UNVEILING SPANISH UNEMPLOYMENT PERSISTENCE BY OUTPUT GAP: A TIME-VARYING PARAMETER APPROACH

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ABSTRACT

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This paper investigates the persistence of Spanish unemployment by incorporating the output gap over the period of 1972-2015. Unlike to the existing literature which identifies labor market rigidity as the triggering factor of high unemployment, we utilize output gap extracted by Kalman filter in order to discriminate between impacts originated from (demand side) shocks and labor market institutions. Time-varying parameter approach allowing for both abrupt and smooth structural changes of parameters facilitates to explore the evolution of the persistence in the country whose history is full of crises and labor market reforms. The presence of lags between the implementation of the policy and its influence on the economy and the interactions between the shocks induce direction towards the gradual changes in Spain. Moreover, the model enables to scrutinize the natural rate or hysteresis hypothesis for each period without restricting the analysis into a dichotomous framework. Estimation results providing evidence in favor of hysteretic effects during the late 1970s and the early 1980s reveal a declining (rising) coefficient for lagged unemployment (output gap) in the subsequent years. Whereas abrupt changes of coefficients after 1984 and 1994 reforms coincided with the start of recovery phases, smooth transition of persistence coefficient after 2008 underlies different dynamics.

Keywords: Unemployment persistence, Output gap, Time-varying parameters, Spain

ÖZ

İSPANYOL İŞSİZLİK DİRENCİNİN ÇIKTI AÇIĞIYLA ANALİZİ: ZAMANA GÖRE DEĞİŞEN PARAMETRELER YAKLAŞIMI

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Bu çalışma İspanyol işsizliğinin sürekliliğini, çıktı açığını kapsayarak 1972-2015 dönemi için incelemektedir. Yüksek işsizliğin tetikleyici faktörü olarak işgücü piyasası katılığını belirleyen mevcut yazından farklı olarak, (talep tarafı) şoklar ve işgücü piyasası kurumlarından kaynaklanan etkiler arasında ayrım yapmak için Kalman filtresi ile elde edilen çıktı açığını kullanmaktayız. Geçmişi krizler ve işgücü piyasası reformları ile dolu olan bu ülke için, parametrelerin hem ani hem de yumuşak geçişli yapısal değişikliklerine olanak veren zamanla değişen parametreler yaklaşımı, işsizlik sürekliliğinin gelişimini keşfetmeyi kolaylaştırmaktadır. Politikanın uygulanması ile ekonomiye olan etkisi arasındaki gecikmelerin varlığı ve şoklar arasındaki etkileşimler, İspanya'da kademeli değişimlere doğru yönelime yol açmaktadır. Ayrıca model, analizi dikotom bir çerçeveye sınırlamadan, her dönem için doğal işsizlik oranı veya histeri hipotezini incelemeye olanak sağlamaktadır. Tahmin sonuçları 1970'lerin sonlarında ve 1980'lerin başlarında histerik etkiler lehine kanıt sağlarken, takip eden yıllarda işsizlik direnci (çıktı açığı) için azalan (artan) bir katsayı ortaya koymaktadır. 1984 ve 1994 sonrası reformların ani değişimleri, ekonomik canlanma evrelerinin başlangıcı ile çakışırken, 2008 sonrası direnç katsayısının yumuşak geçişi farklı dinamikleri vurgulamaktadır.

Anahtar Kelimeler: İşsizlik direnci, Çıktı açığı, Zamanla değişen parametreler, İspanya

To

Wild World

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criterion
ARMA	Autoregressive Moving Average
ARIMA	Autoregressive Integrated Moving Average
BFGS	Broyden-Fletcher-Goldfarb-Shanno
BIC	Bayesian Information Criterion
BN	Beveridge-Nelson
CLS	Conditional Least Squares
EC	European Community
EMS	European Monetary System
EPL	Employment Protection Legislation
ERM	Exchange Rate Mechanism
ESM	European Single Market
EU	European Union
GDP	Gross Domestic Product
HP	Hodrick-Prescott
HQC	Hannan-Quinn Information Criterion
KPSS	Kwiatkowski–Phillips–Schmidt–Shin
ML	Maximum Likelihood
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
QML	Quasi-Maximum Likelihood
UC	Unobserved-Components
UK	United Kingdom
US	United States

CHAPTER 1

INTRODUCTION

Unemployment is on the front burner of the agenda in the world economy after the severe impacts of the global financial crisis of 2008. Although it may be claimed that the labor markets are more flexible than as they were four decades ago, there is still great room for policy implications. Since the labor market involves human-being factor as distinct from the other markets, the policy recommendations are crucial not only because of the efficiency concerns but also due to the social dimension of the issue from the perspective of normative economics. In this sense, four main hypotheses come into the picture with the aim of exploring the dynamics of the unemployment and producing expedient policy proposals. The natural unemployment rate and the structuralist approach to the natural rate by Phelps (1967, 1968, 1994) hypotheses propound the presence of an equilibrium rate that the present unemployment rate adjusts eventually even if the shocks lead to transitory divergence from that rate. On the other side, the hysteresis hypothesis by Blanchard and Summers (1986) suggests the absence of such an equilibrium unemployment rate relying on the claim that the shocks permanently adjust the dynamics of the unemployment. Consequently, the policies creating temporary shocks may reduce the unemployment due to the considerable degree of path dependence. The fourth hypothesis claims the presence of high persistence in unemployment which may be specified under the natural rate hypotheses but also have similar policy implications to the hysteresis scenario as the adjustment span may be exceptionally long without intervention.

As the policy suggestions differ considerably relying on the empirical validity of these hypotheses, the empirical literature put considerable effort in testing these opponent hypotheses. For this reason, the majority of the studies utilize unit root tests since the hysteresis hypothesis is formulized as the nonstationarity of the unemployment series, empirically. The studies including Alogoskoufis and Manning (1988), Elmeskov and MacFarlan (1993), Jaeger

and Parkinson (1994), and Røed (1996) fail to reject the hysteresis hypothesis in favor of the natural rate by relying on the standard testing procedures. However, the conventional unit root tests neglecting the presence of the structural breaks, the nonlinear structure, and the near unit root alternative suffer from low power and may provide evidence in favor of the nonstationarity, erroneously. By incorporation of the structural breaks in unit root testing processes, the evidence in favor of the stationarity increases as Arestis and Mariscal (1999), Ewing and Wunnava (2001), Camarero et al. (2005), Lee and Chang (2008), Ramirez and Rodríguez (2014), among others, premediate the structuralist approach to the natural rate against the hysteresis. By the same token, the studies allowing for the nonlinearity including Bianchi and Zoega (1998), León-Ledesma and McAdam (2004), and Fosten and Ghoshray (2011) support the natural rate hypothesis, essentially. Tschernig and Zimmermann (1992) and Cuestas et al. (2011), on the other hand, find evidence of the high persistence even if the hysteresis is rejected when the fractional integration is allowed. Therefore, the support for the stationarity of the unemployment series increases once the modified unit root tests are utilized based on different concerns. In this sense, the primary focus of the literature is on testing the unemployment hypotheses by leaving the degree of persistence aside. However, the estimation of the persistence degree matters beyond solely testing these hypotheses in practical terms. To this end, following the test of the hypotheses the autoregressive coefficients are used in calculations of the half-lives as the estimates of the persistence degree. On the other hand, the studies utilizing the time-varying parameter approach (Anderton (1998), Edwards and Edwards (2000), Srinivasan and Mitra (2012)) focus on the estimation of the persistence coefficient at the forefront by relying on the lagged unemployment.

The objective of this thesis is to investigate the persistence of unemployment by embodying the output gap in a state-space model enabling for time-varying parameters over the period of 1972-2015 in Spain. In the current structure, the persistence coefficient is expected to reflect the dynamics of the labor market institutions while the output gap coefficient displays the impact of the temporary shocks to the labor markets from the output side of the economy. Therefore, the dynamics of the unemployment rate are explored in terms of both the shocks and the persistence mechanism explanations as implied by Dolado and Jimeno (1997). Although the high unemployment rates in the European countries compared to the US is treated as usual in the traditional literature for the period after the 1970s, Spain emerges as an outlier

among the other countries in the region regarding its unemployment performance as demonstrated by OECD (2010), recently. Conventionally, the rigid labor market structure is assumed to be responsible from so claimed high persistence and high levels of the unemployment in Spain. In this sense, the various number of labor market policies have been implemented during the last four decades. Moreover, the substantial transformation of the economy triggered by the death of Franco in 1975 has gained momentum in line with the European integration process from the 1980s onwards. The empirical literature, focusing on testing the unemployment hypotheses provide the mixed evidence even if the modified versions of the unit root tests tend to reject the hysteresis hypothesis, more predominantly. Different from Arestis and Mariscal (1999, 2000), Papell et al. (2000), Everaert (2001), Garcia-del Barrio and Gil-Alana (2009), and Ramirez and Rodríguez (2014) relying on the sharp structural breaks on the specification of the valid unemployment hypothesis in the Spanish case, the approach in this study allows for identifying smooth change dynamics, as well. Moreover, the primary focus is on the degree of persistence beyond the sole concentration to the hypotheses, unlike the majority of the studies in the literature. The reflections of the transition process on the labor markets and the interaction of the reforms to this transformation span are explored conveniently by virtue of flexibility facilitated by the time-variation of the parameters.

The empirical results reveal that, although the persistence coefficient displaying explosive behavior and the output gap coefficient being positive, remarks the extreme form of rigidity in the unemployment until the mid-1980s, the resilience of the labor markets has improved after this period. The substantially decreasing persistence coefficient in the mid-1980s and the 1990s, in addition to the output gap coefficient turning to negative, enables to evaluate the extent of the labor market reforms in 1984 and 1994. On the other hand, the analysis conducted for the youth in order to unveil potential heterogeneity hidden by the adults as the benchmark group reveals that the sensitivity of the unemployment rate to the output gap is substantially higher for this group. Therefore, the difference between the adult and the youth may result from the higher cyclicality of the unemployment in the latter group. The empirical findings by utilizing the disaggregated female-male unemployment data, in other respects, emphasize that the articulation of females to the labor market has emerged under relatively flexible circumstances during the late 1970s and the 1980s as displayed by the more stable behavior of the persistence coefficient than the male. However, the labor market reforms seem

to be rather influential in reducing the persistence coefficient of males compared to females. Apart from the sharp changes of the persistence in the reform periods coincided with the recovery phases, a smooth decline of the persistence under the adverse economic conditions after 2008 suggests the validity of the discouraged worker effects for the male labor force whereas the response of the female labor force is not alike. To the best of our knowledge, this study is the first attempt to explore the persistence dynamics of the Spanish unemployment rate by incorporating the output gap in order to differentiate between the impacts brought by the cyclical shocks versus the structural propagation by the labor market institutions in the time-varying parameters approach.

The rest of the study is formed as follows. Chapter 2 presents a brief summary of the relevant literature. Chapter 3 provides a historical overview of the Spanish economy concerning both the general and the labor market perspectives in addition to the description of data. Chapter 4 clarifies the methodology as the filtering procedures for the output gap estimates and the time-varying parameters model by Kalman filter. The empirical results are discussed in Chapter 5 and the conclusions are presented in Chapter 6.

CHAPTER 2

LITERATURE REVIEW

Unemployment attracts great attention in the literature due to its social consequences in addition to economic costs attached. Although two major hypotheses as the natural unemployment rate and unemployment hysteresis have come into prominence on theoretical grounds at the beginning, these two theories have given rise to the emergence of two more hypotheses namely the structuralist approach to the natural unemployment rate and the high persistence in the following years. Therefore, based on the historical evolution of the literature it is possible to mention four fundamental hypotheses with different policy implications regarding unemployment.

Early studies by Phelps (1967, 1968) theorize the natural rate hypothesis which claims the existence of an equilibrium rate of unemployment based on the structural features of product and labor markets in the economy. In this framework, shocks to the unemployment rate lead to temporary fluctuations around the natural rate and the behavior of unemployment have an ultimate tendency to revert this constant level after the absorption of these shocks. The rise of European unemployment during the 1970s has been investigated through the impacts of shocks such as oil price upsurge, the slowdown of productivity growth combined with potential rigidities embedded in the price mechanisms (Blanchard, 2006). Therefore, consistent with the natural rate hypothesis, it was expected that the unemployment rate would return to this constant rate as in the period before receiving the shocks.

However, the lack of tendency in the European unemployment rates moving back to a probable equilibrium level characterizing the pre-shock period has challenged the standard theory and brought the validity of the natural rate theory up for discussion in the 1980s. Blanchard and Summers (1986) propound hysteresis hypothesis as an alternative explanation to clarify the dynamics of unemployment rates. The formal definition of the unemployment hysteresis

is made as "current unemployment depends on past values with coefficients summing to 1."[1] In this respect, it is expected that shocks to the unemployment rate lead to permanent alterations which destroy the concept of a natural unemployment rate by making it path dependent. Instead of a unique equilibrium rate, Blanchard and Summers (1988) specify European unemployment in the context of "fragile equilibria" relying on the assumption that it is substantially sensitive to the initial conditions, and to the shocks received currently and in the past.

In order to identify mechanisms giving rise to hysteresis; insider-outsider theory, human capital depreciation, and physical capital accumulation, explanations are proposed. Insider-outsider model by Blanchard and Summers (1986) emphasize that in the wage setting system bargaining system operates by taking solely insider members, employed people into account and neglect outsiders, unemployed people. This set-up gives rise to inertia by preventing adjustment through prices even in the case of escalating unemployment and promotes quantity adjustments. Secondly, unemployment spells lead skills of unemployed people to depreciate and make it difficult to adjust these skills with requirements of available jobs in a dynamic market structure. The explanation is more compatible with longer durations of unemployment as in this case employers are more likely to treat unemployment duration as a bad signal concerning the employability of unemployed people. Another problem regarding the long duration of unemployment may result from the irrational behavior of the unemployed people in the form of rising reservation wages and diminishing search effort especially if unemployment benefits are available. On the other hand, physical capital accumulation is presented as another explanation of the hysteresis hypothesis. Concerning this explanation, temporary rise of unemployment is transformed into a permanent surge as it undermines evolution of capital associated with lower output and profit by boosting unemployment further due to shrinking capital stock. Instead of "full persistence" defined as the hysteresis process, the high persistence of unemployment is regarded as a third hypothesis. In theoretical respects, Blanchard (2006) provides support by the facts that unions would be aware of the probability that insiders may become outsiders at some point in wage setting process and firms use high level of unemployment as a trump card in the bargaining table prevent hysteresis from being prevalent even if it may drive a great degree of persistence. Therefore, it is remarked that the high level

[1] Blanchard and Summers (1986, 1987) emphasize that they use "hysteresis" concept loosely speaking "to refer to the case where the degree of dependence on the past is very high for a long time, where the sum of coefficients is close but not necessarily equal to 1".

of unemployment creates downward pressure on the persistence mechanism despite the limitation of the impact. In the following years, the structural natural rate hypothesis has come into front by Phelps (1994). In this framework, it is claimed that although most of the shocks to the unemployment rate are on a temporary basis, occasional shocks related to factors such as technology, institutions or even real macroeconomic variables like interest rates may give rise to permanent modifications in the natural unemployment rate. Moreover, the focus of the studies shifted to the role of labor market institutions[2] on unemployment due to diversifying unemployment experience within the European countries (OECD, 1994). Blanchard (2006) summarizes the primary reasons of the unemployment movements in line with the evolution of the literature as shocks in the 1970s, persistence mechanisms in the 1980s, labor market institutions in the 1990s and the interaction of shocks and institutions afterward.

The empirical literature may be investigated based on two dimensions concerning the unemployment hypotheses. In the former aspect, the studies concentrate mainly on testing between the contending hypotheses of the natural rate and/or the structural natural rate versus the hysteresis so called the full persistence processes. The conclusion in favor of one of the hypotheses allows for drawing rough policy implications based on the empirical evidence. In this sense, the natural rate and the structural natural rate hypotheses do not involve demand-side policies in order to influence the unemployment rate since the policies can lead to temporary changes, merely. The policy recommendation under these scenarios is more likely to rely on structural reforms affecting the supply-side dynamics. On the other hand, the high or the full persistence hypotheses requires active demand-side policies since the policy impacts tend to be either long-lasting or permanent. However, the testing procedures in this dimension do not directly incorporate the measurement of the persistence degree which emerges as a critical issue beyond purely testing these hypotheses. That is to say, even though the testing procedure supports the natural rate hypothesis, the degree of persistence matters in terms of the magnitude and the timing concerning the absorption of the shocks in the economy. For this reason, although the natural rate hypotheses are supported there can still be room for the demand side policies on the basis of the persistence level. Therefore, the measurement of the persistence emerging as a critical issue beyond merely testing the hypotheses constitutes the second dimension of the literature.

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[2] For further details, see Nickell and Layard (1999).

The first dimension of the empirical time series literature has evolved in several aspects in order to differentiate between these hypotheses. Initially, the presence of hysteresis or the natural rate hypothesis has been examined by scrutinizing stationarity of the series in time series approach[3]. In this formulation, hysteresis hypothesis has been analyzed as the analog to nonstationarity of the series which ensures permanent effects of the past and current shocks on the level of the unemployment rate. On the other hand, stationarity or mean reversion properties have been represented as evidence in favor of the natural rate hypothesis. Hence, following the study of Blanchard and Summers (1986) investigating the empirical validity of the hysteresis hypothesis for European countries and the US through an ARMA, diversified type of unit root and stationarity tests are utilized in the literature. The studies Alogoskoufis and Manning (1988), Neudorfer et al. (1990), Brunello (1990), Elmeskov and MacFarlan (1993), Jaeger and Parkinson (1994), Røed (1996), Payne et al. (1999), and Roberts and Morin (1999) provide dominant evidence in favor of hysteresis hypothesis in the various OECD countries and the natural rate hypothesis in the US unemployment rates by using conventional ADF and KPSS tests. However, as also emphasized by these studies, traditional unit root tests may lead to misjudgment of hypotheses in several cases namely, the presence of structural breaks, the near unit root case, and the nonlinear structure. To start with the structural breaks, the fact that the conventional unit root tests suffer from low power as they may lead to not rejection of the unit root hypothesis has been demonstrated by Perron (1989). Accordingly, the studies by Mitchell (1993), Arestis and Mariscal (1999), Arestis and Mariscal (2000), Papell et al. (2000), Everaert (2001), Ewing and Wunnava (2001), Camarero et al. (2005), Lee and Chang (2008), Gomes and da Silva (2009), Ramirez and Rodríguez (2014), and García-Cintado et al. (2015) extend the analysis by allowing for either exogenously or endogenously determined sharp structural changes in unemployment rates. In these methods, rejecting the nonstationarity provide evidence in favor of the structural natural rate hypothesis. That is to say, even though most of the shocks to the unemployment result in temporary fluctuations, infrequent shocks may lead to permanent adjustments in the natural rate. With the inclusion of

[3] In order to avoid the small sample problems and exploit further information via a cross-sectional dimension, several studies have employed unit root tests in the panel framework. In this context, Papell et al. (2000), Silvestre et al. (2002), Chang et al. (2005), Camarero et al. (2006), Camarero et al. (2008), Romero-Avila and Usabiaga (2007), Romero-Ávila and Usabiaga (2008), and Lee et al. (2010) take structural breaks into account; whereas Song and Wu (1998), León-Ledesma (2002) and Camarero and Tamarit (2004) do not deal with this matter. In addition to the mixed evidence provided by these studies, they are also criticized by the sensitivity of the results to the selection of members included in the panel as remarked by Fosten and Ghoshray (2011).

structural breaks, these studies reveal more prevalent evidence in favor of the structural natural rate hypothesis as the hysteresis is rejected more confidently. However, from an alternative perspective, the results induce a mixed evidence due to the failure of rejection of the unit root, entirely in Mitchell (1993), Gomes and da Silva (2009), and García-Cintado et al. (2015) and partially in Arestis and Mariscal (1999) and Arestis and Mariscal (2000). Thus, the unit root tests allowing for the structural breaks are lack of producing unambiguous results regarding the unemployment hypotheses.

Moreover, as underlined by Shiller and Perron (1985), the standard unit root tests lack the power to discriminate between unit root and near unit root processes. In that sense, the second strand of the empirical literature on the testing the unemployment hypothesis employs fractional integration methods to investigate the persistence hypothesis, which is characterized by the presence of a nonstationary but mean-reverting unemployment rate. In this respect, the degree of integration is associated with the extent of the persistence in the literature. Tschernig and Zimmermann (1992) reject the hysteresis in favor of high persistence in the unemployment rates of Western Germany after the failure of rejection by the unit root tests. Similarly, Cuestas et al. (2011) find support for high persistence by fractional integration after concluding nonstationarity based on the unit root tests in the Central and Eastern European countries.

On the other hand, Gil-Alana and Henry (2003) could not reject the hysteresis on univariate model whereas the multivariate model incorporating real oil price and real interest rates suggests high persistence in the UK unemployment. Crato and Rothman (1996) and Gil-Alana (2001) partially support the persistence hypothesis against the hysteresis for the OECD countries. Contrarily, Ayala et al. (2012) cannot reject the hysteresis with fractional integration method whereas the counter-evidence is suggested by the unit root tests allowing for structural breaks in the Latin American countries. Garcia-del Barrio and Gil-Alana (2009) also could not reject the hysteresis in the Spanish regional unemployment rates even in the presence of structural breaks. Herewith, though the fractional integration methods bring further flexibility via enabling to test persistence hypothesis among the other alternatives, criticisms raised concerning several points. The formalization of the framework is criticized as the as-

sessment of the integration orders regarding the high persistence hypothesis is not definite[4]. Moreover, the puzzling evidence due to the inclusion of the structural breaks may be suggestive of further technical complexities[5].

Alternative to the stationarity test approach under the linearity assumption, the unemployment hypotheses are also investigated in the nonlinear time-series analysis. The standard unit root framework highly suffers from differentiating between nonlinearity and nonstationarity since the majority of these testing procedures take the linear structure as given at the beginning of the analysis. Therefore, the potential of an identifiable nonlinear relation is neglected almost entirely in these procedures. However, as emphasized by Neftçi (1984) among other studies, the unemployment rate series have a tendency to display asymmetry over the business cycle which may be captured by allowing for nonlinearity. In this respect, a second formulation of the hypotheses beyond stationarity for the dynamics of unemployment is used in the nonlinear literature[6]. This approach is based on multiple equilibria concept that allowing for varied equilibrium rates among different regimes of unemployment. Skalin and Teräsvirta (2002) ground this approach in time series econometrics by referring to the theoretical model by Diamond (1982). Specifically, it can be recognized in a similar way to the fragile equilibria concept by Blanchard and Summers (1988), as discussed before. Moreover, the relaxation of the restrictive assumption of dichotomy[7] between the hysteresis hypothesis and the natural rate hypothesis may be exploited in this set-up. Bianchi and Zoega (1998), León-Ledesma and McAdam (2004), Skalin and Teräsvirta (2002), Fosten and Ghoshray (2011), and Ghoshray and Stamatogiannis (2015) investigate the behavior of the unemployment series allowing for the nonlinearity regarding these concerns reveals the presence of different regimes that can be captured by nonlinear structure beyond the nonstationarity over time.

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[4] See Ghoshray and Stamatogiannis (2015).

[5] As referred in Chang (2011), Bierens (1997) mentions possibility of nonlinear pattern brought by the structural changes. It is emphasized that the earlier studies relying on unit root testing procedures may have considerable limitations.

[6] See Hallett and Piscitelli (2002) for a study even further discriminating between nonlinearity and hysteretic behavior based on a technical definition of the hysteresis.

[7] In this context, mutual exclusiveness of these two hypotheses over the whole sample period is implied by the term. That is to say, these studies ignore the possibility that different sub-periods in the sample can be characterized by distinct hypotheses.

The second dimension of the empirical time series literature, on the other hand, may be classified based on the calculations of the persistence coefficient. To this aim, the empirical literature utilizes the autoregressive coefficients of the unemployment rate in order to estimate the persistence. Primarily, several studies estimate the persistence coefficient following the testing of unit root properties of the series. Elmeskov and MacFarlan (1993) and Arestis and Mariscal (1999) draw conclusions regarding the high level of persistence in the European countries by identifying the persistence coefficient directly as the autoregressive coefficient of the model which they test the unit root hypothesis. On the other hand, Mitchell (1993), Papell et al. (2000), and Lee and Chang (2008) specify the persistence coefficient based on the half-lives of the received shocks. In this context, the longer half-life which shows half of the required time for the impacts of a shock to disappear corresponds to the higher persistence of the unemployment rate series. Although Mitchell (1993) provides evidence of high persistence in this way, Papell et al. (2000) also indicates that the half-life measures falling considerably once the structural breaks are incorporated in the estimation. Also, Lee and Chang (2008) find the half-life spans below one year for the majority of the European countries support the low persistence in the presence of structural breaks. Thus, the persistence calculations relying on the half-lives suggest declining persistence coefficient compared to the case where the possibility of structural breaks is neglected.

On the other hand, there is no reason to assume a constant persistence coefficient over time once the suggestions of the studies regarding the structural breaks are incorporated. To illustrate, Marques et al. (2017) uses mean bias-corrected estimation with rolling windows method for the estimation of persistence parameter in order to investigate a potential disconnection resulted from the Great Recession in the OECD countries and confirms the switch of the parameter for the majority of them. In this sense, several studies suggest estimation of the persistence coefficient within the scope of the time-varying parameters approach while allowing for the further flexibility. In this framework, Anderton (1998), Edwards and Edwards (2000), and Srinivasan and Mitra (2012) use the time-varying autoregressive coefficient estimates as the persistence parameter. In a more detailed way, Anderton (1998) estimates the unemployment persistence coefficient in the European countries with the aim of exploring the impacts of the ERM concludes the decline of the persistence coefficient in several countries including Spain and France during the 1980s. On the other hand, Edwards and Edwards

(2000) find significant evidence for the decrease of the persistence coefficient consistent with the labor market reforms in the Chilean labor markets in the time-varying approach. Similarly, Srinivasan and Mitra (2012) analyzing the unemployment persistence in France and Germany from 1955 to 2005 show the upward adjustment in the persistence parameter related to the labor market developments whereas the persistence coefficient is relatively stable in the case of Germany.

In this study, we analyze unemployment persistence in Spain. Although rising unemployment has been a prevalent experience shared by almost all European countries during the 1970s and 1980s, signals of heterogeneity among them have become apparent in the 1990s. In this respect, Spanish unemployment occupies a great place in the literature as a result of its high levels and the claims of considerable persistence. When the existing empirical studies are examined, it appears that Alogoskoufis and Manning (1988), Elmeskov and MacFarlan (1993), and Røed (1996) find evidence supporting the hysteresis hypothesis in Spain through standard unit root tests. By incorporating the structural breaks, Arestis and Mariscal (2000), and by allowing both for the structural breaks and the fractional integration, Garcia-del Barrio and Gil-Alana (2009) formally could not reject the hysteresis hypothesis. However, the latter study states that the evidence in favor of the hysteresis becomes blurred once the structural breaks are taken into account. On the other hand, Arestis and Mariscal (1999), Papell et al. (2000), and Ramirez and Rodríguez (2014) reject hysteresis once the structural breaks are allowed in the testing procedure. More specifically, Papell et al. (2000) specify three significant structural breaks in the Spanish case as opposed to the maximum of two breaks in the other OECD countries. Also, Everaert (2001) considering structural breaks concludes the extreme persistence pattern calculated as 14 years to revert a strong shock as opposed to 3-6 years in the majority of the other countries although the hysteresis hypothesis is rejected. Similarly, by incorporating panel unit root tests, Camarero et al. (2006) reject the hysteresis but also classified Spain in the countries displaying high unemployment persistence. On the other extreme side, Olmedo (2011) infers that there is chaos as a particular form of nonlinearity in the Spanish unemployment rates by utilizing a monthly data set from 1964 to 2001. In summary, the empirical literature points out that the structural breaks may have greater importance and the persistence may be more relevant with respect to Spanish unemployment problem compared to the other European countries experiencing the alike shocks. Regarding reasons for

so-called “Spanish disease”; the studies have a tendency to concentrate on two popular arguments as the shocks and the persistence as remarked by Dolado and Jimeno (1997). On the other hand, whether the primary focus should be on the labor market rigidities operating as an amplifying mechanism to the shocks (Nickell, 1997) or it should be on the different dynamics of the shocks (Bentolila & Blanchard, 1990) has remained as a controversial issue. Moreover, potential interactions of the shocks and the labor market institutions require further attention. Further details concerning the shocks and their interactions with the labor market institutions will be discussed in the following chapter.

In this paper, we apply a state space model allowing for time-varying parameters to the Spanish unemployment rates. The main motivation of the paper is rationalized on the basis of several dimensions. Initially, the plausibility of the persistence hypothesis due to the theoretical reasons explained by the insider-outsider theory and the contradiction of unemployment to follow a pure nonstationary process as a bounded variable[8] as mentioned in Brunello (1990) generate an incongruous framework for the unit root testing. In this sense, the unit root testing procedure may be insufficient to capture the rich underlying dynamics of the hypotheses by neglecting these aspects. On the other hand, the empirical evidence supporting the high degree of unemployment persistence necessitates a flexible approach focusing primarily on the persistence levels in addition to the testing the mentioned hypotheses.

Secondly, even the modified versions of these unit root tests considering abrupt structural breaks and the absence of dichotomy disregard probability of smooth changes[9] in the parameters over time. Considering these limitations, time-varying parameters models constitute a flexible alternative to investigate the persistence of unemployment. It can be confidently claimed that smooth transitional dynamics have great importance in the Spanish unemployment context since the impacts of the shocks with potential the rigidities embedded in the labor markets as overly emphasized. The Spanish economy has experienced a great transformation in the last four decades including a regime change, the participation in the EU, several economic crises and a vast number of labor market reforms. The presence of lags be-

[8] Interestingly, Albulescu and Tiwari (2018) provides supportive evidence for the hysteresis by applying bounded unit root tests to the European countries.

[9] Only the studies by Chang (2011), Chang and Su (2014), and Cheng et al. (2014) using Fourier function in the testing approach can be excluded.

tween the implementation of a policy and its influence on the economy; the feedback effects alternating magnitude of the shocks; and the interactions between the shocks, and the institutions induce direction towards the gradual changes. In addition to the capability of presenting smooth changes, this framework allows the data to speak by themselves also with respect to the abrupt changes. Furthermore, as this approach does not impose any restriction regarding the number or timing of the switches between the hypotheses, it enables to extend the scope of the dichotomy problem further. That is to say, for each period the parameters are allowed to follow any of the hypotheses.

Thirdly, to understand the dynamics of the unemployment in a more concrete way, it is important to discriminate between the shocks from output markets and the labor market inflexibility. In this respect, the former can be associated with cyclical movements of the unemployment whereas the latter will be reflective in terms of structural features of it. As emphasized Berger and Everaert (2006) that incorporates the output gap to the cyclical unemployment in the UC model framework to estimate a time-varying natural rate of unemployment, disregarding the persistence impacts of the demand shocks may mislead the interpretation. That is to say, it may be not possible to differentiate whether the demand side shocks or the labor market institutions affect the natural rate and/or give rise to the hysteresis. To account for both the claims regarding the high cyclical component in the Spanish unemployment and dominance of the structural component due to rigidities, the model incorporated the output gap in the analysis of the persistence. The inclusion of the output gap to the model allows interpreting the lag coefficient of unemployment as the institutional features of the labor market. Concerning the claim of a considerable bootstraps component in the Spanish unemployment rate that can be altered via the labor market policies by Bentolila and Blanchard (1990), the persistence coefficient is expected to display the information regarding these adjustments as a result of the policy change. On the other hand, the time-varying parameter displaying the relation between the current unemployment rate and the output gap would be useful on discovering to what extent the changes of output gap drive changes on the unemployment rate and the evolution of the cyclical link during the last four decades.

CHAPTER 3

OVERVIEW OF THE SPANISH ECONOMY

In this chapter, the historical developments of the Spanish economy[1] are discussed for the analysis period. Section 3.1 is devoted to a brief summary of the economic and political events. In Section 3.2, the labor market issues are summarized by specifying further details. Within the scope of this study, the former section may be associated with the shocks whereas the latter section provides background information regarding persistence mechanisms of unemployment and the potential interactions.

3.1 General Overview: The Shocks

The 1970s can be treated as the decade of structural changes for the Spanish economy and the initial conditions triggering the following transformation have dated back to this period. Initially, the gradual transition of the economy from agriculture to industry has been fulfilled to a great extent after the period of 1950-1975 which described by the "Golden Age of Industrialization" (de La Escosura, 2017) with the rapid growth rates. Although the impacts of the first oil shock in 1973 has been absorbed until the death of Franco[2] in 1975, the following years have been characterized by the apparent impacts of the price shocks (Dolado & Jimeno, 1997). The death of Franco has triggered the political transition of the country to a democracy from a dictatorship has taken place and the process was accompanied by substantial changes in the economy. Proceeding a long period of restrictive labor market policies, the legalization of trade unions in 1977 and attempts to soften transition process have created great wage pressures. The great efforts have been put to reduce price level via several ways

[1] See Chislett (2002) and de La Escosura (2017) for the detailed descriptive analysis in a historical context.

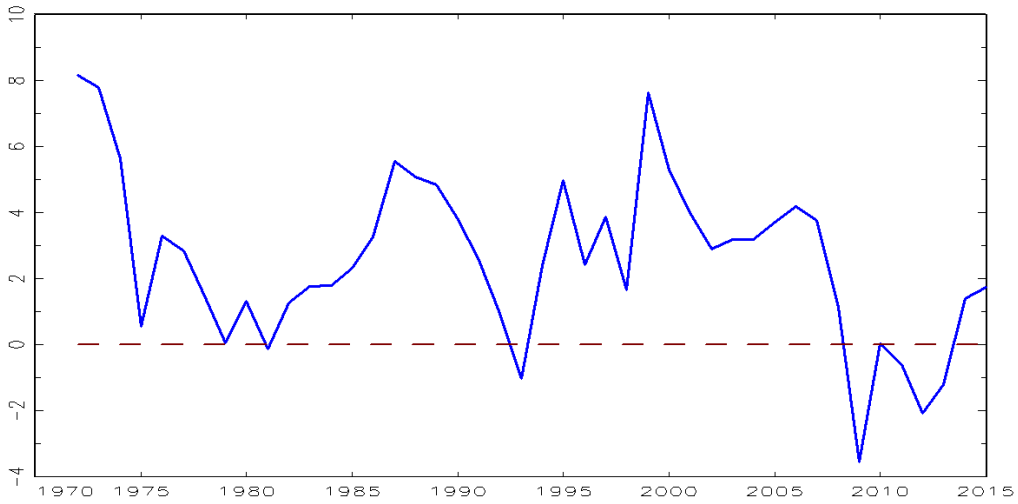
[2] He has ruled the country for 36 years after the Spanish Civil War.

such as the devaluations of the Peseta in 1976 and 1977, the Moncloa agreements[3] between social partners for determining wage growth on the basis of the future inflation, and the restrictive stance of monetary policy which gave rise to increase in the real interest rates after negative real interest rates in the 1960s (Blanchard & Wolfers, 2000) by year 1977. However, the second oil shock in 1979 and the opening up process improved by reductions in import restrictions in 1979 (Bentolila & Blanchard, 1990) have contributed further to the rising price level. On the other hand, the adverse price effects have been encouraged reorganization of the industry by assisting elimination of the obsolete industrial structure. Regarding the role of the government, the fiscal policy has been expansionary in the period, and the regular steps have been taken to improve Welfare State (Bentolila & Jimeno, 2002). Therefore, the shocks widespread in Europe have coincided with the country-specific shocks drastically during the 1970s.

In the first middle of the 1980s, the impact of the shocks combined with the political instability has given rise to an economically slack phase in the economy. Ongoing restructuring process of the economy has stagnated in such a way that the wage pressures and the high level of real interest rates have deteriorated the investment motivations (Bentolila & Blanchard, 1990). On the other hand, as illustrated in Figure 3.1, the recovery period emerging gradually has gained expeditious momentum after 1984. In the second half of the decade, participation in the EC in 1986 and the EMS in 1989 have created a substantial boost in the economy. The high inflation experienced in the 1970s has decreased, and the stance of the high interest rates and the overvaluation of the exchange rate have been used on the purpose of attracting the capital flows (Dolado & Jimeno, 1997). The fiscal policy that has turned out to contractionary in the late 1980s has emerged as a limited tool due to the restrictions brought by the monetary side. Hence, the developments of the 1980s can be interpreted in the light of the positive impacts of the rising synchronization to the European cycle.

However, the crisis directed by the ERM after the reunification of Germany in 1989 has led to the substantial decrease in the growth rates during the initial middle of the 1990s as reflected by Figure 3.1. On the other hand, the developments advancing European integration process, the establishment of the union by the Maastricht Treaty in 1992 and the ESM in 1993 have

[3] See Bentolila and Blanchard (1990) for the details.



Source: IMF, International Financial Statistics

Figure 3.1: GDP, Percentage Change, 1972-2015

changed the direction of the Spanish economy, considerably. As explained by Estrada et al. (2009), the required reforms and policy changes with the aim of fulfilling the convergence criteria[4] of the treaty have motivated fiscal consolidation and declining interest rates from 1995. Thus, the borrowing capacity of the economy has expanded both due to the low interest rates and the capital transfers from the EU. The recovery under these circumstances has generated flourishing impacts especially on the domestic consumption and the residential investment. The last stage of the monetary union anticipated was completed by the introduction of the Euro currency in 2002 in Spain.

As demonstrated by Figure 3.1, the performance of the economy has been characterized by positive and the relatively stable growth rates until 2007. Price and wage moderation supported stability in the late 1990s have contributed positively to a rising trend. In general, the economy has been classified as one of the European countries that displaying the strongest growth in the area as reported by OECD (2006). On the other hand, Alberola et al. (2014) emphasizes that in spite of a great growth potential resulted from the macroeconomic stability, and the reduced costs of borrowing under the monetary union, the present growth rates of the economy were excessive in the post-1999 period. The notable imbalances accumulated in this period are reported by Estrada et al. (2009) as the rise of the household and corporate debt, the construction boom and the building up of the foreign debt that are driven by the low

[4] See European Commission (2002) for the details.

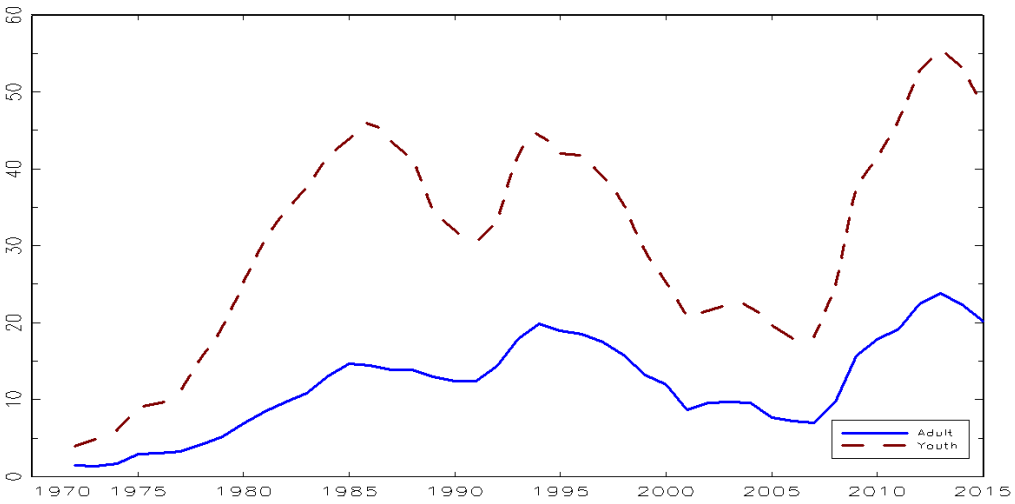
interest rates, the easy credit opportunities, the demographic pressures, appreciation of the real exchange rate, etc. Consequently, the Great Recession hit the economy in a rather severe way as indicated by the growth rates reached to -3.6 percent in 2009 (Figure 3.1). Following that the Sovereign Debt Crisis has emerged in the so-called peripheral countries of Europe and the economy contracted during three consecutive years from 2011 onwards.

3.2 The Labor Markets and Unemployment: The Persistence Mechanisms

Spanish labor markets have entered the process of flexibilization after a long period of restrictive labor market policies during the Franco era. As can be seen from Figure 3.2, the unemployment rates show ample upsurges from the late 1970s after the limited upward movements in the early years of 1970s. Given the severity of the shocks on the output illustrated by Figure 3.1, it appears that the response of the labor markets to these shocks has remained highly restricted in the 1970s. As indicated by Dolado et al. (1993), there might be labor hoarding practices in the labor markets over this period due to the strictness of the EPL[5]. The strictness of the EPL gives rise to slow adjustments over the cycle since the great cost of firing decisions during the adverse macroeconomic conditions also put a limit on hirings under the favorable cyclical conditions (OECD, 1996). That is to say, it smooths the volatile behavior of the employment and unemployment over different phases of the cycle but it is also a potential source of the persistence. On the other hand, the longevity of the negative cycle has reflected in the unemployment rates in the late 1970s. As displayed in Figure 3.2, the unemployment rate of of adult labor force which contains people at and above age 25 exceeded 10 percent in 1982.

The response of the youth labor markets comprising the labor force between 15-24 ages was even more severe as the unemployment rate reached nearly to 40 percent in 1985 from 10 percent in 1977. As reflected in Figure 3.3, the unemployment rates have similar trends for both female and male labor force in this period. Meanwhile, the incidence of the long-term unemployment in the unemployment has also increased dramatically in this period (Franks, 1994). The long-term unemployment is regarded as one of the extreme persistence mechanisms due

[5] See OECD (2014) for further details regarding the EPL.



Source: ILOSTAT

Figure 3.2: Unemployment Rate by Age, 1972-2015

to the combined impacts of the discrimination by the employers[6] and the lower search efforts of the unemployed people with longer unemployment spells. The extent of dis-attachment may give rise to the failure of market mechanisms even under highly flexible labor market conditions[7].

Although the initial attempts of the normalization have been made under the Workers Statute in 1980, the unemployment rates have maintained its escalating trend until the mid-1980s as displayed in Figure 3.2. In 1984, the second labor market reform has taken place in order to lessen the rigidities in the labor markets. Within the scope of this reform, utilization of the non-standard type of contracts such as temporary and fixed-term contracts with extremely flexible conditions compared to the permanent contracts has been stimulated. As can be observable in Figure 3.4, the share of employees with temporary contracts has been more than doubled after a couple of years they introduced. These types of contracts may be useful to improve the functioning of the labor markets since they will potentially reduce mismatch problems by enabling employers to screen employees during a specified time period. In this respect, they are especially beneficial for the long-term unemployed people and new

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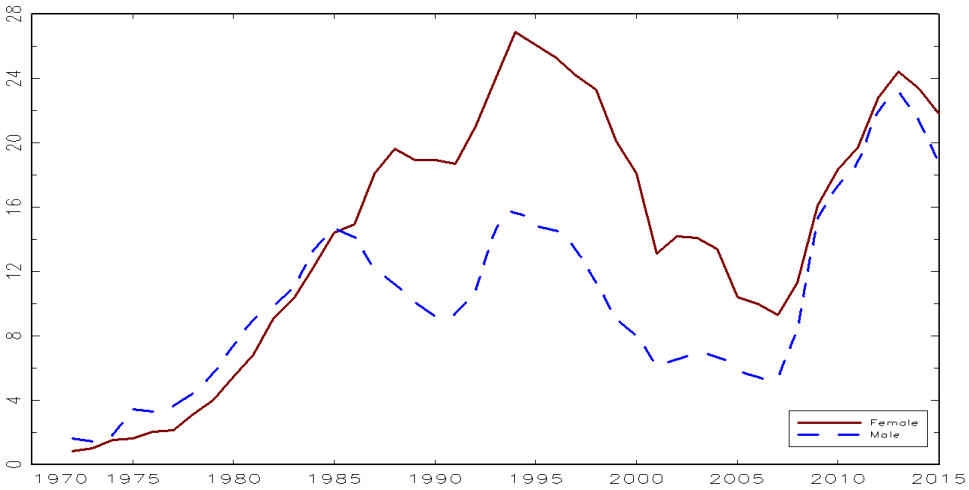
[6] As remarked by Krueger et al. (2014), the discrimination resulted from that long duration of unemployment could be seen as a sign of low productivity of workers because of high likelihood of human capital depreciation during unemployment spell.

[7] de Graaf-Zijl et al. (2015) shows empirically how long-term unemployed fails to affect the wages and the number of vacancies.

entrants to the labor market. Furthermore, Dolado et al. (2002) emphasizes that they have created downward pressures in the long-term structural unemployment rates and potentially have reduced the extent of hysteresis. As it is less costly to fire the workers under reversal of economic conditions, employment opportunities have expanded further during the positive cycle of the economy. Therefore, as presented in Figure 3.2 the unemployment rates have moved in the downward direction during the rest of the decade.

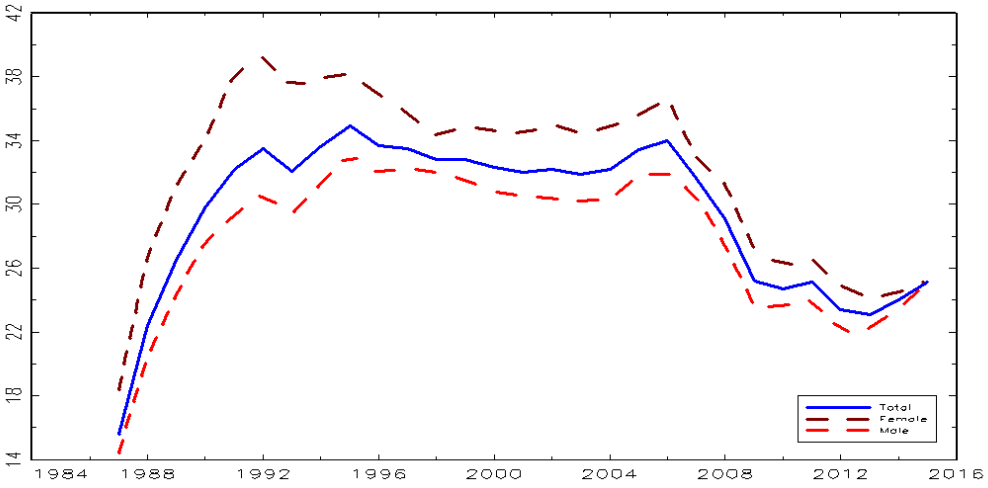


Source: ILOSTAT

Figure 3.3: Unemployment Rate by Sex, 1972-2015

At this point, it is important to remark that the timing of the reform coincided with the recovery period probably induce the downward movements of the total unemployment, further. In this respect, the declining volatile behavior of the output versus the amplified volatile behavior of the employment during the 1980s compared to the 1970s by Dolado et al. (1993) is understandable in the light of developments regarding the boom of temporary contracts in the economy beyond the favorable impacts of the expansion. On the other hand, the disaggregated rates as displayed in Figure 3.3 indicates that the rise in the unemployment rate of the female has retained until 1988 despite the detectable impacts of the reform in the male group immediately after 1985. The seemingly contrasting evidence in Figure 3.4 which demonstrates the higher share of temporary contracts for the female compared to the male may be clarified via Figure 3.5(b) displaying the participation rates. As apparently seen from Figure 3.5(b), the participation of female workers to the labor force has followed a gradual upward trend in

spite of the extremely low initial participation rates for the European standards[8]. On the other hand, the participation rate of male workers has been fairly stable over the period. Therefore, although these two groups have experienced divergent unemployment paths, the decline of the unemployment rates even under the increasing participation rates of female provides apparent evidence for the employment performance of the economy during the late 1980s.



Source: ILOSTAT, EU Labor Force Survey

Figure 3.4: Share of Temporary Employees by Sex, 1987-2015

When the infant flexibility of the labor markets has been tested by the adverse cyclical effects, the total unemployment rates have climbed from 12.4 (30.5) percent in 1991 to 19.9 (45) percent in 1994 for the adult (youth) (Figure 3.2). Although the positive effects of the temporary contracts have been prominent in the previous expansion, the other side of the medallion has become apparent in the subsequent downturn. For example, OECD (1999) remarks that the utilization of specific type of fixed-term contracts with training obligations improved the employment opportunities for the young people in Germany in contrast to Spain where these contracts have been substituted by regular fixed-term contracts most probably due to obtaining the pure cost advantage. Despite the enormous hike of the temporary contracts[9], the low conversion rates to the permanent contracts and even shifts from the permanent contracts to the temporary ones as shown by Alba-Ramirez (1991) lead to the interpretation that they have been treated as substitutes to the permanent contracts. In this respect, they could not go substantially beyond to be a cost advantage to the firms although they have raised labor flows

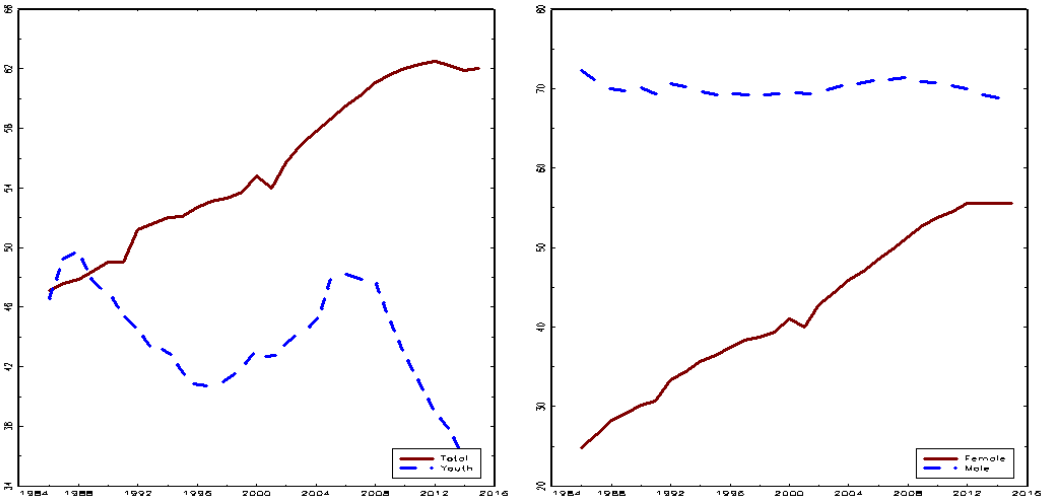
[8] See Franks (1994) for the comparison.

[9] See OECD (2002) for the utilization of these types of contracts in the other European countries.

and the volatile behavior of the employment. Also, the different level of protection and the wage differentials between the temporary and permanent contracted workers have built duality in the labor markets (Bentolila & Dolado, 1994). Concerning the insider-outsider theory, the fragmentation between these different types of contracts may be seen as a source of the persistence mechanism. Although in general the role of the unions has been examined with respect to insider-outsider effects, the low union density combined with the high coverage rates (Nickell, 1997; Nickell et al., 2005) prevent the validity of this explanation in this case. In terms of flexibility measures, the generosity of the unemployment benefits[10] treated as one of the persistence mechanisms has decreased by increasing the minimum contributory period in 1992 (European Commission, 2005). Nonetheless, the slack administration of the benefit system combined with the low share of the active labor market policies as stressed by Nickell (1997) may be treated as the challenging issues to the quality of the flexibility measures. On the purpose of reducing the duality and providing a well-organized flexibilization framework, the reforms of 1994 and 1997 have attempted to subsidize the permanent contracts, reduce the employment protection of the permanent contracted workers and increase control mechanisms on the temporary contracts as explained by Ramirez and Rodríguez (2014). However, as can be seen in Figure 3.3, the share of temporary workers has stayed above 30 percent by decreasing only moderately during the second half of the 1990s. By these reforms, specific groups such as female and young workers have also been explicitly targeted. After 1996, declining participation rates of the youth population from 1986 has switched to a growing trend that can be understood through the impacts of the reforms combined with the positive cycle effects as in the case of 1984 reform. At the end of the 1990s, the unemployment rates have come down around 10 percent and 20 percent for adult and youth, respectively (Figure 3.2). On the other hand, the gap between female and male unemployment rate has remained relatively constant in the recovery period with the higher unemployment rate for female.

As reflected in the Beveridge curve estimates by OECD (2003), the decline of the unemployment rate in the second half of the 1990s has been accompanied by a substantial rise of the vacancy rate even exceeding the post-1985 expansion period. In this sense, transition of the labor markets towards a rather flexible structure is detectable compared to the preceding pe-

[10] Blanchard and Jimeno (1995) states that despite the similar characteristics of Spain and Portugal concerning the economic history and the labor market institutions, unemployment benefit differentials may be responsible from high persistence in Spain unlike Portugal.



Source: ILOSTAT, EU Labor Force Survey

Figure 3.5: Labor Force Participation Rates by (a) Age and (b) Sex (for Adults), 1986-2015

riod of the mid-1990s. Further steps in favor of improving the flexibility measures have been taken during the 2000s. Initially, the main focus of the 2001 reform was to remove the duality of the labor markets similar to the two former reforms taken place in the 1990s. However, Figure 3.4 shows that the share of temporary contracts has relatively stabilized around 32 percent and has not shown a tendency to go down in the first half of the 2000s. As another flexibility measure, the eligibility conditions for the unemployment benefits became stricter in 2002 as reported by European Commission (2005). The impact of the following reform in 2006 has triggered the share of temporary contracts to decline even if the extent of the downturn was limited until 2008, as displayed in Figure 3.4. More specifically, it has been aimed to tackle the fragility fed by the gap between temporary and permanent contracts. In this sense, young and female workers were particularly targeted (Ramirez & Rodríguez, 2014) as the most vulnerable groups similar to the reforms in the 1990s. Given the numerous number of reforms taken place until the Great Recession period, the flexibilization performance may be examined as a success story on the basis of high unemployment rates of the history. However, Alberola et al. (2014) also indicates the labor market reforms were not sufficient in a way that they have removed the rigidities and functionalize the labor market. On the contrary, the existing duality has been fueled further due to low skilled immigrant flows to the country from the late 1990s. In this respect, it is stated that the real adjustment has been avoided as the growing share of the construction sector has created further employment opportunities for this flexible segment

of the labor market. Consequently, the adult unemployment rate has climbed to 15.7 percent in 2009 from 7 percent which is the trough point after 1980 in 2007. The extent of rise has been more extreme in the youth unemployment rates by surging to 37.7 percent in 2009 from 18.1 percent in 2009. The raising trends have undergirded by the impacts of the Sovereign Debt Crisis and the adult unemployment has soared above 20 percent besides the youth unemployment beyond 50 percent. In this period, it is stated that more than 40 percent of the job destruction in the construction sector (Horwitz & Myant, 2015). In this respect, it may be understandable why the male and female groups have suffered disproportionally from the adverse conditions as emphasized by Figure 3.3. Concerning the participation rates displayed in Figure 3.5, decreasing trends associated with the discouraged workers were noticeable for all groups evidently except the stabilization of the rising female participation around 2012 following the modest rises after 2008. Different from the lagged and smooth decrease of the adult male, the response of the youth group as withdrawing from the labor market has occurred immediately. The effort has been put into improving internal flexibility measures in order to alleviate the severity of the crises sequence. For this reason, the firms have been allowed to adjust working conditions of their employees in addition to the relaxing of the EPL (Ramirez & Rodríguez, 2014). Moreover, the limits on the use of temporary contracts have become stricter in the 2010 reform. As displayed by Figure 3.4, the decline of temporary contracts has intensified after 2007 whereas it has started to rise again after 2013.

CHAPTER 4

METHODOLOGY

In this study, we apply a time-varying parameter approach to the unemployment rate series by utilizing the lagged unemployment rate and the output gap as explanatory variables. In order to extract the output gap, three detrending techniques namely the HP filter, BN decomposition, and Kalman filter are used. Following a brief introduction of the time-invariant version of the model in Section 4.1, the state space model allowing for time-varying parameters is elucidated in Section 4.2. The decomposition methods for generating the output gap are covered in Section 4.3.

4.1 The (Baseline) Time-Invariant Parameters Model

Although the autoregressive unemployment variable is frequently utilized in the traditional persistence analysis, it is not sufficient to differentiate between the impacts of the potential inertia explanations in the labor markets and the transitory macroeconomic shocks. With the interest of obtaining a comprehensive proxy for the cyclical effects, the Okun's law suggesting the presence of an inverse relationship between the unemployment and the output gap may be exploited in econometric terms. On the basis of this rationale, the persistence of the unemployment rate can be investigated in a standard time-invariant regression model as:

$$u_t = \beta_0 + \beta_1 u_{t-1} + \beta_2 g_t + \varepsilon_t \tag{4.1}$$

where u_t and u_{t-1} are the current and the lagged unemployment rates, g_t is the output gap in the present period and ε_t is the stochastic disturbance term.

In this representation, the coefficient β_0 demonstrates the level of unemployment rate con-

ceivably associated with the labor supply dynamics and/or the long-term trends of the output market which cannot be captured by the phase of business cycle. The coefficient β_1 is the persistence parameter displaying the extent of the unemployment rate in the preceding period on explaining the current unemployment rate. The persistence parameter is expected to be positive as in the case of the most macroeconomic series. However, the interpretation of this parameter gives rise to further implications concerning the empirical relevance of the natural rate or the hysteresis hypothesis. More specifically, while the case of $\beta_1 \geq 1$ points to evidence favor of the hysteresis, $|\beta_1| < 1$ provides empirical support for the natural rate hypothesis. Furthermore, as explained in Chapter 2, the degree of persistence matters far beyond testing these contending hypotheses. In this respect, the great magnitude of the persistence coefficient manifests the policy requirements over the analysis period. Lastly, the coefficient β_2 measures the impact of the transitory output movements on the unemployment rate. An inverse relationship is anticipated between the variables since the job creation, and the destructive effects of the business cycle are expected to be reflected in the labor markets. More specifically, the anti-cyclical behavior reveals that if the output gap is negative, the production below the potential level triggers a rise in the unemployment rate. The adjustment process takes place if the dynamics of the labor markets are responsive to the temporary output changes. Hence, it is important to note that the coefficient β_2 is more likely to be related to the cyclical element in the unemployment rate as suggested by the Okun's Law whereas the structural motions of the unemployment are reflected by the coefficients β_0 and β_1.

Although model (4.1) enables to examine the persistence in the unemployment via incorporating the output gap, this conventional time-invariant approach suffers from severe shortcomings. Primarily, the time span covered contains a great potential for the presence of structural changes due to the numerous crises and the policy actions as reviewed in Section 3. In this context, the model based on the assumption that a constant parameter is capable of capturing the fundamental dynamics of the four decades is far from the reality. Despite the alternative methods like the dummy variables allowing the sharp structural breaks in the time-invariant framework, the determination of the accurate breakpoints is problematic. Even if the definite periods of the crises or the policy changes are recognized, their reflections in the economy may be realized with the certain lags. Simply, as the economic agents adjust their expectations conditional to the circumstances, the responses probably take place after the realization

of the changes. In this sense, it is more plausible to anticipate the impacts of the certain structural changes to evolve gradually rather than abruptly as a result of the interactions of the variables and the feedback mechanisms embedded in the economy. To illustrate, after implementation of a flexibility measure on the labor markets, firms may boost employment if they are confident about the macroeconomic environment. On the contrary, the same policy may create devastating impacts during an economic downturn. Since the economic theory does not provide clear-cut answers regarding these aspects, the flexibility of the modeling strategy in capturing the dynamic structure emerges as a crucial issue. The conventional time-invariant model is lack of this flexibility as it cannot incorporate the potential lag effects and the smooth transition mechanisms. After all, the direction of the research is implied through the limitations of the scrutinized model (4.1) in this section.

4.2 The Time-Varying Parameters Model

Given both the technical incapability of the time-invariant model and the main motivation of this study concerning the policy analysis, we allow the unemployment persistence and the output gap link to evolve gradually over time by forming time-varying parameters model in the state-space form:

$$u_t = \boldsymbol{x_t}\boldsymbol{\beta_t} + \varepsilon_t \tag{4.2}$$

$$\boldsymbol{\beta_t} = \boldsymbol{\Phi}\boldsymbol{\beta_{t-1}} + \boldsymbol{v_t} \tag{4.3}$$

Equation (4.2) is the observation or measurement equation with $\boldsymbol{x_t}$ being the vector of regressors including a constant term, u_{t-1} and g_t, and ε_t being the disturbance term following an independent, identical, normal distribution with zero mean and the variance covariance matrix $\mathbf{R}$. In the state or transition equation (4.3), $\boldsymbol{\beta_t}$ refers to the unobserved state vector formed as $\boldsymbol{\beta_t} = (\beta_{0t}\ \beta_{1t}\ \beta_{2t})'$, $\boldsymbol{\Phi}$ is a 3x3 transition matrix and $\boldsymbol{v_t}$ is the vector of the disturbances defined as $\boldsymbol{v_t} = (v_{0t}\ v_{1t}\ v_{2t})'$ following an independent, identical, normal distribution with zero mean and variance-covariance matrix $\mathbf{Q}$. In this representation, it is assumed that the disturbances in the measurement and transition equations are independent. Being in line with the majority

of the empirical studies in the literature, we set the transition equation to the general autoregressive form[1] in equation (4.3) and proceed to the imposition of the assumption that $\mathbf{\Phi} = \mathbf{I}$ after the estimation of the autoregressive parameters encompassed in $\mathbf{\Phi}$ in order to ensure the validity of the assumption. Engle and Watson (1987) propose that $\boldsymbol{\beta_t}$ follows a random walk process relying on the previous empirical evidence and the theoretical justification. Furthermore, as emphasized by Primiceri (2005), this specification of the state equation allows for concentrating on the permanent shifts of the parameters in addition to preserving the degree of freedom in the estimation procedure by avoiding the autoregressive parameters. On the other hand, the estimation of the autoregressive parameters before the imposition of the assumption is critical in order to allow for the possibility of the transitory changes in the parameters. After all, the existing set-up facilitates the time-varying coefficients to evolve independent of each other and in permanent ways.

After forming the state space model, the Kalman filter approach[2] can be utilized to derive the optimal estimate of the unobserved state vector $\boldsymbol{\beta_t}$. The filter operates recursively, conditional on the information set realized in the previous period. For this reason, the procedure is involved two stages as the prediction and the update stages. The equations of these consecutive stages are in the form of:

$$\begin{aligned}
\hat{\boldsymbol{\beta}}_{\mathbf{t|t-1}} &= \mathbf{\Phi}\, \hat{\boldsymbol{\beta}}_{\mathbf{t-1|t-1}} \\
\mathbf{P_{t|t-1}} &= \mathbf{\Phi}\, \mathbf{P_{t-1|t-1}}\, \mathbf{\Phi'} + \boldsymbol{Q} \\
\eta_{t|t-1} &= u_t - \boldsymbol{x_t}\, \hat{\boldsymbol{\beta}}_{\mathbf{t|t-1}} \\
\mathbf{f_{t|t-1}} &= \mathbf{x_t}\, \mathbf{P_{t|t-1}}\, \mathbf{x_t'} + \mathbf{R}
\end{aligned} \tag{4.4}$$

$$\begin{aligned}
\hat{\boldsymbol{\beta}}_{\mathbf{t|t}} &= \hat{\boldsymbol{\beta}}_{\mathbf{t|t-1}} + \boldsymbol{K_t}\, \eta_{t|t-1} \\
\mathbf{P_{t|t}} &= \mathbf{P_{t|t-1}} - \mathbf{K_t}\, \mathbf{x_t}\, \mathbf{P_{t|t-1}} \\
\mathbf{K_t} &= \mathbf{P_{t|t-1}}\, \mathbf{x_t'}\, \mathbf{f_{t|t-1}^{-1}}
\end{aligned} \tag{4.5}$$

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[1] See Beck (1983) and Wells (1996) for alternative models for the transition equation such as the random coefficients model, the mean reverting model and the return to normalcy model and their details.

[2] See Harvey (1990); Hamilton (1994) and Neusser (2016) for the technical details. More specifically, Wells (1996) provide the insight regarding the utilization of the filter in economics.

where $\hat{\boldsymbol{\beta}}_{\mathbf{t|t-1}}$ is the estimate of the unobserved state parameter in the current period t conditional on the previous period $t-1$, and $\mathbf{P}_{\mathbf{t|t-1}}$ is the conditional variance of the unobserved state. $\eta_{t|t-1}$ and $\mathbf{f}_{\mathbf{t|t-1}}$, respectively, represent the conditional prediction error and its conditional variance which are used in the following update stage in (4.5). $\boldsymbol{K_t}$ is referred as the Kalman gain and it is utilized in order to determine the degree of the update on the basis of the conditional information available in the previous period and the new information realized in the current period. As derived in Wells (1996), it is a weighted average of these two elements. The gain term is positively related to the variance of the state equation and negatively related to the variance of the measurement equation. Therefore, the greater uncertainty linked to the unobserved system in the present period boost the Kalman gain, automatically. In turn, the update of the state relies more on the new information realized in the current period rather than the previous information used in the estimation of the unobserved state. After that, the updated estimates are used for the estimation of the parameters in the next time period by equation (4.4).

In practical terms, the initializations of the unobserved state vector $\hat{\boldsymbol{\beta}}_{\mathbf{0|0}}$ and the variance-covariance vector of the transition equation $\mathbf{P}_{\mathbf{0|0}}$ are required since the algorithm described in equations (4.4) and (4.5) proceeds recursively by relying on the conditional information of the previous period. Hamilton (1994) suggests the use of the unconditional expectations as the initial conditions if the eigenvalues of the vector $\boldsymbol{\Phi}$ are all inside the unit circle. However, if there is at least one eigenvalue satisfying the condition $|\lambda_i| \geq 1$ then it is no longer possible to use the unconditional expectations, as in the case of our analysis. Instead, $\hat{\boldsymbol{\beta}}_{\mathbf{0|0}} = \mathbf{0}$ and $\mathbf{P}_{\mathbf{0|0}} = \mathbf{I}$ are suggested as the initial values. Furthermore, it is assumed that the initial state values are distributed normally and independent of the disturbances in the measurement and the transition equations. It may be remarked that the impact of the initial conditions matters to a lesser extent as the sample size becomes larger.

After assigning the initial conditions, the iteration process takes place until the whole sample is covered. The optimal parameters are estimated conditional to the system matrices $\boldsymbol{x_t}$, $\boldsymbol{\Phi}$, $\boldsymbol{R}$, $\boldsymbol{Q}$ and the new information realized in each period. However, the system matrices could include unknown parameters (Harvey, 1990). Therefore, the necessity to estimate these unknown parameters in the system matrices prior to the estimation of the unobserved time-varying parameters arises in practical terms. At this point, the Kalman filter is "a crucial build-

ing block" because of its role in the process of obtaining these unknown parameters in addition to providing the recursive estimates of the unobserved state vector, optimally (Canova, 2007).

After specification of the initial values for both these unknown parameters and the unobserved state variables, the Kalman filter equations yield the construction of the log-likelihood function relying on the distributional assumptions. The marginal log-likelihood functions are obtained after the iterations, as long as the normal distribution is assumed. Then, the joint distribution in the log form can be identified by virtue of identical and independent distribution assumption as the following:

$$lnL \;=\; -\frac{1}{2}\sum_{t=1}^{T} ln(2\pi^{n}\,|\mathbf{f_{t|t-1}}|) \;-\; \frac{1}{2}\sum_{t=1}^{T} \eta'_{t|t-1}\,\mathbf{f^{-1}_{t|t-1}}\,\eta_{t|t-1} \tag{4.6}$$

Once the log-likelihood function in equation (4.6) is set, the optimization[3] conducted by the BFGS algorithm provides the estimates of the unknown parameters in the system matrices. These ML[4] estimates used in equations (4.4) and (4.5) for the recursion and the nested procedure can be reiterated until the parameters do not vary between the iterations. The importance of the distributional assumptions and the identification of the transition function for the sake of the log-likelihood function are apparent as emphasized by Engle and Watson (1987). On the other hand, even if the normal distribution is assumed incorrectly, the QML estimation still preserves the optimality of the estimates to a greater extent under the mild regularity conditions (Neusser, 2016). Having discussed the details of the time-varying parameter approach, the next issue to clarify is the decomposition of the output gap.

4.3 Decomposition Procedures for the Output Gap

The output (y) can be represented in a formal set up as:

$$y_t \;=\; \tau_t \;+ g_t \tag{4.7}$$

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[3] Canova (2007) also suggests the grid search, simplex method and the other gradient methods.

[4] See Engle and Watson (1987) for the alternative estimation methods to the ML in this procedure.

where τ represents the trend or permanent component and g stands for the cycle or transitory component of the output. The literature on decomposition of the trend and the cycle components offers a vast number of ways by expressing various definitions of these components reflected by the divergent assumptions formed[5]. In this analysis, three commonly applied detrending procedures in the empirical literature are utilized. The main motivation of this thesis is to explore the most suitable filter for the empirical analysis, since the literature does not present a "one-size-fits-all" solution. After providing a brief review of the HP, the BN and the Kalman procedures concerning the cycle extraction, the section concludes with the comparison of these techniques and their criticisms concerning both the technical features and their implications for economic theory.

4.3.1 The Hodrick-Prescott Filter

The filter by Hodrick and Prescott (1997) suggests identifying trend and cycle components through the following minimization problem:

$$\sum_{t=1}^{T} (y_t - \tau_t)^2 + \lambda \sum_{t=2}^{T-1} [(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1})]^2 \tag{4.8}$$

where T indicates the number of observation on the output y_t and $\lambda > 0$. In this framework, the sum of the squared of the cycle is minimized in a similar fashion to the OLS estimation. However, the minimization problem is subjected to the square of the second difference of the trend term to ensure the desired smoothness of it (Zarnowitz & Özyıldırım, 2006). The trend component is obtained by the first order conditions, and the cycle is extracted as the difference between the actual series and the estimated trend. Thus, the cyclical component is obtained similarly to a residual term with the assumption of zero average value over a long time horizon. There is no correlation between the trend and cycle components, and no irregular component is assumed in the filter.

In this representation, λ is called as the smoothness parameter and it represents the penalty for the growth of the trend. For the initial extreme case, when λ approaches to zero, the trend

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[5] Providing complete technical details of the filtering procedures is not intended in this paper. See Watson (1986) and Canova (1998) for the applications of the alternative techniques and the underlying problems in the literature.

becomes identical to the original series and the cycle disappears. On the other hand when λ goes to infinity the trend turns into a linear trend by the OLS, and the cycle captures the variation of the original series completely. The smoothness parameter is not obtained from an optimization problem as the inverse of the signal to noise ratio (Harvey & Trimbur, 2008) but rather assumed on the basis of prior knowledge with the aim of analyzing the movements of the U.S business cycles in the original paper. Regarding the frequency, $\lambda = 1600$ as proposed for the quarterly data is commonly utilized in the literature. The value of the smoothness parameter for annual data (monthly data) is not precise although the values lower (higher) than the quarter specification are suggested, theoretically as high-frequency data will contain greater variation. In that respect, Ravn and Uhlig (2002) suggests $\lambda = 6.25$ for the annual data by adjusting the quarter value via the fourth power of the frequency alteration.

In practical terms, the procedure can be covered in three steps. In the beginning, the assumption of a predetermined, constant smoothness parameter for the (second order) growth of the trend is imposed. Then, equation (4.8) is minimized with respect to the trend and the cycle is obtained by equation (4.7).

4.3.2 The Beveridge-Nelson Decomposition

Beveridge and Nelson (1981) identify the cycle as "the forecastable momentum" of the original series at each time period. In this method, it is assumed that the original series follows a nonstationary ARIMA process and it is converted to a stationary ARMA process by taking the first difference as:

$$\Delta y_t \;=\; \mu \;+\varepsilon_t \;+\; \lambda_1\, \varepsilon_{t-1} \;+\; \lambda_2\, \varepsilon_{t-2} \;+\; \ldots \tag{4.9}$$

In this representation, μ is the constant term of the original series and ε_t is the independently, identically distributed disturbance term with zero expectation and variance σ_ε^2. The coefficient λ_t represents a combination of the autoregressive and the moving average parameters of the first-differenced series. The forecast of y_t for k period ahead yields:

$$\hat{y}_t(k) \;\cong\; k\,\mu \;+\; y_t \;+\; \left(\sum_{i=1}^{\infty} \lambda_i\right) \varepsilon_t \;+\; \left(\sum_{i=2}^{\infty} \lambda_i\right) \varepsilon_{t-1} \;+\; \ldots \tag{4.10}$$

The trend or permanent component represents the long-run path of the series which is demonstrated as the long-horizon forecast adjusted for the mean growth rate μ over the forecast horizon k as the following:

$$\tau_t = y_t + \left(\sum_{i=1}^{\infty} \lambda_i\right) \varepsilon_t + \left(\sum_{i=2}^{\infty} \lambda_i\right) \varepsilon_{t-1} + \dots \tag{4.11}$$

The trend term follows a random walk process with the same drift of the original series as proved in the pioneered paper. After the estimation of the trend term, the derivation of the cycle is solely dependent on equation (4.7) without identifying separate dynamics for that component. In this frame, the cycle follows a stationary zero-mean process which is expected to disappear when the original series approaches their trend level, in the long-run.

The variation of the trend component depends on the direction of the correlation between the first differences of the original series and it is remarked that this correlation is more likely to be positive for the majority of the economic time series. In that respect, the stochastic trend term elucidates a considerable extent of the variation in the series[6] whereas the role of the cyclical component is rather limited (Morley et al., 2003). By the same token, both components are driven by the same shocks since the design of the structure does not attribute distinct dynamics to the cyclical component. As a result of this specification, these two components are assumed to be perfectly negatively correlated.

Empirically, the decomposition may be summarized in three steps. Obviously, the initial step is the specification and the estimation of the stationary ARMA model for the first difference series. In that sense, the autoregressive order (p) and moving-average order (q) are determined for the first difference series based on diversified information criteria (AIC, BIC, and HQC) and the model parameters are estimated by the ML and/or CLS estimation. Also, the residual series is obtained in this initial step. Secondly, the infinite sums of the series in equation (4.11) are supposed to be reorganized due to the practical concerns. In this step, either the infinite sums may be truncated for a large value of k[7] as suggested by Beveridge and Nelson (1981) or the exact method proposed by Newbold (1990) may be utilized on the basis of the alternative

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[6] The variation in the permanent component may even exceed the variation in the series as illustrated in Beveridge and Nelson (1981).

[7] It is claimed that the truncation at $k = 100$ yields only minor differences compared to the greater values.

orders for p and q. After substituting the infinite sums, the trend and the cycle terms may be constructed using the equations (4.7) and (4.11).

4.3.3 The Kalman Filter

The trend-cycle decomposition may be formed as an UC model by the Kalman filter in a similar fashion to the time-varying parameters procedure discussed in Section 4.1. In the state space representation, while equation (4.7) is the measurement equation, the transition equations are set as:

$$\begin{aligned} \tau_t &= \delta + \tau_{t-1} + v_{0t} \\ g_t &= \phi_1\, g_{t-1} + \phi_2\, g_{t-2} + \ldots + \phi_p\, g_{t-p} + v_{1t} \end{aligned} \tag{4.12}$$

where δ represents the drift term of the trend and ϕ_i represent the autoregressive parameters of the cycle satisfying $|\phi_i| < 1$ for $i = 1, 2, \ldots, p$. Being different from the time-varying parameters model, the measurement equation (4.7) does not include a disturbance term.. On the other hand, it is assumed that the disturbance terms of the transition equations, v_{0t} and v_{1t} follow independent identical normal distributions with $(0, \sigma_\tau^2)$ and $(0, \sigma_g^2)$, respectively. It is further assumed that these disturbance terms are uncorrelated.

As indicated by equations (4.12), the trend component is modeled as a random walk process with drift whereas the cycle follows a stationary autoregressive process. Apart from the previous decomposition methods extracting the cycle residually, the cycle component is allowed to have its own dynamics in this framework. The innovations to the trend and the cycle are assumed to be originated from completely disparate sources. In this fashion, the correlation between the trend and the cycle is restricted to zero in the model which also called the orthogonal UC model.

Concerning the empirical application, the method may be encapsulated in five steps. To begin with, the model cast in the state space form represented by the equation (4.12) and the initial values for the unknown parameters δ, ϕ_1, ϕ_2, $\ldots$, ϕ_p, σ_τ^2, σ_g^2, the unobserved state variables and the variance-covariance matrix of the transition equations are assigned as discussed in Section 4.1. After structuring the ML function via the Kalman iterations in equations (4.4) and

(4.5) as the third step, the unknown parameters are estimated in order to start the recursion. Finally, the Kalman iterations are utilized for the estimation of the unobserved components.

4.3.4 Assessment of the Filters

As explained in technical aspects, these three univariate detrending procedures suggest different cyclical components mainly on the basis of their definitions for these unobservable elements and how they deal with the correlation among these components. Regarding the classification, Canova (2007) recognizes the HP filter as a hybrid method incorporating economic justification and statistics whereas the BN decomposition and the unobservable component decomposition with Kalman filter are characterized as the statistical methods. Concerning the comparison of these aspects (Morley et al., 2003; Zivot, 2005), both the HP and the UC decompositions are eager to smooth the trend component and assume zero correlation among the unobserved components. On the other hand, the HP and the BN share the characteristic of deriving the cycle in a residual manner whereas the cycle definition of the UC is more in depth. Both in the BN and the UC decompositions, the trend term is modeled as a random walk process and they do not assume a priori as in the smoothness parameter of the HP. Although the HP filter is extensively applied in the empirical studies and it conceivably incorporates the economic intuition more than the other methods, it suffers from considerable limitations in technical terms. Initially, the prior selection of the constant smoothness parameter is criticized extensively in the literature. As explained among others by Phillips and Jin (2015), the characteristics of the filter may be extremely dependent on the choice of the smoothness parameter. Therefore, the identification of the cyclical component is obliged to be arbitrary unless there is apparent evidence that the specified parameter reflects the true value. In this respect, Harvey and Jaeger (1993) present that imprudently utilization of the filter may cause to artificial results. Moreover, Hamilton (2017) questions its convenience for economic time series following a random walk process. It is shown that even the collaboration of the fourth order differences may fail to produce a stationary cyclical component in addition to the unavoidable risk of eliminating features of the true data generating process because of the lavish differencing. Apparently, the technical limitations arise as a crucial issue in the HP filter case.

On the other hand, the joint discussion of the statistics based procedures the BN decomposition and the Kalman filter with the orthogonal UC model forms a plausible analysis. In this sense, Watson (1986) note that they share alike characteristics in the short-run although these characteristics differ considerably in the long-run. In this respect, it is important to state that the decomposition may be sensitive to the ARMA specification in the BN decomposition whereas the outcome of the UC model may not be critically sensitive to the AR order selection (Canova, 1998). These two approaches diverge mainly on the basis of the assumptions regarding the correlation between the trend and cycle components. As the specification of the correlation either require complex procedures or cannot be directly estimated as explained by Stock and Watson (1988), either the perfect correlation or the zero correlation assumptions are imposed frequently in the structural time series literature. However, in the BN decomposition, the perfect negative correlation is not assumed explicitly but instead arises as a consequence of the existing context which suggests a noisy cyclical component completely transformed by the trend process. In terms of the empirical literature, Morley et al. (2003) provides evidence in favor of the strong negative correlation relying on the theoretical equivalence of these two methods after the relaxation of the zero correlation assumption in the UC model for the US data. However, Basistha (2007) mentions the potential spuriousness in the univariate studies by employing the Monte Carlo experiments. Concerning the bivariate studies, Sinclair (2008) also supports the negative correlation in the U.S case despite to a lesser extent than Morley et al. (2003), whereas Basistha and Nelson (2007) concludes that the output gap estimates are dominant even if the correlation is allowed among the components. Proietti (2002) claims the correlation among the unobservable components may emerge due to the underestimation of the cyclical component. On the other hand, Clark (1987) accepts that although the zero correlation assumption is not true, it is more outstanding than the perfect correlation assumption. Especially, in economic terms, it is clear that the shocks affecting the cyclical component do not necessarily influence the permanent component. More extremely, the dichotomy assumption utilized in the macroeconomic theory differentiates starkly between the impacts of the transitory shocks and the permanent shocks.

Consequently, considering the limitations of the univariate analysis and the application to the annual data which have a high potential to mask the cyclical variation as emphasized by Clark (1987) it seems that the zero correlation assumption provides more relevant outcomes.

Moreover, since the output gap is utilized as an explanatory variable in the model, the Kalman filter permitting to attribute specific dynamics to the cycle component provides a preferable approach over the BN decomposition.

CHAPTER 5

EMPIRICAL RESULTS

In this study, the empirical analysis[1] of the Spanish unemployment is conducted by utilizing the annual data over the period of 1972-2015. The central focus of the analysis is to uncover the evolution of the persistence and the output gap sensitivity of unemployment in this context. Concerning decomposition procedures, the main purpose is to select the filter both incorporating technical advantages within the scope of this study and reflecting the country-specific dynamics of the Spanish economy properly. Following the discussions of the HP filter, the BN decomposition and the Kalman filter in Section 4.3, the estimation results are presented in Section 5.1. The estimation results are investigated with respect to the fit of the data to the corresponding chronologies in the literature. Subsequent to the filter choice, the empirical findings of the time-varying parameters model and the further implications of the parameters are presented in Section 5.2.

5.1 Decomposition Results

Given the diversified assumptions of the filters, Figure 5.1 displays the alternative output gap estimations. To start with the HP filter estimates, the results seem to be completely consistent with the expectations regarding the alternative choice of the smoothness parameter λ. Apparently, the greater λ allows for the greater variation in the cycle term as a result of the higher degree of smoothing in the trend component. However, as explained in Section 4.3 the robustness of the filter suffers from the prior choice of the parameter. As clearly demonstrated in Figure 5.1, the output gap estimate of the HP filter with $\lambda = 6.25$ neglects the recessionary dynamics in the late 1970s entirely, whereas the filter with $\lambda = 100$ displays

[1] The analysis was conducted in GAUSS 9.0.

somehow compatible results to the tendencies of that period. On the other hand, the latter parameter choice suggesting the presence of a slack period in the second half of the 1990s which coincides with the recovery period as reviewed in Section 3.1, may be interpreted as misleading. Therefore, in addition to the limitations of the mechanical use of the HP filter in general sense; there are notable signs of spurious cyclicality in this specific application to the Spanish economy.

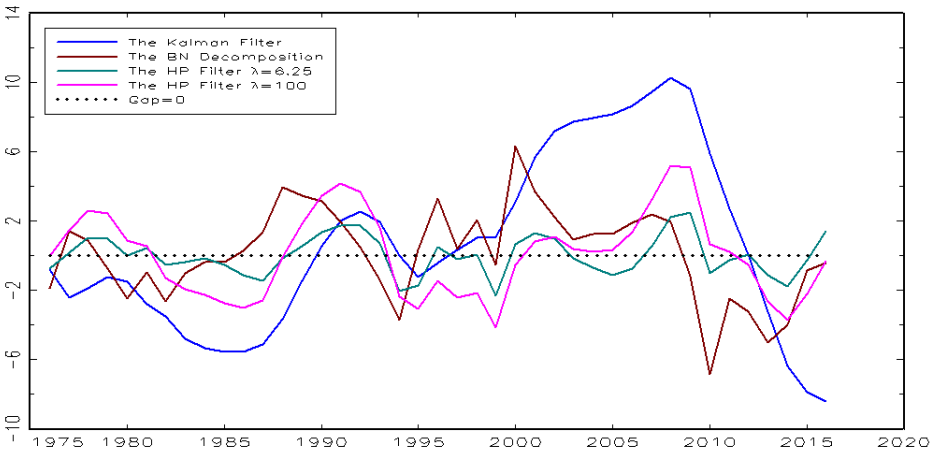


Figure 5.1: Output Gap Estimates, Percentage, 1975-2015

On the other hand, the output gap estimated by the BN decomposition suggests rather abrupt movements over time, as the cycle compensates the changes in the permanent trend component, contemporaneously. As discussed in Section 4.3, the shocks to the output gap are directly driven by the shocks to the long-run path of the output. Regarding the Spanish economy, the output gap estimated by the BN decomposition seems to coincide with the traditional chronologies for the somehow better than the HP filter results. Especially, the economically slack periods are reflected consistently with the general overview until the mid-1990s to a great extent. After that, the suggested volatile behavior during the second half of the 1990s cannot be justified with the developments observed in the economy. Moreover, the inflated output in the 2000s and the fizzling out process in the aftermath of the period are not revealed in the estimate. Conceivably, the restricted role of the cycle to the long-run trend movements fails to generate proper dynamics of the Spanish economy.

The output gap estimated by the Kalman filter which identifies the cycle as a stationary autoregressive process displays smoother transitions compared to the other methods. In this

method, the output gap is driven by the cyclical shocks being independent of the shocks inducing movements in the permanent component. Although zero correlation among these unobserved components might sound as a strict assumption, the greater importance is attached to estimate the cycle by allowing separate dynamics from the trend process. Since the cyclical component is utilized as an explanatory variable in this study, it is preferable that the gap component contains information beyond the restrictions imposed by the trend estimates. Among the other alternatives, the Kalman filter provides a unique option to not extract the cycle like an irregular component of the series. Moreover, the chronology of the shocks reviewed in Section 3.1 is represented properly by this filter. Specifically, as remarked by Estrada et al. (2009) and Alberola et al. (2014), the output level beyond the sustainable measures during the 2000s and the severe adverse effects of the European Debt crisis in the aftermath of the Great Recession are captured only in this decomposition approach, prominently. By considering the technical strengths and the harmony with the country-specific dynamics, the Kalman filter estimate of the output gap is used in the following analysis.

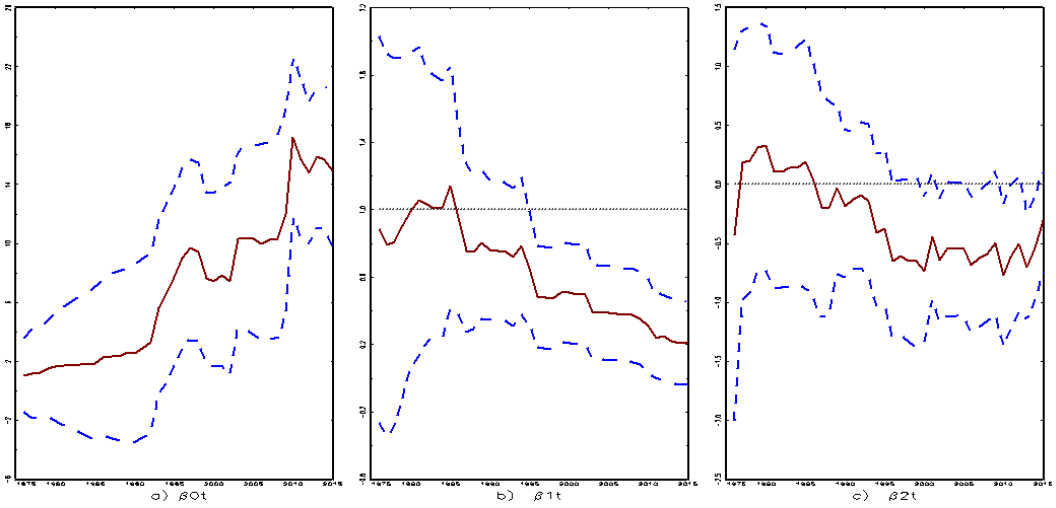
5.2 Time-Varying Parameters Model Results

The model formed in the state space framework as in equations (4.2) and (4.3) is estimated by utilizing the total adult unemployment rate as the benchmark to explore the aggregate condition, in the first stage. On the other hand, the estimation by the youth and the disaggregated data for sexes (female-male) enable to unveil the conceivable heterogeneity among these groups. The estimation results of the parameters are presented in Section 5.2.1. In Section 5.2.2.1, the further implications of the estimated parameters are incorporated. Specifically, the implied natural rate by the estimates of the benchmark group and the presence of asymmetric effects for the output gap link in the disaggregated data are scrutinized.

5.2.1 Estimation Results

As mentioned before, the interpretations of the parameters in the time-varying framework are anticipated to reveal the transformation of the structural and the cyclical factors associated with the unemployment rate. The former element embedded in the coefficients β_{0t} and β_{1t}

reflects the general tendency and the institutional effects in the labor markets, potentially. On the other hand, the latter component related to the coefficient β_{2t} manifests the link between the unemployment rate and the transitory shocks being transmitted from the output side of the economy.



Note: Dashed blue lines represent 90 percent upper and lower confidence intervals of the parameters.

Figure 5.2: Time-varying coefficients estimates (a) Constant coefficient, (b) Persistence coefficient, and (c) Output gap coefficient, 1976-2015

With loosely speaking "the constant" coefficient β_{0t} is expected to display remainder effects of the lagged unemployment and the output gap. Since the economic theory reckons the possibility of imperfections that gives rise to mismatch problems, an expectation of the unemployment rate is assigned as different from zero even in the absence of persistence and output gap. For this reason, although it is not an easily interpretable coefficient due to the reflection of various impacts challenging to identify without further empirical investigation, the coefficient is necessarily included in the model. Intuitively, it may be claimed that the coefficient provides information regarding the evolution of the structural element in the unemployment rate as it reflects the movements directly in the level of the unemployment rate. Empirically, Srinivasan and Mitra (2012) interprets the movements of this coefficient related to the labor market institutions affecting the reservation wages, in a univariate set-up without the output gap variable. In this respect, it may provide information regarding the long-term behavior of the unemployment series. For this reason, although the major pillars of this study are to examine the persistence and the output gap coefficients, the constant coefficient estimates are

also presented for the benchmark group as displayed in Figure 5.2(a). The constant coefficient follows a relatively stable path with moderate increases which could be associated with firmly increasing labor force participation effects over the period 1976-1990. In the next period, on the contrary, it exhibits upward movements in the first middle of the 1990s and the post-2008 period. However, different from the sustained regular rises during the 1990s, the jump between 2008 and 2009 is extremely aggressive. In this respect, it may be assumed that the changing structure of the economy taken place smoothly under the stabilization policies combined with the rising volume of the labor market flows due to the role of temporary contracts may be reflected in the labor markets by such movements in the earlier period. However, the climb of the Great Recession period conceivably displays the sudden destruction of the jobs in the labor-intensive sectors such as the construction, of the economy to a great extent. Concerning the periods following the rising trends, the downward movement after the mid-1990s does not represent a long-lasting effect despite the positive impacts of the recovery period taken place in this period. On the other hand, the coefficient tends to decrease immediately after 2010 in spite of the ongoing impacts of the crises. In this respect, it may be observed that the role of the institutions such as the unemployment benefits stimulating reservation wages is decreased to a limited extent in the latter experience. The reforms in 1994, 2002 and 2012 tightening utilization of the benefits or decreasing the generosity are probably relevant in this context.

The time path of the coefficient β_{1t} displaying the degree of persistence in the unemployment rate presents a measure concerning the evolution of flexibility versus inertia in the labor markets. The impulse of the policies aiming to improve the labor market flexibility may be observable as the break of the link between the past and the present unemployment within this scope. Figure 5.2(b) demonstrates the time-variation of the persistence coefficient. The uninterrupted rise of the coefficient from 1977 to 1985 may be explained through the rigid labor practices such as the strict employment protection and it is consistent with the increasing unemployment duration as reviewed in Section 3.2. In this period, the smoothing role of the employment protection in the labor market flows over the business cycle leads to inertia in the unemployment rate due to the unfavorable macroeconomic circumstances. The persistence coefficient reaching one in 1980 and exceeding this level in the following years propounds the presence of hysteretic effects until 1986. In the empirical literature, Romero-Ávila and

Usabiaga (2008) also finds the evidence for breaks in the positive direction during the first half of the 1980s by utilizing the regional data. From 1985 to 1987, on the other hand, the persistence coefficient shows a tremendous decline in the aftermath of the 1984 reform. In this respect, European Commission (2005) remarks on the fact that the persistence of unemployment provokes the 1984 reform which expedites the utilization of temporary contracts. The flexibility in the form of low employment protection by these types of contracts boosts employment opportunities greatly under positive macroeconomic conditions of the mid-1980s. In this respect, Anderton (1998) also confirms the decline of the persistence coefficient from 1985 onwards in the time-varying framework. Although the persistence coefficient is still in high levels in the second half of the 1980s, the hysteretic impacts regarding the value of the coefficient are eliminated after 1985. However, statistically, the confidence intervals containing one over the period of 1976-1996 give rise to the failure of rejection to the hysteresis hypothesis which implies the persistence coefficient is not significantly different from one, as demonstrated in Figure 5.2(b). The stable time path of the persistence coefficient in the first half of the 1990s is interrupted by another downward shift in the 1994-1996 period accompanied by the labor market reform in 1994 followed by the economic expansion phase. Similarly, Garcia-del Barrio and Gil-Alana (2009) propose the decline of the persistence coefficient after 1994 following the specification of the breakpoint in the fourth quarter of 1993. Specifically, the persistence coefficient moving below 0.5 indicates that the high persistence hypothesis describing the previous decade from the second half of the 1980s is no longer relevant. The decrease of the EPL for the workers with permanent contracts with the aim of alleviating duality in the labor markets may be explanatory on understanding the decline of the coefficient after the 1994 reform. In other respects, as mentioned in Section 3.2, the attempts to decrease the share of temporary contracts stayed pretty much limited. Therefore, even if the abruptly declining link between the past and the current unemployment is supportive in terms of the resilience of the labor markets, they also become more fragile to the shocks due to the unrestrainable utilization of the temporary contracts. In the following period, the downward movement of the persistence coefficient is accelerated strikingly between 2002 and 2003 following the reforms in the early 2000s with similar aspects to the 1994 and 1997 reforms. The smoothly diminishing transformation of the persistence coefficient from 0.38 in 2008 to 0.21 in 2015 conceivably reflects the discouraged worker effects as indicated by the increasing incidence of the discouraged workers in the labor force as provided by OECD (2018).

The persistence may be driven further down by the reforms combined with the expansionary phase in the aftermath of the Great Recession period. The abrupt decreases of the persistence coefficient in 1985-87, 1994-96 take place by the interaction of the flexibility measures to the recovery periods whereas the smooth retreat of the persistence suggested during the reforms under the Great Recession period. Interestingly, the time path of the persistence coefficient reveals the importance of interaction between the phase of the business cycle and the policy changes.

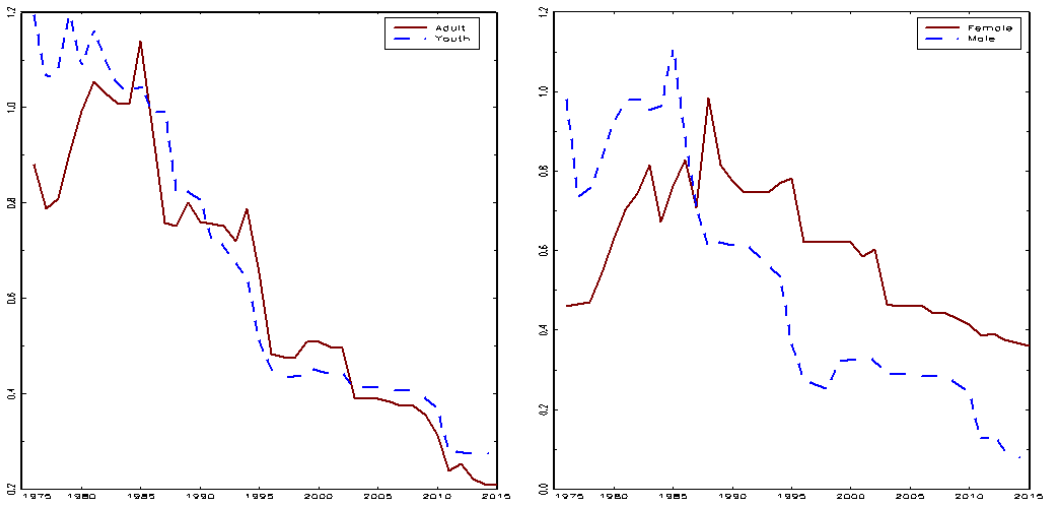


Figure 5.3: Persistence coefficient estimate for (a) Age and (b) Sex, 1976-2015

Given the declining persistence suggested for the benchmark group, Figure 5.3 displays the evolution of the persistence coefficient for the comparison of the adult and youth groups in panel (a) and the female and male groups in panel (b)[2]. Following the investigation of the persistence coefficient for the disaggregated groups (Figure 5.3), the output gap coefficient is scrutinized for the benchmark group and the disaggregated groups as displayed by Figure 5.2(c) and Figure 5.4, respectively.

Regarding the youth-adult comparison, the overall trends of the persistence coefficient are similar for both groups. That is to say, the effects of the reforms are more likely to coincide regarding the timing of the changes. On the other hand, several disparities are worth to mention. Initially, the persistence coefficient above/around one for each year until 1987

[2] See Appendix A, Figure A.1-A.3 for the coefficients with the confidence intervals for youth, female, and male, respectively, in detail. In this section, the coefficient estimates are presented merely for the comparison reasons.

suggests that the hysteretic effects are more of an issue for the youths than the adults. Therefore, although the identification of the certain reasons is not within the scope of this study, the results are suggestive in that the initial conditions triggering the youth unemployment at least from the mid-1970s are not same as the circumstances of the adult group. On the other hand, statistically, the hysteresis hypothesis may be rejected after 1994 reveals that despite the extremeness of the initial conditions compared to the adults, the developments during the 1980s and the early 1990s managed to decrease the persistence coefficient to a great extent. As displayed in Figure 5.3(a) the movements of the persistence coefficient are smoother than the evolution of the persistence coefficient of the adult group. In this respect, it may be claimed that the decline of the coefficient of youths is induced both by the impacts of the reform in 1984 and also by the decreasing participation effects after 1988 as displayed in Figure 3.5(a) in Section 3.2. On the other hand, the effects of the reforms specifically targeted youth people during the 1990s on the persistence coefficient seem to be limited possibly as a result of the rising participation rates after 1996. By the same token, the impacts of the reforms in the early 2000s are less noticeable through the persistence coefficient of the youths different from the adults.

Similar to the previous comparison, the difference between the female and male groups as displayed in Figure 5.3(b) emerges from the initial years of the analysis. As explained in Section 3.2, the low participation levels of the female to the labor force started to rise during the 1980s reflects the upward movements of the persistence coefficient is more limited than the persistence of the male. Especially, even though the persistence coefficient of female exhibits highly volatile behavior until the late 1980s, it never reaches to one except 1988. On the other hand, the persistence coefficient of the male suggests the presence of the hysteretic effects until 1986. In this period, it is noticeable that although the female persistence coefficient responds with certain lag effects to the policy changes, the articulation of the female emerging under rather flexible labor market conditions than the male prevents the persistence mechanism to operate fully as in the case of hysteresis. The upper movement of the female persistence coefficient in the early 1990s different from the male may be interpreted as a result of the first great crisis they experienced following their high involvement in the labor markets. On the other hand, Figure 5.3(b) reveals that the impacts of the reforms in the second half of the 1990s are rather limited for the female compared to the male though they explicitly target

them. Overall, the results suggesting the limited effects of these reforms for both the female and the youth groups may lead to question to what extent these reforms achieved their aim to protect the vulnerable groups in the labor markets. The persistence coefficients of these groups after 2009 indicate that the discouraged worker effects may be more relevant for the male group than the female. On the contrary, the persistence coefficient of the female is relatively stable probably due to the added worker effects as claimed by Addabbo et al. (2013) compensating for the discouraged workers. Given the mixed evidence regarding the structural element in the unemployment rate reflected by the increasing constant coefficient while the persistence coefficient declines, the movements of the output gap coefficient indicate the extent of the cyclical component in the unemployment series. As it is anticipated to be negative, the smaller the value of the coefficient is the greater the sensitivity of the unemployment to the output gap. The positive coefficient of the output gap, Figure 5.2(c), indicates the absence of an expected connection between labor and output markets until 1986. As mentioned in 3.2 , the signs of the labor hoarding are present during the economic downturn in this period. The estimation results show that instead of the transmission mechanism of the shocks through the cyclical unemployment as expected in a flexible labor market, the interaction of the shocks with the rigid institutions give rise to the complex and possibly amplified effects in the labor markets. In this sense, the first decade of the analysis from 1976 is characterized by an extreme form of inflexibility in the labor markets as remarked jointly by the explosive behavior of the persistence coefficient and the positive sign of the output gap coefficient. These coefficients providing evidence for the disrupted adjustment mechanisms also rationalize the necessity of the labor market reform, in this period. Although the output gap coefficient turns to be negative in 1987 after a sharp decline from 1985 onwards, the coefficient is statistically insignificant until 2000s except 1996. During the 2000s, significant output gap coefficient in several years and the upper confidence interval approaching to zero for the others may be understandable as the strengthening of the cyclical component of the unemployment, after the period of the stabilization policies aiming to achieve the requirements of the Maastricht treaty during 1990s. Also, the effects of the recovery during the second half of the 1990s on the labor markets may give rise to the extent of cyclical unemployment to be important in the economy as implied by the output gap coefficient. Hence, the time paths of both the persistence coefficient and the output gap coefficient point out the improvement of the flexibility in the labor markets gradually after the 1990s. However, it is important to note that the

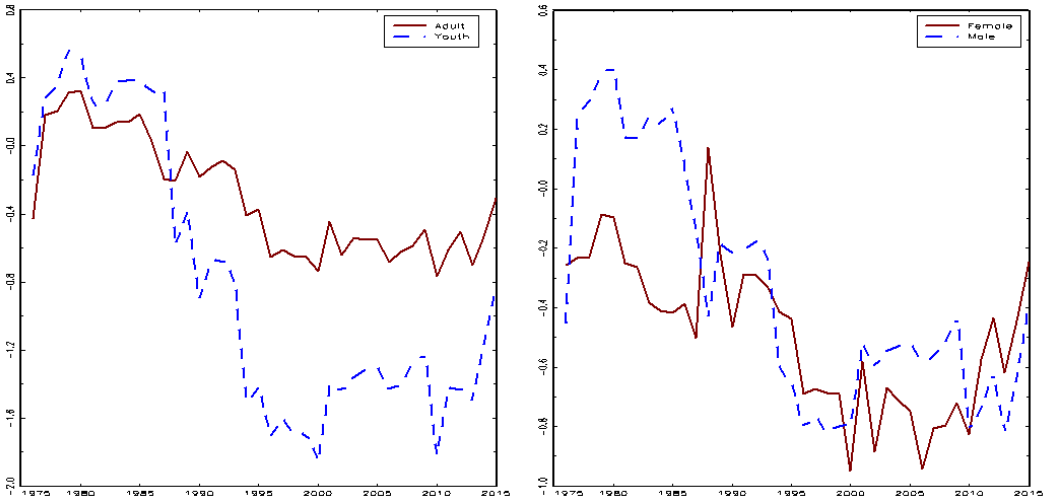


Figure 5.4: Output gap coefficient estimate for (a) Age and (b) Sex, 1976-2015

significance of output gap coefficient limited to the several years indicates the restrained role of cyclical component in unemployment rates of the benchmark group. On the other hand, the cyclical impacts of the Great Recession are reflected as the minimum point of the coefficient in 2010 with certain lag effects after 2008. The insignificance of the coefficient in 2011 and 2012 turn to be significant and it increases strikingly in 2013 to a similar level to 2010 by manifesting the extent of the rise in the cyclical unemployment. However, as mentioned the sudden upward adjustment of the constant coefficient shows the impacts these shocks are beyond the sole rise of the cyclical unemployment, in the late 2000s.

As demonstrated by Figure 5.4(a) the output gap coefficient of the youth follows a substantially decreasing trend over the period of 1992-1996 similar to the output gap coefficient of the adult displaying positive sign until 1988. Different from the adult, however, the output gap coefficient of the youth turns to be statistically significant in 1994 and remains significant except 2009 and 2015 during the rest of the period. The extent of the decline in the youth output gap coefficient greater than the adults indicates the cyclical unemployment constitutes a relatively substantial part of the youth unemployment. In this sense, although the youth unemployment suffers from extreme rigidity as mentioned by the interpretations of the persistence coefficient in the pre-1990s, the cyclical component comes into forefront after 1994 probably as a result of the over-utilization of the temporary contracts in a period with rising labor force participation rates (Figure 3.5). The flexibility measures taken in the labor markets give rise to

high dependence of the youth unemployment to the output movements in this sense. Similar to the output gap coefficient of the adult, the response of the youth gap coefficient to the 2008 crisis displays the maximum effect in 2010 which is more profound than the response of the adults. After that period the coefficient decreasing only slightly shows the severe impacts of the crises operated through the cyclical unemployment different from the adult group which the cyclical component is relatively limited.

Given the comparison of the output gap coefficient among the age groups, Figure 5.4(b) displays the gap coefficient for the disaggregated data for the sex. As mentioned before, the articulation of the female to the labor market under rather flexible labor market conditions also reflected by the negative coefficient during the late 1970s and 1980s in contrast to the positive coefficient in the case of the male. In other regards, it is not possible to identify the more sensitive group for all periods like the youth-adult comparison. The output gap coefficient for the female group becomes significant in 2000-2010 period represents the greater cyclical impacts during the expansion periods as shown by the 2000s. On the other hand, the output gap coefficient of the male becomes significant during the period 1996-2002 reflects the importance of the recovery during the second half of the 1990s. The output gap coefficient of male becomes significant after 2010 following its statistical insignificance during 2003-2009 periods which demonstrates the limited impacts of the expansion period on the labor markets for male. Different from the output gap coefficient of the male which shows the similar movements to the benchmark group as explained above, the alternated sensitivity of the gap coefficient for the female over the different phases of the economy arouses the suspicion regarding the presence of the asymmetry in the coefficient. Thus, Section 5.2.2 incorporates the investigation of the asymmetry in addition to the implied natural unemployment rate by the constant and the persistence coefficients.

5.2.2 Further Implications of the Estimated Parameters

Given the estimation results presented in Section 5.2.1, the further implications of the coefficients related to the implied natural unemployment rate and the asymmetrical structure of the output gap coefficient over different phases of the cycle are explored in Section 5.2.2.1 and 5.2.2.2, respectively.

5.2.2.1 Natural Unemployment Rate Implied by the Coefficients

The time-varying model in equation (4.2) may be exploited in order to investigate the implied natural unemployment rate by the coefficients of the model. In this context, the natural rate estimate implied by the constant coefficient and the persistence coefficient enables to observe the impacts of the cyclical shocks if applicable in each time period. To this aim, the natural unemployment rate may be estimated by imposing the assumption of a zero output gap to the equation (4.2) and where $|\beta_{1t}| < 1$ as follows:

$$u_t^* = \frac{\beta_{0t}}{1-\beta_{1t}}$$

The estimate of the natural unemployment rate implied by the constant and the persistence coefficients as displayed in Figure 5.5 allows for drawing several conclusions. Initially, the natural rate around 10 percent is adjusted above during the economically adverse conditions present in the early 1990s and it stabilizes around above 15 percent during the recovery period. The natural rate estimate suggests a rather stable pattern during the 2000s although the global crisis generates upward pressures similar to the previous recession. It is important to note

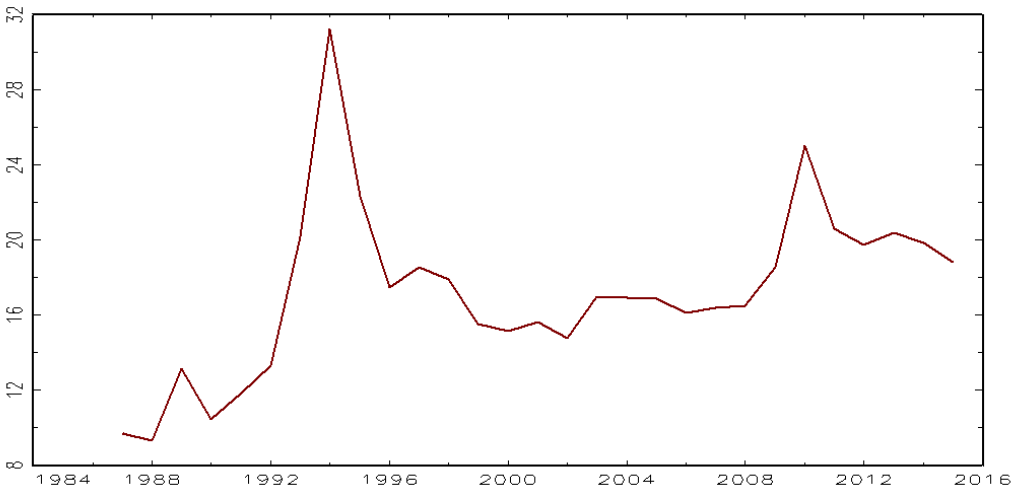


Figure 5.5: Estimate of the natural unemployment rate, 1987-2015

that the level of upward adjustment in the second spike is relatively limited compared to the first spike in 1994. However, being in line with further adverse shocks as the Sovereign Debt crisis, the pace of the reversion in the latter case performs more slowly.

In this respect, although it can be stated that the movements of the natural unemployment rate displays considerable stability after the mid-1990s, whether it will converge back to the pre-crisis level or not is not definite from the expression. Overall, the results suggest that even though the natural unemployment rate may be calculated in the post-1986 period when the persistence coefficient moves below the hysteresis levels, the natural rate is not constant over time as displaying spikes during the crisis periods. Moreover, the upward shift of the natural rate after the recession in the early 1990s reveals the changing structural features of the economy by supporting the structuralist approach to the natural unemployment rate.

5.2.2.2 A Potential Room for Asymmetry: The Output Gap Coefficient

As mentioned before, the output gap coefficients in Figure 5.4(b) may be indicative in terms of the presence of an asymmetry, especially for the female. With the aim of exploring that, the estimated coefficients of the output gap are scattered against the corresponding output gap level at each year as demonstrated by Figure 5.6.

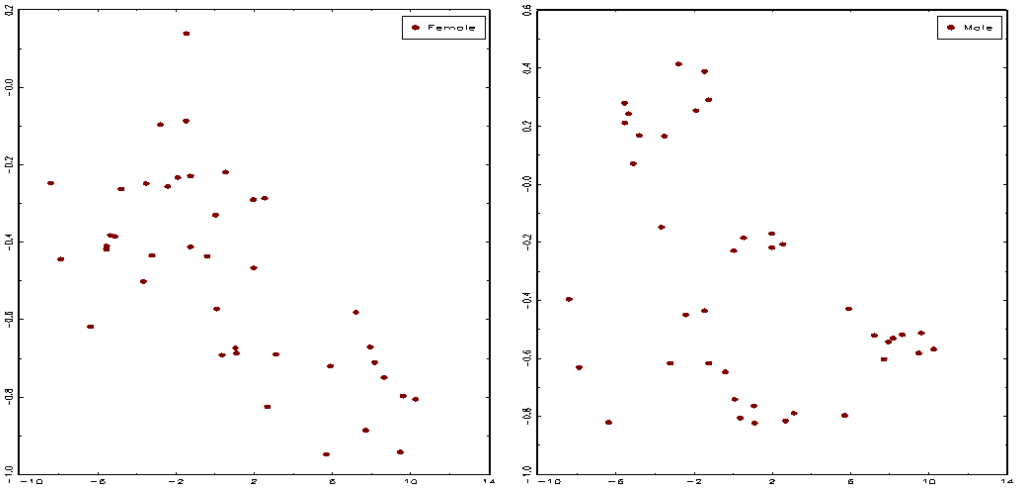


Figure 5.6: The output gap (horizontal) versus the output gap coefficient (vertical) for (a) Female and (b) Male

The figure evidently displays the asymmetrical behavior of the gap coefficient over different values of the output gap. Specifically, the estimated coefficient for female tends to be more sensitive if the output gap is positive and moves towards zero when the output gap becomes more negative. Intuitively, this behavior of the coefficient manifests that if there are positive

business cycle effects then the female unemployment decreases more than it would increase under the negative cyclical effects. Although the evidence provided relies on the visual evidence and the certain reasons leading to the asymmetry are difficult to specify in this context, an interpretation may be drawn based on the flexibility of female workers. To begin with, the coefficient implying that the female worker benefits more during the expansionary periods then they hit during the recessionary periods suggest the great extent of internal flexibility during the crisis times. That is to say, the adjustment through working hours instead of the quantity of employment in the case of female workers may be relevant to explain the present dynamics. On the other hand, the adjustment in the male group probably tends to be through the quantities compared to the female group integrating to the labor market under relatively flexible conditions.

CHAPTER 6

CONCLUSION

This study scrutinizes the extent of the unemployment persistence in the presence of output gap for Spain over the period of 1972-2015. Based on the historical information presenting numerous numbers of crises and the policy changes during the last four decades, the analysis aims to unveil the impacts of these structural transformations which are either in the form of sudden breaks or the smooth transitions on the claimed inertia in labor markets. To this end, the time-varying parameters model is utilized in order to capture proper dynamics of the unemployment rates without imposing any prior assumptions regarding the timing, number and structure of the changes. Furthermore, in order to examine the conventional claim that the labor market rigidities give rise to the higher unemployment in the European context; the output gap is utilized in addition to the lagged unemployment. In this way, disclosing the rough sources of unemployment as the structural or the cyclical is targeted.

For the purpose of obtaining the output gap which is not a directly observable variable, three decomposition procedures are used. Following the selection of the Kalman filter on the basis of both technical convenience and the relevance to the Spanish data, we proceed to the state space model comprising the time-varying parameters. The estimation of the parameters, after setting up the likelihood function by the Kalman filter, facilitates to investigate the empirical validity of the unemployment hypotheses via the confidence intervals in addition to displaying the evolution of the persistence coefficient and the output gap link to the unemployment.

The empirical analysis uncovers the rigidity of the labor markets displayed by the explosive behavior of the persistence coefficient concerning the lagged unemployment rate until the mid-1980s. On the other hand, decreasing extent of the inertia is reflected on the aftermath of the labor market reforms in 1984 and 1994. The disaggregated data on the basis of sex reveals that the integration of females to the labor force coinciding with the measures attempting to

flex labor market institutions after the early 1980s as leads to a relatively stable behavior of the persistence coefficient compared to males. Yet the impacts of the reforms demonstrated by the persistence coefficient remarks that the rigidity of the unemployment rate of the male has been affected relatively more than that of the female. Overall, it may be concluded that the resilience of the labor markets has advanced substantially following the periods when the labor market reforms coincided with the economic recovery phases. However, the smooth decline pattern of the persistence coefficient during the crises of the late 2000s and the early 2010s conceivably indicates the discouraged worker effects besides the potential impacts of the reforms during the economically slack period. On the other side, the positive sign of the output gap coefficient during the late 1970s and the first half of 1980s, contrary to the negative sign expectations implied in the context of Okun's Law, confirms the rigidity claims by the persistence coefficient further. Following the substantial transformation during the early 1990s, the rising sensitivity of the unemployment to the output gap displays the importance of the cyclical component for the next period. The cyclical link which is considerably greater for the youth compared to the adult reveals the substantial importance of the output side effects on the youth labor markets. In this respect, the fragility of the youth to the cyclical shocks calls for further policy implications. Indeed, the unveiled heterogeneity among the youth and adult may be interpreted as the requirement of the specific recipes which consider the underlying features of the target groups, extensively.

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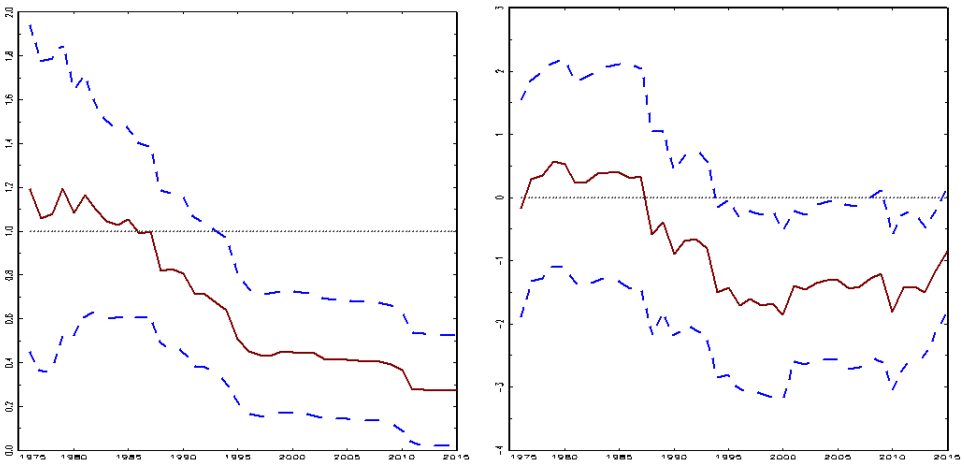
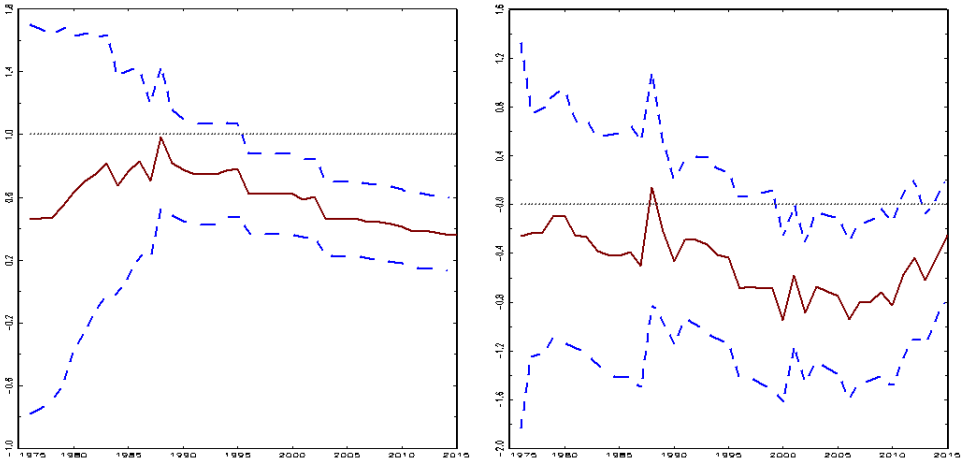
APPENDIX A

COEFFICIENTS WITH THE CONFIDENCE INTERVALS FOR THE SUB-GROUPS



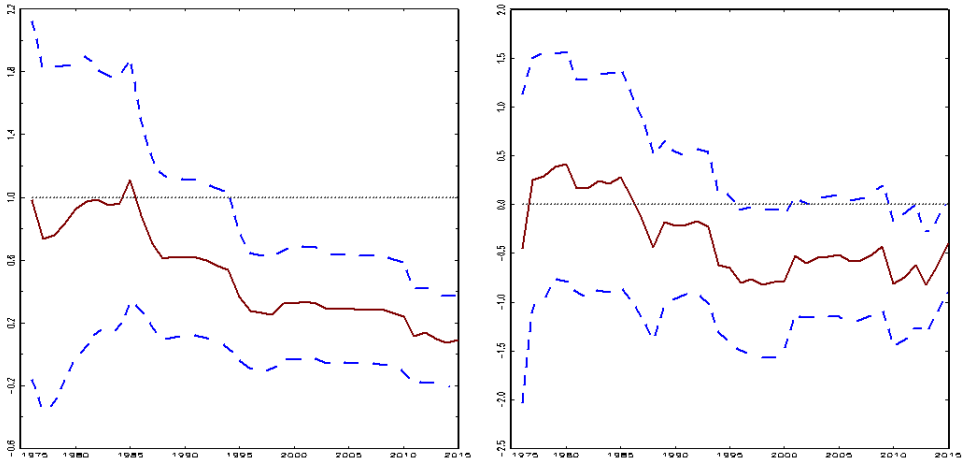
Note: Dashed blue lines represent 90 percent upper and lower confidence intervals of the parameters.

Figure A.1: (a) Persistence coefficient and (b) Output gap coefficient for youth, 1976-2015



Note: Dashed blue lines represent 90 percent upper and lower confidence intervals of the parameters.

Figure A.2: (a) Persistence coefficient and (b) Output gap coefficient for female, 1976-2015



Note: Dashed blue lines represent 90 percent upper and lower confidence intervals of the parameters.

Figure A.3: (a) Persistence coefficient and (b) Output gap coefficient for male, 1976-2015

APPENDIX B

TURKISH SUMMARY / TÜRKÇE ÖZET

İşsizlik, 2008 küresel finansal krizinin şiddetli etkilerinden sonra dünya ekonomisinin gündeminde ön sıralarda yer almaktadır. Diğer piyasalardan farklı olarak işgücü piyasasının insan faktörünü içermesi, politika önerilerini verimlilik kaygılarının ötesinde konunun sosyal boyutu açısından da önemli hale getirmektedir. Yazına bakıldığında işsizlik dinamiklerini inceleyen dört temel hipotez bulunmaktadır. Phelps (1967, 1968); işsizlik oranlarının ürün ve işgücü piyasalarının yapısal özelliklerine bağlı bir denge noktasının bulunduğunu öne sürerek, doğal işsizlik oranı teorisinin temellerini ortaya atmaktadır. Bu çerçevede, işsizlik oranına yönelik şoklar sadece geçici dalgalanmalara yol açmakta ve şokların etkisi geçtikten sonra mevcut işsizlik oranı "doğal oran" diye nitelendirilen sabit bir seviyeye gelme eğilimi göstermektedir. Örneğin, 1970'lerde Avrupa'da işsizliğin yükselişi petrol fiyatlarındaki artış, verimlilik artışının yavaşlaması vb. şoklarla ilgili olarak değerlendirilmiş (Blanchard, 2006) ve şokların etkilerinin ortadan kalkmasıyla, işsizlik oranının doğal orana dönmesi beklenmiştir. Ancak, işsizlik oranlarının şok öncesi dönemi karakterize eden olası bir denge seviyesine geri dönme eğiliminin olmaması; standart teoriye meydan okumuş ve geçerliliğini tartışmaya açmıştır. Bu dönemde Blanchard ve Summers (1986,1987), işsizlik dinamiklerini nitelendirmek için alternatif olarak histeri hipotezini öne sürdüler. Histeri teorisi, mevcut dönemdeki işsizlik oranının başlangıç koşullarına ek olarak ortaya çıkmış veya mevcut şoklara da büyük ölçüde duyarlı olduğu varsayımına dayanmaktadır. Bu etkilerin sürekli oluşunu açıklayabilmek adına içeridekiler-dışarıdakiler teorisi, beşeri sermayenin amortismanı ve fiziki sermayenin birikimi önerilmiştir. Fakat teorik olarak içeridekiler diye nitelendirilen çalışan grup üyelerinin bir noktada işsiz kalma ihtimallerinin varlığı ve yüksek işsizlik oranının firmalar tarafından pazarlık masasında koz olarak kullanılabilirliği gibi faktörler histeri teorisindense yüksek direnç/süreklilik teorisini destekler niteliktedir. Bu anlamda, yüksek direnç teorisi işsizliği etkileyen şokların etkileri uzun sürse bile belli

bir zaman sonra ortadan kaybolacağını ve mevcut serilerin doğal işsizlik oranına döneceğini ortaya koymaktadır. Takip eden yıllarda doğal işsizlik oranına yapısal yaklaşım hipotezi Phelps (1994) tarafından ön plana çıkarılmıştır. Bu çerçevede, şokların çoğunun işsizlik oranında geçici değişiklere sebep olmasına rağmen, teknoloji, kurumlar ve hatta faiz oranları gibi makroekonomik değişkenler aracılığıyla oluşan şokların doğal işsizlik oranında kalıcı değişikliklere yol açabileceği kabul edilmektedir. Bu teoriler eşliğinde, işsizliğin gelişimini inceleyen yazın sırasıyla 1970'lerde şoklar, 1980'lerde süreklilik mekanizmaları, 1990'larda işgücü piyasası kurumları ve daha sonrasında da şoklarla kurumların etkileşimine odaklanmaktadır.

Uygulamalı yazın, genel hatlarıyla, iki farklı boyutta incelenebilir. İlk olarak, çalışmalar doğal oran veya yapısal yaklaşımlı doğal oran hipotezleri ile histeri hipotezi arasında test etmeye yoğunlaşmaktadır. Hangi hipotezin desteklendiğine bağlı olarak politika önerileri değişim göstermektedir. Bu bağlamda, doğal oran ve yapısal yaklaşımlı doğal oran hipotezleri lehinde bulgular, talep tarafı politikaların uygulanmasını gerekli görmemektedir. Çünkü bu senaryolar altında talep taraflı politikalar işsizlik oranında sadece geçici değişimlere yol açabilmekte, orta ve uzun vadede etkisiz kalmaktadır. Öte yandan, arz dinamiklerini etkileme yetisine sahip yapısal reformlara dayanan politikalar doğal oran teorilerinin desteklendiği durumlarda ön plana çıkmaktadır. İşsizliğin histeri ya da yüksek direnç/süreklilik hipotezleriyle karakterize edildiği durumlarda, uzun süreli ya da kalıcı etkilere yol açacak talep tarafını etkileyen politikaların uygulanması önerilmektedir. Ancak farklı işsizlik teorileri arasında test etme prosedürüne odaklanan bu yazın, direnç düzeyinin ölçülmesini birincil olarak ele almamaktadır. Oysa doğal işsizlik oranının desteklendiği durumda dahi şokların etkisinin ne kadar bir zamanda kaybolacağı önem arz etmektedir. Bu nedenle, direnç düzeyine bağlı olarak doğal işsizlik hipotezinin desteklendiği durumlarda bile talep tarafı politikalarına ihtiyaç duyulabilir. Sonuç olarak, hipotezleri test etmenin ötesinde direnç düzeyini ölçmeyi ön plana çıkaran çalışmalar uygulamalı yazının ikinci ayağını oluşturmaktadır.

Uygulamalı zaman serisi yazının ilk boyutu, söz konusu hipotezleri işsizlik serisinin durağanlığına bağlı olarak incelemektedir. Bu formülüzasyonda, histeri hipotezi işsizlik serisinin durağan olmayışına benzeş olarak analiz edilmekte ve böylelikle hem geçmiş dönemki hem de mevcut dönemki şokların işsizlik oranı üzerinde kalıcı etkileri olması sağlanmaktadır. Öte yandan durağanlık ve ortalamaya dönme özellikleri, doğal oran hipotezi lehine kanıt olarak

değerlendirilmektedir. Blanchard ve Summers (1986)'nın Avrupa ülkeleri ve Amerika Birleşik Devletleri için histeri hipotezinin geçerliliğini otoregresif değişken ortalamalı model üzerinden birim kök ve durağanlık testleri kullanarak incelemesinden sonra, Alogoskufis ve Manning (1988), Neudorfer vd. (1990), Brunello (1990), Elmeskov ve MacFarlan (1993), Jaeger ve Parkinson (1994), Roed (1996), Payne vd. (1999), Roberts ve Morin (1999) de konvansiyonel ADF ve KPSS testlerini kullanarak, Avrupa ülkelerinin genelinde histeri, Amerika Birleşik Devletlerinde ise doğal işsizlik oranı lehine kanıtlar ortaya koymaktadırlar. Ancak, bu çalışmaların da vurguladığı üzere, geleneksel birim kök testleri yapısal kırılmaların varlığı, yaklaşık birim kök durumu ve doğrusal olmayan yapıların varlığı gibi durumlarda hipotezlerin yanlış değerlendirilmesine yol açabilmektedir. Perron (1989)'da gösterildiği gibi, yapısal kırılmaların varlığını göz önünde bulundurmayan geleneksel birim kök testleri bu durumda düşük güce sahip olduğundan birim kök hipotezini reddetmede yetersiz kalabilmektedir. Bu sorunu göz önünde bulunduran Mitchell (1993), Arestis ve Mariscal (1999, 2000), Papell vd. (2000), Everaert (2001), Ewing ve Wunnava (2001), Camarero vd. (2005), Lee ve Chang (2008), Gomes ve Silva (2009), Ramirez ve Rodriguez (2014), Garcia-Cintado vd. (2015) vb. Gibi çalışmalar, birim kök analizini işsizlik oranlarında dışsal veya içsel olarak belirlenen, keskin yapısal değişikliklere olanak verecek biçimde genişletmektedir. Bu çalışmalarda, histeri hipotezinin yapısal kırılmalı doğal işsizlik oranı lehine reddedilmesi Phelps (1994) ile ortaya konan yapısal yaklaşımlı doğal işsizlik oranı teorisine destek sağlamaktadır. Yani, işsizliğe yönelik şokların çoğu geçici dalgalanmalara yol açsa da, bazı şoklar doğal işsizlik oranında kalıcı değişikliklere yol açabilmektedir. Yapısal kırılmaları göz önünde bulunduran çalışmaların çoğunluğu, histeri hipotezinin daha güçlü bir şekilde reddedilmesiyle yapısal doğal işsizlik oranı lehine yaygın kanıtlar ortaya koymaktadır. Öte yandan, birim kök hipotezinin bahsi geçen çalışmaların bir bölümünde reddedilememesi, yapısal kırılmalara izin veren birim kök testlerinin işsizlik teorilerinden biri lehine kesin sonuçlar üretmesinin önüne geçmektedir. İkinci olarak, Shiller ve Perron (1985)'de belirtildiği gibi, standart birim kök testleri birim kök ile birim köke yakın fakat birim kökten farklı olduğu durumlar arasında ayrım yapma konusunda zayıf kalmaktadır. Bu sorunu göz önünde bulunduran çalışmalar, işsizlik hipotezlerini araştırmak amacıyla kademeli bütünleşme yöntemlerine yönelmektedir. Bu yazında, bütünleşme derecesi işsizlik direncinin bir göstergesi olarak ele alınmaktadır. Tschernig ve Zimmerman (1992), Cuestas vd. (2011), Crato ve Rothman (1996), Gil Alana (2001) çeşitli ülkeler için histeri hipotezini yüksek direnç hipotezi

lehine büyük ölçüde kanıt sağlayarak reddetmişlerdir. Kademeli bütünleşme olasılığını göz önünde bulunduran çalışmalar, yüksek direnç hipotezini test etmeye olanak sağlamasına rağmen, bütünleşme derecesinin hangi noktadan sonra yüksek direnç hipoteziyle ilişkilendirileceği konusundaki belirsizlik bu yazına yönelik eleştirilere neden olmuştur. Diğer yandan Neftçi (1984)'de belirtildiği gibi işsizlik serileri doğrusal olmayan yapıda olma eğilimi taşımaktadırlar. Bu noktada işsizlik hipotezlerini çeşitli birim kök testleri üzerinden test eden çalışmalar, analizin başında doğrusallık varsayımı yaparak potansiyel doğrusal olmayan dinamikleri göz ardı etmektedirler. İşsizlik serilerinde doğrusal olmayan yapıyı göz önünde bulunduran çalışmalar; Bianchi ve Zoega (1998), Leon-Ledesma ve McAdam (2004), Skalin ve Terasvirta (2002), Fosten ve Ghoshray (2011) ve Ghoshray ve Stamatoganns (2015) durağanlıktan ziyade doğrusal olmayan yapı sayesinde yakalanabilen farklı dönemlerde farklı teorileri destekleyen rejimlerin varlığını ortaya koymaktadırlar. Uygulamalı yazının ikinci boyutu ise, direnç/süreklilik katsayısının hesaplanmasına odaklanmaktadır. Bu amaçla, modeldeki otoregresif katsayı sürekliliğin göstergesi olarak kullanılmaktadır. Ayrıca, Mitchell (1993), Papell vd. (2000) ile Lee ve Chang (2008)'de gösterildiği gibi süreklilik katsayısını hesaplamak için şokların yarılanma süresi otoregresif katsayıya dayanarak kullanılmaktadır. Yarılanma süresine dayanan süreklilik katsayısı hesaplamaları, yapısal kırılmaların göz önüne alındığı durumda, Papell vd. (2000)'de bahsedildiği gibi katsayının ciddi bir şekilde azaldığı yönünde kanıt sunmaktadır. Diğer çalışmalar, süreklilik katsayısının zaman içinde sabit olduğu varsayımını gevşeterek, zamana göre değişen katsayılar hesaplanmasına olanak vermektedirler. Bu çerçevede, Anderton (1998), Edwards ve Edwards (2000) ve Srinivasan ve Mitra (2012) çalışmaları örnek gösterilebilir.

Bu tez, İspanya'da işsizlik direncini çıktı açığını da göz önünde bulundurarak 1972-2015 yılları için analiz etmektedir. Her ne kadar artan işsizlik problemi, 1970 ve 1980'li yıllarda neredeyse tüm Avrupa ülkeleri tarafından paylaşılan yaygın bir deneyim olsa da, sorunun boyutları ve ciddiyeti ülkeler arasında farklılık göstermektedir. Bu bağlamda, İspanya işsizlik oranının hem yüksek seviyeleri deneyimlediği hem de bu yüksek oranlarda kayda değer bir direnç gösterdiği bir ülke olarak ekonomik yazında önemli yer tutmaktadır. Mevcut uygulamalı çalışmalar incelendiğinde, geleneksel birim kök testlerini kullanan çalışmalar; Alogoskufis ve Manning (1988) , Elmeskov ve MacFarlan (1993) ve Roed (1996) histeri hipotezini destekleyen kanıtlar öne sürmektedir. Öte yandan, yapısal kırılmaları ve kademeli

bütünleşme olasılığını göz önüne alan çalışmaların bazıları histeriyi reddederken (Arestis ve Mariscal (1999), Papell vd. (2000), Ramirez ve Rodriguez (2014)); diğerleri (Arestis ve Mariscal (2000), GarGarcia-del-Barrio ve Gil-Alana (2009)) reddedememektedir. Daha spesifik olarak, Papell vd. (2000), diğer OECD ülkelerinde en fazla iki yapısal kırılma gözlemlenirken, İspanya'da üç tane yapısal kırılma olduğuna yönelik sonuçlar bulmaktadır. Ayrıca, Everaert (2001) yapısal kırılmaları dikkate alarak histeri hipotezini reddedebilmesine rağmen, diğer ülkelerin çoğunda 3-6 yıl arasında kaybolan şok etkilerinin İspanya'da 14 yıla kadar ulaşabileceğini göstermektedir. Benzer şekilde, Camarero vd. (2006) panel birim kök testlerini kullanarak histeriyi reddetmiş ancak İspanya'yı yüksek işsizlik direnci gösteren ülkeler arasında sınıflandırmıştır. Özetle, uygulamalı çalışmalar, İspanya özelinde yapısal kırılmaların daha belirgin olabileceğine ve Dolado ve Jimeno (1997)'de belirtildiği gibi benzer şokları deneyimleyen diğer Avrupa ülkelerine kıyasla şokların kaybolmasını engelleyen olası direnç mekanizmalarının varlığına işaret etmektedir. Bu anlamda, işgücü piyasası katılıkları (Nickell, 1997) ya da İspanya'yı etkileyen şokların diğer ülkelerden farklı dinamikleri olması (Bentolila ve Blanchard, 1990) konusunda tartışmalar ortaya çıkmaktadır. Dahası, şokların ve işgücü piyasası kurumlarının potansiyel etkileşimleri dikkat gerektirmektedir.

Bu çalışma, anılan özellikleri dikkate alarak, İspanya'da işsizlik sürekliliğini zamana göre değişen parametrelere izin veren durum uzay (state-space) modeliyle incelemektedir. Çalışmanın ana hareket noktası çeşitli açılardan temellendirilmektedir. Başlangıçta, içeridekiler-dışarıdakiler teorisiyle açıklanan nedenler ve Brunello (1990)'da belirtildiği gibi sınırlı bir değişkenin durağan olmamasının yarattığı çelişkili durum, birim kök testi için uyumsuz bir çerçeve oluşturmaktadır. Bu anlamda birim kök testi prosedürü, hipotezlerin altında yatan dinamikleri yakalamak için yetersiz kalmaktadır. Öte yandan, yüksek işsizlik direncini öne süren çalışmaların bulguları, söz konusu hipotezlerin test edilmesinden öte, öncelikle kalıcılık düzeylerine odaklanan esnek bir yaklaşım gerektirmektedir. İkinci olarak, ani yapısal kırılmaları göz önüne alan birim kök testleri yumuşak geçişli yapısal değişimleri dikkate almamaktadır. Bu sınırlamalar göz önüne alındığında, zamana göre değişen parametreler yönetimi işsizlik direncini araştırmak için esnek bir alternatif oluşturmaktadır. Özellikle İspanya'daki işsizlik için şokların dirençli etkisi, işgücü piyasasında katılıkların varlığı yumuşak geçiş dinamiklerini ön plana çıkarmaktadır. Son kırk yılda İspanya ekonomisi; rejim değişikliği, Avrupa Birliği'ne katılım, pek çok ekonomik kriz ve işgücü piyasası reformları da dâhil

olmak üzere büyük bir dönüşüm geçirmiştir. Bir politikanın uygulanması ile ekonomiye etkisi arasındaki gecikmelerin varlığı, şokların değişkenler üzerindeki etkisinde geribildirim mekanizmalarının büyüklüğü, şoklar ve kurumlar arasındaki etkileşimler bu anlamda yumuşak yapısal değişimlere sebep olmaktadır. Bu çerçeve, ayrıca, ani yapısal kırılmaların verilerin kendi dinamikleri tarafından belirlenmesine izin vermektedir. Ek olarak, bu yaklaşım farklı dönemlerde farklı işsizlik hipotezlerinin desteklenmesine ve rejim değişikliklerinin veriler tarafından içsel olarak belirlenmesine olanak sağlamaktadır. Bu anlamda, ikilik (dichotomy) varsayımının kapsamı daha da genişletilerek, her dönem için parametrelerin herhangi bir hipotezi takip etmesine izin verilmektedir. Üçüncü olarak, işsizlik dinamiklerini daha somut bir şekilde anlamak açısından, üretim piyasalarından gelen şoklar ve işgücü piyasasının esnekliği arasında ayrım yapmak önemlidir. Bu bakımdan, üretim piyasası şokları devresel işsizlik ile ilişkilendirilebilirken, işgücü piyasasının esnekliği işsizliğin yapısal özelliklerini yansıtmaktadır. Bu çalışmada, İspanyol işsizliğindeki yüksek çevrimsel bileşenle ilgili iddiaları ve katılıktan kaynaklanan yapısal bileşenin baskınlığını hesaba katmak için, işsizlik sürekliliğin analizinde geçmiş dönemki işsizlik oranına ek olarak çıktı açığı da açıklayıcı değişken olarak kullanılmıştır. Çıktı açığının modele dâhil edilmesi, işsizlik direnç katsayısında işgücü piyasasının kurumsal özelliklerinin gözlemlenmesine olanak sağlamaktadır. Bu açıdan işgücü piyasası kurumlarını etkileyen politika değişikliklerinin etkileri süreklilik katsayısı özelinde gözlemlenebilmektedir. Öte yandan, mevcut işsizlik oranı ile çıktı açığı arasındaki ilişkiyi gösteren zamana göre değişen parametre, çıktı açığındaki değişikliklerin işsizlik oranındaki etkilerini ve bu anlamda devresel işsizliğin evrimini göstermektedir.

Doğrudan gözlemlenebilen bir değişken olmaması nedenıyle çıktı açığının elde edilmesi için alternatif ayrıştırma yöntemleri önerilmektedir. Bu çalışmada, çıktı açığını elde etmek için üç farklı tek değişkenli ayrıştırma yöntemi, Hodrick-Prescott (HP) filtresi, Beveridge-Nelson (BN) ayrıştırması ve Kalman filtresi, kullanılmaktadır. Bu yöntemler, gözlemlenemeyen eğilim (trend) ve çevirim bileşenleri tanımları ve bu bileşenler arasındaki bağıntı (correlation) ile ilgili varsayımlarına bağlı olarak farklı bileşenler elde etmektedir. Bu yöntemlerin sınıflandırılması açısından, Canova (2007) HP filtresini ekonomik gerekçeleri ve istatistikleri içeren karma bir yöntem olarak kabul ederken, BN ayrışması ve Kalman filtresi istatistiksel yöntemler olarak karakterize edilmektedir. Bu yöntemlerin karşılaştırılmasıyla ilgili olarak (Morley vd., 2003; Zivot, 2005), HP ve Kalman filtreleri, eğilim bileşeninin oriji-

nal seriye bağlı olarak yavaş değişimlerine izin vermekte ve eğilim ile çevirim bileşenleri arasında bağıntı olmadığı varsayımına dayanmaktadır. Öte yandan, HP ve BN ayrıştırmaları çevirim bileşenini eğilimden geriye kalan artık şeklinde elde ederken, Kalman filtresinin çevirim tanımı daha derin dinamikleri kapsamaktadır. Hem BN hem de Kalman ayrıştırmalarında, eğilim terimi rastgele yürüyüş (random walk) süreci olarak modellenmiştir ve HP filtresindeki gibi eğilim bileşeninin değişimine dair yumuşatma (smoothness) parametresinde olduğu gibi bir varsayımda bulunmamaktadır. HP filtresi uygulamalı çalışmalarda yoğun bir şekilde uygulanmakla birlikte, teknik açıdan önemli sınırlamalar getirmektedir. Sabit yumuşatma parametresinin analizden önce ve tesadüfi varsayımlara bağlı olarak seçilmesi yazında yoğun olarak eleştirilmektedir. Diğerleri arasında, Phillips ve Jin (2015) tarafından açıklandığı gibi, filtrenin özellikleri parametre seçimine yüksek oranda bağlı olabilmektedir. Bu nedenle, belirtilen parametrenin gerçek değeri yansıttığı yönünde kanıtlar olmadıkça, çevirim bileşenin tanımlanması tesadüfi olmaya zorlanmaktadır. Bu bağlamda, Harvey ve Jaeger (1993), filtrenin uygunsuz şekilde kullanılmasının yapay sonuçlara neden olabileceğini ortaya koymuştur. Dahası, Hamilton (2017), rastgele yürüyüş sürecini takip eden ekonomik zaman serilerinde bu yöntemin kullanılışını sorgulamaktadır. Dördüncü dereceden fark almanın, gerçek veri üretim sürecinin özelliklerini ortadan kaldırmanın kaçınılmaz riskine ek olarak, durağan bir çevirim bileşeni üretmekte başarısız olabileceği gösterilmiştir. Dolayısıyla, teknik sınırlamalar HP filtresinin uygulanmasında önemli sorunlar ortaya çıkarmaktadır. Öte yandan, istatistik temelli prosedürlerden BN ayrışması ve Kalman filtresinin özelliklerini bir arada tartışmak mantıklı bir çerçeve oluşturmaktadır. Bu anlamda Watson (1986), bu iki ayrıştırma yönteminin kısa vadede benzer özellikleri paylaştıklarını, ancak bu özelliklerin uzun vadede önemli ölçüde farklılık gösterdiğine dikkat çekmektedir. Bu bağlamda, BN ayrıştırmasının otogegresif hareketli ortalama (autoregressive moving average – ARMA) model seçimine duyarlı olabileceği, ancak Kalman filtresinin model seçimine kritik duyarlılık gösteremeyeceğini belirtmek önemlidir (Canova, 1998). Bu iki yaklaşım, temel olarak eğilim ve çevrim bileşenleri arasındaki bağıntıya ilişkin varsayımlar temelinde ayrılmaktadır. Bağıntının tahminlenmesi ya karmaşık prosedürler gerektirdiğinden ya da Stock ve Watson (1988) tarafından açıklandığı gibi doğrudan tahmin edilemediği için, bu alandaki çalışmalar ya sıfır bağıntı ya da tam bağıntı varsayımlarına dayanmaktadır. Bu anlamda, BN ayrışması tam negatif bağıntı varsayımına dayanmakta ve çevirim bileşenini tamamen eğilim bileşeninin dinamiklerine bağlı olarak tahmin etmektedir. Uygula-

malı yazın açısından, Morley vd. (2003), ABD verileri için Kalman filtresindeki sıfır bağıntı varsayımının gevşetilmesinden sonra BN ve Kalman ayrıştırmalarının teorik olarak eşdeğer olduğunu göstermekte ve gözlemlenemeyen değişkenler arasında güçlü negatif bağıntı lehine kanıt sağlamaktadır. Bununla birlikte, Basistha (2007), Monte Carlo deneylerini kullanarak tek değişkenli çalışmaların potansiyel problemlerinden bahsetmektedir. İki değişkenli çalışmalar arasında, Sinclair (2008) ve Morley vd. (2003) ABD örneği için negatif korelasyon tahmini ortaya koyarken, Basistha ve Nelson (2007) ise bileşenler arasındaki bağıntıya izin verildiği durumda dahi, çıktı açığındaki hareketliliğin baskın olduğu sonucuna varmışlardır. Proietti (2002), gözlemlenemeyen bileşenler arasındaki bağıntının, çevrimsel bileşenin teknik sorunlardan kaynaklı mevcut yapıdan daha az tahmin edilmesinden ortaya çıkabileceğini iddia etmektedir. Öte yandan Clark (1987), sıfır bağıntı varsayımının doğru olmasa da, tam bağıntı varsayımından daha üstün olduğunu açıklamaktadır. Özellikle, ekonomik açıdan, çevirim bileşenini etkileyen şokların kalıcı bileşeni etkilemeyeceği açıktır. Daha da önemlisi, makroekonomik teoride kullanılan ikilik varsayımı, geçici şokların ve kalıcı şokların etkileri arasında açıkça farklılaşmaktadır. Sonuç olarak, tek değişkenli analizin sınırlamaları ve Clark (1987) tarafından vurgulandığı gibi yıllık veri sıklığının çevirim bileşenindeki potansiyel varyasyonu maskeleme olasılığının yüksekliği sıfır korelasyon varsayımının daha anlamlı sonuçlar sağladığını göstermektedir. Ayrıca, çıktı açığı modelde açıklayıcı bir değişken olarak kullanıldığı için, bu bileşenin kendine özgü dinamikleri olmasına olanak sağlayan Kalman filtresi, BN ayrıştırma yöntemine tercih edilmektedir. Bu çalışmada, İspanyol işsizliği 1972-2015 dönemi boyunca yıllık veriler kullanılarak uygulamalı olarak analiz edilmiştir. Analizin odak noktası, işsizliğin sürekliliğinin ve bu bağlamda çıktı açığı duyarlılığının evrimini ortaya çıkarmaktır. Ayrışma yöntemleri ile ilgili olarak, temel amaç, hem bu çalışmanın kapsamına teknik avantajlar getiren ve hem de İspanyol ekonomisinin kendine özgü dinamiklerini doğru bir şekilde yansıtan filtrenin seçilmesidir. HP filtresi, BN ayrışması ve Kalman filtresinin teknik özellikleri göz önünde bulundurularak; tahmin sonuçları, verilerin yazındaki ilgili kronolojilere uygunluğu açısından incelenmiştir. Şekil 6'daki alternatif çıktı açığı tahminlerine dayanarak, HP filtre yöntemindeki yumuşatma parametresinin alternatif seçimiyle ilgili beklentilerle tamamen tutarlı olduğu görünmektedir. Ancak, daha önce belirtildiği gibi filtrenin sağlamlığı, yumuşatma parametresinin analizden önce seçiminden kaynaklı eleştirilere maruz kalmaktadır. Şekil 6'da açıkça görüldüğü gibi, 6.25 yumuşatma parametresinin seçildiği HP filtresi çıktı açığı tahmini, 1970'lerin sonlarındaki durgunluk di-

namiklerini tamamen ihmal etmektedir. Diğer yandan, yumuşatma parametresinin 100 olarak seçildiği filtre bahsi geçen dönemin dinamiklerini daha iyi yansıtmakla birlikte, 1990'ların ikinci yarısındaki ekonomik toparlanma dönemi için durgunluk dönemine benzer dinamikler yansıtarak yanıltıcı olmaktadır. Bu nedenle, HP filtresinin genel anlamda mekanik kullanımının sebep olabileceği sınırlamalara ek olarak; İspanyol ekonomisine uygulamasında da sahte çevirimler yarattığına dair belirgin işaretler ortaya çıkmaktadır. Öte yandan, BN ayrışması ile tahmin edilen çıktı açığı, HP filtresiyle kıyaslandığında İspanya ekonomisi için öne sürülen geleneksel kronolojilerle daha iyi örtüşmektedir. Özellikle 1990'ların ortalarına kadarki ekonomik durgunluk dönemleri büyük ölçüde, tutarlı bir şekilde yansıtılmaktadır. Diğer yandan, 1990'ların ikinci yarısından itibaren önerilen dengesiz, dalgalı davranışlar ekonomide gözlenen gelişmeler ile gerekçelendirilememektedir. Ayrıca, 2000'li yılları kapsayan dönem için ekonominin sürdürülebilir oranların ötesinde büyüdüğünü öne süren çalışmalara zıt olarak bu dönemin dinamikleri daha durağan biçimde ortaya konmaktadır. Bu açıdan, teknik olarak çevirim bileşeninin uzun vadeli eğilim bileşeninin hareketlerine tabii oluşu, BN ayrışmasının İspanyol ekonomisinin doğru dinamiklerini üretmede başarısız olmasına sebep olmaktadır. Çevrim bileşenini durağan bir otoregresif süreç olarak tanımlayan Kalman filtresi tarafından tahmin edilen çıktı açığı ise diğer yöntemlerle karşılaştırıldığında daha yumuşak geçişler göstermektedir. Bu yöntemde çıktı açığı, eğilim bileşenindeki hareketlere sebep olan şoklardan bağımsız olarak çevirim bileşenin kendi şokları tarafından yönlendirilmektedir. Bu gözlemlenemeyen bileşenler arasında sıfır korelasyon olduğu varsayımı katı görünse de, eğilim bileşeninden ayrı dinamiklere izin vererek çevirim bileşeninin tahmin edilmesi ön plana çıkmaktadır. Çevirim bileşeni bu çalışmada açıklayıcı değişken olarak kullanıldığı için eğilim bileşeninin tahminlerinin getirdiği kısıtlamaların ötesinde bilgi içermesi tercih edilmektedir. Diğer alternatifler arasında Kalman filtresi, Bölüm 3'te gözden geçirilen şokların kronolojisi ile en uygun filtreyi temsil edilmektedir. Özellikle Estrada vd. (2009) ve Alberola vd. (2014)' de bahsedildiği gibi 2000'li yıllarda sürdürülebilir seviyenin ötesindeki çıktı seviyesi ve 2008 krizi ile sonrasındaki Avrupa Borç krizinin ağır olumsuz etkileri sadece bu ayrıştırma yaklaşımında dikkat çekici bir şekilde ortaya konulmaktadır. Bu sebeplerden, hem teknik özellikler hem de ülkeye özgü dinamikler ile uyumu göz önüne alındığında, uygulamalı analizde çıktı açığı için Kalman filtresi tahmini kullanılmaktadır. Bu çalışmada, zamana göre değişen parametreler yöntemi çerçevesinde yapısal işsizlik ve döngüsel işsizlik faktörlerinde yıllar içindeki değişimin ortaya çıkarılması amaçlanmaktadır.

Yapısal işsizlik sabit katsayı ve süreklilik katsayısına bağlı olarak ele alınmakta ve potansiyel olarak işgücü piyasalarındaki genel eğilimi ve kurumsal etkileri yansıtmaktadır. Öte yandan, çıktı açığı parametresi işsizlik oranı ve üretim tarafından aktarılan geçici şoklar arasındaki bağlantıyı ortaya koymaktadır. İşsizlik oranındaki süreklilik derecesini gösteren katsayının zaman içindeki değişimi, işgücü piyasalarındaki esnekliğin evrimine dair bir ölçü sunmaktadır. Bu anlamda, İş piyasası esnekliğini iyileştirmeyi amaçlayan politikaların itici gücü, bu kapsamdaki geçmiş ve şimdiki işsizlik arasındaki bağlantının kopması olarak gözlemlenebilir. Şekil 7b'de görüldüğü gibi katsayının 1977'den 1985'e kadar kesintisiz olarak artması, katı istihdam koruması gibi sıkı işgücü piyasası kurumları ile açıklanabilir. Bu dönemde, istihdam korumasının olumsuz makroekonomik koşullardan kaynaklanan işsizlik oranındaki olası artışları azaltma özelliği atalete yol açmaktadır. 1980'de bir sınırına ulaşan ve sonraki yıllarda bu seviyeyi aşan süreklilik katsayısı 1986'ya kadar histeretik etkilerin varlığını ortaya koymaktadır. Öte yandan, bu katsayı, 1984 reformunun ardından 1985-1987 döneminde ciddi bir düşüş göstermektedir. Bu bağlamda, Avrupa Komisyonu (2005), işsizlikte meydana gelen ataletin, geçici süreli sözleşmelerin kullanımını hızlandıran 1984 reformuna yol açtığını belirtmektedir. Bu tür sözleşmelerle sağlanan düşük istihdam koruması biçimindeki esneklik, 1980'lerin ortalarından itibaren olumlu makroekonomik koşullar altında istihdam olanaklarını büyük ölçüde arttırmaktadır. Bu bağlamda, Anderton (1998) de 1985 sonrası süreklilik katsayısının azaldığını ortaya koymaktadır. İstatistiksel olarak ise, 1976-1996 dönemi için histeri hipotezi güven aralıklarına dayanarak reddedilememektedir. Bu anlamda, 1994-1996 döneminde işgücü piyasası reformunun eşlik ettiği olumlu makroekonomik koşullar ile bir başka aşağı yönlü kayma süreci gözlemlenmektedir. Benzer şekilde Garcia-del-Barrio ve Gil-Alana (2009), 1994 sonrasında süreklilik katsayısının azaldığını önermektedir. Özellikle, 0,5'in altına düşen kalıcılık katsayısı, 1994 sonrası işsizlik direncinin ciddi biçimde azaldığı yönünde kanıtlar ortaya koymaktadır. Bu kapsamda, geçmiş ile mevcut işsizlik arasında azalan bağlantı, işgücü piyasalarının esnekliği açısından önemli olmakla birlikte, geçici süreli sözleşmelerin sınırsızca kullanılması işgücü piyasasını çevrimsel şoklara karşı kırılgan hale gelmektedir. Olumlu makroekonomik dönemlerle çakışan 1984 ve 1994 reformları sonrasında süreklilik katsayısında oluşan ani düşüşlerden farklı olarak, iki krizi kapsayan 2008-2015 döneminde süreklilik katsayısı yumuşak geçişli bir azalış ortaya koymaktadır. Bu azalışın OECD (2018) verisinde gösterildiği gibi mevcut dönemde meydana gelen cesaretini kaybetmiş (discouraged) işgücüyle alakalı olduğu öne sürülmektedir.

Kalıcılık katsayısının azalmasıyla artan sabit katsayının yansıttığı işsizlik oranındaki yapısal bileşene ilişkin karışık kanıtlar göz önüne alındığında, çıktı açığı katsayısının hareketleri işsizlik serilerindeki döngüsel bileşenin kapsamını göstermektedir. Negatif olması beklenen katsayının değeri ne kadar küçükse, işsizliğin çıktı açığına olan duyarlılığı da o kadar fazla olmaktadır. Çıktı açığının pozitif katsayısı, Şekil 7 (c)'de görüldüğü gibi 1986'ya kadar işgücü ve çıktı piyasaları arasında beklenen bir bağlantının olmadığını göstermektedir. Bölüm 3'te de belirtildiği gibi bu ekonomik durgunluk dönemi için emek istifi işaretleri gözlemlenmektedir. Tahmin sonuçları, esnek bir işgücü piyasasında beklendiği gibi, döngüsel işsizlik yoluyla şokların aktarım mekanizması yerine, şokların katı kurumlarla etkileşmesinin, işgücü piyasalarındaki karmaşık ve muhtemelen güçlendirilmiş etkilere yol açtığını göstermektedir. Çıktı açığı katsayısı, 1987'de 1985'ten itibaren keskin bir düşüşün ardından negatif hale gelmesine rağmen, 1996 yılı hariç 2000'li yıllara kadar istatistiksel olarak anlamsızdır. 2000'li yıllar için bazı yıllarda istatistiksel olarak anlamlı hale gelen çıktı açığı katsayısı, bu dönemde işsizlikteki yapısal bileşenin baskınlığına rağmen çevrimsel etkilerin de ön plana çıktığını işaret etmektedir. Bu anlamda, 1990'larda Maastricht anlaşmasının gerekliliklerini yerine getirmeyi amaçlayan istikrar politikalarının uygulanmış olması ve 1990'ların ikinci yarısındaki ekonomik toparlanma sürecinin işgücü piyasaları üzerindeki etkileri önemli bir rol oynamaktadır. Dolayısıyla, hem kalıcılık katsayısının hem de çıktı açığı katsayısının zamana göre değişimi, 1990'lardan sonra işgücü piyasalarındaki esnekliğin kademeli olarak iyileştiğine işaret etmektedir. Bununla birlikte, çıktı açığı katsayısının birkaç yıla sınırlanmış olan istatistiksel anlamlılığı, işsizlik oranında döngüsel bileşenin kısıtlı rolünü işaret etmektedir. Fakat 2008 krizinin işsizlik üzerindeki çevrimsel etkileri, çıktı açığı katsayısının belirli gecikme etkileriyle birlikte 2010'da azami noktaya ulaşmasıyla yansıtılmaktadır. 2013 yılında da benzer bir değişim gösteren çıktı açığı katsayısı 2000'li yılların sonlarından itibaren işsizlik oranındaki döngüsel bileşenin rolünün arttığını ortaya koymaktadır.

APPENDIX C

THESIS PERMISSION FORM / TEZ İZİN FORMU

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Bölümü / Department : İktisat

TEZİN ADI / TITLE OF THE THESIS (**İngilizce** / English) : Unveiling Spanish Unemployment Persistence by Output Gap: A Time-Varying Parameter Approach

TEZİN TÜRÜ / DEGREE: **Yüksek Lisans** / Master ☒ **Doktora** / PhD ☐

1. **Tezin tamamı dünya çapında erişime açılacaktır. /** Release the entire work immediately for access worldwide. ☒
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