.979
2	14.04	30.76	80.92	0.966
3	5.64	12.36	93.28	0.922
4	3.07	6.72	100	0.868

Table A.5.1 (Part I)<sup>78</sup> Correlation Coefficients between First Canonical Score and *Pseudo* score-  
with reference to Greece<sup>[79][80][81][82]</sup> at Level 1

Variable	BE	DK	DE	GR (C.1)	ES	FR	IE	IT	LU	Mean for BE, DK, DE, GR (C.1), ES, FR, IE, IT, LU, NL, AT, PT, FI, SE, UK, NO and CH
Investment	-0.662	-0.588	-0.676	-0.680	-0.609	-0.608	-0.533	-0.678	-0.703	0.597
Consumption	-0.417	-0.316	-0.023	-0.216	-0.471	-0.486	-0.141	-0.527	0.363	0.300
GDP	-0.336	-0.105	-0.021	-0.247	-0.098	-0.271	0.046	-0.354	-0.082	0.209
Government Net Lending	0.189	0.072	-	0.179	0.186	0.165	-0.098	0.2	-	0.176
Government Net Lending as a % of GDP	0.183	0.08	-	0.268	0.208	0.174	-0.096	0.228	-	0.187
Total Direct Taxes	-0.22	-	-0.231	-0.205	-0.385	-0.284	-0.264	-0.393	-	0.279
Taxes on income and profits as a % of GDP	-0.048	-0.138	-0.081	-0.135	-0.104	-0.08	-0.082	-0.384	-0.07	0.151
Indirect Taxes	0.2	-	0.178	0.099	0.201	0.223	0.327	0.286	-	0.214
Taxes on goods and services as a % of GDP	0.538	0.486	0.431	0.421	0.11	0.544	0.491	0.497	0.354	0.423
Total tax revenue as a % of GDP	0.178	0.122	0.104	0.094	-0.013	0.216	0.212	-0.164	0.014	0.104
Social Security Contributions	-0.12	0.036	-	-0.083	-0.222	-0.11	-0.113	-0.155	-	0.141
Social Benefits	-0.067	0.081	-	-0.067	-0.18	-0.087	-0.046	-0.15	-	0.095
Exports of goods and services	0.187	0.144	-	0.188	0.282	0.097	0.229	0.049	0.193	0.210

<sup>78</sup> Due to the restriction of space, this table is presented in two parts: Part I displays correlations associated with the countries Belgium to Luxembourg and Part II displays correlations associated with countries the Netherlands to Switzerland, which is presented in the following table.

<sup>79</sup> Here in the title of the table “*Pseudo* score-with reference to Greece (or country that is named in the title of each of the tables A.5.1 to A.5.20)” implies that the *Pseudo* scores are calculated by using relative variables of the form: annual rate of change of Greece’s variable (or that country’s variable, which is named in the title of each of the tables A.5.1 to A.5.20) relative to that of each of the other countries presented in the column heads.

<sup>80</sup> The acronyms of the countries used in the tables A.5.1 to A.5.20 are given in table A.4.1 of this appendix A.

<sup>81</sup> In the tables A.5.1 to A.5.20, negative correlation coefficients are shown within parenthesis and correlation coefficients that are not significant at 1% or 5% level of significance are underlined.

<sup>82</sup> In the tables from A.5.1 to A.5.20, the top four correlation coefficients (absolute values) are represented by the following color scheme:

Highest	2nd Highest	3rd Highest	4th Highest

Variable	BE	DK	DE	GR (C.1)	ES	FR	IE	IT	LU	Mean for BE, DK, DE, GR (C.1), ES, FR, IE, IT, LU, NL, AT, PT, FI, SE, UK, NO and CH
Imports of goods and services	0.318	0.318	-	0.207	0.396	0.37	0.373	<u>0.117</u>	0.321	0.291
Net exports of goods and services	-0.208	0.15	-	<u>0.006</u>	0.41	-0.442	-0.226	-0.364	<u>-0.084</u>	0.256
Trade in goods and services as a % of GDP	<b>0.564</b>	<b>0.635</b>	<b>0.585</b>	<b>0.506</b>	<b>0.606</b>	<b>0.654</b>	<b>0.633</b>	<b>0.526</b>	<b>0.572</b>	<b>0.573</b>
Bilateral Exchange Rate	0.167	0.168	0.13	<u>-0.067</u>	0.202	0.181	0.175	0.248	0.167	0.138
Consumer Price Index	<u>0.024</u>	-	<u>0.027</u>	-0.194	<u>0.013</u>	<u>0.021</u>	<u>0.026</u>	<u>0.03</u>	<u>0.023</u>	<u>0.036</u>
Nominal Oil Price	<u>0.069</u>	<u>0.069</u>	<u>0.069</u>	<u>0.069</u>	<u>0.069</u>	<u>0.069</u>	<u>0.069</u>	<u>0.069</u>	<u>0.069</u>	<u>0.069</u>
Real Oil Price	<u>0.054</u>	<u>0.054</u>	<u>0.054</u>	<u>0.054</u>	<u>0.054</u>	<u>0.054</u>	<u>0.054</u>	<u>0.054</u>	<u>0.054</u>	<u>0.054</u>
Net Migration	-	-0.214	-	<u>-0.056</u>	<u>-0.103</u>	<b>0.685</b>	-	<u>-0.101</u>	-0.321	0.202
Youth Population Share	<u>0.025</u>	<u>-0.105</u>	<u>-0.056</u>	<u>0.097</u>	-0.264	<u>-0.047</u>	<u>0.087</u>	-0.278	<u>-0.069</u>	<u>0.115</u>
Male civilian labor force participation rate	<u>0.049</u>	<b>-0.417</b>	<b>-0.645</b>	-0.255	<u>-0.052</u>	-0.161	<b>-0.373</b>	-0.431	<u>0.058</u>	0.268
Female civilian labor force participation rate	0.31	0.269	<u>-0.094</u>	0.219	<b>0.515</b>	0.283	0.266	<u>0.069</u>	<b>0.366</b>	0.281
All civilian labor force participation rate	0.265	-0.388	<u>0.104</u>	0.123	0.439	0.161	0.126	-0.132	0.216	0.187
Employment rate for age group 15-24	-	-	-	-	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-	-	-	-	-
Women's Employment Rate	-	-	-	-	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-	-	-	-	-

1. Greece's construction, market and non-market services sectors are in Cluster 1 (C.1).

2. The continuation of this table is presented in the table below.

Table A.5.1 (Part II) Correlation Coefficients between First Canonical Score and *Pseudo* score-  
with reference to Greece at Level 1

Variable	NL	AT	PT	FI	SE	UK	NO	CH	Mean for BE, DK, DE, GR (C.1), ES, FR, IE, IT, LU, NL, AT, PT, FI, SE, UK, NO and CH
Investment	-0.625	-0.7	-0.725	-0.517	-0.582	-0.386	-0.354	-0.525	0.597
Consumption	-0.359	-0.404	-0.417	-0.022	-0.164	-0.154	-0.261	-0.362	0.300
GDP	-0.396	-0.287	-0.267	-0.01	-0.198	-0.06	-0.184	-0.598	0.209
Government Net Lending	0.008	0.172	0.128	0.376	0.49	0.01	-0.192	-	0.176
Government Net Lending as a % of GDP	0.017	0.183	0.16	0.357	0.493	0.005	-0.171	-	0.187
Total Direct Taxes	-0.308	-0.382	-0.355	-0.251	-0.259	-0.265	-0.098	-	0.279
Taxes on income and profits as a % of GDP	-0.334	-0.452	-0.021	-0.081	-0.127	-0.22	0.028	-0.181	0.151
Indirect Taxes	0.143	0.177	0.242	0.217	0.23	0.292	0.184	-	0.214
Taxes on goods and services as a % of GDP	0.468	0.415	0.295	0.545	0.382	0.629	0.175	0.404	0.423
Total tax revenue as a % of GDP	0.068	0.004	0.027	0.185	0.032	0.105	0.052	0.182	0.104
Social Security Contributions	0.004	-0.091	-0.535	-0.155	-0.117	-0.065	-0.164	-	0.141
Social Benefits	-0.115	-0.064	0.008	-0.153	-0.106	-0.094	-0.11	-	0.095
Exports of goods and services	0.337	0.079	0.002	0.346	0.402	0.455	0.332	0.038	0.210
Imports of goods and services	0.381	0.094	0.225	0.369	0.421	0.451	0.166	0.134	0.291
Net exports of goods and services	0.124	0.601	0.13	-0.419	0.186	-0.279	-0.414	-0.055	0.256
Trade in goods and services as a % of GDP	0.645	0.585	0.594	0.53	0.53	0.444	0.567	0.558	0.573
Bilateral Exchange Rate	0.124	0.129	0.261	-0.057	0.139	-0.018	0.065	0.044	0.138
Consumer Price Index	0.036	0.025	-0.086	-0.004	0.019	-	0.008	0.004	0.036
Nominal Oil Price	0.069	0.069	0.069	0.069	0.069	0.069	-0.069	0.069	0.069
Real Oil Price	0.054	0.054	0.054	0.054	0.054	0.054	-0.054	0.054	0.054
Net Migration	0.235	-	0.078	-0.113	-0.053	-0.603	-0.058	0.011	0.202
Youth Population Share	-0.189	-0.17	-0.216	0.034	-0.012	-0.045	-0.177	-0.091	0.115
Male civilian labor force participation rate	0.046	-0.101	-0.565	-0.496	-0.256	-0.251	-0.184	-0.212	0.268

Variable	NL	AT	PT	FI	SE	UK	NO	CH	Mean for BE, DK, DE, GR (C.1), ES, FR, IE, IT, LU, NL, AT, PT, FI, SE, UK, NO and CH
Female civilian labor force participation rate	0.39	<b>0.48</b>	0.29	0.254	0.191	0.266	0.217	0.291	0.281
All civilian labor force participation rate	0.258	0.387	-0.139	<u>0.063</u>	<u>0.036</u>	0.12	<u>0.084</u>	0.143	0.187
Employment rate for age group 15-24	-	-	-	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-	-	-	-
Women's Employment Rate	-	-	-	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-	-	-	-

1. This table A.5.1 (Part II) is a continuation of the table A.5.1 (Part I). Therefore, the last column is same for both Part I and Part II.

Table A.5.2 (Part I)<sup>83</sup> Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Portugal at Level 1

Variable	BE	DK	DE	GR	ES	FR	IE	IT	Mean for BE, DK, DE, GR, ES, FR, IE, IT, LU, NL, PT (C.3), AT, FI, SE, UK, NO and CH
Investment	0.167	<u>-0.012</u>	<u>-0.092</u>	<u>-0.052</u>	0.173	-0.133	0.225	<u>0.035</u>	0.175
Consumption	0.448	-0.211	-0.233	0.403	0.368	0.48	0.3	0.425	0.378
GDP	0.169	0.236	<b>-0.491</b>	0.476	0.033	0.353	-0.467	0.461	0.317
Government Net Lending	<u>0.092</u>	<u>-0.041</u>	-	<b>0.626</b>	<b>0.471</b>	<b>0.564</b>	0.27	<b>0.648</b>	0.344
Government Net Lending as a % of GDP	<u>0.037</u>	<u>-0.055</u>	-	<b>0.65</b>	0.37	0.333	0.234	<b>0.584</b>	0.300
Total Direct Taxes	0.267	-	0.375	-0.421	0.196	0.296	0.218	0.217	0.286
Taxes on income and profits as a % of GDP	<u>-0.097</u>	<u>-0.071</u>	0.188	-0.534	-0.146	-0.143	<u>-0.086</u>	-0.118	0.157
Indirect Taxes	0.496	-	<b>0.543</b>	<b>-0.684</b>	<b>0.667</b>	0.544	<b>0.635</b>	0.488	<b>0.531</b>

<sup>83</sup> Due to the restriction of space, this table is presented in two parts: Part I displays correlations for countries Belgium to Italy and Part II displays correlations for countries Luxembourg to Switzerland, which is presented in the following tables.

Variable	BE	DK	DE	GR	ES	FR	IE	IT	Mean for BE, DK, DE, GR, ES, FR, IE, IT, LU, NL, PT (C.3), AT, FI, SE, UK, NO and CH
Taxes on goods and services as a % of GDP	0.261	0.313	0.255	-0.451	-0.224	0.21	0.49	<u>-0.074</u>	0.223
Total tax revenue as a % of GDP	0.275	<b>0.473</b>	<b>0.519</b>	-0.438	0.23	0.269	0.437	0.176	0.314
Social Security Contributions	<b>0.547</b>	<b>0.533</b>	-	<u>0.024</u>	<b>0.541</b>	<b>0.595</b>	<b>0.613</b>	<b>0.535</b>	<b>0.516</b>
Social Benefits	<b>0.516</b>	<b>0.625</b>	-	<u>-0.087</u>	<b>0.46</b>	<b>0.56</b>	<b>0.656</b>	<b>0.617</b>	<b>0.486</b>
Exports of goods and services	<b>0.576</b>	0.432	-	0.441	0.187	<b>0.639</b>	0.292	0.522	0.472
Imports of goods and services	0.357	0.27	-	0.276	0.191	0.499	0.258	0.369	0.393
Net exports of goods and services	<u>0.098</u>	-0.168	-	<u>-0.079</u>	<u>-0.015</u>	<u>-0.045</u>	<u>-0.031</u>	-0.316	0.145
Trade in goods and services as a % of GDP	<u>-0.019</u>	<u>-0.099</u>	-0.297	<u>0.007</u>	<u>0.096</u>	<u>0.048</u>	0.207	<u>-0.058</u>	0.137
Bilateral Exchange Rate	0.411	0.375	0.318	<b>-0.66</b>	0.455	0.398	0.345	0.248	0.314
Consumer Price Index	0.484	-	<b>0.512</b>	-0.603	0.458	0.526	<b>0.566</b>	0.524	<b>0.485</b>
Nominal Oil Price	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.179
Real Oil Price	<u>0.053</u>	<u>0.053</u>	<u>0.053</u>	<u>0.053</u>	<u>0.053</u>	<u>0.053</u>	<u>0.053</u>	<u>0.053</u>	<u>0.050</u>
Net Migration	-	-0.121	-	<u>-0.062</u>	0.225	0.455	-	<u>-0.008</u>	0.176
Youth Population Share	<b>0.55</b>	<b>0.597</b>	0.414	-0.147	<u>0.086</u>	0.354	-0.3	0.482	0.381
Male civilian labor force participation rate	0.275	0.161	0.348	0.412	0.387	0.374	0.403	0.213	0.304
Female civilian labor force participation rate	0.223	<u>0.088</u>	0.373	0.333	<u>-0.006</u>	0.453	-0.185	<u>-0.093</u>	0.302
All civilian labor force participation rate	0.308	0.41	0.146	0.533	0.303	0.452	0.292	0.124	0.339
Employment rate for age group 15-24	-	-	-0.334	-	-0.339	<u>0.062</u>	-	-0.214	0.262
Men's Employment Rate	-	-	-0.406	-	-0.454	-0.181	-	-0.135	0.284
Women's Employment Rate	-	-	-0.341	-	-0.425	<u>-0.02</u>	-	-0.349	0.276
Total Employment Rate	-	-	-0.391	-	-0.367	<u>-0.092</u>	-	-0.244	0.200

1. Portugal's textile and clothing manufacturing, construction, market and non-market services sectors are in Cluster 1(C.1).
2. The continuation of this table is presented in the table below.

Table A.5.2 (Part II) Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Portugal at Level 1

Variable	LU	NL	AT	PT (C.3)	FI	SE	UK	NO	CH	Mean for BE, DK, DE, GR, ES, FR, IE, IT, LU, NL, AT, PT(C.3)FI, SE, UK, NO and CH
Investment	<u>-0.052</u>	0.216	<u>-0.114</u>	0.363	0.363	<u>0.081</u>	0.363	0.338	-0.192	0.175
Consumption	<u>0.035</u>	0.297	0.395	0.625	0.452	<b>0.586</b>	0.377	0.171	<b>0.627</b>	0.378
GDP	-0.376	<u>0.066</u>	0.318	0.568	0.437	0.299	0.323	<u>0.059</u>	0.257	0.317
Government Net Lending	-	0.164	0.392	<b>0.808</b>	<u>-0.05</u>	-0.214	-0.159	0.311	-	0.344
Government Net Lending as a % of GDP	-	<u>0.096</u>	0.355	<b>0.729</b>	<u>-0.07</u>	-0.224	-0.169	0.294	-	0.300
Total Direct Taxes	-	0.181	0.172	0.355	0.301	0.364	0.298	0.338	-	0.286
Taxes on income and profits as a % of GDP	<u>0.101</u>	<u>-0.117</u>	-0.23	<u>-0.067</u>	-0.26	<u>0.106</u>	<u>-0.101</u>	-0.192	<u>-0.118</u>	0.157
Indirect Taxes	-	0.428	<b>0.502</b>	0.491	<b>0.634</b>	0.308	<b>0.488</b>	<b>0.528</b>	-	<b>0.531</b>
Taxes on goods and services as a % of GDP	0.234	<u>0.085</u>	0.331	0.220	0.237	<u>0.006</u>	<u>-0.022</u>	0.147	0.224	0.223
Total tax revenue as a % of GDP	<b>0.483</b>	0.364	0.284	0.365	<u>0.035</u>	0.301	0.305	0.219	0.161	0.314
Social Security Contributions	-	<b>0.648</b>	<b>0.539</b>	0.539	0.465	0.472	<b>0.628</b>	<b>0.55</b>	-	<b>0.516</b>
Social Benefits	-	0.439	<b>0.478</b>	0.494	0.414	0.47	0.452	<b>0.533</b>	-	<b>0.486</b>
Exports of goods and services	<u>0.045</u>	<b>0.523</b>	0.346	<b>0.764</b>	0.553	<b>0.679</b>	<b>0.581</b>	0.473	<b>0.494</b>	0.472
Imports of goods and services	<u>-0.043</u>	0.404	0.177	<b>0.764</b>	<b>0.558</b>	<b>0.607</b>	<b>0.666</b>	0.474	0.371	0.393
Net exports of goods and services	<u>-0.028</u>	-0.146	0.17	0.259	0.134	0.342	<u>0.052</u>	-0.298	-0.147	0.145
Trade in goods and services as a % of GDP	-0.169	0.125	-0.245	<u>-0.114</u>	0.212	0.242	-0.121	<u>-0.047</u>	0.228	0.137
Bilateral Exchange Rate	<b>0.411</b>	0.325	0.317	<u>-0.085</u>	0.276	0.23	<u>0.002</u>	0.166	0.318	0.314
Consumer Price Index	<b>0.5</b>	0.458	0.447	0.456	0.467	0.364	-	0.499	<b>0.416</b>	<b>0.485</b>
Nominal Oil Price	0.19	0.19	0.19		0.19	0.19	0.19	0.19	0.19	0.179
Real Oil Price	<u>0.053</u>	<u>0.053</u>	<u>0.053</u>		<u>0.053</u>	<u>0.053</u>	<u>0.053</u>	<u>0.053</u>	<u>0.053</u>	<u>0.050</u>
Net Migration	<u>-0.073</u>	<u>0.026</u>	-	0.202	0.177	0.418	<u>-0.062</u>	-0.279	-0.176	0.176
Youth Population Share	<b>0.481</b>	0.491	<b>0.562</b>	-0.281	0.387	<u>0.106</u>	0.399	0.299	<b>0.543</b>	0.381
Male civilian labor force participation rate	-0.288	<u>0.042</u>	0.179	0.283	0.416	0.394	0.422	0.493	<u>0.078</u>	0.304



Variable	LU	NL	AT	PT (C.3)	FI	SE	UK	NO	CH	Mean for BE, DK, DE, GR, ES, FR, IE, IT, LU, NL, AT, PT(C.3)FI, SE, UK, NO and CH
Female civilian labor force participation rate	-0.263	-0.198	<u>-0.06</u>	0.605	<b>0.702</b>	<b>0.596</b>	0.322	0.406	-0.227	0.302
All civilian labor force participation rate	-0.297	<u>-0.052</u>	<u>0.076</u>	0.534	<b>0.635</b>	0.564	0.449	<b>0.519</b>	<u>-0.061</u>	0.339
Employment rate for age group 15-24	-	<b>-0.55</b>	-	-0.361	-0.129	-0.204	-	-0.166	-	0.262
Men's Employment Rate	-	-0.473	-	-0.369	-0.124	-0.334	-	<u>-0.08</u>	-	0.284
Women's Employment Rate	-	<b>-0.54</b>	-	0.236	0.313	0.219	-	<u>0.039</u>	-	0.276
Total Employment Rate	-	-0.482	-	<u>-0.078</u>	<u>0.089</u>	<u>-0.034</u>	-	<u>-0.02</u>	-	0.200

1. This table A.5.1 (Part II) is a continuation of the table A.5.1 (Part I). Therefore, the last column is same for both Part I and Part II.

Table A.5.3 (Part I)<sup>84</sup> Correlation Coefficients between First Canonical Score and *Pseudo* score-with reference to UK at Level 2

Variable	BE	DK	DE	FR	LU	NL	AT	CH	Mean for BE, DK, DE, FR, LU, NL, AT, CH, GR, ES, IE, IT, PT, FI, SE and NO of clusters 1, 2 and 3	Mean for BE, DK, DE, FR, LU, NL, AT and CH of Cluster 1	Mean for GR, ES, IE, IT, PT, FI, SE and NO of Cluster 2
Investment	(0.296)	0.427	(0.160)	(0.421)	(0.241)	(0.237)	(0.394)	(0.150)	0.339	0.291	0.387
Consumption	<u>(0.101)</u>	0.429	<u>(0.107)</u>	<u>0.057</u>	<b>(0.583)</b>	<u>0.068</u>	(0.289)	<u>0.034</u>	0.272	0.209	0.336
GDP	(0.592)	<u>0.079</u>	(0.430)	<b>(0.708)</b>	(0.545)	(0.587)	<b>(0.695)</b>	<u>(0.049)</u>	<b>0.511</b>	0.461	<b>0.560</b>
Government Net Lending	(0.263)	0.463	-	0.307	-	(0.345)	0.274	-	0.321	0.331	0.315
Government Net Lending as a % of GDP	(0.272)	0.462	-	0.307	-	(0.344)	0.361	-	0.322	0.349	0.305
Total Direct Taxes	<b>0.786</b>	-	<b>0.787</b>	0.237	-	0.236	(0.563)	-	0.353	0.522	0.248
Taxes on income and profits as a % of GDP	<b>0.654</b>	0.527	0.436	<u>(0.036)</u>	<b>0.604</b>	0.135	0.125	0.365	0.348	0.360	0.335
Indirect Taxes	0.396	<b>0.805</b>	-	0.474	-	0.555	0.253	-	0.302	0.497	0.180
Taxes on goods and services as a % of GDP	<u>(0.070)</u>	0.405	0.172	0.236	(0.143)	0.198	(0.164)	0.495	0.231	0.235	0.226
Total tax revenue as a % of GDP	0.537	<b>0.675</b>	0.387	0.270	0.347	0.258	(0.142)	0.389	0.299	0.376	0.222
Social Security Contributions	0.451	<u>(0.080)</u>	-	0.279	-	0.288	(0.181)	-	0.259	0.256	0.261
Social Benefits	0.273	<u>0.117</u>	-	<u>0.080</u>	-	0.253	0.511	-	0.257	0.247	0.263
Exports of goods and services	0.626	0.420	-	<b>0.591</b>	0.477	<b>0.642</b>	0.555	<b>0.711</b>	0.426	<b>0.574</b>	0.297
Imports of goods and services	0.530	0.580	-	0.300	0.395	0.622	<b>0.634</b>	<b>0.796</b>	0.411	0.551	0.289
Net exports of goods and services	0.205	(0.339)	-	0.279	<u>0.071</u>	(0.182)	<u>(0.105)</u>	(0.403)	0.183	0.226	0.145

<sup>84</sup> Due to the restriction of space, this table is presented in two parts: Part I displays correlations for countries Belgium to Switzerland and Part II displays correlations for countries Greece to Norway, which is presented in the following table.

Variable	BE	DK	DE	FR	LU	NL	AT	CH	Mean for BE, DK, DE, FR, LU, NL, AT, CH, GR, ES, IE, IT, PT, FI, SE and NO of clusters 1, 2 and 3	Mean for BE, DK, DE, FR, LU, NL, AT and CH of Cluster 1	Mean for GR, ES, IE, IT, PT, FI, SE and NO of Cluster 2
Trade in goods and services as a % of GDP	(0.870)	(0.854)	(0.862)	(0.885)	(0.788)	(0.885)	(0.724)	(0.666)	0.641	0.817	0.465
Bilateral Exchange Rate	(0.788)	(0.786)	(0.706)	(0.809)	(0.788)	(0.718)	(0.696)	(0.634)	0.633	0.741	0.526
Consumer Price Index	-	-	-	-	-	-	-	-	-	-	-
Nominal Oil Price	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595
Real Oil Price	0.477	0.477	0.477	0.477	0.477	0.477	0.477	0.477	0.477	0.477	0.477
Net Migration	-	0.655	-	0.140	0.094	0.648	-	0.174	0.443	0.342	0.515
Youth Population Share	0.191	0.042	0.300	0.071	0.263	0.046	0.266	0.077	0.114	0.157	0.072
Male civilian labor force participation rate	0.223	0.343	0.472	0.357	(0.190)	(0.411)	0.321	(0.130)	0.250	0.306	0.194
Female civilian labor force participation rate	0.183	(0.152)	(0.018)	0.214	(0.367)	(0.375)	0.143	(0.463)	0.196	0.239	0.152
All civilian labor force participation rate	0.243	0.207	0.045	0.329	(0.285)	(0.415)	0.030	(0.360)	0.187	0.239	0.134
Employment rate for age group 15-24	-	-	-	-	-	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-	-	-	-	-	-
Women's Employment Rate	-	-	-	-	-	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-	-	-	-	-	-

1. The continuation of this table is presented in the table below.

Table A.5.3 (Part II) Correlation Coefficients between First Canonical Score and *Pseudo* score-with reference to UK at Level 2

Variable	GR	ES	IE	IT	PT	FI	SE	NO	Mean for BE, DK, DE, FR, LU, NL, AT, CH, GR, ES, IE, IT, PT, FI, SE and NO of clusters 1, 2 and 3	Mean for BE, DK, DE, FR, LU, NL, AT and CH of Cluster 1	Mean for GR, ES, IE, IT, PT, FI, SE and NO of Cluster 2
Investment	<u>0.043</u>	(0.500)	<b>(0.729)</b>	(0.349)	(0.265)	<b>(0.637)</b>	(0.266)	(0.305)	0.339	0.291	0.387
Consumption	(0.384)	(0.307)	(0.471)	(0.382)	(0.354)	(0.391)	<u>(0.088)</u>	0.310	0.272	0.209	0.336
GDP	(0.431)	<b>(0.833)</b>	<b>(0.631)</b>	(0.418)	(0.469)	<b>(0.665)</b>	<b>(0.541)</b>	0.494	<b>0.511</b>	0.461	<b>0.560</b>
Government Net Lending	0.237	0.322	0.457	0.352	0.364	(0.158)	(0.321)	0.307	0.321	0.331	0.315
Government Net Lending as a % of GDP	0.241	0.323	0.467	0.354	0.277	(0.141)	(0.322)	0.312	0.322	0.349	0.305
Total Direct Taxes	<u>0.056</u>	(0.131)	<u>0.045</u>	<u>(0.074)</u>	0.288	(0.314)	<b>0.695</b>	(0.381)	0.353	0.522	0.248
Taxes on income and profits as a % of GDP	<u>0.076</u>	(0.155)	0.356	(0.116)	<b>(0.795)</b>	(0.424)	0.479	(0.281)	0.348	0.360	0.335
Indirect Taxes	<u>(0.023)</u>	(0.089)	(0.340)	<u>(0.035)</u>	(0.114)	(0.227)	<u>(0.075)</u>	0.541	0.302	0.497	0.180
Taxes on goods and services as a % of GDP	0.282	<u>(0.056)</u>	0.045	<u>(0.041)</u>	0.447	(0.217)	<u>0.089</u>	<b>0.633</b>	0.231	0.235	0.226
Total tax revenue as a % of GDP	0.449	(0.127)	0.329	<u>0.051</u>	0.038	(0.333)	0.170	0.281	0.299	0.376	0.222
Social Security Contributions	(0.225)	(0.255)	(0.410)	<u>(0.086)</u>	0.396	<u>(0.062)</u>	(0.354)	0.297	0.259	0.256	0.261
Social Benefits	(0.298)	(0.340)	(0.115)	(0.362)	(0.228)	0.216	0.306	(0.240)	0.257	0.247	0.263
Exports of goods and services	<u>0.086</u>	<u>(0.034)</u>	<u>(0.037)</u>	0.478	0.194	0.418	0.463	<b>(0.664)</b>	0.426	<b>0.574</b>	0.297
Imports of goods and services	<u>(0.082)</u>	(0.493)	(0.213)	(0.208)	(0.287)	0.321	0.242	0.469	0.411	0.551	0.289
Net exports of goods and services	<u>0.039</u>	<u>0.066</u>	0.142	0.141	<u>0.036</u>	(0.198)	0.486	0.056	0.183	0.226	0.145
Trade in goods and services as a % of GDP	(0.385)	<b>(0.739)</b>	(0.579)	<b>(0.548)</b>	<b>(0.800)</b>	<u>(0.035)</u>	<u>(0.045)</u>	(0.590)	<b>0.641</b>	<b>0.817</b>	0.465
Bilateral Exchange Rate	<b>(0.475)</b>	(0.478)	<b>(0.764)</b>	<b>(0.609)</b>	(0.466)	(0.457)	(0.333)	<b>(0.629)</b>	<b>0.633</b>	<b>0.741</b>	<b>0.526</b>

Variable	GR	ES	IE	IT	PT	FI	SE	NO	Mean for BE, DK, DE, FR, LU, NL, AT, CH, GR, ES, IE, IT, PT, FI, SE and NO of clusters 1, 2 and 3	Mean for BE, DK, DE, FR, LU, NL, AT and CH of Cluster 1	Mean for GR, ES, IE, IT, PT, FI, SE and NO of Cluster 2
Consumer Price Index	-	-	-	-	-	-	-	-	-	-	-
Nominal Oil Price	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595	0.595
Real Oil Price	0.477	0.477	0.477	0.477	0.477	0.477	0.477	0.477	0.477	0.477	0.477
Net Migration	0.734	0.574	-	0.574	(0.605)	0.130	0.566	(0.423)	0.443	0.342	0.515
Youth Population Share	(0.104)	0.070	0.010	0.128	0.003	0.072	(0.031)	0.156	0.114	0.157	0.072
Male civilian labor force participation rate	0.334	0.101	0.173	0.059	0.284	0.252	0.045	0.308	0.250	0.306	0.194
Female civilian labor force participation rate	(0.087)	(0.113)	0.026	(0.418)	(0.306)	(0.047)	(0.038)	0.179	0.196	0.239	0.152
All civilian labor force participation rate	0.075	(0.038)	0.106	(0.252)	0.258	0.080	(0.009)	0.258	0.187	0.239	0.134
Employment rate for age group 15-24	-	-	-	-	-	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-	-	-	-	-	-
Women's Employment Rate	-	-	-	-	-	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-	-	-	-	-	-

1. This table A.5.1 (Part II) is a continuation of the table A.5.1 (Part I). Therefore, the last three columns are same for both the Part I and Part II.

Table A.5.4 (Part I)<sup>85</sup> Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Austria at Level 2

Variable	BE	DK	DE	FR	LU	NL	AT (C.2)	CH	Mean for countries of clusters 1, 2 and 4	Mean for BE, DK, DE, FR, LU, NL, AT and CH of Cluster 1	Mean for GR, ES, IE, IT, PT, FI, SE and NO of Cluster 2
Investment	-0.274	-0.393	-0.31	-0.323	<u>-0.021</u>	-0.422	<u>0.082</u>	<b>-0.556</b>	0.308	0.298	0.320
Consumption	0.366	<u>-0.009</u>	0.213	0.243	<u>0.088</u>	0.397	0.534	<b>0.551</b>	0.292	0.300	0.298
GDP	<b>-0.691</b>	<b>-0.638</b>	<b>-0.501</b>	-0.682	<b>-0.618</b>	<b>-0.702</b>	-0.158	-0.197	<b>0.571</b>	<b>0.523</b>	<b>0.615</b>
Government Net Lending	-0.278	0.168	-	0.101	-	<u>0.065</u>	0.492	-	0.226	0.221	0.257
Government Net Lending as a % of GDP	-0.278	0.172	-	0.14	-	<u>0.053</u>	0.450	-	0.248	0.219	0.296
Total Direct Taxes	-0.176	-	-0.318	-0.325	-	<b>0.621</b>	0.583	-	0.405	0.405	0.421
Taxes on income and profits as a % of GDP	-0.123	-0.143	0.325	0.146	<u>0.024</u>	<b>0.536</b>	<u>0.108</u>	<u>-0.061</u>	0.212	0.183	0.252
Indirect Taxes	-0.511	-0.551	-	<b>-0.784</b>	-	-0.157	0.525	-	<b>0.593</b>	<b>0.506</b>	<b>0.649</b>
Taxes on goods and services as a % of GDP	-0.185	-0.201	<u>-0.099</u>	-0.305	<b>-0.472</b>	-0.265	-0.271	-0.329	0.381	0.266	0.455
Total tax revenue as a % of GDP	-0.306	-0.216	0.185	-0.391	-0.129	0.376	<u>-0.015</u>	<b>-0.512</b>	0.317	0.266	0.360
Social Security Contributions	-0.233	-0.017	-	-0.5	-	<b>0.658</b>	<b>0.650</b>	-	0.429	0.412	0.445
Social Benefits	0.34	-0.148	-	-0.453	-	0.517	<b>0.691</b>	-	0.470	0.430	0.509
Exports of goods and services	0.42	0.318	-	0.505	-0.197	0.381	0.503	0.284	0.343	0.373	0.296
Imports of goods and services	0.26	<u>-0.086</u>	-	0.391	-0.172	0.287	0.436	0.24	0.187	0.267	0.128
Net exports of goods and services	-0.331	<u>-0.044</u>	-	-0.239	-0.268	-0.284	-0.256	-0.27	0.298	0.242	0.351

<sup>85</sup> Due to the restriction of space, this table is presented in two parts: Part I displays correlations for countries Belgium to Switzerland and Part II displays correlations for countries Greece to UK, which is presented in the following table.

Variable	BE	DK	DE	FR	LU	NL	AT (C.2)	CH	Mean for countries of clusters 1, 2 and 4	Mean for BE, DK, DE, FR, LU, NL, AT and CH of Cluster 1	Mean for GR, ES, IE, IT, PT, FI, SE and NO of Cluster 2
Trade in goods and services as a % of GDP	-0.518	-0.083	-0.245	<u>-0.006</u>	-0.286	<u>-0.09</u>	<u>-0.020</u>	0.309	0.219	0.195	0.231
Bilateral Exchange Rate	<b>-0.701</b>	<b>-0.687</b>	-0.394	<b>-0.707</b>	<b>-0.701</b>	-0.431	<u>-0.023</u>	0.48	0.528	<b>0.515</b>	0.541
Consumer Price Index	-0.536	-	<b>-0.528</b>	-0.606	<b>-0.594</b>	0.5	<b>0.686</b>	0.392	<b>0.599</b>	<b>0.549</b>	<b>0.643</b>
Nominal Oil Price	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118
Real Oil Price	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294
Net Migration	-	-	-	-	-	-	-	-	-	-	-
Youth Population Share	0.204	0.228	-0.339	-0.16	0.237	0.516	-0.408	-0.119	0.307	0.276	0.311
Male civilian labor force participation rate	<b>0.738</b>	<b>0.735</b>	<b>0.408</b>	<b>0.781</b>	<u>-0.065</u>	0.304	0.515	<b>0.485</b>	<b>0.539</b>	0.504	<b>0.559</b>
Female civilian labor force participation rate	0.319	<b>0.583</b>	0.387	0.559	-0.106	-0.186	0.610	0.285	0.333	0.379	0.284
All civilian labor force participation rate	<b>0.713</b>	0.423	<b>0.699</b>	<b>0.732</b>	<u>-0.043</u>	0.133	<b>0.704</b>	0.391	0.472	0.480	0.453
Employment rate for age group 15-24	-	-	-	-	-	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-	-	-	-	-	-
Women's Employment Rate	-	-	-	-	-	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-	-	-	-	-	-

1. Austria's energy and mining, transportation, marketing and non-marketing sectors are in Cluster 2(C.2).

2. The continuation of this table is presented in the table below.

Table A.5.4 (Part II) Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Austria at Level 2

Variable	GR	ES	IE	IT	PT	FI	SE	NO	UK	Mean for countries of clusters 1, 2 and 4	Mean for BE, DK, DE, FR, LU, NL, AT and CH of Cluster 1	Mean for GR, ES, IE, IT, PT, FI, SE and NO of Cluster 2
Investment	<u>-0.078</u>	-0.436	-0.152	<u>0.088</u>	-0.449	-0.439	-0.405	<b>-0.514</b>	-0.289	0.308	0.298	0.320
Consumption	<u>-0.073</u>	0.437	0.312	0.294	0.352	-0.243	0.537	-0.134	-0.177	0.292	0.300	0.298
GDP	-0.549	<b>-0.699</b>	<b>-0.673</b>	-0.635	-0.569	<b>-0.691</b>	<b>-0.638</b>	-0.469	<b>-0.592</b>	<b>0.571</b>	<b>0.523</b>	<b>0.615</b>
Government Net Lending	0.308	0.375	<u>-0.034</u>	0.41	0.307	0.51	<u>0.107</u>	<u>0.001</u>	<u>-0.008</u>	0.226	0.221	0.257
Government Net Lending as a % of GDP	0.441	0.413	<u>-0.013</u>	0.466	0.573	0.346	<u>0.112</u>	<u>0.005</u>	<u>-0.005</u>	0.248	0.219	0.296
Total Direct Taxes	-0.658	-0.476	-0.459	-0.649	-0.339	<b>-0.557</b>	-0.223	<u>-0.008</u>	-0.28	0.405	0.405	0.421
Taxes on income and profits as a % of GDP	-0.369	-0.272	0.298	-0.382	-0.172	<u>-0.107</u>	0.133	0.286	<u>-0.113</u>	0.212	0.183	0.252
Indirect Taxes	<b>-0.752</b>	<b>-0.682</b>	-0.602	<b>-0.738</b>	<b>-0.739</b>	-0.512	<b>-0.61</b>	<b>-0.557</b>	<b>-0.582</b>	<b>0.593</b>	<b>0.506</b>	<b>0.649</b>
Taxes on goods and services as a % of GDP	-0.56	-0.652	-0.365	-0.527	-0.456	-0.507	-0.435	-0.141	<b>-0.712</b>	0.381	0.266	0.455
Total tax revenue as a % of GDP	-0.667	-0.466	<u>0.014</u>	-0.619	<b>-0.622</b>	-0.274	<u>-0.038</u>	0.178	-0.389	0.317	0.266	0.360
Social Security Contributions	<b>-0.717</b>	-0.495	-0.509	<b>-0.691</b>	-0.346	<b>-0.64</b>	<u>-0.099</u>	<u>-0.061</u>	-0.396	0.429	0.412	0.445
Social Benefits	-0.674	-0.494	-0.556	-0.54	-0.58	<b>-0.597</b>	-0.226	-0.402	-0.367	0.470	0.430	0.509
Exports of goods and services	0.664	-0.405	-0.45	<u>-0.001</u>	-0.522	<u>-0.033</u>	<u>0.038</u>	0.252	0.519	0.343	0.373	0.296
Imports of goods and services	<u>0.087</u>	<u>-0.043</u>	-0.145	0.166	0.156	<u>0.082</u>	0.237	<u>0.104</u>	<u>0.095</u>	0.187	0.267	0.128
Net exports of goods and services	-0.249	-0.252	-0.3	-0.651	-0.596	-0.247	-0.207	-0.302	-0.28	0.298	0.242	0.351



Variable	GR	ES	IE	IT	PT	FI	SE	NO	UK	Mean for countries of clusters 1, 2 and 4	Mean for BE, DK, DE, FR, LU, NL, AT and CH of Cluster 1	Mean for GR, ES, IE, IT, PT, FI, SE and NO of Cluster 2
Trade in goods and services as a % of GDP	0.409	-0.418	<u>-0.106</u>	<u>-0.079</u>	-0.236	0.164	-0.282	0.151	-0.319	0.219	0.195	0.231
Bilateral Exchange Rate	-0.677	-0.586	-0.591	-0.627	<b>-0.708</b>	-0.222	-0.511	-0.409	-0.528	0.528	<b>0.515</b>	0.541
Consumer Price Index	<b>-0.68</b>	<b>-0.719</b>	<b>-0.628</b>	<b>-0.718</b>	<b>-0.714</b>	-0.519	<b>-0.607</b>	<b>-0.558</b>	-	<b>0.599</b>	<b>0.549</b>	<b>0.643</b>
Nominal Oil Price	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118	<u>-0.118</u>	0.118	0.118	0.118
Real Oil Price	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	-0.294	0.294	0.294	0.294
Net Migration	-	-	-	-	-	-	-	-	-	-	-	-
Youth Population Share	-0.361	-0.271	-0.356	-0.203	-0.268	0.191	-0.519	-0.319	-0.521	0.307	0.276	0.311
Male civilian labor force participation rate	<b>0.699</b>	<b>0.665</b>	<b>0.697</b>	<b>0.719</b>	0.24	0.404	<b>0.547</b>	<b>0.503</b>	<b>0.655</b>	<b>0.539</b>	0.504	<b>0.559</b>
Female civilian labor force participation rate	-0.237	<u>-0.061</u>	<u>-0.014</u>	0.37	0.437	0.421	0.453	0.275	0.363	0.333	0.379	0.284
All civilian labor force participation rate	0.163	0.479	<b>0.649</b>	0.569	0.448	0.359	0.523	0.433	0.563	0.472	0.480	0.453
Employment rate for age group 15-24	-	-	-	-	-	-	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-	-	-	-	-	-	-
Women's Employment Rate	-	-	-	-	-	-	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-	-	-	-	-	-	-

1. This table A.5.1 (Part II) is a continuation of the table A.5.1 (Part I). Therefore, the last three columns are same for both the Part I and Part II.

Table A.5.5 Correlation Coefficients between First Canonical Score and *Pseudo* score-with reference to Germany at Level 3's First Analysis

Variable	BE	DK	FR	LU	NL	AT	CH	Mean for BE, DK, FR, LU, NL, AT and CH of Cluster 1	Mean for BE, DK, LU, AT and CH of Cluster 1	Mean for BE and LU of Cluster 3
Investment	0.433	0.093	0.343	(0.143)	0.031	0.551	0.113	0.244	0.267	0.288
Consumption	0.497	0.358	0.515	0.231	0.505	0.478	0.544	0.447	0.422	0.364
GDP	0.445	0.377	0.484	(0.224)	0.425	0.524	0.488	0.424	0.412	0.335
Government Net Lending	-	-	-	-	-	-	-	-	-	-
Government Net Lending as a % of GDP	-	-	-	-	-	-	-	-	-	-
Total Direct Taxes	-	-	-	-	-	-	-	-	-	-
Taxes on income and profits as a % of GDP	(0.124)	(0.598)	(0.193)	0.333	0.461	(0.174)	(0.184)	0.295	0.283	0.228
Indirect Taxes	-	-	-	-	-	-	-	-	-	-
Taxes on goods and services as a % of GDP	0.088	(0.204)	0.216	(0.211)	(0.275)	0.207	(0.223)	0.203	0.187	0.150
Total tax revenue as a % of GDP	(0.144)	(0.558)	(0.187)	0.284	0.093	(0.242)	(0.168)	0.239	0.279	0.214
Social Security Contributions	-	-	-	-	-	-	-	-	-	-
Social Benefits	-	-	-	-	-	-	-	-	-	-
Exports of goods and services	-	-	-	-	-	-	-	-	-	-
Imports of goods and services	-	-	-	-	-	-	-	-	-	-
Net exports of goods and services	-	-	-	-	-	-	-	-	-	-
Trade in goods and services as a % of GDP	0.348	0.204	0.395	(0.119)	0.104	0.013	0.324	0.215	0.202	0.234
Bilateral Exchange Rate	(0.076)	0.099	(0.135)	0.099	(0.207)	0.149	0.287	0.150	0.142	0.088
Consumer Price Index	-	-	-	-	-	-	-	-	-	-
Nominal Oil Price	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264
Real Oil Price	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116
Net Migration	-	-	(0.171)	0.288	0.258	-	0.159	0.219	0.224	0.288
Youth Population Share	(0.423)	(0.367)	(0.462)	(0.551)	(0.115)	(0.315)	(0.518)	0.393	0.435	0.487

Variable	BE	DK	FR	LU	NL	AT	CH	Mean for BE, DK, FR, LU, NL, AT and CH of Cluster 1	Mean for BE, DK, LU, AT and CH of Cluster 1	Mean for BE and LU of Cluster 3
Male civilian labor force participation rate	(0.196)	0.556	0.475	<b>(0.497)</b>	(0.136)	0.282	0.131	0.325	0.332	<b>0.346</b>
Female civilian labor force participation rate	0.155	<b>0.750</b>	<b>0.526</b>	<b>(0.578)</b>	(0.236)	<u>(0.100)</u>	(0.142)	0.355	<b>0.345</b>	<b>0.366</b>
All civilian labor force participation rate	<u>0.023</u>	<b>0.737</b>	<b>0.563</b>	<b>(0.571)</b>	(0.215)	<u>0.049</u>	0.013	0.310	0.279	0.297
Employment rate for age group 15-24	-	-	0.502	-	<b>(0.450)</b>	-	-	<b>0.476</b>	-	-
Men's Employment Rate	-	-	<b>0.517</b>	-	(0.070)	-	-	0.293	-	-
Women's Employment Rate	-	-	0.434	-	(0.267)	-	-	0.350	-	-
Total Employment Rate	-	-	0.478	-	(0.178)	-	-	0.328	-	-

Table A.5.6 Correlation Coefficients between First Canonical Score and *Pseudo* score-with reference to France at Level 3's First Analysis

Variable	BE	DK	FR (C.1)	LU	NL	AT	CH	Mean for BE, DK, FR(C.1), LU, NL, AT and CH of Cluster 1	Mean for BE, DK, FR, LU, AT and CH of Cluster 1	Mean for BE and LU of Cluster 3
Investment	<b>-0.743</b>	<b>-0.57</b>	<b>-0.683</b>	-0.533	<b>-0.69</b>	<b>-0.609</b>	<b>-0.495</b>	<b>0.618</b>	<b>0.607</b>	<b>0.638</b>
Consumption	-0.327	-0.25	0.495	-0.618	<u>0.061</u>	-0.33	0.215	0.328	0.300	0.473
GDP	-0.149	-0.149	0.520	-0.502	-0.233	0.246	0.192	0.284	0.245	0.326
Government Net Lending	-0.25	0.188	0.261	-	0.222	0.295	-	0.243	0.239	0.250
Government Net Lending as a % of GDP	-0.265	0.187	0.257	-	0.218	0.299	-	0.245	0.242	0.265
Total Direct Taxes	<u>0.033</u>	-	0.372	-	0.381	<u>0.04</u>	-	0.206	0.151	<u>0.033</u>

Variable	BE	DK	FR (C.1)	LU	NL	AT	CH	Mean for BE, DK, FR(C.1), LU, NL, AT and CH of Cluster 1	Mean for BE, DK, FR, LU, AT and CH of Cluster 1	Mean for BE and LU of Cluster 3
Taxes on income and profits as a % of GDP	0.114	-0.422	<u>0.087</u>	0.414	0.51	<u>0.075</u>	<u>0.078</u>	0.243	0.269	0.264
Indirect Taxes	<u>-0.06</u>	-	0.458	-	<u>0.008</u>	0.24	-	0.192	<u>0.103</u>	<u>0.060</u>
Taxes on goods and services as a % of GDP	-0.162	<b>-0.444</b>	-0.151	-0.316	-0.471	<u>0.044</u>	<b>-0.411</b>	0.286	0.308	0.239
Total tax revenue as a % of GDP	<u>0.031</u>	-0.566	0.262	0.43	0.216	<u>-0.053</u>	<u>-0.103</u>	0.237	0.233	0.231
Social Security Contributions	-0.368	<u>-0.016</u>	0.384	-	<u>0.045</u>	-0.393	-	0.241	0.206	0.368
Social Benefits	0.128	-0.249	0.413	-	0.497	-0.125	-	0.282	0.250	0.128
Exports of goods and services	-0.563	-0.387	<b>0.667</b>	<b>-0.661</b>	-0.459	-0.432	-0.208	0.482	0.452	0.612
Imports of goods and services	<b>-0.625</b>	<b>-0.551</b>	<b>0.631</b>	<b>-0.687</b>	-0.531	<b>-0.658</b>	<u>-0.099</u>	<b>0.540</b>	<b>0.525</b>	<b>0.656</b>
Net exports of goods and services	-0.353	<u>-0.062</u>	-0.120	-0.179	-0.193	<u>-0.002</u>	-0.297	0.172	0.181	0.266
Trade in goods and services as a % of GDP	<u>0.007</u>	-0.355	0.138	-0.379	-0.494	-0.342	<u>-0.027</u>	0.249	0.267	0.193
Bilateral Exchange Rate	<b>0.657</b>	0.213	-0.277	0.12	<b>0.657</b>	0.108	0.123	0.308	0.313	0.389
Consumer Price Index	0.118	0.128	0.374	<u>0.087</u>	0.154	<u>-0.005</u>	0.165	0.147	0.110	<u>0.103</u>
Nominal Oil Price	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264
Real Oil Price	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116
Net Migration	-	-	-0.540	0.326	0.203	-	<b>-0.409</b>	0.370	0.313	0.326
Youth Population Share	0.278	0.191	<b>-0.669</b>	0.173	<b>0.563</b>	0.447	<b>0.399</b>	0.389	0.342	0.226
Male civilian labor force participation rate	-0.619	0.2	-0.443	-0.615	-0.442	-0.154	-0.193	0.381	0.371	0.617
Female civilian labor force participation rate	-0.6	<b>0.5</b>	0.548	<b>-0.721</b>	-0.447	<b>-0.68</b>	-0.355	<b>0.550</b>	<b>0.551</b>	<b>0.661</b>
All civilian labor force participation rate	<b>-0.655</b>	0.386	<u>0.020</u>	<b>-0.69</b>	-0.475	<b>-0.494</b>	-0.293	0.430	0.499	<b>0.673</b>
Employment rate for age group 15-24	-	-	-0.591	-	<b>-0.585</b>	-	-	<b>0.588</b>	<b>0.585</b>	-
Men's Employment Rate	-	-	-0.461	-	-0.358	-	-	0.410	0.358	-

Variable	BE	DK	FR (C.1)	LU	NL	AT	CH	Mean for BE, DK, FR(C.1), LU, NL, AT and CH of Cluster 1	Mean for BE, DK, FR, LU, AT and CH of Cluster 1	Mean for BE and LU of Cluster 3
Women's Employment Rate	-	-	0.451	-	-0.428	-	-	0.439	0.428	-
Total Employment Rate	-	-	-0.197	-	-0.398	-	-	0.297	0.398	-

1. France's market and non-market services sectors are in Cluster 1 (C.1).

Table A.5.7 Correlation Coefficients between First Canonical Score and *Pseudo* score-with reference to Netherlands at Level 3's First Analysis

Variable	BE	DK	FR	LU	NL (C.1)	AT	CH	Mean for BE, DK, FR, LU, NL(C.1), AT and CH of Cluster 1	Mean for BE, DK, FR, LU, AT and CH of Cluster 1	Mean for BE and LU of Cluster 3
Investment	0.451	0.268	0.327	-0.026	0.275	0.546	0.18	0.296	0.300	0.239
Consumption	-0.241	-0.331	-0.052	-0.576	0.501	-0.22	0.077	0.285	0.250	0.409
GDP	0.181	0.083	0.238	-0.462	0.570	0.407	0.397	0.334	0.295	0.322
Government Net Lending	-0.461	0.35	0.029	-	0.378	-0.208	-	0.285	0.262	0.461
Government Net Lending as a % of GDP	-0.461	0.352	0.027	-	0.344	-0.204	-	0.278	0.261	0.461
Total Direct Taxes	-0.392	-	-0.344	-	0.223	-0.484	-	0.361	0.407	0.392
Taxes on income and profits as a % of GDP	-0.406	-0.616	-0.004	-0.477	-0.506	-0.491	-0.453	0.422	0.408	0.442
Indirect Taxes	-0.03	-	0.025	-	0.574	0.282	-	0.228	0.112	0.030
Taxes on goods and services as a % of GDP	0.403	0.03	-0.047	0.453	0.543	0.481	-0.024	0.283	0.240	0.428
Total tax revenue as a % of GDP	-0.185	-0.455	0.174	-0.165	-0.090	-0.182	-0.189	0.206	0.225	0.175
Social Security Contributions	-0.241	-0.044	0.012	-	0.525	-0.363	-	0.237	0.165	0.241
Social Benefits	-0.392	-	-0.344	-	0.212	-0.484	-	0.358	0.407	0.392
Exports of goods and services	0.097	-0.018	0.156	-0.397	0.702	-0.048	0.278	0.242	0.166	0.247

Variable	BE	DK	FR	LU	NL (C.1)	AT	CH	Mean for BE, DK, FR, LU, NL(C.1), AT and CH of Cluster 1	Mean for BE, DK, FR, LU, AT and CH of Cluster 1	Mean for BE and LU of Cluster 3
Imports of goods and services	-0.057	-0.222	<b>0.556</b>	<b>-0.569</b>	<b>0.684</b>	-0.341	<b>0.308</b>	0.391	0.342	0.313
Net exports of goods and services	-0.283	0.273	<u>0.093</u>	-0.28	<u>0.084</u>	<b>0.614</b>	0.264	0.270	0.301	0.282
Trade in goods and services as a % of GDP	0.223	<u>0.077</u>	-0.163	<u>-0.078</u>	0.305	<b>0.513</b>	0.215	0.225	0.212	0.151
Bilateral Exchange Rate	0.123	<u>-0.055</u>	0.208	-0.126	-0.378	0.123	0.21	0.175	0.141	0.125
Consumer Price Index	-0.173	-0.134	-0.151	-0.195	0.528	<b>-0.539</b>	<u>0.015</u>	0.248	0.201	0.184
Nominal Oil Price	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264
Real Oil Price	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116
Net Migration	-	-	-0.244	0.225	<u>-0.100</u>	-	0.16	0.182	0.210	0.225
Youth Population Share	<b>-0.453</b>	<b>-0.475</b>	<b>-0.561</b>	<b>-0.471</b>	<b>-0.636</b>	-0.193	<b>-0.443</b>	<b>0.462</b>	<b>0.433</b>	<b>0.462</b>
Male civilian labor force participation rate	<u>0.072</u>	<b>0.474</b>	0.447	-0.419	0.173	0.335	0.254	0.311	0.334	0.246
Female civilian labor force participation rate	<u>0.072</u>	0.474	0.447	-0.419	0.476	0.335	0.254	0.354	0.334	0.246
All civilian labor force participation rate	0.234	<b>0.579</b>	<b>0.465</b>	-0.427	0.465	0.29	0.227	0.384	0.370	0.331
Employment rate for age group 15-24	-	-	<b>0.584</b>	-	0.254	-	-	<b>0.419</b>	<b>0.584</b>	-
Men's Employment Rate	-	-	0.353	-	0.048	-	-	0.200	0.353	-
Women's Employment Rate	-	-	0.41	-	0.486	-	-	<b>0.448</b>	<b>0.410</b>	-
Total Employment Rate	-	-	0.383	-	0.328	-	-	0.355	0.383	-

1. Netherlands' marketing services sectors are in Cluster 1 (C.1).

Table A.5.8 Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Belgium at Level 3's First Analysis

Variable	BE (C.1)	DK	DE	FR	NL	AT	CH	Mean for BE(C.1), AT, CH, DK, FR, NL and DE of clusters 1 and 2	Mean for BE(C.1), AT, CH, DK, FR and NL of Cluster 1	Mean for DE, FR and NL of Cluster 2
Investment	<u>-0.061</u>	<u>-0.079</u>	-0.18	<u>-0.014</u>	<b>-0.509</b>	-0.41	0.159	0.202	0.205	0.234
Consumption	<u>-0.039</u>	-0.197	<u>0.052</u>	0.464	<b>-0.613</b>	0.323	0.132	0.26	0.295	0.376
GDP	0.103	0.292	0.107	<b>0.645</b>	-0.286	-0.301	-0.469	0.315	0.349	0.346
Government Net Lending	<u>-0.029</u>	0.337	-	<u>-0.007</u>	-0.157	0.194	-	0.145	0.145	<u>0.082</u>
Government Net Lending as a % of GDP	<u>-0.024</u>	0.335	-	<u>-0.009</u>	-0.161	0.194	-	0.145	0.145	<u>0.085</u>
Total Direct Taxes	-0.172	-	0.452	0.473	0.043	<u>-0.074</u>	-	0.243	0.19	0.323
Taxes on income and profits as a % of GDP	<u>0.057</u>	0.153	<u>-0.042</u>	0.15	0.205	-0.08	0.4	0.155	0.174	0.132
Indirect Taxes	-0.211	0.349	-	0.587	-0.313	0.222	-	0.336	0.336	<b>0.45</b>
Taxes on goods and services as a % of GDP	<b>-0.483</b>	-0.133	<b>-0.692</b>	-0.588	-0.28	-0.145	-0.38	0.386	0.335	<b>0.52</b>
Total tax revenue as a % of GDP	-0.359	0.116	-0.401	-0.243	0.497	-0.271	0.159	0.292	0.274	0.38
Social Security Contributions	-0.237	-0.153	-	0.574	0.192	-0.489	-	0.329	0.329	0.383
Social Benefits	-0.347	0.132	-	0.492	-0.101	-0.508	-	0.316	0.316	0.297
Exports of goods and services	0.123	0.159	-	<u>-0.094</u>	-0.319	0.401	<b>0.544</b>	0.273	0.273	0.207
Imports of goods and services	0.179	0.303	-	<u>-0.046</u>	-0.297	0.195	0.315	0.223	0.223	0.172
Net exports of goods and services	<u>0.008</u>	<b>0.513</b>	-	-0.336	0.147	0.101	<b>0.556</b>	0.277	0.277	0.242
Trade in goods and services as a % of GDP	-0.152	<b>-0.555</b>	<b>-0.486</b>	<b>-0.687</b>	<b>-0.608</b>	<b>-0.629</b>	-0.391	<b>0.501</b>	<b>0.504</b>	<b>0.594</b>
Bilateral Exchange Rate	<b>-0.477</b>	<b>-0.61</b>	<b>-0.546</b>	<b>-0.685</b>	<u>-0.005</u>	<b>-0.676</b>	<b>-0.69</b>	<b>0.527</b>	<b>0.524</b>	0.412
Consumer Price Index	-0.347	-	0.359	<b>0.616</b>	-0.496	<b>-0.592</b>	-0.455	<b>0.478</b>	<b>0.501</b>	<b>0.49</b>
Nominal Oil Price	<b>0.379</b>	0.379	0.379	0.379	0.379	0.379	0.379	0.379	0.379	0.379
Real Oil Price	<b>0.439</b>	0.439	0.439	0.439	0.439	0.439	0.439	0.439	<b>0.439</b>	0.439
Net Migration	-	-	0.16	-	0.225	-	-0.244	0.21	0.235	0.193
Youth Population Share	<u>-0.042</u>	<b>0.531</b>	<b>0.553</b>	0.114	0.499	<b>0.683</b>	<b>0.669</b>	<b>0.442</b>	0.423	0.389

Variable	BE (C.1)	DK	DE	FR	NL	AT	CH	Mean for BE(C.1), AT, CH, DK, FR, NL and DE of clusters 1 and 2	Mean for BE(C.1), AT, CH, DK, FR and NL of Cluster 1	Mean for DE, FR and NL of Cluster 2
Male civilian labor force participation rate	0.355	0.256	0.367	-0.228	0.382	-0.294	0.215	0.3	0.288	0.326
Female civilian labor force participation rate	-0.337	0.344	-0.109	-0.531	-0.652	0.005	0.06	0.291	0.322	0.431
All civilian labor force participation rate	-0.088	0.36	0.159	-0.4	-0.181	-0.178	0.139	0.215	0.224	0.247
Employment rate for age group 15-24	-	-	-	-	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-	-	-	-	-
Women's Employment Rate	-	-	-	-	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-	-	-	-	-

1. Belgium's construction and market services sectors are in Cluster 1(C.1).

Table A.5.4.9 Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Luxembourg at Level 3's First Analysis

Variable	DK	DE	FR	NL	AT	CH	BE	Mean for AT, CH, DK, DE, FR, NL and BE of clusters 1 and 2	Mean for AT, CH, DK, FR and NL of Cluster 1	Mean for DE, FR and NL of Cluster 2
Investment	0.492	0.495	0.521	0.350	0.407	0.528	0.548	0.477	0.460	0.456
Consumption	(0.091)	0.115	0.218	(0.304)	0.262	0.104	0.069	0.166	0.196	0.212
GDP	(0.032)	(0.037)	0.008	(0.149)	(0.173)	(0.234)	(0.094)	0.104	0.119	0.065
Government Net Lending	-	-	-	-	-	-	-	-	-	-
Government Net Lending as a % of GDP	-	-	-	-	-	-	-	-	-	-
Total Direct Taxes	-	-	-	-	-	-	-	-	-	-



Variable	DK	DE	FR	NL	AT	CH	BE	Mean for AT, CH, DK, DE, FR, NL and BE of clusters 1 and 2	Mean for AT, CH, DK, FR and NL of Cluster 1	Mean for DE, FR and NL of Cluster 2
Taxes on income and profits as a % of GDP	0.367	0.307	0.391	0.388	0.239	0.483	0.453	0.375	0.374	0.362
Indirect Taxes	-	-	-	-	-	-	-	-	-	-
Taxes on goods and services as a % of GDP	(0.462)	(0.676)	(0.604)	(0.559)	(0.441)	(0.608)	(0.517)	0.553	0.535	0.613
Total tax revenue as a % of GDP	0.239	(0.055)	0.180	0.486	(0.005)	0.265	0.288	0.217	0.235	0.240
Social Security Contributions	-	-	-	-	-	-	-	-	-	-
Social Benefits	0.238	-	(0.034)	(0.069)	0.062	0.167	0.150	0.120	0.114	0.051
Exports of goods and services	0.045	-	(0.033)	(0.118)	0.149	0.230	0.000	0.096	0.115	0.076
Imports of goods and services	(0.033)	-	(0.163)	(0.244)	(0.127)	(0.036)	(0.175)	0.130	0.121	0.203
Net exports of goods and services	0.595	-	(0.400)	0.269	0.096	0.480	0.462	0.384	0.368	0.334
Trade in goods and services as a % of GDP	(0.360)	(0.425)	(0.423)	(0.496)	(0.661)	(0.272)	0.150	0.398	0.442	0.448
Bilateral Exchange Rate	(0.685)	-	(0.005)	(0.676)	(0.690)	(0.546)	(0.610)	0.535	0.520	0.341
Consumer Price Index	-	0.280	0.572	(0.509)	(0.578)	(0.459)	(0.189)	0.431	0.529	0.453
Nominal Oil Price	0.379	0.379	0.379	0.379	0.379	0.379	0.379	0.379	0.379	0.379
Real Oil Price	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439
Net Migration	-	(0.608)	0.280	-	(0.448)	(0.115)	-	0.363	0.281	0.444
Youth Population Share	0.345	0.541	(0.092)	0.337	0.637	0.540	(0.322)	0.402	0.390	0.323
Male civilian labor force participation rate	0.294	0.298	0.060	0.326	(0.037)	0.317	0.181	0.216	0.207	0.228
Female civilian labor force participation rate	0.306	0.200	0.079	0.014	0.256	0.270	0.236	0.194	0.185	0.098
All civilian labor force participation rate	0.342	0.289	0.081	0.194	0.115	0.326	0.237	0.226	0.211	0.188
Employment rate for age group 15-24	-	-	-	-	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-	-	-	-	-

Variable	DK	DE	FR	NL	AT	CH	BE	Mean for AT, CH, DK, DE, FR, NL and BE of clusters 1 and 2	Mean for AT, CH, DK, FR and NL of Cluster 1	Mean for DE, FR and NL of Cluster 2
Women's Employment Rate	-	-	-	-	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-	-	-	-	-

Table A.5.10 Correlation Coefficients between First Canonical Score and *Pseudo* score-with reference to Greece at Level 3's Second Analysis

Variable	ES	IE	IT	PT	FI	SE	NO	Mean for ES, IE, IT, PT, FI, SE and NO of clusters 1 and 3	Mean for ES, IE, IT, PT, SE, and NO of Cluster 1	Mean for FI, SE and NO of Cluster 3
Investment	0.267	<u>0.149</u>	0.393	<b>0.470</b>	0.226	0.325	<u>0.189</u>	0.288	0.264	<u>0.171</u>
Consumption	<b>0.419</b>	<u>0.034</u>	<b>0.588</b>	0.271	<u>0.127</u>	<b>0.380</b>	0.265	0.298	0.326	0.257
GDP	<u>(0.054)</u>	<u>(0.296)</u>	<u>0.177</u>	<u>(0.056)</u>	<u>0.027</u>	<u>0.045</u>	<u>0.020</u>	<u>0.096</u>	<u>0.108</u>	<u>0.031</u>
Government Net Lending	<u>(0.195)</u>	<b>0.448</b>	<u>(0.250)</u>	<u>(0.056)</u>	<u>(0.192)</u>	<u>(0.260)</u>	<u>(0.089)</u>	0.213	0.216	<u>0.181</u>
Government Net Lending as a % of GDP	<u>(0.227)</u>	<b>0.444</b>	<u>(0.310)</u>	<u>(0.096)</u>	<u>(0.194)</u>	<u>(0.265)</u>	<u>(0.118)</u>	0.236	0.243	0.192
Total Direct Taxes	0.408	0.350	<b>0.440</b>	0.394	<b>0.370</b>	0.249	<u>0.157</u>	<b>0.338</b>	<b>0.333</b>	0.258
Taxes on income and profits as a % of GDP	<u>0.162</u>	0.212	0.347	<u>0.116</u>	0.280	<u>0.162</u>	0.283	0.223	0.214	0.241
Indirect Taxes	<u>0.019</u>	<u>(0.175)</u>	<u>(0.160)</u>	<u>(0.042)</u>	<u>0.008</u>	<u>0.066</u>	<u>(0.031)</u>	<u>0.072</u>	<u>0.082</u>	<u>0.035</u>
Taxes on goods and services as a % of GDP	<u>0.077</u>	<u>(0.216)</u>	<u>(0.316)</u>	<u>(0.138)</u>	<u>(0.303)</u>	<u>(0.198)</u>	<u>(0.194)</u>	0.206	<u>0.190</u>	0.231
Total tax revenue as a % of GDP	0.416	0.324	<b>0.406</b>	0.221	<b>0.384</b>	0.293	<b>0.428</b>	<b>0.353</b>	<b>0.348</b>	<b>0.368</b>
Social Security Contributions	0.239	0.231	<u>0.188</u>	<b>0.558</b>	0.263	<u>0.185</u>	<u>0.183</u>	0.264	0.264	0.210
Social Benefits	0.205	<u>0.163</u>	0.192	0.320	<u>0.166</u>	<u>0.143</u>	<u>0.116</u>	<u>0.186</u>	<u>0.190</u>	<u>0.141</u>
Exports of goods and services	<u>(0.271)</u>	<u>(0.328)</u>	<u>0.013</u>	<u>(0.043)</u>	<u>(0.277)</u>	<u>(0.322)</u>	<u>(0.069)</u>	<u>0.189</u>	<u>0.174</u>	0.223
Imports of goods and services	<u>(0.347)</u>	<b>(0.420)</b>	<u>0.051</u>	<u>(0.273)</u>	<u>(0.213)</u>	<u>(0.267)</u>	<u>0.159</u>	0.247	0.253	0.213

Variable	ES	IE	IT	PT	FI	SE	NO	Mean for ES, IE, IT, PT, FI, SE and NO of clusters 1 and 3	Mean for ES, IE, IT, PT, SE, and NO of Cluster 1	Mean for FI, SE and NO of Cluster 3
Net exports of goods and services	<u>(0.128)</u>	0.415	<u>0.180</u>	(0.267)	0.271	(0.221)	<b>0.335</b>	0.260	0.258	0.276
Trade in goods and services as a % of GDP	<b>(0.512)</b>	<b>(0.602)</b>	(0.400)	<b>(0.457)</b>	<b>(0.548)</b>	<b>(0.440)</b>	(0.301)	<b>0.466</b>	<b>0.452</b>	<b>0.430</b>
Bilateral Exchange Rate	<u>(0.138)</u>	<u>(0.104)</u>	<u>(0.185)</u>	<u>(0.014)</u>	<u>0.046</u>	<u>(0.083)</u>	<u>(0.064)</u>	<u>0.091</u>	<u>0.098</u>	<u>0.064</u>
Consumer Price Index	<u>0.105</u>	<u>0.162</u>	<u>0.107</u>	0.395	<u>0.134</u>	<u>0.132</u>	<u>0.107</u>	<u>0.163</u>	<u>0.168</u>	<u>0.124</u>
Nominal Oil Price	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198
Real Oil Price	<u>0.179</u>	<u>0.179</u>	<u>0.179</u>	<u>0.179</u>	<u>0.179</u>	<u>0.179</u>	<u>0.179</u>	<u>0.179</u>	<u>0.179</u>	<u>0.179</u>
Net Migration	0.307	-	<u>0.122</u>	<u>0.134</u>	<b>0.304</b>	<b>0.587</b>	<u>0.047</u>	0.250	0.239	<b>0.313</b>
Youth Population Share	<b>0.569</b>	<u>(0.068)</u>	<b>0.702</b>	<b>0.563</b>	<u>0.045</u>	<b>0.354</b>	<b>0.589</b>	<b>0.413</b>	<b>0.474</b>	<b>0.329</b>
Male civilian labor force participation rate	<u>(0.019)</u>	<u>0.115</u>	0.266	0.232	0.193	<u>0.054</u>	<b>(0.312)</b>	<u>0.170</u>	<u>0.166</u>	<u>0.186</u>
Female civilian labor force participation rate	<b>(0.441)</b>	<u>(0.184)</u>	<u>0.021</u>	<u>(0.085)</u>	<u>(0.021)</u>	<u>0.026</u>	<u>(0.074)</u>	<u>0.122</u>	<u>0.139</u>	<u>0.040</u>
All civilian labor force participation rate	(0.356)	<u>(0.108)</u>	<u>0.141</u>	<u>0.089</u>	<u>0.095</u>	<u>0.096</u>	<u>(0.144)</u>	<u>0.147</u>	<u>0.156</u>	<u>0.111</u>
Employment rate for age group 15-24	-	-	-	-	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-	-	-	-	-
Women's Employment Rate	-	-	-	-	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-	-	-	-	-

Table A.5.11 Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Finland at Level 3's Second Analysis

Variable	GR	ES	IE	IT	PT	SE (C.1)	NO (C.1)	Mean for GR, ES, IE, IT, PT, SE and NO of clusters 1 and 2	Mean for ES, IE, IT, PT, SE, and NO of Cluster 1
Investment	0.522	<u>0.170</u>	0.370	0.446	0.427	0.239	<b>(0.661)</b>	0.405	0.385
Consumption	0.428	0.579	0.282	0.509	0.534	<b>0.657</b>	0.466	0.494	0.505
GDP	0.541	0.351	<u>(0.115)</u>	0.497	0.524	0.373	0.289	0.384	0.358
Government Net Lending	<u>(0.057)</u>	<u>0.036</u>	<u>(0.084)</u>	<u>0.127</u>	<u>0.166</u>	<u>0.063</u>	<u>(0.106)</u>	<u>0.091</u>	<u>0.097</u>
Government Net Lending as a % of GDP	<u>(0.005)</u>	<u>0.019</u>	<u>(0.108)</u>	<u>0.120</u>	<u>0.162</u>	<u>0.036</u>	<u>(0.113)</u>	<u>0.080</u>	<u>0.093</u>
Total Direct Taxes	<u>(0.200)</u>	<u>0.135</u>	0.254	0.312	<u>(0.244)</u>	0.519	0.369	0.290	0.305
Taxes on income and profits as a % of GDP	<u>0.047</u>	<u>0.046</u>	0.482	0.385	<u>(0.116)</u>	0.279	0.303	0.237	0.269
Indirect Taxes	<u>0.056</u>	<u>(0.303)</u>	<u>(0.356)</u>	<u>(0.092)</u>	<u>(0.298)</u>	0.338	0.514	0.279	0.317
Taxes on goods and services as a % of GDP	0.451	<u>(0.503)</u>	<u>(0.396)</u>	<u>(0.156)</u>	<u>0.018</u>	<u>0.008</u>	0.364	0.271	0.241
Total tax revenue as a % of GDP	0.452	<u>(0.105)</u>	<u>0.178</u>	0.570	<u>0.016</u>	0.359	0.517	0.314	0.291
Social Security Contributions	<u>(0.505)</u>	0.387	<u>(0.106)</u>	0.438	<u>(0.312)</u>	0.322	0.512	0.369	0.346
Social Benefits	<u>(0.656)</u>	<u>(0.503)</u>	<u>(0.391)</u>	<u>(0.597)</u>	<b>(0.661)</b>	0.258	<u>(0.124)</u>	0.456	0.422
Exports of goods and services	<b>0.726</b>	0.401	<u>0.180</u>	<b>0.638</b>	0.376	0.529	<b>0.549</b>	0.486	0.446
Imports of goods and services	<b>0.722</b>	0.326	<u>0.155</u>	0.538	0.394	<b>0.689</b>	<b>0.642</b>	0.495	0.457
Net exports of goods and services	<u>(0.701)</u>	<u>(0.530)</u>	<b>(0.698)</b>	0.286	<b>(0.694)</b>	<u>(0.455)</u>	<b>(0.711)</b>	<b>0.582</b>	<b>0.562</b>
Trade in goods and services as a % of GDP	0.287	<b>(0.637)</b>	<b>(0.587)</b>	<u>(0.528)</u>	<u>(0.468)</u>	<u>(0.560)</u>	<u>0.135</u>	0.457	0.486
Bilateral Exchange Rate	<u>(0.672)</u>	<b>(0.765)</b>	<b>(0.757)</b>	<b>(0.763)</b>	<b>(0.760)</b>	<b>(0.638)</b>	<u>(0.505)</u>	<b>0.694</b>	<b>0.698</b>
Consumer Price Index	<u>(0.483)</u>	<u>(0.587)</u>	<b>(0.639)</b>	<b>(0.642)</b>	<u>(0.617)</u>	<u>(0.119)</u>	<u>(0.463)</u>	<b>0.507</b>	<b>0.511</b>
Nominal Oil Price	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>
Real Oil Price	<u>(0.162)</u>	<u>(0.162)</u>	<u>(0.162)</u>	<u>(0.162)</u>	<u>(0.162)</u>	<u>(0.162)</u>	<u>(0.162)</u>	<u>0.162</u>	<u>0.162</u>
Net Migration	<u>(0.674)</u>	<b>(0.593)</b>	-	<b>(0.675)</b>	<b>0.655</b>	<b>(0.612)</b>	<u>(0.294)</u>	<b>0.584</b>	<b>0.566</b>
Youth Population Share	<u>(0.314)</u>	<u>(0.173)</u>	<u>(0.361)</u>	<u>(0.241)</u>	<u>(0.190)</u>	<u>(0.602)</u>	<u>(0.400)</u>	0.326	0.328
Male civilian labor force participation	<u>(0.291)</u>	0.305	<u>(0.100)</u>	0.624	0.363	0.363	<u>0.133</u>	0.311	0.315

Variable	GR	ES	IE	IT	PT	SE (C.1)	NO (C.1)	Mean for GR, ES, IE, IT, PT, SE and NO of clusters 1 and 2	Mean for ES, IE, IT, PT, SE, and NO of Cluster 1
rate									
Female civilian labor force participation rate	<b>(0.724)</b>	(0.294)	<u>0.093</u>	<u>0.083</u>	<u>(0.133)</u>	0.215	<u>(0.051)</u>	0.227	<u>0.145</u>
All civilian labor force participation rate	<b>(0.711)</b>	<u>(0.109)</u>	<u>0.044</u>	0.403	<u>0.157</u>	0.368	<u>0.060</u>	0.264	0.190
Employment rate for age group 15-24	-	0.331	-	0.297	0.397	<u>(0.001)</u>	<u>0.177</u>	0.240	0.240
Men's Employment Rate	-	<b>0.589</b>	-	0.417	0.505	0.419	0.280	0.442	0.442
Women's Employment Rate	-	<u>0.136</u>	-	<u>0.183</u>	<u>(0.076)</u>	<u>0.102</u>	<u>0.056</u>	<u>0.111</u>	<u>0.111</u>
Total Employment Rate	-	0.444	-	0.376	0.336	0.326	0.210	0.338	0.338

1. Both Sweden's and Norway's market and non-market services sectors are in Cluster 1(C.1).

Table A.5.12 Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Sweden at Level 3's Second Analysis

Variable	GR	ES	IE	IT	PT	NO (C.1)	SE (C.1)	Mean for GR, ES, IE, IT, PT, FI, SE and NO of clusters 1 and 2	Mean for ES, IE, IT, PT, SE and NO of Cluster 1
Investment	<b>0.724</b>	0.431	<b>0.536</b>	<b>0.616</b>	<b>0.588</b>	<b>-0.4</b>	0.481	<b>0.539</b>	<b>0.509</b>
Consumption	-0.312	<u>0.016</u>	-0.345	-0.329	<u>0.163</u>	<u>-0.116</u>	0.394	0.239	0.227
GDP	0.591	0.215	-0.27	<b>0.576</b>	0.552	<u>0.177</u>	<b>0.678</b>	0.437	0.411
Government Net Lending	-0.221	-0.225	-0.228	-0.214	-0.212	-0.262	-0.211	0.225	0.225
Government Net Lending as a % of GDP	-0.216	-0.224	-0.227	-0.213	-0.21	-0.252	-0.214	0.222	0.223
Total Direct Taxes	-0.413	-0.281	<u>-0.152</u>	<u>-0.088</u>	-0.44	<u>-0.011</u>	<b>0.663</b>	0.293	0.272
Taxes on income and profits as a % of GDP	<u>-0.163</u>	<u>-0.188</u>	0.264	0.196	-0.273	<u>-0.045</u>	0.219	<u>0.193</u>	<u>0.198</u>
Indirect Taxes	<u>-0.161</u>	<b>-0.607</b>	<b>-0.465</b>	-0.454	-0.565	<u>0.099</u>	0.519	0.410	<b>0.451</b>
Taxes on goods and services as a % of GDP	0.472	-0.427	<u>-0.186</u>	<u>-0.046</u>	<u>0.044</u>	0.376	0.289	0.263	0.228

Variable	GR	ES	IE	IT	PT	NO (C.1)	SE (C.1)	Mean for GR, ES, IE, IT, PT, FI, SE and NO of clusters 1 and 2	Mean for ES, IE, IT, PT, SE and NO of Cluster 1
Total tax revenue as a % of GDP	0.24	-0.424	<u>-0.149</u>	0.266	-0.285	<u>0.035</u>	<u>0.181</u>	0.226	0.223
Social Security Contributions	-0.512	<u>0.033</u>	-0.266	<u>0.085</u>	-0.367	0.286	<b>0.609</b>	0.308	0.274
Social Benefits	-0.624	-0.562	<b>-0.436</b>	<b>-0.609</b>	<b>-0.617</b>	<b>-0.423</b>	0.516	<b>0.541</b>	<b>0.527</b>
Exports of goods and services	0.685	<u>-0.012</u>	-0.204	0.493	<u>0.038</u>	0.375	0.451	0.323	0.262
Imports of goods and services	0.603	<u>-0.116</u>	-0.303	<u>0.148</u>	<u>0.09</u>	0.329	0.344	0.276	0.222
Net exports of goods and services	-0.202	-0.525	-0.196	-0.208	-0.199	<u>-0.127</u>	-0.202	0.237	0.243
Trade in goods and services as a % of GDP	0.534	<u>-0.189</u>	<u>0.087</u>	<u>0.158</u>	<u>0.029</u>	<b>0.506</b>	0.534	0.291	0.250
Bilateral Exchange Rate	-0.426	-0.357	<u>-0.072</u>	-0.537	-0.556	0.327	0.460	0.391	0.385
Consumer Price Index	-0.515	<b>-0.608</b>	<b>-0.489</b>	<b>-0.641</b>	<b>-0.643</b>	-0.228	0.571	<b>0.528</b>	<b>0.530</b>
Nominal Oil Price	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>
Real Oil Price	<u>-0.162</u>	<u>-0.162</u>	<u>-0.162</u>	<u>-0.162</u>	<u>-0.162</u>	<u>-0.162</u>	<u>-0.162</u>	<u>0.162</u>	<u>0.162</u>
Net Migration	<b>0.745</b>	<b>0.736</b>	-	-0.343	-0.242	<u>0.064</u>	<b>0.710</b>	<b>0.473</b>	0.419
Youth Population Share	0.34	0.412	0.383	0.356	0.444	<b>0.494</b>	0.239	0.381	0.388
Male civilian labor force participation rate	-0.462	<u>-0.058</u>	-0.343	0.489	<u>0.177</u>	<u>-0.139</u>	-0.255	0.275	0.243
Female civilian labor force participation rate	<b>-0.716</b>	-0.33	<u>0.049</u>	<u>0.019</u>	-0.223	<u>-0.156</u>	0.448	0.277	0.204
All civilian labor force participation rate	<b>-0.705</b>	-0.246	<u>-0.117</u>	0.325	<u>-0.005</u>	<u>-0.135</u>	<u>0.110</u>	0.235	<u>0.156</u>
Employment rate for age group 15-24	-	0.475	-	<b>0.425</b>	<b>0.565</b>	0.201	<u>0.032</u>	0.340	0.340
Men's Employment Rate	-	<b>0.595</b>	-	0.341	0.499	<u>0.022</u>	<u>-0.005</u>	0.292	0.292
Women's Employment Rate	-	<u>0.118</u>	-	<u>0.184</u>	<u>-0.172</u>	<u>0.004</u>	0.307	<u>0.157</u>	<u>0.157</u>
Total Employment Rate	-	0.39	-	0.337	0.257	<u>0.028</u>	<u>0.136</u>	0.230	0.230

1. Both Sweden's and Norway's market and non-market services sectors are in Cluster 1(C.1).

Table A.5.13 Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Norway at Level 3's Second Analysis

Variable	GR	ES	IE	IT	PT	SE (C.1)	NO (C.1)	Mean for GR, ES, IE, IT, PT, FI, SE and NO of clusters 1 and 2	Mean for ES, IE, IT, PT, SE and NO of Cluster 1
Investment	0.583	0.391	0.486	0.48	0.531	<b>0.425</b>	-0.290	0.455	0.434
Consumption	<u>-0.12</u>	<u>0.142</u>	-0.252	<u>-0.024</u>	0.234	<u>0.13</u>	0.325	<u>0.175</u>	<u>0.184</u>
GDP	0.242	<u>-0.057</u>	-0.352	<u>0.143</u>	0.368	<u>-0.158</u>	0.430	0.250	0.251
Government Net Lending	0.251	0.274	<u>-0.148</u>	0.3	0.323	<u>0.183</u>	0.332	0.259	0.260
Government Net Lending as a % of GDP	0.263	0.276	<u>-0.141</u>	0.302	0.327	0.19	0.313	0.259	0.258
Total Direct Taxes	-0.372	<u>-0.187</u>	<u>-0.112</u>	<u>-0.029</u>	-0.38	<u>0.038</u>	<b>0.600</b>	0.245	0.224
Taxes on income and profits as a % of GDP	<u>-0.132</u>	<u>-0.1</u>	0.301	0.227	-0.227	<u>0.051</u>	0.251	<u>0.184</u>	<u>0.193</u>
Indirect Taxes	<u>-0.19</u>	<b>-0.613</b>	<b>-0.67</b>	-0.482	-0.531	<u>-0.081</u>	<b>0.576</b>	0.449	<b>0.492</b>
Taxes on goods and services as a % of GDP	0.324	<b>-0.624</b>	-0.49	-0.442	-0.261	-0.334	<u>-0.154</u>	0.376	0.384
Total tax revenue as a % of GDP	0.216	-0.403	<u>-0.187</u>	0.311	-0.366	<u>-0.018</u>	0.207	0.244	0.249
Social Security Contributions	<b>-0.613</b>	-0.253	<b>-0.52</b>	-0.191	-0.49	-0.243	0.476	0.398	0.362
Social Benefits	<b>-0.593</b>	-0.279	-0.334	<b>-0.549</b>	-0.564	<b>0.422</b>	<b>0.594</b>	<b>0.476</b>	0.457
Exports of goods and services	0.379	-0.298	-0.368	<u>-0.032</u>	-0.226	-0.338	0.334	0.282	0.266
Imports of goods and services	0.498	-0.289	-0.461	-0.197	<u>-0.098</u>	-0.263	0.241	0.292	0.258
Net exports of goods and services	<u>-0.142</u>	-0.425	<u>-0.089</u>	<u>0.07</u>	<u>-0.135</u>	-0.232	-0.258	<u>0.193</u>	0.202
Trade in goods and services as a % of GDP	0.307	<b>-0.664</b>	<b>-0.598</b>	<b>-0.511</b>	<b>-0.747</b>	<b>-0.504</b>	<u>0.036</u>	<b>0.481</b>	<b>0.510</b>
Bilateral Exchange Rate	-0.59	<b>-0.574</b>	<b>-0.655</b>	<b>-0.61</b>	<b>-0.694</b>	-0.324	0.477	<b>0.561</b>	<b>0.556</b>
Consumer Price Index	-0.463	-0.521	-0.52	<b>-0.602</b>	<b>-0.6</b>	0.232	<b>0.635</b>	<b>0.510</b>	<b>0.518</b>
Nominal Oil Price	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>	<u>0.046</u>
Real Oil Price	<u>-0.162</u>	<u>-0.162</u>	<u>-0.162</u>	<u>-0.162</u>	<u>-0.162</u>	<u>-0.162</u>	<u>-0.162</u>	<u>0.162</u>	<u>0.162</u>
Net Migration	0.582	<u>-0.025</u>	-	-0.28	<b>-0.655</b>	0.199	<u>-0.054</u>	0.299	0.243
Youth Population Share	<u>0.133</u>	0.253	<u>0.141</u>	0.201	0.274	<b>-0.494</b>	<u>-0.056</u>	0.222	0.237
Male civilian labor force participation rate	-0.339	<u>0.143</u>	-0.201	0.427	0.242	<u>0.145</u>	<u>-0.103</u>	0.229	0.210

Variable	GR	ES	IE	IT	PT	SE (C.1)	NO (C.1)	Mean for GR, ES, IE, IT, PT, FI, SE and NO of clusters 1 and 2	Mean for ES, IE, IT, PT, SE and NO of Cluster 1
Female civilian labor force participation rate	<b>-0.741</b>	-0.339	<u>0.164</u>	<u>0.141</u>	<u>-0.107</u>	<u>0.157</u>	0.429	0.297	0.223
All civilian labor force participation rate	<b>-0.731</b>	-0.2	<u>-0.006</u>	0.351	<u>0.109</u>	<u>0.138</u>	0.269	0.258	<u>0.179</u>
Employment rate for age group 15-24	-	0.225	-	0.266	0.239	<u>-0.167</u>	-0.250	0.229	0.229
Men's Employment Rate	-	0.42	-	0.343	0.342	<u>-0.009</u>	<u>-0.028</u>	0.228	0.228
Women's Employment Rate	-	<u>0.143</u>	-	0.198	<u>-0.173</u>	<u>0.009</u>	0.269	<u>0.158</u>	<u>0.158</u>
Total Employment Rate	-	0.345	-	0.32	<u>0.178</u>	<u>-0.016</u>	<u>0.130</u>	<u>0.198</u>	<u>0.198</u>

1. Both Sweden's and Norway's market and non-market services sectors are in Cluster 1(C.1).

Table A.5.14 Correlation Coefficients between First Canonical Score and *Pseudo* score-with reference to Austria at Level 4's First Analysis

Variable	DK	CH	FR	BE	Mean for DK, CH, FR and BE of Cluster 2, 3, and 4	Mean for DK and BE of Cluster 3	Mean for DK, FR and BE of Cluster 2
Investment	(0.282)	<b>(0.719)</b>	<b>(0.842)</b>	(0.403)	0.562	0.343	0.509
Consumption	<b>0.566</b>	0.518	<u>0.118</u>	0.620	0.455	0.593	0.435
GDP	<b>(0.632)</b>	<b>(0.601)</b>	(0.774)	(0.707)	<b>0.679</b>	<b>0.669</b>	<b>0.704</b>
Government Net Lending	<u>0.119</u>	-	0.611	<u>(0.061)</u>	0.264	<u>0.090</u>	0.264
Government Net Lending as a % of GDP	<u>0.123</u>	-	0.656	<u>(0.061)</u>	0.280	<u>0.092</u>	0.280
Total Direct Taxes	-	-	(0.764)	(0.291)	0.527	0.291	0.527
Taxes on income and profits as a % of GDP	(0.542)	<b>(0.572)</b>	(0.571)	(0.378)	0.515	0.460	0.497
Indirect Taxes	<u>(0.138)</u>	-	(0.359)	<u>0.027</u>	<u>0.175</u>	<u>0.083</u>	<u>0.175</u>
Taxes on goods and services as a % of GDP	0.381	<u>0.125</u>	0.300	<u>(0.076)</u>	<u>0.220</u>	<u>0.228</u>	0.252
Total tax revenue as a % of GDP	<b>(0.619)</b>	(0.400)	(0.698)	(0.682)	0.600	0.651	0.666
Social Security Contributions	(0.549)	-	<b>(0.860)</b>	<b>(0.828)</b>	<b>0.746</b>	<b>0.689</b>	<b>0.746</b>
Social Benefits	(0.341)	-	(0.661)	0.448	0.483	0.395	0.483



Variable	DK	CH	FR	BE	Mean for DK, CH, FR and BE of Cluster 2, 3, and 4	Mean for DK and BE of Cluster 3	Mean for DK, FR and BE of Cluster 2
Exports of goods and services	(0.116)	(0.448)	0.721	0.627	0.478	0.372	0.488
Imports of goods and services	0.415	(0.161)	0.515	0.668	0.440	0.541	0.533
Net exports of goods and services	0.119	(0.206)	0.059	(0.351)	0.184	0.235	0.176
Trade in goods and services as a % of GDP	(0.374)	(0.408)	(0.127)	(0.705)	0.404	0.540	0.402
Bilateral Exchange Rate	(0.859)	0.290	(0.840)	(0.855)	0.711	0.857	0.851
Consumer Price Index	-	(0.114)	(0.824)	(0.876)	0.605	0.876	0.850
Nominal Oil Price	(0.088)	(0.088)	(0.088)	(0.088)	(0.088)	(0.088)	(0.088)
Real Oil Price	(0.244)	(0.244)	(0.244)	(0.244)	(0.244)	(0.244)	(0.244)
Net Migration	-	-	-	-	-	-	-
Youth Population Share	0.036	0.545	0.379	0.796	0.439	0.416	0.404
Male civilian labor force participation rate	0.286	(0.092)	0.695	0.510	0.396	0.398	0.497
Female civilian labor force participation rate	(0.185)	(0.269)	0.308	0.358	0.280	0.271	0.284
All civilian labor force participation rate	(0.006)	(0.182)	0.587	0.562	0.334	0.284	0.385
Employment rate for age group 15-24	-	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-	-
Women's Employment Rate	-	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-	-

Table A.5.15 Correlation Coefficients between First Canonical Score and *Pseudo* score-with reference to the Netherlands at Level 4's First Analysis

Variable	DK	CH	FR	BE	Mean for DK, CH, FR, and BE of Cluster 2, 3, and 4.	Mean for DK and BE of Cluster 3.	Mean for DK, FR and BE of Cluster 2.
Investment	(0.005)	(0.740)	(0.722)	0.416	0.471	0.372	0.381
Consumption	(0.020)	(0.474)	(0.735)	(0.534)	0.441	0.277	0.430
GDP	(0.114)	0.457	(0.704)	(0.111)	0.346	0.112	0.309
Government Net Lending	0.076	-	(0.175)	(0.174)	0.142	0.125	0.142
Government Net Lending as a % of GDP	0.083	-	(0.097)	(0.171)	0.117	0.127	0.117

Variable	DK	CH	FR	BE	Mean for DK, CH, FR, and BE of Cluster 2, 3, and 4.	Mean for DK and BE of Cluster 3.	Mean for DK, FR and BE of Cluster 2.
Total Direct Taxes	-	-	(0.418)	(0.039)	0.228	0.039	0.228
Taxes on income and profits as a % of GDP	0.130	0.163	0.152	0.279	0.181	0.205	0.187
Indirect Taxes	(0.329)	-	(0.510)	(0.239)	0.360	0.284	0.360
Taxes on goods and services as a % of GDP	0.708	0.429	0.626	0.222	0.496	0.465	0.518
Total tax revenue as a % of GDP	0.386	0.440	0.547	0.469	0.460	0.427	0.467
Social Security Contributions	(0.586)	-	(0.419)	(0.207)	0.404	0.396	0.404
Social Benefits	(0.321)	-	(0.466)	(0.054)	0.281	0.188	0.281
Exports of goods and services	(0.848)	(0.845)	0.251	(0.399)	0.586	0.624	0.499
Imports of goods and services	(0.157)	(0.649)	(0.164)	(0.183)	0.288	0.170	0.168
Net exports of goods and services	(0.856)	0.033	0.239	(0.678)	0.451	0.767	0.591
Trade in goods and services as a % of GDP	(0.447)	(0.287)	(0.214)	(0.798)	0.436	0.622	0.486
Bilateral Exchange Rate	(0.866)	0.352	(0.849)	(0.861)	0.732	0.864	0.859
Consumer Price Index	-	(0.423)	(0.792)	(0.819)	0.678	0.819	0.805
Nominal Oil Price	(0.088)	(0.088)	(0.088)	(0.088)	(0.088)	(0.088)	(0.088)
Real Oil Price	(0.244)	(0.244)	(0.244)	(0.244)	(0.244)	(0.244)	(0.244)
Net Migration	-	0.547	0.605	-	0.576	-	0.605
Youth Population Share	(0.092)	0.098	0.267	0.759	0.304	0.426	0.373
Male civilian labor force participation rate	(0.039)	(0.407)	0.289	0.030	0.191	0.035	0.119
Female civilian labor force participation rate	0.526	0.575	0.696	0.704	0.625	0.615	0.642
All civilian labor force participation rate	0.269	0.195	0.556	0.503	0.381	0.386	0.443
Employment rate for age group 15-24	-	-	0.327	-	0.327	-	0.327
Men's Employment Rate	-	-	0.363	-	0.363	-	0.363
Women's Employment Rate	-	-	0.605	-	0.605	-	0.605
Total Employment Rate	-	-	0.481	-	0.481	-	0.481

Table A.5.16 Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Denmark at Level 4's First Analysis

Variable	AT	NL	CH	FR	Mean for AT, NL and CH of Clusters 1 and 4	Mean for AT and NL of Cluster 1
Investment	0.320	<u>0.063</u>	(0.324)	<u>0.185</u>	<u>0.236</u>	<u>0.176</u>
Consumption	0.378	<u>(0.051)</u>	0.388	<u>0.079</u>	0.272	<u>0.215</u>
GDP	<u>0.195</u>	0.333	<b>0.509</b>	0.304	0.346	0.264
Government Net Lending	<b>(0.451)</b>	<b>0.433</b>	-	(0.434)	<b>0.442</b>	<b>0.442</b>
Government Net Lending as a % of GDP	<b>(0.451)</b>	<b>0.433</b>	-	(0.435)	<b>0.442</b>	<b>0.442</b>
Total Direct Taxes	-	-	-	-	-	-
Taxes on income and profits as a % of GDP	(0.380)	0.306	0.263	<u>(0.020)</u>	0.316	0.343
Indirect Taxes	<b>0.614</b>	0.297	-	<u>0.061</u>	<b>0.456</b>	<b>0.456</b>
Taxes on goods and services as a % of GDP	<b>0.631</b>	<u>0.100</u>	<b>(0.605)</b>	0.392	<b>0.446</b>	<b>0.366</b>
Total tax revenue as a % of GDP	<u>(0.087)</u>	0.388	(0.358)	<u>(0.047)</u>	0.277	<u>0.237</u>
Social Security Contributions	<u>(0.196)</u>	<u>(0.047)</u>	-	<u>(0.246)</u>	<u>0.122</u>	<u>0.122</u>
Social Benefits	<u>(0.184)</u>	0.286	-	<b>(0.578)</b>	<u>0.235</u>	<u>0.235</u>
Exports of goods and services	<u>(0.054)</u>	<u>0.219</u>	0.281	0.266	<u>0.184</u>	<u>0.136</u>
Imports of goods and services	<u>0.214</u>	<b>0.471</b>	0.352	<b>0.511</b>	0.346	0.343
Net exports of goods and services	<u>(0.065)</u>	<u>(0.015)</u>	<u>(0.048)</u>	<u>(0.001)</u>	<u>0.043</u>	<u>0.040</u>
Trade in goods and services as a % of GDP	<u>(0.039)</u>	<u>0.238</u>	<b>0.494</b>	0.330	0.257	<u>0.139</u>
Bilateral Exchange Rate	0.295	<u>0.242</u>	<b>0.444</b>	<b>(0.488)</b>	0.327	0.268
Consumer Price Index	-	-	-	-	-	-
Nominal Oil Price	<u>(0.154)</u>	<u>(0.154)</u>	<u>(0.154)</u>	<u>(0.154)</u>	<u>(0.154)</u>	<u>(0.154)</u>
Real Oil Price	(0.288)	(0.288)	(0.288)	(0.288)	(0.288)	(0.288)
Net Migration	-	-	-	-	-	-
Youth Population Share	<u>0.208</u>	<b>0.513</b>	<u>0.157</u>	<u>(0.012)</u>	0.293	0.361
Male civilian labor force participation rate	<u>0.111</u>	<u>0.045</u>	<u>(0.015)</u>	<b>0.439</b>	<u>0.057</u>	<u>0.078</u>
Female civilian labor force participation rate	<u>(0.097)</u>	<u>(0.159)</u>	(0.314)	<u>0.110</u>	<u>0.190</u>	<u>0.128</u>
All civilian labor force participation rate	<u>(0.005)</u>	<u>(0.068)</u>	<u>(0.204)</u>	0.313	<u>0.092</u>	<u>0.037</u>
Employment rate for age group 15-24	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-
Women's Employment Rate	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-

Table A.5.17 Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Belgium at Level 4's First Analysis

Variable	AT	NL	CH	FR	Mean for AT, NL and CH of Clusters 1 and 4	Mean for AT and NL of Cluster 1
Investment	<b>0.698</b>	0.255	(0.270)	0.259	<b>0.408</b>	<b>0.462</b>
Consumption	(0.061)	0.116	<b>0.581</b>	0.178	0.253	0.089
GDP	0.406	(0.155)	0.446	0.026	0.335	0.280
Government Net Lending	0.068	(0.173)	-	(0.143)	0.121	0.121
Government Net Lending as a % of GDP	0.069	(0.175)	-	(0.142)	0.122	0.122
Total Direct Taxes	(0.510)	0.301	-	(0.312)	<b>0.405</b>	<b>0.405</b>
Taxes on income and profits as a % of GDP	(0.516)	0.282	0.158	(0.112)	0.319	0.399
Indirect Taxes	<b>0.510</b>	(0.228)	-	(0.515)	0.369	0.369
Taxes on goods and services as a % of GDP	0.328	(0.505)	(0.738)	(0.325)	<b>0.524</b>	<b>0.417</b>
Total tax revenue as a % of GDP	(0.204)	<b>0.417</b>	(0.478)	(0.419)	0.367	0.311
Social Security Contributions	(0.020)	<b>0.720</b>	-	(0.142)	0.370	0.370
Social Benefits	(0.302)	<b>0.512</b>	-	(0.437)	<b>0.407</b>	<b>0.407</b>
Exports of goods and services	(0.370)	(0.033)	(0.056)	0.138	0.153	0.201
Imports of goods and services	(0.256)	0.113	(0.026)	0.286	0.132	0.184
Net exports of goods and services	0.125	0.133	(0.276)	<b>0.494</b>	0.178	0.129
Trade in goods and services as a % of GDP	0.000	0.184	0.427	0.222	0.204	0.092
Bilateral Exchange Rate	0.283	0.243	(0.547)	0.407	0.358	0.263
Consumer Price Index	0.163	0.260	0.196	(0.397)	0.206	0.211
Nominal Oil Price	(0.154)	(0.154)	(0.154)	(0.154)	(0.154)	(0.154)
Real Oil Price	(0.288)	(0.288)	(0.288)	(0.288)	(0.288)	(0.288)
Net Migration	-	-	-	-	-	-
Youth Population Share	(0.048)	0.253	(0.169)	(0.409)	0.157	0.151
Male civilian labor force participation rate	(0.189)	(0.170)	(0.228)	0.275	0.195	0.179
Female civilian labor force participation rate	(0.227)	(0.168)	(0.310)	0.146	0.235	0.198
All civilian labor force participation rate	(0.262)	-	-	0.264	0.262	0.262
Employment rate for age group 15-24	-	-	-	-	-	-
Men's Employment Rate	-	-	-	-	-	-
Women's Employment Rate	-	-	-	-	-	-
Total Employment Rate	-	-	-	-	-	-

Table A.5.18 Correlation Coefficients between First Canonical Score and *Pseudo* score-with reference to Sweden at Level 4's Second Analysis

Variable	ES	IT	IE	PT	NO	Mean for ES, IT, IE and PT of clusters 1, 4, and 5.	Mean for ES and IT of Cluster 1.	Mean for NO and IE of Cluster 3.
Investment	(0.164)	<b>0.707</b>	0.100	(0.557)	(0.175)	0.382	0.436	0.144
Consumption	(0.525)	(0.449)	(0.595)	(0.637)	(0.713)	0.552	0.487	0.654
GDP	(0.298)	(0.147)	(0.753)	(0.143)	(0.388)	0.335	0.223	0.570
Government Net Lending	0.571	0.582	0.553	0.573	(0.337)	0.570	0.577	0.445
Government Net Lending as a % of GDP	0.573	0.582	0.555	0.575	(0.333)	<b>0.571</b>	<b>0.578</b>	0.444
Total Direct Taxes	(0.276)	(0.663)	(0.748)	(0.492)	(0.005)	0.545	0.470	0.377
Taxes on income and profits as a % of GDP	0.126	(0.394)	(0.138)	0.191	(0.041)	0.212	0.260	0.090
Indirect Taxes	(0.551)	<b>(0.750)</b>	(0.202)	<b>(0.745)</b>	(0.217)	0.562	<b>0.650</b>	0.210
Taxes on goods and services as a % of GDP	0.028	0.080	0.534	0.175	(0.133)	0.204	0.054	0.333
Total tax revenue as a % of GDP	(0.395)	(0.681)	(0.241)	(0.514)	(0.539)	0.458	0.538	0.390
Social Security Contributions	<b>(0.797)</b>	<b>(0.790)</b>	<b>(0.823)</b>	<b>(0.803)</b>	(0.575)	<b>0.803</b>	<b>0.794</b>	0.699
Social Benefits	(0.497)	(0.307)	(0.412)	<b>(0.702)</b>	0.238	0.480	0.402	0.325
Exports of goods and services	(0.573)	(0.422)	<b>(0.841)</b>	(0.314)	0.217	0.538	0.498	0.529
Imports of goods and services	(0.304)	(0.204)	(0.779)	(0.317)	(0.651)	0.401	0.254	0.715
Net exports of goods and services	(0.121)	0.009	(0.070)	0.016	0.002	0.054	0.065	0.036
Trade in goods and services as a % of GDP	0.518	0.365	0.599	<b>0.803</b>	0.742	<b>0.571</b>	0.442	0.671
Bilateral Exchange Rate	(0.316)	(0.560)	(0.467)	0.105	(0.297)	0.362	0.438	0.382
Consumer Price Index	(0.453)	(0.426)	(0.032)	(0.576)	0.199	0.372	0.439	0.116
Nominal Oil Price	(0.470)	(0.470)	(0.470)	(0.470)	(0.470)	(0.470)	(0.470)	0.470
Real Oil Price	(0.585)	(0.585)	(0.585)	(0.585)	(0.585)	<b>(0.585)</b>	<b>(0.585)</b>	0.585
Net Migration	0.051	(0.153)	-	(0.363)	0.274	0.189	0.102	0.274
Youth Population Share	(0.063)	0.333	(0.437)	(0.145)	0.552	0.245	0.198	0.495
Male civilian labor force participation rate	<b>(0.599)</b>	(0.290)	(0.302)	(0.336)	(0.449)	0.382	0.444	0.375
Female civilian labor force participation rate	<b>(0.646)</b>	0.114	<b>(0.807)</b>	(0.609)	<b>(0.784)</b>	0.544	0.380	<b>0.796</b>
All civilian labor force participation rate	<b>(0.681)</b>	(0.055)	<b>(0.793)</b>	(0.494)	(0.672)	0.506	0.368	0.733
Employment rate for age group 15-24	(0.026)	<b>(0.719)</b>	-	(0.323)	<b>(0.798)</b>	0.356	0.373	<b>0.798</b>
Men's Employment Rate	(0.052)	(0.684)	-	(0.276)	(0.729)	0.337	0.368	0.729
Women's Employment Rate	(0.367)	(0.581)	-	(0.496)	<b>(0.756)</b>	0.481	0.474	<b>0.756</b>
Total Employment Rate	(0.191)	(0.703)	-	(0.438)	<b>(0.769)</b>	0.444	0.447	<b>0.769</b>

Table A.5.19 Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Sweden at Level 4's Second Analysis

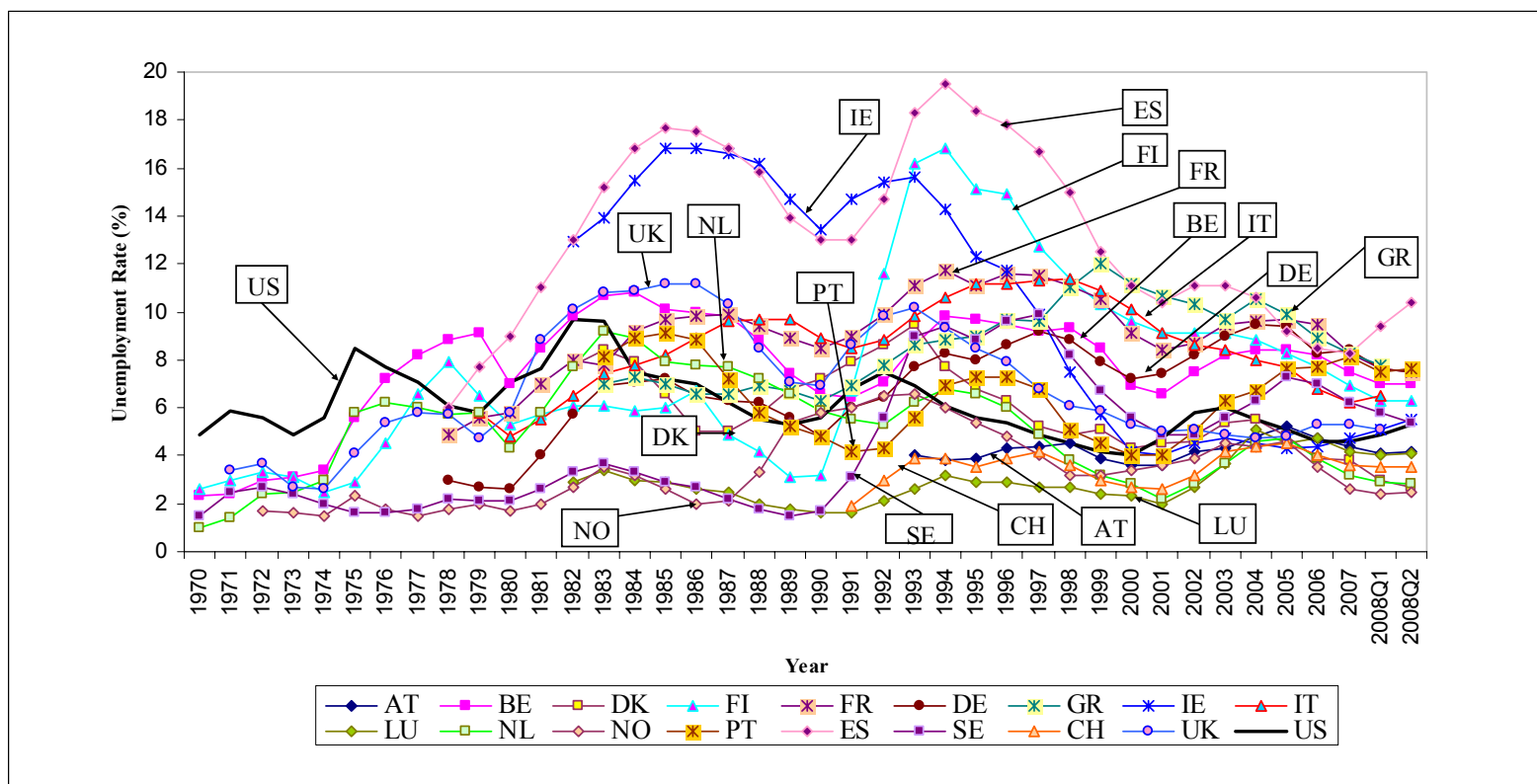
Variable	ES	IT	IE	PT	Mean for ES, IT, IE and PT of clusters 1, 4, and 5.	Mean for ES and IT of Cluster 1.
Investment	<b>0.499</b>	(0.285)	<b>(0.549)</b>	0.443	<b>0.444</b>	0.392
Consumption	0.425	<b>0.576</b>	<b>(0.490)</b>	0.321	<b>0.453</b>	<b>0.500</b>
GDP	<b>0.541</b>	0.407	<u>(0.117)</u>	0.448	0.378	<b>0.474</b>
Government Net Lending	<u>(0.176)</u>	<u>(0.182)</u>	<u>(0.189)</u>	<u>(0.215)</u>	<u>0.190</u>	<u>0.179</u>
Government Net Lending as a % of GDP	<u>(0.179)</u>	<u>(0.186)</u>	<u>(0.192)</u>	<u>(0.218)</u>	<u>0.194</u>	<u>0.182</u>
Total Direct Taxes	0.495	<u>0.222</u>	<u>(0.105)</u>	0.306	0.282	0.358
Taxes on income and profits as a % of GDP	<b>0.506</b>	0.433	<b>0.470</b>	0.243	0.413	0.469
Indirect Taxes	<u>(0.153)</u>	<u>(0.069)</u>	<b>(0.636)</b>	<u>0.142</u>	0.250	<u>0.111</u>
Taxes on goods and services as a % of GDP	0.474	<b>0.529</b>	<u>0.125</u>	<b>0.504</b>	0.408	<b>0.502</b>
Total tax revenue as a % of GDP	<b>0.646</b>	0.375	0.426	0.310	0.439	<b>0.511</b>
Social Security Contributions	0.371	0.321	<u>(0.087)</u>	0.365	0.286	0.346
Social Benefits	<u>0.020</u>	<u>(0.157)</u>	<u>(0.427)</u>	<u>0.223</u>	<u>0.207</u>	<u>0.089</u>
Exports of goods and services	0.260	0.385	<u>(0.097)</u>	<b>0.671</b>	0.353	0.323
Imports of goods and services	0.407	0.252	<u>(0.234)</u>	0.344	0.309	0.329
Net exports of goods and services	<u>(0.368)</u>	<u>(0.452)</u>	<u>(0.354)</u>	<u>(0.361)</u>	0.384	0.410
Trade in goods and services as a % of GDP	<u>0.173</u>	<u>(0.210)</u>	<u>0.209</u>	0.306	<u>0.224</u>	<u>0.191</u>
Bilateral Exchange Rate	<u>(0.164)</u>	<u>(0.451)</u>	<u>(0.062)</u>	0.262	<u>0.235</u>	0.308
Consumer Price Index	<u>(0.079)</u>	<u>(0.084)</u>	<u>(0.397)</u>	0.318	<u>0.220</u>	<u>0.082</u>
Nominal Oil Price	0.446	0.446	0.446	0.446	<b>0.446</b>	0.446
Real Oil Price	0.469	<b>0.469</b>	0.469	<b>0.469</b>	<b>0.469</b>	0.469
Net Migration	<u>0.215</u>	0.455	<u>0.023</u>	<u>0.096</u>	<u>0.197</u>	0.335
Youth Population Share	<u>0.217</u>	0.455	<u>0.026</u>	<u>0.095</u>	<u>0.198</u>	0.336
Male civilian labor force participation rate	<u>(0.127)</u>	0.395	<u>(0.052)</u>	<u>0.219</u>	<u>0.198</u>	0.261
Female civilian labor force participation rate	<u>0.217</u>	0.455	<u>0.026</u>	<u>0.095</u>	<u>0.198</u>	0.336
All civilian labor force participation rate	0.312	<b>0.476</b>	<u>(0.007)</u>	<u>0.214</u>	0.252	0.394
Employment rate for age group 15-24	0.340	<u>0.167</u>	-	0.396	0.301	0.254
Men's Employment Rate	<u>0.167</u>	<u>0.055</u>	-	0.350	<u>0.191</u>	<u>0.111</u>
Women's Employment Rate	<u>0.109</u>	<u>0.033</u>	-	0.451	<u>0.198</u>	<u>0.071</u>
Total Employment Rate	<u>0.080</u>	<u>0.003</u>	-	<b>0.456</b>	<u>0.180</u>	<u>0.041</u>

Table A.5.20 Correlation Coefficients between Second Canonical Score and *Pseudo* score-with reference to Norway at Level 4's Second Analysis

Variable	ES	IT	IE	PT	Mean for ES, IT, IE and PT of clusters 1, 4, and 5.	Mean for ES and IT of Cluster 1.
Investment	0.580	0.312	(0.061)	0.563	0.379	0.446
Consumption	0.352	0.354	(0.375)	0.345	0.357	0.353
GDP	(0.489)	(0.586)	<b>(0.609)</b>	(0.388)	0.518	0.538
Government Net Lending	0.483	0.541	0.223	0.441	0.422	0.512
Government Net Lending as a % of GDP	0.468	0.526	0.229	0.423	0.412	0.497
Total Direct Taxes	<b>0.801</b>	<b>0.715</b>	0.560	<b>0.766</b>	<b>0.710</b>	<b>0.758</b>
Taxes on income and profits as a % of GDP	<b>0.632</b>	<b>0.649</b>	<b>0.734</b>	0.598	<b>0.653</b>	<b>0.640</b>
Indirect Taxes	<b>0.597</b>	<b>0.635</b>	(0.314)	<b>0.614</b>	<b>0.540</b>	<b>0.616</b>
Taxes on goods and services as a % of GDP	0.316	0.338	(0.124)	0.442	0.305	0.327
Total tax revenue as a % of GDP	<b>0.651</b>	0.574	<b>0.563</b>	<b>0.644</b>	<b>0.608</b>	<b>0.612</b>
Social Security Contributions	0.429	0.318	(0.168)	0.410	0.331	0.373
Social Benefits	0.391	0.114	(0.318)	0.333	0.289	0.252
Exports of goods and services	0.533	<b>0.600</b>	0.229	<b>0.694</b>	0.514	0.567
Imports of goods and services	0.420	0.241	(0.265)	0.362	0.322	0.331
Net exports of goods and services	(0.373)	(0.251)	0.319	0.497	0.360	0.312
Trade in goods and services as a % of GDP	(0.276)	(0.564)	(0.195)	(0.050)	0.271	0.420
Bilateral Exchange Rate	(0.350)	(0.507)	<b>(0.617)</b>	0.022	0.374	0.428
Consumer Price Index	0.249	0.214	(0.287)	0.406	0.289	0.231
Nominal Oil Price	0.446	0.446	0.446	0.446	0.446	0.446
Real Oil Price	0.469	0.469	0.469	0.469	0.469	0.469
Net Migration	0.012	0.353		(0.218)	0.194	0.183
Youth Population Share	0.171	0.399	(0.184)	0.041	0.199	0.285
Male civilian labor force participation rate	0.320	0.508	0.258	0.388	0.368	0.414
Female civilian labor force participation rate	0.324	0.385	0.047	0.138	0.224	0.354
All civilian labor force participation rate	0.279	0.442	0.097	0.307	0.281	0.360
Employment rate for age group 15-24	0.138	0.061		0.161	0.120	0.100
Men's Employment Rate	0.146	0.141		0.297	0.195	0.144
Women's Employment Rate	0.049	(0.034)		0.406	0.163	0.042
Total Employment Rate	0.060	0.008		0.336	0.135	0.034

## Appendix Figures

Figure B.2.1 Standardized Unemployment rates<sup>86</sup> of the US and 17 European Countries, 1970-2008<sup>87</sup><sup>88</sup>



<sup>86</sup> Standardized unemployment rate is the rate measured as far as possible across countries according to International Labor Organization's guidelines of measuring unemployment and labor force.

<sup>87</sup> For the year 2008, the unemployment rates for the first two quarters are plotted.

<sup>88</sup> Source: The OECD Database.



Figure B.2.2 Belgium's Actual and Structural Unemployment Rates<sup>89</sup>, 1970-2008

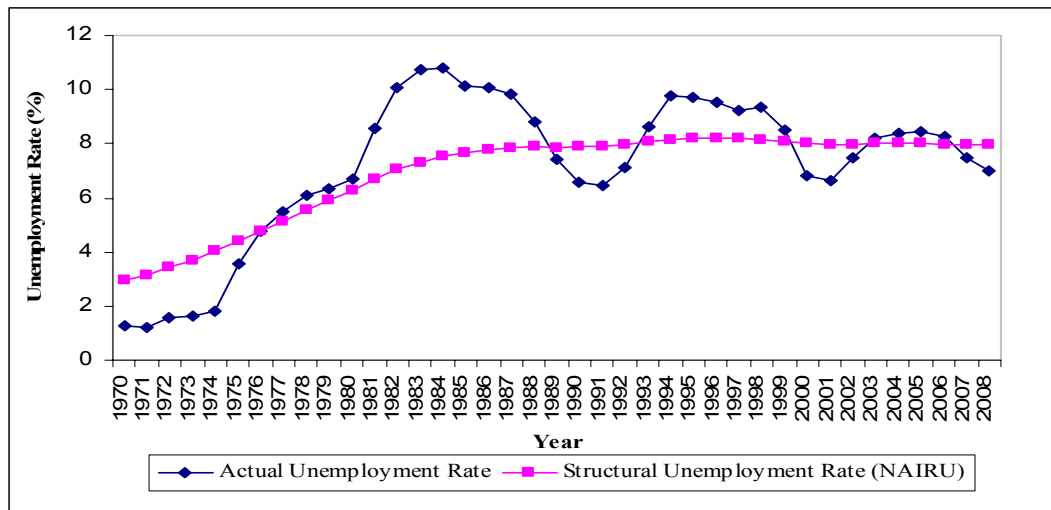
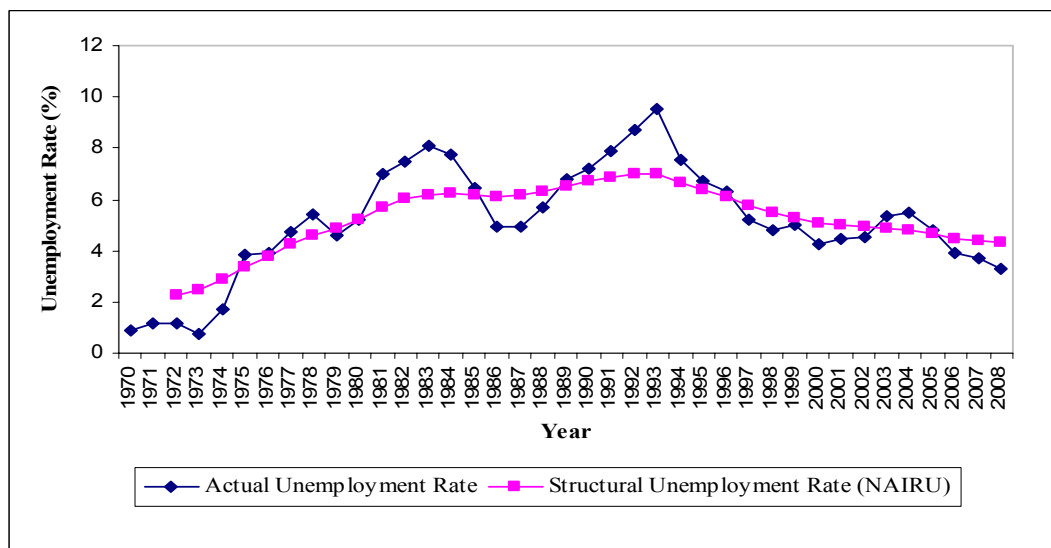


Figure B.2.3 Denmark's Actual and Structural Unemployment Rates, 1970-2008



<sup>89</sup> The data plotted in Figures B.2.2 to B.2.19 are obtained OECD Database. In the figures, structural unemployment rate is the rate consistent with the constant price inflation (NAIRU), given current economic conditions.

Figure B.2.4 Germany's Actual and Structural Unemployment Rates, 1991-2008

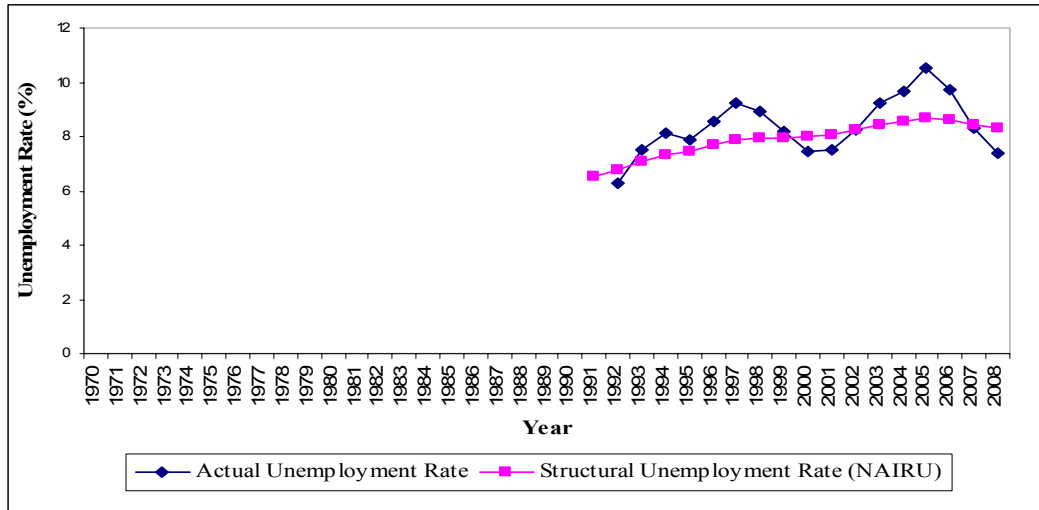


Figure B.2.5 Greece's Actual and Structural Unemployment Rates, 1970-2008

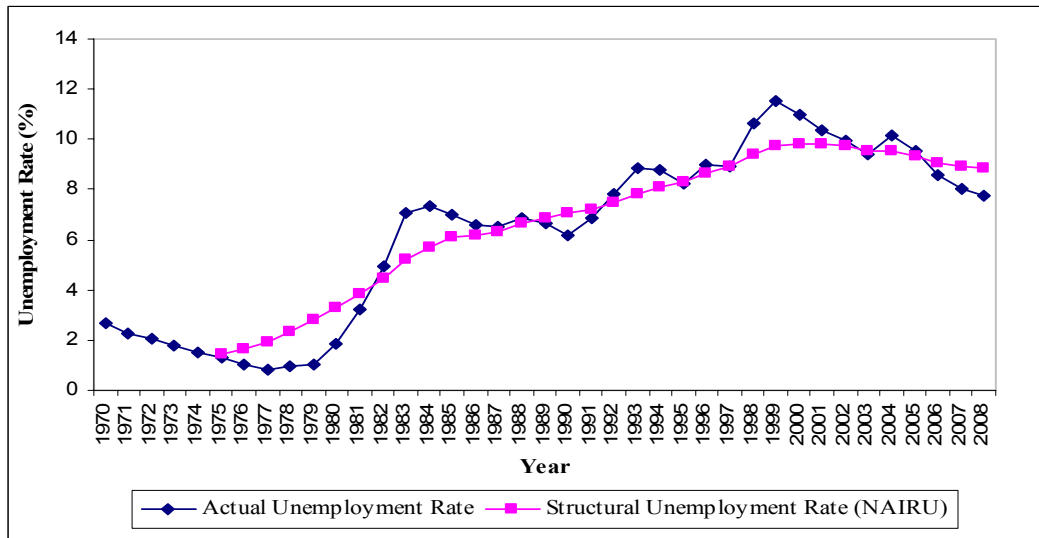


Figure B.2.6 Spain's Actual and Structural Unemployment Rates, 1970-2008

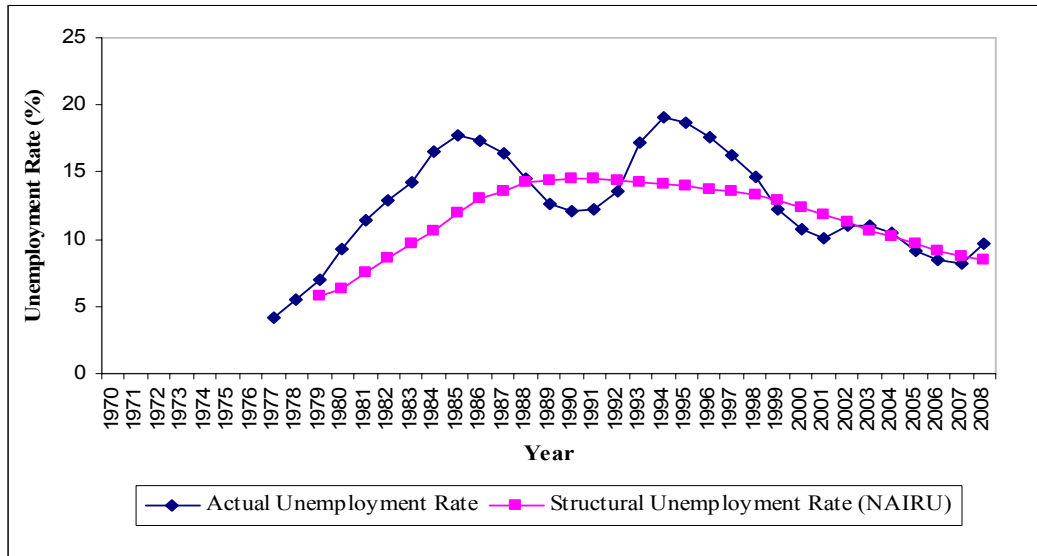


Figure B.2.7 France's Actual and Structural Unemployment Rates, 1970-2008

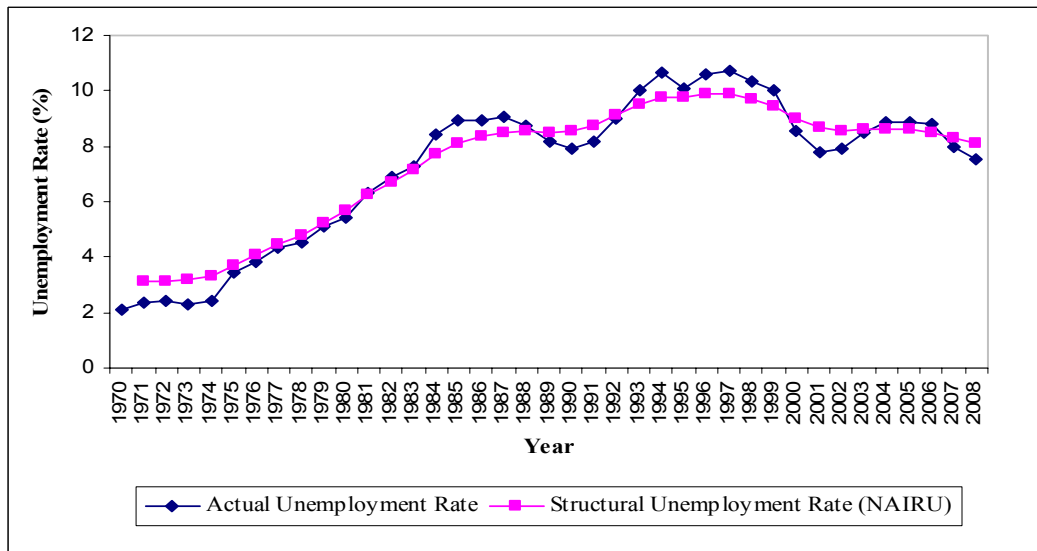


Figure B.2.8 Ireland's Actual and Structural Unemployment Rates, 1970-2008

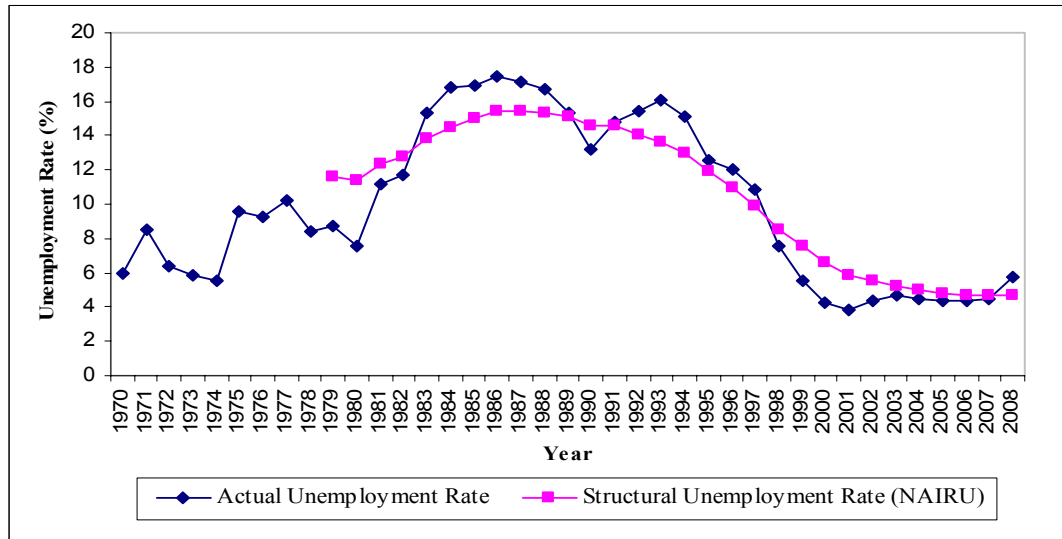


Figure B.2.9 Italy's Actual and Structural Unemployment Rates, 1970-2008

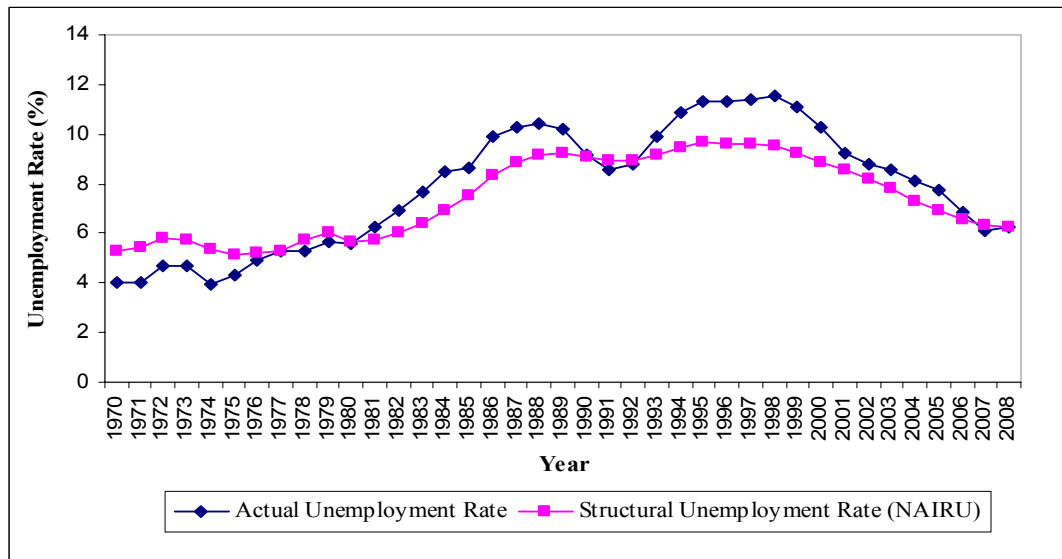


Figure B.2.10 Luxembourg's Actual and Structural Unemployment Rates, 1970-2008

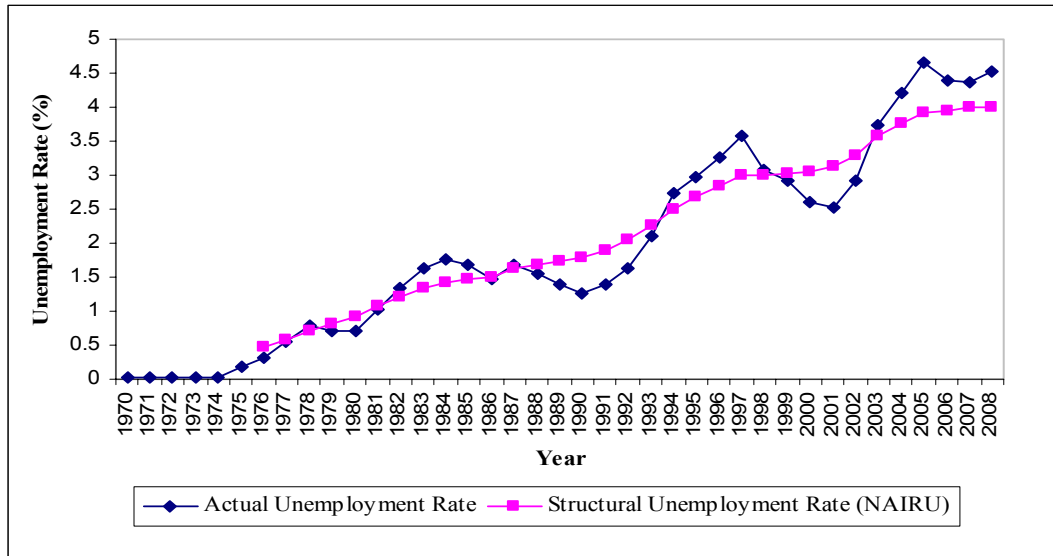


Figure B.2.11 Austria's Actual and Structural Unemployment Rates, 1970-2008

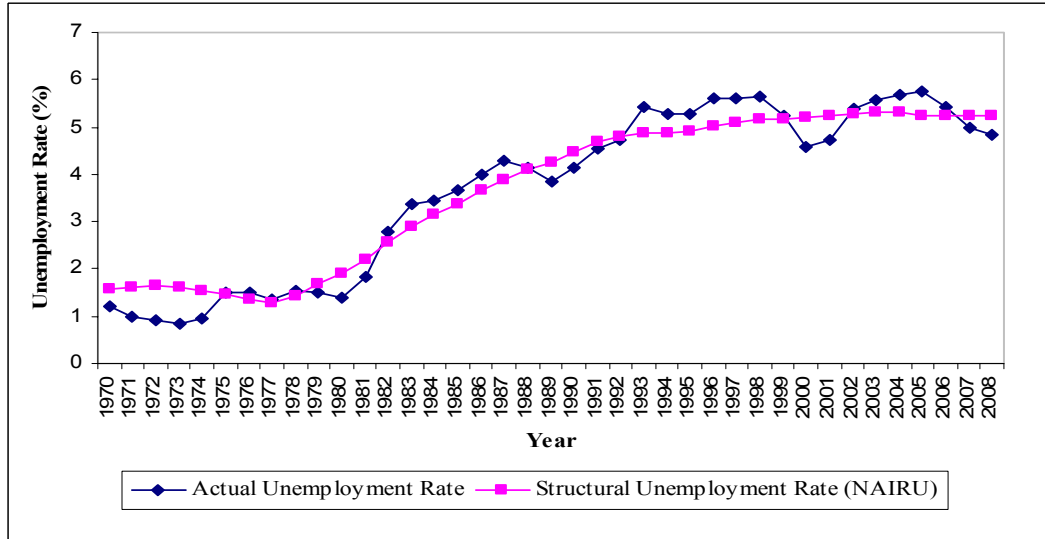


Figure B.2.12 Netherlands's Actual and Structural Unemployment Rates, 1970-2008

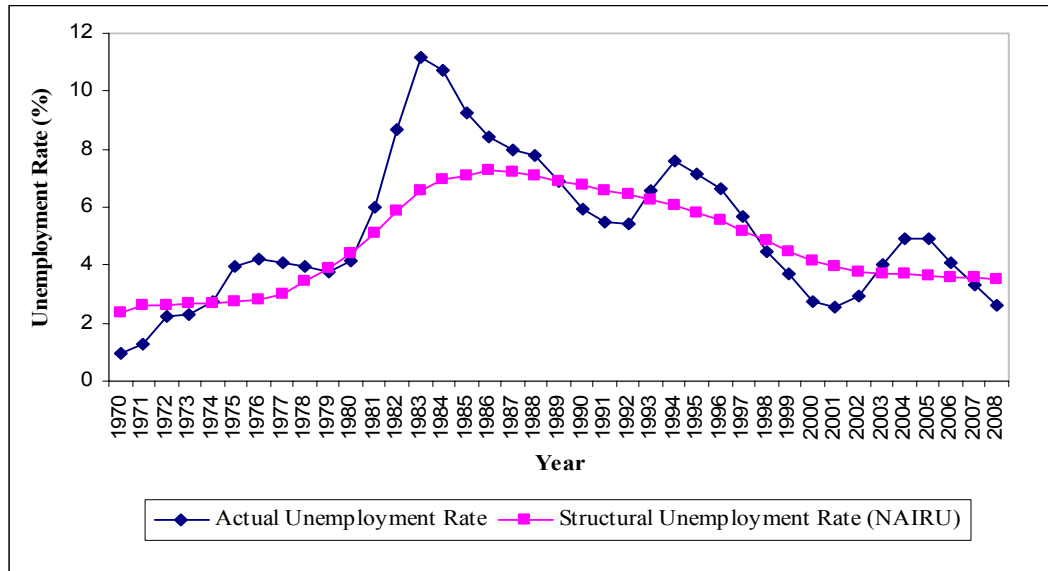


Figure B.2.13 Portugal's Actual and Structural Unemployment Rates, 1970-2008

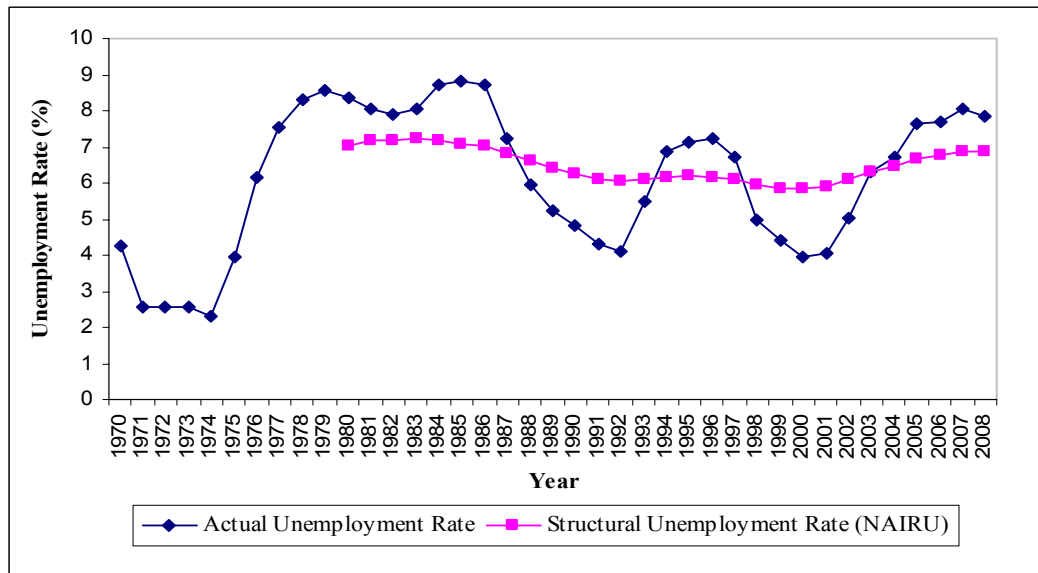


Figure B.2.14 Finland's Actual and Structural Unemployment Rates, 1970-2008

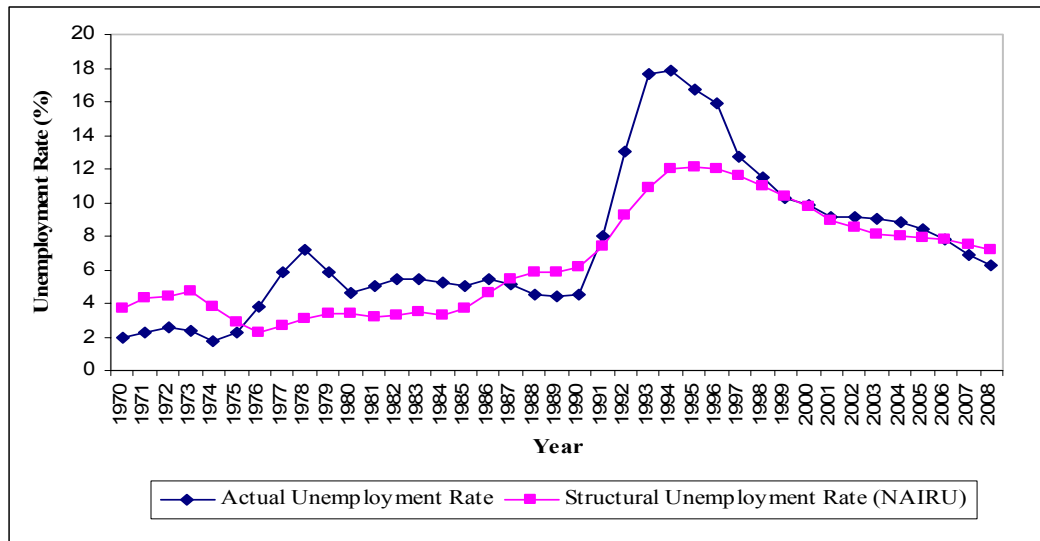


Figure B.2.15 Sweden's Actual and Structural Unemployment Rates, 1970-2008

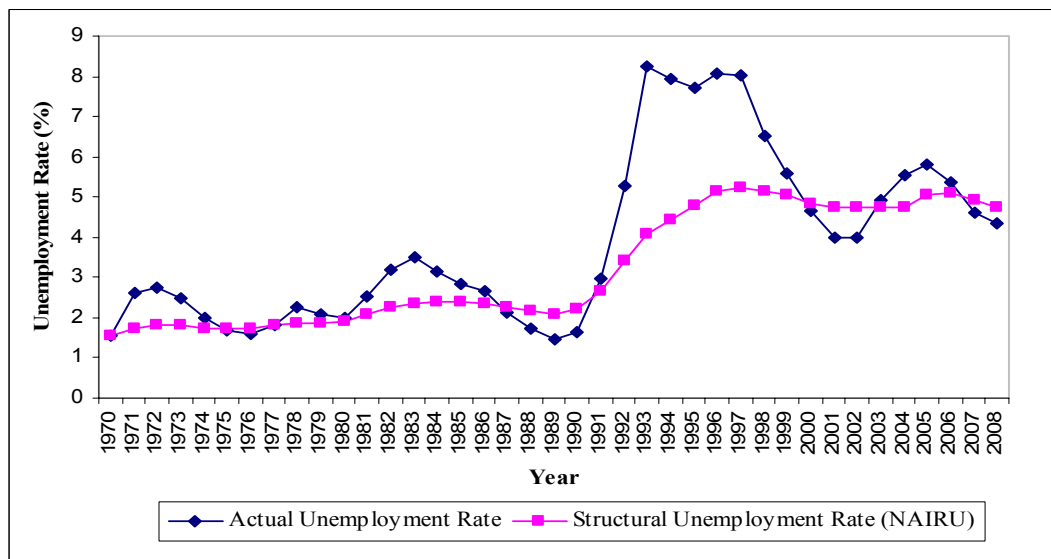


Figure B.2.16 United Kingdom's Actual and Structural Unemployment Rates, 1970-2008

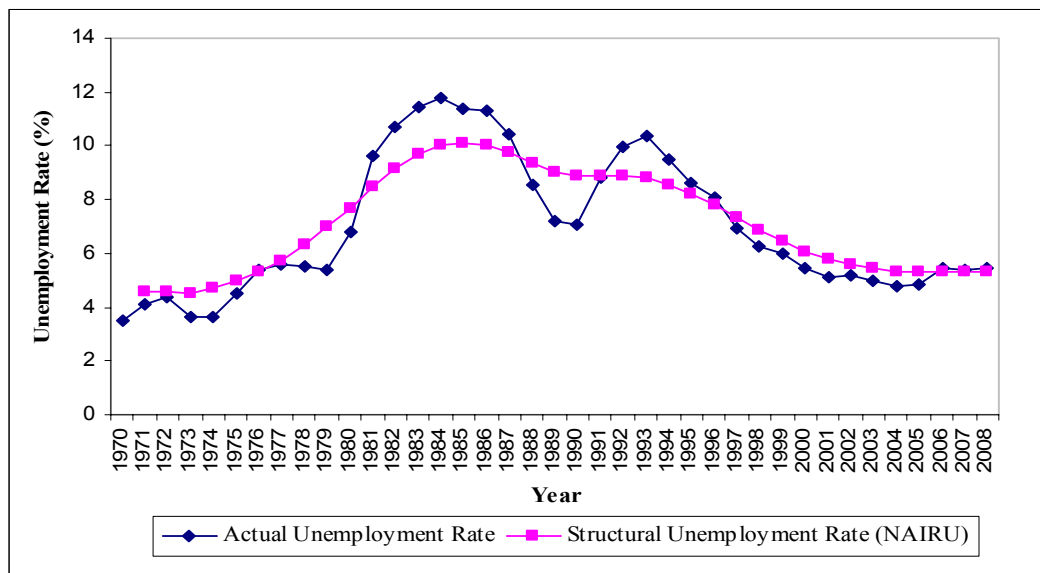


Figure B.2.17 Norway's Actual and Structural Unemployment Rates, 1970-2008

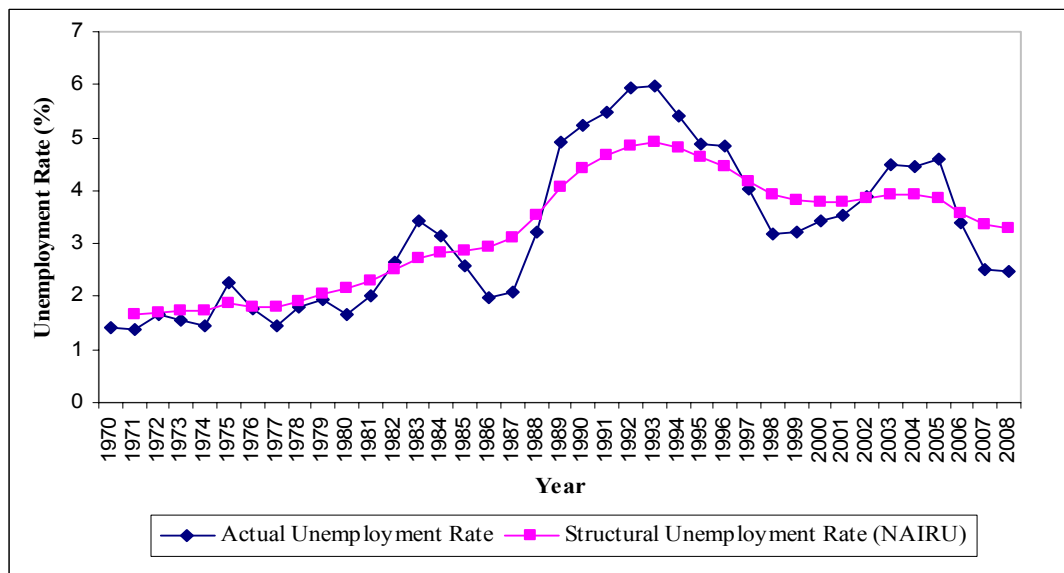




Figure B.2.18 Switzerland's Actual and Structural Unemployment Rates, 1970-2008

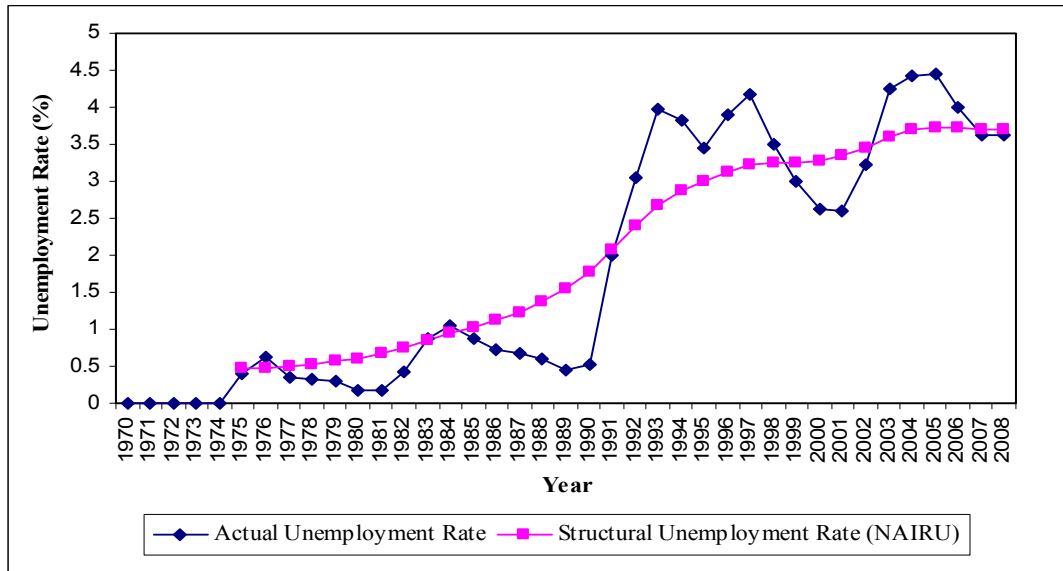
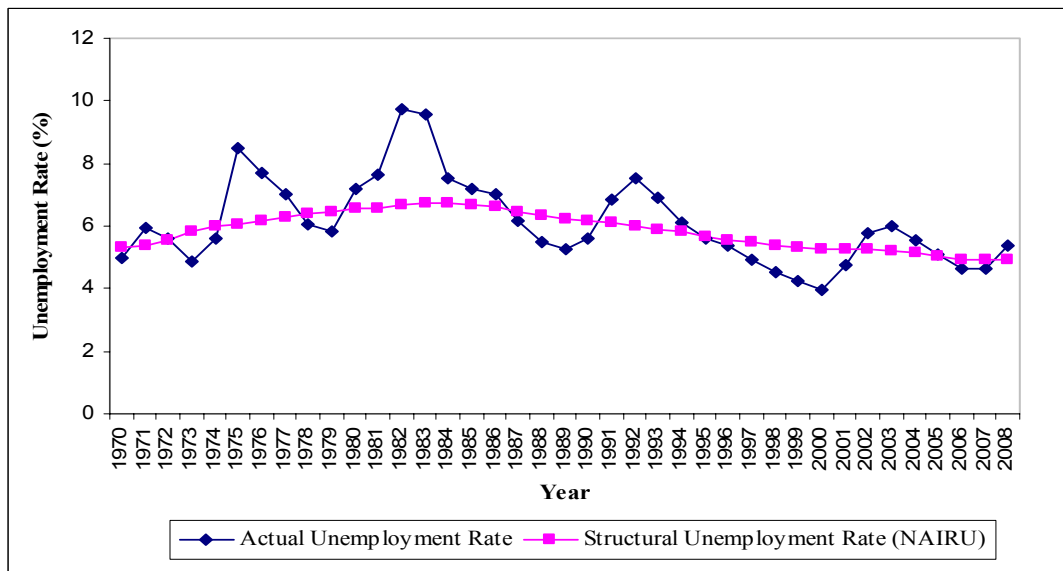


Figure B.2.19 United States' Actual and Structural Unemployment Rates, 1970-2008



## GLOSSARY

- **Investment** represents total investment of fifteen sectors<sup>90</sup> of a country, which is measured in millions euro. The data on investment is available for each of the fifteen sectors of each of the seventeen European countries.
- **Household expenditure** represents the household consumption of a country, which is measured in millions euro.
- **Gross Domestic Product (GDP)** is the value to total output of goods and services of an economy. It is measured in millions euro.
- **Government net lending** represents government deficits, which is government expenditure less of its revenues. Government expenditure includes components such as government investments, government consumption expenditure, social benefits paid by government, interest payments on public debt, subsidies and others. Government revenue, on the other hand, includes revenues received by the government in the form of different types of taxes, social security contributions, dividends and other property income and others.
- **Government net lending as a percentage of GDP** represents the share of government net lending in GDP.
- **Total direct taxes** include taxes on incomes of household, business and others. Direct taxes are levied on income from employment, property, capital gains and any other source of individuals and enterprises.
- **Taxes on incomes and profits as a percentage of GDP** represents the amount of resources collected by government directly from the incomes of people and companies.
- **Indirect taxes** include taxes on goods and services rather than on individuals and are paid by consumers in the form of higher prices. These taxes are levied on the production, extraction, sale, transfer, leasing or delivery of goods, and the rendering of services, or on the use of goods or permission to use goods or to perform activities. These taxes take the forms such as sales taxes and value-added taxes.
- **Taxes on goods and services as a percentage of GDP** represents the amount of resources the government collects from people as they spend their income on goods and services.
- **Total Tax Revenue** is the revenue received by government in the form of taxes on income and profits, the taxes on good and services, payments made by employers and employees under compulsory social security schemes, payroll taxes, and taxes related to the ownership and transfer of property, and other taxes. **Total tax revenue as a percentage of GDP** indicates the share of a country's output that is collected by the government through taxes. It can thus be regarded as a measure of the degree to which the government controls the economy's resources.
- **Social Benefits paid by government** include current transfers received by households from the government intended to provide for the needs that arise from certain events or circumstances, for example, sickness, unemployment, retirement, housing, education or family circumstances.

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<sup>90</sup> (i) agriculture, forestry and fishing; (ii) mining and energy supply; (iii) food, beverages and tobacco manufacturing; (iv) textiles and clothing manufacturing; (v) fuels, chemicals, rubber and plastic products manufacturing; (vi) electronics manufacturing; (vii) transport equipment manufacturing; (viii) other manufacturing; (ix) construction; (x) wholesale and retail; (xi) hotels and restaurants; (xii) transport and communications; (xiii) financial services; (xiv) other market services, and (xv) non-market services.

- **Social contributions** include actual or imputed payments made by employees and employers to social insurance schemes for making provision for social insurance benefits to be paid.
- **Net Exports of goods and services** is the exports of goods and services less of its imports. The exports, imports and net exports of goods and services are all valued in US dollar.
- **Trade in goods and services as a percentage of GDP** represents the share of trade in goods and services in GDP (ratio of sum of exports and imports of goods and services to GDP), which measures the importance of international trade in an economy.
- **Bilateral exchange rate** represents the national currency of a country per US dollar. It measures the changes in a country's price competitiveness in the international market based on changes in that country's exchange rate relative to those of its competitors.
- **Consumer price index** measures changes over time in the general level of prices of goods and service that a reference population acquires, uses or pays for consumption. Relative consumer price index measures the changes in a country's price competitiveness in the international market based on changes in that country's price level relative to those of its competitors. Unlike nominal bilateral exchange rates, relative consumer price index takes into account of not only the changes in market exchange rates, but also variations in relative price levels and therefore can be used as an indicator of competitiveness.
- **Nominal and real oil price** represent world crude oil price measured in US dollar per barrel.
- **Net Migration** is defined as the total number of immigrant nationals and foreigners minus the total of emigrant foreigners and nationals.
- **Youth share in population** is the percentage of youth of age-group 15-24 in total population.
- **Male (Female) civilian labor force participation rate** is defined as the percentage of male (female) civilian labor force (employment and unemployed) in total working age population (15 to 64). It is a measure of the extent of an economy's working-age male (female) population that is economically active.
- **All person civilian labor force participation rate** is defined as the percentage of total civilian labor force (employment and unemployed) to the working age population (15 to 64). It is a measure of the extent of an economy's working-age population that is economically active.
- **Employment rate of age-group 15 to 24** is the percentage of persons of age-group 15-24 who are in employment.
- **Employment rate of female** is the percentage of female of working age (15 to 64) who are in employment.
- **Employment rate of male** is the percentage of male of working age (15 to 64) who are in employment.
- **Total employment rate** is the percentage of all persons of working age (15 to 64) who are in employment.

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## **VITA**

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