

Competing Theories of Unemployment and Economic Policies

Evidence from the US, Swedish and German Economies

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The objective of the paper is to evaluate the explanatory power of three competing core interpretations and economic strategy approaches to unemployment. The first is the neo-classical hypothesis according to which the rigidities in the labour market are responsible for the presence of unemployment. The second is the Keynesian hypothesis according to which the market system fails to create adequate effective demand for the full employment of labour. Finally, the third is the classical/Marxian model according to which employment or unemployment are depended on the dynamics of capital accumulation. The econometric analysis uses data from the US, German and Swedish economies which are characterised by quite diverse labour market structures. The results of empirical analysis reveals that the explanatory content of both the Keynesian and the classical/Marxian core models fared better than the mainstream approach.

I. Introduction

The issue of unemployment figures prominently in the research agenda of economic analysis. In the recent decades, the priorities of economic policy have shifted from a direct treatment of unemployment through public spending policies to an indirect one, where governments provide the means through which labour markets should operate sidestepping various institutional impediments, such as full time work, rigid time schedule and the like. In this indirect outlook of labour markets, which is associated with neoliberal point of view, the major tool of analysis is the Non Accelerated Inflation Rate of Unemployment (NAIRU) hypothesis according to which poor employment performance can only be effectively addressed by fundamental reforms in the national labour market institutions (Blanchard and Wolfers, 2000; Siebert, 1997; Krugman, 1994). Alternatively, the Keynesian voices, which remain sporadic and dim,

insist on the idea that demand boosting policies still might be effective and may help coping with unemployment (Stockhammer, 2004; Akerlof, 2002; Ball, 1999).

Employment policy strategies, stemming either from mainstream or Keynesian strands, emanate from the belief that an economy can reach, in one way or another, the desired level of employment (Howell, 2005; Baimbridge *et al.*, 2000; Sawyer, 1994; Arestis, 1992; Kurzer, 1992). In contrast to these two views, a third associated with classical economics, argues that the nature of capitalist production process inevitably creates unemployment (Godley and Shaikh, 2002; Botwinick, 1993; Williams and Smith, 1990). In fact, the classical/Marxian tradition based on either the subsistence wage theory or the reserve army argument holds that unemployment is present as a by product of the dynamics of capital accumulation. It is worth noting that a strand of new-Keynesian economics, especially those of the efficiency wage persuasion, shares the classical view of the presence of chronic involuntary unemployment considering it as a necessary “worker discipline device” of the market economy (Shapiro and Stiglitz, 1984).

The objective of the present paper is to evaluate the explanatory power of three competing core interpretations and economic strategy approaches to the problem of unemployment. That is the neoliberal hypothesis which, although emanates from different theoretical settings, rely on labour market rigidities in explaining the presence of unemployment; the Keynesian hypothesis which relies on effective demand policies and the classical/Marxian approach which relies on the dynamics of capital accumulation. The present paper also claims that the standard econometric techniques used by the majority of similar studies may give rise to spurious results. These shortcomings can be avoided by employing in the empirical analysis the more recent and (to our knowledge) not yet applied Autoregressive Distributed Lag (ARDL) approach to cointegration (see Pesaran *et al.*, 2001) to test the validity of the various unemployment source proposals. As a consequence, the results derived from the present empirical analysis are expected to be more reliable and therefore, more useful for economic policy purposes. The data used in the analysis refer to the US, German and Swedish economies spanning the period 1960–1995. The three economies were selected for they represent quite different labour market structures, with the Swedish labour market being the most heavily regulated, the US labour market the least regulated and the German labour market being somewhere in between (Salvanes, 1997).

The remainder of the paper is organised as follows: Section II presents the core propositions for the causes and sources of unemployment. Section III discusses some methodological issues and focuses on the advantages of the ARDL cointegration technique over the standard ones. Section IV tests the explanatory content of each core unemployment model. The final section summarises and concludes.

II. Core Models of Unemployment

At this point, we may note that in comparing alternative approaches and strategy proposals it is imperative to single out their fundamental variables which in fact shape them. Once, these fundamental variables are singled out and the most typical representation of each strand is formed, then one should continue the analysis by evaluating them. If, in turn, the empirical analysis reveals that one of the core representations is significantly more powerful than the others, this may lend support to the claim that the specific proposal embodies a superior hypothesis; since it can account for much more of the observed phenomena before someone resorts into injecting ad hoc variables and complexities in the analysis. Hence, what should matter most is the core of each representative hypothesis of unemployment, because there is no doubt that each of them can be empirically elaborated sufficiently so as to provide explanations of the observed phenomena.

The central feature of the neoclassical approach with respect to the labour market is that if an economy is left to its own devices, involuntary unemployment can result only from short run market readjustments. The whole adjustment mechanism within the mainstream approach is independent of social factors (unions, welfare state, etc.) which, as argued, give rise to disequilibrium phenomena. In fact, full employment of labour is the only equilibrium position of the labour market within this framework (Godley and Shaikh, 2002); as prices, wages and output adjust in the long run, the labour market clears and unemployment disappears. Hence, if unemployment is present it may indicate that labour market does not function free of any outside interference. Among the most frequently cited causes of unemployment are long and durable unemployment benefits, job protection measures, high social security contributions, strong unions, *etc.* (Layard and Nickell, 1990; 1986). In mainstream literature, the evolution of unemployment over time is explained for a single economy by incorporating in the analysis shocks like productivity slowdown, oil price, *etc.* (Howell, 2003: 137), whereas for a cross country analysis, by blaming labour market institutions and welfare state policies which “adversely affects the dynamics responses to economic shocks and to increasing turbulence in the economic environment” (Lungqvist and Sargent, 1998: 517).

The economic policy strategy adopted by mainstream economist shares many similarities with the NAIRU hypothesis in which also wage-push variables are crucial in explaining the rise in unemployment and most of the policies designed to confront unemployment focus on labour market reforms. Specifically, Siebert (1997: 53) notes that “the specter of unemployment that is haunting Europe will not be exorcised unless governments are prepared to undertake major reforms of the institutional set up of the labor market”, whereas Krugman (1994: 57) argues “that the generosity of Europe’s welfare states is in some sense responsible for the rise in their unemployment rates”.

It is worth noting at this point that the NAIRU hypothesis relies on a different theoretical framework from that of the neoclassical theory. The NAIRU argument is founded on a post-Walrasian theoretical analysis in which there is a stable equilibrium without a market clearing condition in the labour market. In contrast, the traditional neoclassical approach accepts a Walrasian market clearing condition and thus the existence of any unemployment is treated as a disequilibrium phenomenon. In addition, the NAIRU hypothesis shares many similarities with the natural rate of unemployment hypothesis, since both accept the presence of unemployment in the market. As a matter of fact, it is argued that there are no big practical differences between the two strands (Ball and Mankiw, 2002; Snowden, *et al.*, 1996), whereas Stockhammer (2008: 480) argues that the monetarist natural rate of unemployment should not be confused with the NAIRU, as the former is a theory of voluntary unemployment. However, in theoretical level, there are crucial differences between them which relate to their micro foundations. Natural rate of unemployment is a market clearing concept in a Walrasian sense that is the new zero in labour market—full employment does not correspond to zero unemployment but rather to a “zero model unemployment” with the presence of voluntary unemployment; whereas in a NAIRU framework there is involuntary unemployment which continues to be an equilibrium phenomenon but within a non market clearing equilibrium framework whose micro foundations relate to theories of imperfect competition in the labour and product markets (Snowdon *et al.*, 1996: 323; Carlin and Soskice, 2006).

Although there are theoretical differences between the neoclassical and the NAIRU approach to unemployment, we examine them by using the same econometric specification since both, in interpreting unemployment, rely mainly on labour market imperfections. Stockhammer (2008: 484) points out that according to NAIRU argument the rise of unemployment in Europe is due to labour market inflexibility and changes in the NAIRU over the past decades have been due to wage-push factors conveniently summarised as overgenerous welfare state. Hereafter, therefore, the term neoclassical is used to describe a specific economic policy strategy rather than a theory. A standard presentation of the two hypotheses, similar to the one proposed by Stockhammer (2004: 7) in which unemployment is regressed against inflation, wage-push variables and some control variables can be formalised by the following model (1):

$$U_i = f[X_i^+, P_i^-, Z_i] \quad (1)$$

where U_i stands for the unemployment rate, X_i is a set of variables that approximate the magnitude of labour's market malfunctioning (i.e., employment protection index, duration of unemployment benefits, union density, etc.), P_i is the inflation rate and Z_i is a set of control variables that captures the macro and micro environment of an economy (i.e., labour unit cost, capacity utilization, etc.). Within the control variables, an index of capacity utilisation is included in order to control for the phase of business

cycle, since in mainstream theory there is a distinction between cyclical and 'natural' rate of unemployment. It is the equilibrium rate of unemployment (natural rate of unemployment) that is determined by real rigidities and the cyclical one that is determined by nominal rigidities and the phase of the business cycle which captures not only the short run but also the long run effects indicating also the resistance of the market, due to various rigidities, to return back to equilibrium. In addition, within the NAIRU explanations, the capacity utilisation rate can also be used as a proxy to demand fluctuations since there are NAIRU models which embody the idea of the so called hysteresis theories (Phelps, 1972) according to which aggregate demand may influence the rate of unemployment.

The NAIRU hypothesis lies within the neo-Keynesian tradition, according to which the labour market is not clearing and there is a tradeoff between unemployment and inflation (Stockhammer, 2004: 7). Furthermore, traditional Keynesian variables, such as the effect of demand (Ball, 1999) and capital accumulation (Arestis and Maricsal, 1998) form Keynesian extensions and further elaborations of the NAIRU hypothesis. Although the NAIRU hypothesis has Keynesian roots, we nevertheless highlight separately the Keynesian proposal in our effort to give empirical content to its relative importance in comparison to NAIRU approach. Within the Keynesian tradition, unemployment mainly arises because the economy is in recession, the economic activity is low and there is idle capacity (Stockhammer, 2004; Grieve-Smith, 1994; Bhattacharjea, 1987); this state of affairs could be cured if appropriate countercyclical policies are pursued to increase the level of effective demand. In a Keynesian specification, therefore, the core explanatory variable of unemployment is the state of effective demand. More specifically, model (2) is specified as follows:

$$U_i = f[D_i, Z_i] \quad (2)$$

where U_i stands for unemployment, D_i approximates effective demand and Z_i is a port manteau of variables that captures macro and micro dimensions of the economy. For the purpose of the empirical estimation, within the set of Z_i variables, we include an index of capacity utilisation rate to capture the effects of business cycles, the inflation, and the labour unit cost.

Finally, the classical approach to unemployment relies on the theory of 'free' competition which is conceived as a process of rivalry between firms in their incessant struggle for survival. Competition forces individual capitals to increase productivity and to reduce unit cost of production mainly through the mechanisation of the labour process which takes place through the introduction of fixed capital in the production process (Flaschel and Semmler, 1990; Shaikh, 1980). Within this theorisation of competition, optimal capacity utilisation is associated with the full employment of capital (and not necessarily of labour) since only idle machines (and not idle labour) signify lost opportunities for producing more profits. In fact, classical subsistence wage

proposition does not require full employment of labour and Marx's argument of the reserve army of unemployed indicates that the dynamics of the economy affect not the existence of unemployment, since it is always at hand, but the level of it; that is unemployment fluctuates following the 'fat and lean years' of economic activity. Hence, the level of unemployment rises when the economy is in recession and it falls during the periods of prosperity, but it is always present.

The dynamic interactions of the rate of capital accumulation, the mechanisation of the labour process as this is captured in the movement of the capital-labour ratio and the movement of the labour force participation of the potential working population are the three variables responsible for the unemployment level in an economy (Botwinick, 1993: 110-11). Within this framework, the rate of capital accumulation is the crucial factor in determining the demand for labour and not necessarily the flexibility in the wage rate as it is in mainstream and Keynesian approaches.

The role of capital accumulation and, in particular, of investment is very crucial in post-Keynesian models as well, according to which the level of employment in an economy depends on the capital stock in combination with imperfect substitution between capital and labour (Stockhammer, 2008; Alexiou and Pitelis, 2003). The later framework shares the Keynesian view that variations in effective demand and investment in particular are the prime motivator for dynamic changes in an economy providing at the same time a link between economic growth and income distribution. Hence, in post-Keynesian analysis, fluctuations in investment explain much of the inherent dynamics of capitalism acknowledging, at the same time, the power of firms to set prices at levels sufficient to generate internal funds for investment purposes. Their micro foundation of macro determination of income distribution relies on their view of administered pricing policies which arise either by a Kaleckian mark-up approach or by an imperfect competition framework. Thus, according to post-Keynesians, the causal relationship runs from expenditure to profits and the use of traditional demand management policies may have a positive impact upon output and employment levels through the mechanism of income distribution (Snowdon *et al.*, 1996: 370). In conclusion, post-Keynesians make the claim that the cooperation between entrepreneurs and workers and demand-led variables may determine the long run investment of an economy (Lavoie *et al.*, 2004: 128). Hence, they do not differ from traditional Keynesians in the sense they support a mix of appropriate policies to cope with the inefficiencies in the markets including labour as well.

In classical/Marxian framework, by contrast, the pace of capital accumulation is not a policy issue but mainly the outcome of the dynamics of capitalism. Capital accumulation and mechanisation of labour process are the only expected outcomes arising from the fierce competition among individual capitals; no 'ideal' policy mix can alter the working of the labour market which is doomed with the presence of

unemployment. More specifically, an increase in the rate of capital accumulation tends to enhance the demand for labour, whereas capitalism's long run tendency to mechanise the labour process tends to contract the demand for it. The negative effect on labour demand of the latter overcomes the positive impact of the former, because accumulation of capital and mechanisation of the production process go together. Accumulation, inevitably, leads to the mechanisation of the labour process, which is reflected in a rising capital-labour ratio that eventually results in the replacement of capital for labour. Hence, capital accumulation and the associated with it mechanisation are responsible for the rising unemployment rate.

In addition, mechanisation tends to reduce the average skill level of workers, an outcome that reduces to a great extent the ability of workers to control both the organisation and the intensity of the labour process. The mechanisation, the concomitant automation of the labour process and the inevitable deskilling of labour show the way to larger parts of population to enter into labour market since no special skills are required any more (Marx, 1867: 420). As a result, one expects that over time the labour participation rate to rise and to exert an upward pressure on unemployment (Botwinick, 1993: 101). A typical specification to account for unemployment within the classical/Marxian framework is presented by the following model (3):

$$U_i = f[K_i^-, k_i^+, L_i^+, Z_i] \quad (3)$$

where U_i stands for the unemployment rate, K_i stands for capital accumulation, k_i is the mechanisation level, L_i approximates the labour force participation ratio and Z_i , once again, is a set of control variables (e.g., inflation, labour unit cost, etc.).

III. Econometric Methodology

The three core approaches to unemployment (model 1, model 2 and model 3) are tested by using time series data of the US, German and Swedish economies. The choice of countries has to do with the availability of data but also because they represent quite different institutional structures ranging from the most heavily regulated labour market, as is the case of Sweden, to the other end of the spectrum as is the US labour market, whereas the German one lies somewhere in between. The data set is of annual frequency and covers the period from 1960 to 1995. The time span of the sample is adjusted to the availability and data limitations of the series involved in the empirical analysis. More specifically, the variables employed in the empirical investigation are: the rate of capacity utilisation (CU) to approximate the phase of the business cycle; the capital-employment ratio to approximate the mechanisation of the labour process (k); the capital stock (K) to capture the effect of capital accumulation; a labour participation ratio (L); and finally, the benefit replacement rate (BRR). Labour market rigidities are proxied by a number of different indices (see Nickell, 1997); however, only the BRR

index is available for the three countries and for the specific time period. Furthermore, we use a set of control variables that include income (Y) proxied by the real GDP, the price level (P) proxied by the consumer price index and the unit labour cost ($LABC$). All variables are expressed in logarithms except the BRR which stands for a measure of labour market rigidity and has been constructed by Nickell (1997). The rest of the variables are taken from the *OECD Statistical Compendium* (2005).

In order to explore the presence of a long run relation between the variables used in each of the alternative approaches, we apply the Autoregressive Distributed Lag (ARDL) approach to cointegration (see Pesaran *et al.*, 2001). The ARDL approach to cointegration, also known as bounds testing, has certain advantages in comparison to other cointegration methodologies. More specifically, the ARDL is a single-equation method and thus requires the estimation of a fairly smaller number of parameters; as a consequence, this approach is more efficient especially with small data samples. The commonly used Johansen Maximum Likelihood method is based on a VAR system of equations which is fairly data-intensive and there is a substantial loss of degrees of freedom. It follows, therefore, that most of the hitherto econometric results based on relatively small samples are very likely to be of dubious validity. These limitations do not apply to the ARDL (Romilly *et al.*, 2001). In fact, the reliability of the unit root tests depends more on the time span of the data, *ceteris paribus*, than on the number of observations. In other words, if we were to choose between annual data that span a long period of time and a larger number of say, quarterly observations that cover shorter period of time, then the former is preferred to the latter (Kennedy, 1998: 267).

In addition, the ARDL method avoids the problem of pre-testing for the order of integration of the individual variables which is a matter of crucial importance in any empirical analysis. In the case where a long run relationship between the variables involved is confirmed, an Error Correction (EC) model can be used to test for Granger-type causality. The advantage of using an EC specification to test for causality is that on the one hand, it allows testing for short-run causality through the lagged differenced explanatory variables and on the other hand, for long-run causality through the lagged EC term. As Granger *et al.* (2000) suggest, a significant EC term implies long-run causality running from the explanatory variables towards the dependent variable.

Given that the ARDL approach to cointegration is a relatively recent development in the literature of time series econometrics, we present a brief outline of the procedure. We begin with the estimation of the following unrestricted EC version of the ARDL model for, let us say, two variables Y and X :

$$DY = \alpha_0 + \sum_{i=1}^p b_i DY_{t-i} + \sum_{i=0}^p c_i DX_{t-i} + \delta_1 Y_{t-1} + \delta_2 X_{t-1} + e_i \quad (4)$$

$$DX = \alpha_0 + \sum_{i=1}^p b_i DX_{t-i} + \sum_{i=0}^p c_i DY_{t-i} + \delta_1 X_{t-1} + \delta_2 Y_{t-1} + e_i \quad (5)$$

On the basis of equations (4) and (5) we form bounds testing procedure in order to ascertain the presence of a long-run relationship between the variables. Actually, an *F*-test is applied for the joint null hypothesis that the coefficients on the level variables are jointly equal to zero (Pesaran and Shin, 1999; Pesaran *et al.*, 2001). The testing statistic displays a non-standard *F* distribution which depends on whether the variables are individually *I*(0) or *I*(1), the number of regressors and the existence of an intercept and/or a trend. Instead of the conventional critical values, Pesaran *et al.* (2001) report two sets of critical bound values for all classifications of the regressors, that is purely *I*(1), purely *I*(0) or mutually cointegrated. If the test statistic exceeds the respective upper critical value, it may be argued that there is evidence of a long-run equilibrium relationship. If the test statistic falls below the lower critical value, we cannot reject the null hypothesis of no cointegration. Finally, if the test statistic lies between the two bounds, then the test becomes inconclusive.

The conditional long-run models can be produced from the reduced form solution of equations (4) and (5), when the first-differenced variables are set jointly equal zero. The long-run coefficients of the EC models are estimated through the ARDL approach to cointegration and the use of OLS. The corresponding EC specification is based on the implied ARDL specification, through a simple linear transformation (Banerjee *et al.*, 1993). The lag structure for the ARDL specification to account for the short-run dynamics is determined by the Akaike's Information Criterion (AIC), which also controls for the problem of autocorrelation.

IV. Empirical Analysis and Discussion of Results

The standard procedure requires to testing the involved series for stationarity. Although the ARDL methodology does not require pre-testing for a unit root, in the case of *I*(2) variables the computed *F*-statistic for the existence of a cointegration relationship is not valid (Pesaran *et al.*, 2001). Thus, we applied conventional ADF tests for all variables and we found no evidence of *I*(2) series. In the next step of the ARDL analysis, we test for the existence of a long-run causal relationship between the unemployment rate and the group of explanatory variables for each one of the three core models and for each one of the three countries under investigation.

Table 1
Results from Bounds Tests on Models (1), (2) and (3)

<i>Dep. Var.</i>	<i>AIC Lags</i>	<i>F-statistic</i>	<i>Intercept</i>	<i>Trend</i>	<i>Bounds Testing (at 90%)</i>	<i>Outcome</i>
<i>Germany</i>						
Model 1: F(U/CU, BRR, P, LABC)	2	F(4, 17)= 3.24 [0.07]	yes	no	lower: 2.425 upper: 3.574	inconclusive
Model 2: F(U/CU, Y, P, LABC)	2	F(4, 17)= 3.89 [0.09]	yes	no	lower: 2.425 upper: 3.574	cointegration
Model 3: F(U/K, k, L, P, LABC)	2	F(5, 18)= 3.06 [0.04]	yes	no	lower: 2.262 upper: 3.367	inconclusive
<i>USA</i>						
Model 1: F(U/CU, BRR, P, LABC)	2	F(4, 18)= 4.04 [0.02]	yes	no	lower: 2.425 upper: 3.574	cointegration
Model 2: F(U/CU, Y, P, LABC)	2	F(4, 18)= 3.30 [0.07]	yes	no	lower: 2.425 upper: 3.574	inconclusive
Model 3: F(U/K, k, L, P, LABC)	2	F(5, 24)= 3.74 [0.04]	yes	no	lower: 2.262 upper: 3.367	cointegration
<i>Sweden</i>						
Model 1: F(U/CU, BRR, P, LABC)	2	F(4, 21)= 3.70 [0.07]	yes	yes	lower: 3.063 upper: 4.084	inconclusive
Model 2: F(U/CU, Y, P, LABC)	2	F(4, 21)= 3.20 [0.06]	yes	yes	lower: 3.063 upper: 4.084	inconclusive
Model 3: F(U/K, k, L, P, LABC)	2	F(5, 17)= 3.96 [0.04]	yes	yes	lower: 2.782 upper: 3.827	cointegration

Notes: Asymptotic critical value bounds are obtained from Table F in Appendix C, Case II: intercept and no trend and Case III: intercept and trend in Pesaran and Pesaran (1997: 478).

As suggested by the bounds testing procedure in Table 1, the results in four out of nine examined cases are in favour of the existence of a cointegration relationship, whereas in the rest five cases the calculated F-statistic lies in the inconclusive area. However, the analysis which follows regarding the estimation of the implied EC models reveals the validity of long-run cointegration relationships.

Table 2 reports the diagnostic tests for the ARDL equations (4) and (5) applied in all three alternative core models and countries of interest and only for the unemployment variable, which is the focus of the analysis.

For all models, the estimated regression fits very well and passes all the tests regarding serial correlation, heteroscedasticity and non-normality. In some cases, the functional form test reveals mis-specification which could be expected since according to Shrestha and Chowdhury (2005), it is natural to detect mis-specification problems because ARDL equations are probably of a mixed order of integration, i.e., $I(0)$ and $I(1)$.

Table 2
ARDL-VECM Model Diagnostic Tests (LM test statistics)

<i>Germany</i>		
Model 1	R ² -Bar = 0.98	F-Stat. F(10, 20) = 136.05 [0.00]
ARDL	Serial Correlation χ^2 (1) = 1.04 [0.31]	Normality χ^2 (2) = 0.75 [0.69]
(1,2,0,2,1)	Functional Form χ^2 (1) = 2.51 [0.11]	Heteroscedasticity χ^2 (1) = 0.16 [0.69]
Model 2	R ² -Bar = 0.98	F-Stat. F(9,21) = 195.47 [0.00]
ARDL	Serial Correlation χ^2 (1) = 1.89 [0.17]	Normality χ^2 (2) = 1.44 [0.49]
(1,1,0,2,1)	Functional Form χ^2 (1) = 1.50 [0.22]	Heteroscedasticity χ^2 (1) = 0.45 [0.50]
Model 3	R ² -Bar = 0.99	F-Stat. F(10, 23) = 299.71 [0.00]
ARDL	Serial Correlation χ^2 (1) = 0.01 [0.94]	Normality χ^2 (2) = 1.20 [0.55]
(2,0,0,2,0,1)	Functional Form χ^2 (1) = 17.15 [0.00]	Heteroscedasticity χ^2 (1) = 0.31 [0.58]
Notes: The ARDL equations are selected based on Akaike Information Criterion.		
<i>USA</i>		
Model 1	R ² -Bar = 0.91	F-Stat. F(8, 22) = 37.39 [0.00]
ARDL	Serial Correlation χ^2 (1) = 0.34 [0.85]	Normality χ^2 (2) = 0.86 [0.65]
(1,0,0,2,1)	Functional Form χ^2 (1) = 0.19 [0.66]	Heteroscedasticity χ^2 (1) = 0.02 [0.89]
Model 2	R ² -Bar = 0.96	F-Stat. F(11,19) = 72.58 [0.00]
ARDL	Serial Correlation χ^2 (1) = 0.09 [0.77]	Normality χ^2 (2) = 1.49 [0.47]
(2,2,1,0,2)	Functional Form χ^2 (1) = 5.01 [0.02]	Heteroscedasticity χ^2 (1) = 1.39 [0.24]

Tables 3 and 4 summarise the results with respect to the long-run coefficients and the EC specification estimates for the considered countries and the examined core approaches to unemployment. In the context of the empirical investigation, we employed various combinations of variables retaining for each core approach its fundamentals; the final models reported in the tables have been selected according to the usual statistical model selection criterion (AIC).

First, we discuss the findings of the NAIRU specification denoted by model (1). Following the relevant theory, unemployment exists mainly due to the rigidities in the labour market. Table 3 reports the long-run estimates of the properly selected ARDL specifications for the model (1) in each of the examined countries respectively and having standardised the cointegration vector with respect to the unemployment rate.

The reported results reveal that the variable *BRR*, which stands for labour market rigidities, in all three economies is not statistically significant and does not have the expected from the theory positive sign. In our effort to quantify the importance of labour market rigidities we employed a host of alternative variables, such as benefit duration, unionisation, etc., for which data sets are available only for the US and German economies. The results were similar to those derived with the *BRR*, the only

variable for which we have data for the three countries under investigation and for the whole period. In fact, for Germany the coefficient of *BRR* is -1.24 with a p-value of 0.85. For USA the respective coefficient is -0.39 with a p-value of 0.59 and finally for Sweden we get -4.53 with a p-value equal to 0.14. On the other hand, the capacity utilisation ratio (*CU*) variable is found statistically significant and of the expected negative sign for all countries under investigation. In particular, for Germany the estimated coefficient is -10.73 (p-value=0.02), for USA it is -5.71 (p-value=0.008) and for Sweden it is -23.31 (p-value=0.02). The inflation rate exerts the expected from the theory negative effect only for the US economy (-0.14), whereas for Germany and Sweden is 2.62 and 0.01, respectively. With respect to the p-value, the inflation rate coefficient is statistically significant only in the case of German economy (p-value=0.02) whereas it is not for the US (p-value=0.62) and Sweden (p-value=0.99).

Table 3
Estimated Long-run Coefficients using the ARDL Approaches

	<i>Germany</i>			<i>USA</i>			<i>Sweden</i>		
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
<i>BRR</i>	-1.24 (0.85)	-	-	-0.39 (0.59)	-	-	-4.53 (0.14)	-	-
<i>CU</i>	-10.73 (0.02)	-7.77 (0.01)	-	-5.71 (0.01)	-13.41 (0.02)	-	-23.31 (0.03)	-9.72 (0.080)	-
<i>Y</i>	-	4.12 (0.05)	-	-	-20.16 (0.07)	-	-	-61.41 (0.03)	-
<i>K</i>	-	-	-4.27 (0.01)	-	-	-1.05 (0.01)	-	-	-21.49 (0.01)
<i>k</i>	-	-	5.38 (0.00)	-	-	1.84 (0.01)	-	-	6.44 (0.02)
<i>L</i>	-	-	9.22 (0.18)	-	-	8.59 (0.00)	-	-	1.82 (0.62)
<i>P</i>	2.62 (0.02)	-2.52 (0.36)	2.53 (0.00)	-0.14 (0.62)	1.52 (0.00)	-6.07 (0.00)	0.01 (0.99)	10.38 (0.10)	-5.86 (0.04)
<i>LABC</i>	-8.26 (0.11)	-5.26 (0.17)	6.94 (0.21)	-2.39 (0.41)	7.09 (0.14)	8.71 (0.01)	-5.35 (0.28)	202.18 (0.10)	27.67 (0.16)
<i>c</i>	21.47 (0.59)	1.22 (0.69)	39.70 (0.02)	81.24 (0.00)	7.58 (0.12)	60.60 (0.00)	4.61 (0.88)	75.16 (0.01)	403.81 (0.01)
<i>t</i>	-	-	-	-	-	-	-0.13 (0.64)	0.49 (0.12)	0.69 (0.04)

Note: The numbers in parentheses are the p-values.

With regard to the short-run dynamics, Table 4 reports the findings (Wald test probability values) from the EC models corresponding to the adopted ARDL specifications for the model (1).

Table 4
Error Correction Representation for the Selected ARDL Models

<i>Lagged groups of</i>	<i>Germany</i>			<i>USA</i>			<i>Sweden</i>		
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
<i>BRR</i>	0.853	-	-	0.576	-	-	0.348	-	-
ΔCU	0.009	0.017	-	0.084	0.002	-	0.001	0.085	-
ΔY	-	0.309	-	-	0.000	-	-	0.000	-
ΔK	-	-	0.001	-	-	0.109	-	-	0.024
Δk	-	-	0.000	-	-	0.000	-	-	0.021
ΔL	-	-	0.005	-	-	0.006	-	-	0.149
ΔP	0.010	0.003	0.001	0.595	0.032	0.000	0.000	0.220	0.000
$\Delta LABC$	0.000	0.000	0.002	0.004	0.253	0.060	0.004	0.140	0.851
<i>EC term</i>	0.000	0.000	0.000	0.000	0.014	0.010	0.020	0.001	0.006
<i>c</i>	-	0.684	0.045	0.000	0.136	0.016	0.888	0.001	0.005
<i>t</i>	-	-	-	-	-	-	0.580	0.003	0.006
R^2	-	0.87	0.90	0.80	0.93	0.98	0.81	0.83	0.92
$R^2\text{-Bar}$	-	0.81	0.86	0.73	0.89	0.97	0.69	0.71	0.88
<i>F-stat</i>	F(7,23)= 17.73 [0.00]	F(6,24)= 23.55 [0.00]	F(8,25)= 25.89 [0.00]	F(6,24)= 15.7 [0.00]	F(8,22)= 33.39 [0.00]	F(12,18)= 102.42 [0.00]	F(8,22)= 9.75 [0.00]	F(9,21)= 9.75 [0.00]	F(8,20)= 27.45 [0.00]

Note: The numbers for EC term represent *t*-values, whereas the others are the *p*-values of Wald χ^2 tests for short-run causality effects. In addition, Δ denotes first difference.

The EC terms in all the three estimated EC models are found *t*-significant confirming the existence of a long-run equilibrium in all the examined countries with long-run causality running from the group of the core explanatory variables towards unemployment rate. More specifically, the *t*-statistics of the EC terms have a *p*-value of 0.00, 0.00 and 0.02 for Germany, USA and Sweden, respectively. The Wald (χ^2) tests for the lagged first-differenced explanatory variables included in the estimated EC specification provide evidence in favour of a significant short-run causal effect running from *CU* towards unemployment rate with *p*-value of 0.009 for Germany, 0.084 for USA and 0.001 for Sweden. However, there is no such evidence for the labour market rigidity variable *BRR*; the Wald tests display a *p*-value of 0.853 for Germany, 0.576 for USA and 0.348 for Sweden. For inflation, we get mixed results, since the Wald tests exhibit a *p*-value of 0.01 for Germany, 0.595 for USA and 0.000 for Sweden.

The above results contradict the fundamental economic policy proposition of model (1) according to which the equilibrium rate of unemployment is determined by real rigidities in the labour market. The extensive empirical literature that link unemployment levels with measures of various labour market institutions is inconclusive; but one is certain that studies within this framework failed to provide strong support to the argument that labour rigidities are responsible for the higher unemployment rate. Howell (2003: 138) found that a number of central and northern European nations with highly developed welfare states (Sweden, Austria, Switzerland, West Germany and Norway) and thus regulated labour markets have lower unemployment rates than the US, a country with unregulated labour market during the period 1983-1994. A study by Fitoussi *et al.* (2000) for the variation of unemployment rate in 19 developed economies for the period 1983-1988 lends support to the conventional institution-as-culprit story only in two unemployment benefit variables, whereas the results for the other four (union density, union coordination, employer exploitation and labour market expenditures) do not confirm the hypothesis that labour market rigidities cause unemployment. In their study, Blanchard and Wolfers (2000) note that the employment protection has an ambiguous effect on the flows of workers and the duration of unemployment, whereas a study by OECD (1999: 50) concludes that the employment protection legislation has little or no effect on overall unemployment. In addition, Nickell (1997) has reached similar conclusions and showed that labour market rigidities, such as the strict employment protection legislation, generous levels of unemployment benefits, high levels of unionisation, etc., appear to have no serious implications to average levels of unemployment. He notes that "it is clear that the broad-brush analysis that says that European unemployment is high because European labour markets are 'rigid' is too vague and probably misleading. Many labour market institutions that conventionally come under the heading of rigidities have no observable impact on unemployment" (Nickell, 1997: 73).

In summary, with respect to the labour market rigidities argument, the empirical analysis is occupied in researching whether rigidities can be best confirmed by modelling them either as a problem of the degree of institutional intervention (Layard *et al.*, 1991), or as a problem of the interaction of the economic shocks in the 1970s-1980s with the presence of strong institutions (Blanchard and Wolfers, 2000) or, finally, as a problem of the change in institutional strength between the 1960s and 1990s (IMF, 2003; Nickell *et al.*, 2002). However, it is worth pointing out that much of the criticism to these studies refer also to the kind of data they use (Baker *et al.*, 2003; Salvanes, 1997) and to the fact that they blame 'bad' institutions as a cause for persistence of high unemployment without distinguishing the 'good' from the 'bad' ones (Howell, 2003: 139).

Turning now to model (2) specification, Table 3 reports the long-run estimates of a properly selected ARDL specification. The results reveal that the *CU* has the expected from the theory sign and it is statistically significant for all countries. Remaining in the same tables, the estimated coefficients for the *CU* variable are for Germany -7.77 (p-value=0.01), for USA -13.41 (p-value=0.02) and for Sweden -9.72 (p-value=0.08). The coefficient of the demand variable, proxied by *Y*, in the case of Germany is positive (4.12) which is inconsistent with economic theory and it is significant at the 7 per cent significance level. The respective coefficients for the USA and Sweden display the expected from the theory negative sign and they are statistically significant. More specifically, for the USA the coefficient is -20.16 with a p-value of 0.050 and for Sweden the same coefficient is -61.41 with a p-value equal to 0.030.

The short-run dynamics of model (2) specifications are reported in Table 4. We observe that the *EC* term in the three estimated *EC* models is found statistically significant confirming the existence of a long-run equilibrium in all examined countries with long-run causality running from the explanatory variables towards unemployment rate. The t-statistics of the *EC* terms have a p-value of 0.000, 0.014 and 0.001 for Germany, USA and Sweden, respectively. Besides, the Wald tests for the lagged first-differenced explanatory variables included in the estimated *EC* specification provide evidence in favour of a significant short-run causal effect running from the capacity utilisation towards unemployment rate. In particular, the Wald tests have a p-value of 0.017 for Germany, 0.002 for the USA and 0.085 for Sweden. Furthermore, similar evidence is found also for the demand variable (*Y*) in the cases of the USA and Sweden, whereas for Germany the demand variable is not found statistically significant. The respective Wald tests display a p-value of 0.309 for Germany, 0.000 for the USA and 0.000 for Sweden.

Summing up, the Keynesian core approach examined by model (2) is supported by the findings reinforcing the view that demand boosting policies are important determinants of unemployment. Within this framework, it is also argued that the 'right mix' of policies may vary quite significantly across countries; recently, the empirical evidence from a number of country studies support the view that good employment outcomes can be achieved through a variety of combinations of labour market institutions with social spending far more generous in some countries than others (Howell, 2005; Hall and Soskice, 2001).

Turning to the classical/Marxian core model (3), its key variables (capital stock and capital-labour ratio) are found to be statistically significant and they have the expected from the theory sign in all economies. Actually, Table 3 summarises the long-run estimates of the properly selected, by means of AIC criterion, ARDL specifications. The results reveal that the capital-labour ratio (*k*) has the expected from the theory positive sign and it is statistically significant for all countries. The estimated coefficient for the

k variable for Germany is 5.38 (p-value=0.000), for the USA is 1.84 (p-value=0.01) and for Sweden is 6.44 (p-value=0.02). Also, in the same tables we observe that the capital stock (K) variable has the expected from the theory negative sign and it is statistically significant for all countries. Hence, for Germany it is -427 (p-value=0.01), for the USA is -1.05 (p-value=0.01) and for Sweden is -21.49 (p-value=0.01). With regard to the labour participation ratio (L), although it has the expected from the theory positive sign for all countries it is statistically significant only in the case of the US economy. More specifically, for Germany it is 9.22 (p-value=0.18), for the USA is 8.59 (p-value=0.00) and for Sweden is 1.82 (p-value=0.62).

With respect to the short-run dynamics reported in Table 4 for the Germany, the USA and Sweden, respectively, we observe that the EC term in all the three estimated EC models is found statistically significant confirming the existence of a long-run equilibrium relationship in all the examined countries with long-run causality running from the group of explanatory variables towards unemployment rate. The t-statistics of the EC terms have a p-value of 0.000, 0.010 and 0.006 for Germany, USA and Sweden, respectively. The Wald χ^2 tests for the lagged first-differenced explanatory variables which are included in estimated EC specification provide evidence in favour of a significant short-run causal effect running from independent variables towards the unemployment rate. The Wald χ^2 test statistics for k has a p-value of 0.000 for Germany, 0.000 for the USA and 0.021 for Sweden; for K has a p-value of 0.001 for Germany, 0.109 for the USA and 0.024 for Sweden; for L has a p-value of 0.005 for Germany, 0.006 for the USA and 0.149 for Sweden; furthermore, the demand variable Y displays a p-value of 0.067 for Germany, 0.005 for the USA and 0.021 for Sweden.

V. Conclusions

This paper attempted to explore the sources of unemployment in the context of three alternative theoretical approaches. The first approach is the mainstream hypothesis according to which the rigidities in the labour market are responsible for the presence of unemployment. The second approach is the Keynesian hypothesis according to which the market system fails to create adequate effective demand for the full employment of labour. Finally, the third approach is the classical/Marxian hypothesis according to which employment or unemployment depends on the dynamics of capital accumulation.

The econometric analysis used the ARDL cointegration method in order to explore the presence of a long-run relation between the variables. The results of our econometric analysis have revealed that the Benefit Replacement Ratio, a variable which is supposed to capture the different levels of labour market rigidities and regulations of each country, did not prove statistically significant in explaining the unemployment rate. This outcome is confirmed in all three countries (the USA, Germany and Sweden) despite the fact that they represent diverse, with respect to labour market, economies.

Even in the US economy, whose labour market is the least regulated, the Benefit Replacement Ratio variable is found insignificant. Turning to the Keynesian core model, our results confirm that the growth of effective demand and the degree of capacity utilisation are statistically significant in all three countries. These results give credence to the Keynesian argument according to which demand boosting policies may be effective in coping with the unemployment problem in most economies independently of the structure of labour markets. Furthermore, this is verified by the fact that in all three economies with such diverse labour market structures, the demand variables are significant in determining the unemployment rate. As for the classical/Marxian core model, we found that its core variables (capital stock and capital-labour ratio) are statistically significant in all three countries; hence, the results give credence to the hypothesis that unemployment depends on the dynamics of capital accumulation and not on the specifics of the labour market structure of an economy.

In conclusion, the results of the present empirical analysis are in sharp contrast to the view that the presence of labour market rigidities bears responsibility for the high unemployment rate and to the policy conclusion according to which countries with considerable unemployment figures should undertake structural reforms in order to free labour market from alleged rigidities which do not allow its proper function (IMF, 2003: 129). In fact, our findings suggest that the growth dynamics of an economy may constitute the main causes of unemployment and not necessarily the structure of labour market. Hence, these findings may give rise to an altogether different perspective to the problem of unemployment and may suggest different policy proposals whose emphasis will be on the dynamics of capital accumulation in combination with demand forces and will not focus solely on establishing an unrestricted labour market.

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