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Determinants of European and United States Unemployment

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1. Introduction

At 25 years old, with a college degree from a respected Spanish university and fluency in the English language, a young Spanish woman still lives with her parents and has been unemployed for almost a year. She has lost hope that her situation will improve anytime in the near future, though she constantly sends résumés to employers and searches the web, newspapers, and other forms of media for job openings. Unfortunately, this describes more than half of Spain's youth as Spanish youth unemployment has reached an astonishing 56.1% (Burgen).

Spain was one of the hardest hit countries as a result of the 2008 global recession and the European sovereign debt crisis, both of which ultimately extended into the Spanish financial crisis that recently ended in October of 2013 as a result of a 0.1% GDP increase in the third quarter of 2013 (BBC Business). Unemployment nationwide surged to 25%, one of the highest rates in Europe. Other European countries however, such as France and Germany, did not experience such drastic changes in unemployment during the recession, with rates peaking at about 10% and 8% respectively (OECD). In addition, unemployment in the United States peaked at 10% during the recession (U.S. Bureau of Labor Statistics). Before 1980, the United States had a significantly higher unemployment rate than European countries; however over the past several decades, European unemployment rates have surpassed those of the United States (Borjas). This paper compares unemployment in the United States and the European countries of France, Germany, and Spain. It attempts to identify and explain the factors that affect unemployment and why/if they differ between the United States and Europe, as well as amongst the European nations.

In analyzing unemployment, it is known that significant policy differences exist between European nations and the United States, usually attributable to the different government structures. Because the United States is more capitalistic, relying on the operations of free markets, there is not as much government intervention as there is in the European countries. This has a huge impact on unemployment in regards to minimum wages, unemployment benefits, and other welfare benefits. This paper analyzes the effects that inflation, average hours worked per worker per year, full-time employment, part-time employment, trade union density, strictness of employment protection for temporary and regular contracts, public unemployment social expenditure, and public total social expenditure have on unemployment in the United States and the given European countries.

This paper also addresses the two-tier labor market structures in the United States and Europe. Existing research argues that the greater number of temporary workers in Europe than in the United States strongly contributes to the overall higher level of unemployment in Europe. The highly inflexible European labor markets contribute to stricter employee protection legislation, higher severance pay, and greater difficulty in firing employees. These factors inevitably result in a greater number of temporary workers hired than permanent workers. This fact is manifested most notably in Spain and is claimed to be a central explanation for the strong difference in unemployment between Spain and France, both of which have very similar institutions and policies (S. P. Bentolila). Overall labor market rigidity is one of the most important aspects of an economy contributing to unemployment as it encompasses a multitude of factors that have direct effects on employment.

Government policy has direct implications on unemployment and thus the economic growth of a nation. There are many governmental approaches to regulations that directly affect

unemployment and it is imperative that a country's government analyze the short- and long-term effects of these policies on the economy before implementing them. The rest of the paper is organized as follows: section 2 presents a review of the literature. An econometric specification is presented in section 3. Section 4 provides definitions, sources, and descriptive statistics of the data. The estimation results are analyzed in section 5. Implications and conclusions of the study are provided in section 6.

2. Literature Review

Previous and current research on unemployment has heavily focused on the two-tier labor market of an economy. In their article "Labor Market Rigidity, Unemployment, and the Great Recession," Murat Tasci and Mary Zenker note that countries with highly flexible labor policies and institutions experienced greater increases in unemployment during the Great Recession than countries with more rigid institutions. They note that the United States has maintained a constant strictness rating over the years accounted for in their study and indeed the U.S.'s increase in unemployment was greater than that of many continental European countries. They argue, however, that this is a tradeoff for lower long-term unemployment in countries with flexible labor markets. This is due to the greater flexibility in hiring and firing employees, as well as legislation on minimum wages, unemployment insurance, advance notice, and labor taxes, all of which directly affect unemployment. The authors explain that employment protection measures may cause a disincentive for job creation because employers would have less flexibility in adjusting their workforce during economic downturns (Tasci). This disincentive is directly related to the number of permanent and temporary workers an economy consists of. As a result of the inability to easily fire an employee, businesses are more likely to hire temporary workers

to avoid the costs that are associated with keeping permanent workers during times of economic crises.

Tasci and Zenker also note that during the recession, countries with stricter employment protection experienced a larger loss of GDP relative to countries with less strict protection measures, but the impact on the unemployment rate was less severe in countries with stricter measures. Lastly, the authors note that "skill-based technical change is a shift in production technology that favors skilled over unskilled labor," and this could have a significant impact on the long-term rate of unemployment in a country (Tasci). This is so because if individuals are out of work longer they are losing human capital by not acquiring new skills that are demanded of the ever-evolving labor market, which increases the likelihood of them not finding a job.

Another component of the two-tier labor market is the role of employment protection legislation (EPL). Bentolila, et al. note in their article "Two-tier employment protection reforms: The Spanish experience," that significant changes in EPL have taken place in Spain, particularly since 1980. These changes have greatly affected the volatility of employment as well as decisions in regards to union action in collective bargaining and contracting temporary and permanent employees. The authors note that in 1980 about 90% of contracts in Spain were permanent contracts. However when unemployment in Spain surged to 20% in 1984, a "more flexible labor market was urgently needed to improve worker reallocation from decaying to more profitable industries," (Bentolila, Dolado and Jimeno). Due to union strength and inflexibility, the only politically feasible way to relax the labor markets was through liberalization of the use of temporary contracts. The prevalence of temporary employment leads to much higher labor market risks for employees. These laxer regulations on temporary contracts led to 35% of Spain's employment being temporary positions. This was a central cause in Spain's large

increase in the rate of unemployment during the recession as employers had greater freedom in regulating these contracts and used layoffs as normal practices. Lastly, the authors explain that the number of temporary contracts has an ambiguous effect on the rate of unemployment because use of these contracts incentivizes both hiring and firing of workers. Thus the dominance of hiring over firing or vice versa is a significant determinant in changes in the rate of unemployment (Bentolila, Dolado and Jimeno).

In an article titled "Two-Tier Labour Markets in the Great Recession: France versus Spain," Bentolila, Cahuc, Dolado, and Le Barbanchon analyze and compare unemployment between France and Spain during the most recent recession, particularly because these countries have similar labor market institutions and their unemployment rates were relatively the same before the recession. The governments of both countries have promoted temporary contracts in order to increase the flexibility of labor markets and decrease unemployment, but the authors note that these temporary contracts have been much more important in Spain than in France. Although these two countries have similar labor market institutions, Spain experienced a peak unemployment rate of 25% during the recession while France's unemployment rate peaked around 10% (Bentolila, Cahuc and Dolado). The authors attribute this to a larger employment protection legislation (EPL) gap in Spain than in France. The EPL gap accounts for the difference between the firing costs of permanent workers and temporary workers, as well as the degree of regulation on the use of temporary contracts. Bentolila, et al. explain that there are very specific cases in France in which temporary contracts may be used and employers are regularly monitored by authorities to ensure compliance. In Spain, however, there are very few de facto restrictions in the use of temporary contracts and employers are rarely monitored to

ensure compliance with use of these contracts. This ultimately leads to more volatility in the already unstable temporary market.

In a separate article titled “Why have Spanish and French unemployment rates differed so much during the Great Recession?” the same authors declare that Spain has had a much stronger dependence on the construction industry than France has since the late 1990s. In 2007, jobs in construction accounted for 13.3% of employment in Spain, compared to only 6.9% in France. The dependence on and growth in this industry was partially due to the ample supply of low-skilled labor in Spain. As this industry continued to grow, there was a “very high dropout rate from compulsory education,” (S. P. Bentolila). This cycle produces fewer and fewer skilled workers and when the industry collapsed in 2008, these workers did not have the new technological skills needed to find a new job, which ultimately increases the rate of long-term unemployment. The heavy dependence on the construction industry, coupled with very rigid permanent contracts, has contributed to the stronger dual labor market in Spain. The differences in regulation of these contracts between the two countries contribute significantly to the responses in the unemployment rates during the recession. Therefore, in one aspect, responses in unemployment are linked to the volatility of a country’s industries and thus the number of temporary employment contracts compared to the number of permanent employment contracts. Clearly labor market rigidity has significant implications on a country’s unemployment rate and these implications are most clearly manifested in times of economic downturns.

Cazes, Verick, and Hussami also conclude in their article “Why did unemployment respond so differently to the global financial crisis across countries? Insights from Okun's Law," that the responsiveness of unemployment during the Great Recession was lower in countries that grant workers greater employment protection. Ultimately, rigid labor markets may prevent

spikes in unemployment in the short-term, however in the long-term these rigid labor markets result in higher rates of unemployment. The authors also claim that the way in which labor markets adjust affect changes in unemployment over the business cycle and these changes can be external, such as laying-off workers, or internal, such as reducing working hours. Cazes, et al. note that Germany in particular used internal changes by extensively reducing working hours rather than dismissing workers, whereas the United States used external adjustments such as wage cuts and dismissing workers. These different responses ultimately resulted in differences in the rates of unemployment. Germany's unemployment rate remained very stable during the recession but its GDP suffered a larger loss than that of the United States; the United States' unemployment rate fluctuated more than Germany's but it did not suffer as great of loss in GDP. The relationship between output and unemployment can be understood through Okun's Law which states that a three percent change in output is "associated with a change in the unemployment rate of around one percentage point," (Cazes, Verick and Al Hussami). The authors declare that this law is a "strong and stable relationship in most countries," as was proven by the Okun coefficients for Germany and the United States during the Great Recession (Cazes, Verick and Al Hussami).

In conjunction with employment protection legislation, previous research has focused on the impact of welfare benefits and governmental policies on unemployment. In his text *Labor Economics*, George Borjas addresses unemployment compensation and unemployment insurance in the United States. He concludes that overall, more generous unemployment insurance and compensation lengthen the duration of unemployment spells and lead to higher post unemployment wages because these benefits ultimately reduce the cost of job search. In the United States these policies had an impact on unemployment during the most recent recession.

Studies have concluded that statistically significant reductions in unemployment exits and small increases in unemployment durations arose from the unemployment insurance extensions during the Great Recession (Farber and Valletta), and that most of the steady increase in unemployment in the United States during the Great Recession was due to "unprecedented extensions of unemployment benefit eligibility," (Hagedorn, Karahan and Manovskii). These programs, however, will not have such lasting impacts in the United States as they will in European countries. Borjas explains that until about 1980 the United States had higher unemployment rates than European countries, but the generous amount of unemployment insurance and other welfare benefits provided by European governments, as well as the responsibilities that European citizens believe the government has, have played a significant role in the higher unemployment rates in Europe in recent years (Borjas).

Additionally, in the article "European Unemployment: Why is it So High and What Should be Done About it," Richard Jackman offers three explanations for the shift in "unemployment rankings" between the United States and Europe over the past few decades. He first acknowledges the institutional changes that have taken place in Europe that have affected its poor labor market performance. These changes include the willingness of governments to legislate to strengthen union rights and improve working conditions through policies affecting hours of work requirements, holiday and parental leaves, and minimum wages. He then offers the possibility of hysteresis in unemployment in Europe. While labor markets may not cause unemployment directly, the role of insiders in wage bargaining, firing costs, capital shortages, and the consequences of long spells of unemployment could be possible explanations for adverse shocks to unemployment that have long-term effects (Jackman). He declares that unions in the European Union have much greater bargaining power than in the U.S. This often leads to

minimum wages that are too high as well as other fallible policies, noting that unions do not usually take into consideration the negative external effects their policies have on other firms. This can essentially lead to a higher rate of unemployment. Additionally, Jackman mentions that differences in the unemployment rates between the EU and U.S. can be partially accounted for by the provision of "indefinite and effectively unconditional unemployment benefits to those out of work" in many European countries (Jackman).

Lastly, Jackman suggests that the interaction between labor market institutions and technological change has a significant impact on unemployment in Europe. He notes that technological progress calls for an increase in the demand for skilled laborers, but in Europe there has not been a corresponding increase in the relative wages of skilled workers as there has been in the United States. This will obviously impact the demand for unskilled workers as well and will lead to an overall increase in unemployment (Jackman). He concludes by arguing that beneficial interventionary policies today come at the expense of higher unemployment in the future, which is consistent with other economic research findings.

Research by Adam Looney and Michael Greenstone also addresses the effects technological changes have had on American workers in the long run. Their article "Unemployment and Earnings Losses: The Long-Term Impacts of The Great Recession on American Workers" suggests that large losses experienced by workers result from skills and knowledge that are less valuable today than they were in earlier years in previous positions. This is because more and more newly created jobs require advanced training and if individuals are unemployed, they do not have the opportunity to acquire these new skills that are developed from new jobs. They also emphasize that college education is crucial for new jobs. Education

and training are pivotal in providing the most vulnerable workers with the skills needed to succeed (Looney and Greenstone).

The rate of inflation may also impact the unemployment rate, as understood by the Phillips Curve. In his article "Phillips Curve," Kevin Hoover explains that A. W. H. Phillips found a consistent inverse relationship with the rate of inflation and the rate of unemployment. Hoover explains Phillips's study, noting that although the general price inflation is usually what one refers to when comparing inflation and unemployment, the prices a company charges are intimately related to the wages it pays. Subsequent studies by economists Milton Friedman and Edmund Phelps, however, have challenged the Phillips Curve. They argue that there is essentially a short-run and long-run Phillips Curve in which the former exists when inflation is fairly constant and thus an inverse relationship between inflation and unemployment results, and the latter exists when the average inflation rate changes. In the long-run, workers' expectations of inflation have time to adjust and their wages will adjust accordingly, leading to a natural unemployment rate that is "compatible with any rate of inflation," (Hoover). Friedman and Phelps claim that "the more quickly workers' expectations of price inflation expectations adapt to changes in the actual rate of inflation, the more quickly unemployment will return to the natural rate," (Hoover).

Although many European countries experienced significant increases in unemployment during the 2008 global financial crisis, Germany fared relatively well as Ulf Rinne and Klaus Zimmerman explain in their article "Another Economic Miracle? The German Labor Market and the Great Recession." They argue that Germany has proven to have strong internal flexibility as seen through its response to the recession. This flexibility is manifested through terms of temporary and permanent employment as well as through other governmental policies. Rinne

and Zimmerman explain the development in Germany and resulting stability can be attributed to the fact that the crisis affected mainly export-oriented companies in Germany, the extension of short-time work, automatic stabilizers, and other factors. An important conclusion in their analysis is that countries with "existing routines" that are quick to adjust to changes during economic recessions fare better than those countries without such routines in which the automatic stabilizers can be used effectively. This research and analysis of Germany can be compared to the policies in Spain and other countries to help explain the disparity in unemployment rates in these European countries during the Great Recession.

Rinne and Zimmerman explain that in the 1990s, Germany had considerably high rate of unemployment due to strict employment protection and high labor costs. The country also offered generous social benefits but these benefits came at a cost of strong segmentation in labor market and high long term unemployment. The authors explain that significant reforms took place in 2003 which included a large reduction in average annual hours worked per employee, reorganization of long-term unemployment benefits and stricter standards to receive these benefits, and other means to incentivize the unemployed to find work (Zimmerman). These reforms essentially provided internal stabilization for the country when the 2008 recession hit. The authors conclude that while Germany's unemployment rate remained very stable during this recession, it suffered a significant loss in GDP compared to other countries. This case confirms that there is a trade-off between the unemployment rate and GDP, as well as a trade-off between short-time work and a long-term shortage of skilled workers.

3. Economic Model

The main objective of this study is to examine the relationship between unemployment and a set of economic and social indicators. Previous research indicates that linear specification is appropriate. Following this tradition the model used in this paper is specified as follows:

$$U = f(I, H, F, T, UD, EPT, EPR, UE, TE)$$

Where U= unemployment rate

I= rate of inflation

H= average annual hours actually worked per worker

F= full-time employment

T= part-time employment

UD= trade union density

EPT= strictness of employment protection (temporary contracts)

EPR= strictness of employment protection (individual & collective dismissals—regular contracts)

UE= public unemployment social expenditure

and TE= public total social expenditure.

A landmark study by A.W.H. Phillips showed a consistent inverse relationship between the rate of inflation and the rate of unemployment: when unemployment is high, wages tend to increase slowly and when unemployment is low, wages usually increase rapidly (Hoover). As noted earlier, economists Milton Friedman and Edmund Phelps argued the existence of a short-run and long-run Phillips curve. In the long-run workers' expectations of inflation have time to adjust to the economy and their wages will adjust accordingly, leading to a natural unemployment rate that is "compatible with any rate of inflation." However in the long-run, it would be expected that there would be a slight inverse relationship between the inflation rate and unemployment rate.

On average the more working hours an individual or a population records, the lower the unemployment rate would likely be. More average annual hours recorded suggests that the population as a whole is employed as opposed to unemployed. However there is reason to believe that the unemployment rate should be of concern. One possibility is that the total number of hours worked increases while the number of people in employment remains the same. Another possibility is that the number of working hours remains the same but the number of people in employment decreases, which would be particularly concerning. Both of these possibilities would result in an increase in the average annual hours actually worked but would not cause the unemployment rate to decrease. A third possibility is that the total annual hours worked decreases while the number of persons employed remains the same. This would cause a decrease in the average annual hours worked per worker and the rate of unemployment may increase, decrease, or remain the same as it did in Germany during the Great Recession (Zimmerman). There are further combinations of increases and decreases in total hours and population that contribute to why the unemployment rate might increase or decrease. Additionally, the effect of this variable could be strongly correlated with other variables such as the strength of employment protection and the number of full-time and part-time workers. Overall there is an ambiguous effect of the average annual hours worked per worker on the unemployment rate and is therefore reasonable to expect either a positive or a negative relationship between these two variables.

The percentage of workers with full-time jobs, or permanent contracts, should be considered when analyzing the rates of unemployment in various countries. One would expect that the higher the number of employees under permanent contracts relative to the number of employees under temporary (fixed) contracts, the lower the rate of unemployment. This can be

expected for many reasons. With permanent contracts come higher firing costs. This is due to the need for advanced notice, court costs, and severance pay, as well as other factors. Additionally, most permanent jobs are skilled positions requiring the work of high-skilled workers. Thus, the cost of firing such an employee would be significant because of the human capital lost and the costs and time associated with training a new employee (Tasci). Therefore it is reasonable to expect that the higher the number of workers in a country with permanent contracts, the less likely they are to be fired and thus the lower the rate of unemployment.

Studies by Bentolila, et al. indicate that the relationship between the number of temporary contracts and the unemployment rate is ambiguous. This is expected because temporary contracts simultaneously lead to both job creation and job destruction. Temporary contracts entail much lower dismissal costs and are typically low-skilled jobs. It is thus not very detrimental for a company to employ workers under temporary contracts because the time and cost required replacing or simply doing without these workers would be minimal. Temporary contracts can also be industry-focused and can vary with the state of that industry and the economy overall (S. P. Bentolila). With an increasing number of these contracts comes higher labor market risk for such individuals, including lower human capital accumulation and higher likelihood of unemployment. Although the creation of temporary jobs could cause a decrease in the unemployment rate in the short-run, in the long-run it is expected that an increase in temporary contracts results in more labor market volatility and a higher unemployment rate. A significant indication of this is what Bentolila, et al. refer to as the Employment Protection Legislation, or EPL, gap (S. P. Bentolila). This gap is the combination of two concepts: the gap between the firing costs of workers with permanent contracts and those with temporary contracts; and the degree of regulation on the use of temporary contracts (S. P. Bentolila). The

authors claim that if this EPL gap is high enough, the increase in job destruction will trump the increase in job creation. This is because "the higher the gap, the lower the proportion of temporary jobs that are transformed into permanent jobs" (S. P. Bentolila). The reasoning here is that larger firing costs of workers with permanent contracts encourage employers to hire with temporary contracts. Therefore it is likely that a higher EPL gap will raise unemployment during economic downturns (S. P. Bentolila).

One could reasonably expect that higher trade union density results in a higher rate of unemployment. Trade union density refers to "the number of wage and salary earners that are trade union members, divided by the total number of wage and salary earners," (OECD). A higher rate of unemployment is expected because of unions' collective bargaining power and its generally negative effects on employers. Unions' bargaining powers typically increase costs for employers by demanding higher wages and sometimes fewer hours for workers. This results in higher labor costs due to increased wages and reduced output. In many cases, when possible, companies will restrict their interactions with unions which can ultimately result in a lower rate of employment because those individuals who are members of the unions will have limited opportunities for employment. Therefore it is reasonable to expect that those countries in which unions have significant power and influence and in which the density of these unions are greater would have a higher rate of unemployment.

Strictness of employment protection, while perhaps not the first variable to be considered when analyzing possible reasons for unemployment, can be expected to have an inverse effect on the rate of unemployment. Similar to the influence of unions, strict permanent employment protection leads to increased costs for employers. Stricter employee protection usually consists of concepts such as generous benefits and entitlements and difficulties in firing employees.

When there are stricter employment protection measures, it is more difficult to fire employees that perhaps are not performing at the level they should be. Even though these employees are costing the company money and time it is difficult to fire them. A typical reaction of a firm might be to not hire as many employees in the first place given these additional potential costs, and this can ultimately result in a higher rate of unemployment. On the other hand, looser employment protection on temporary contracts can lead to an increase in the unemployment rate in the long-run. This is because with looser protection, for example like in Spain, employers are rarely monitored to "ensure compliance with alleged reasons for hiring under temporary contracts" and there are no "de facto" restrictions (Bentolila, Cahuc and Dolado). Therefore employers can hire under temporary contracts with little restrictions. While these contracts may create jobs in the short-run, they ultimately lead to more labor market volatility in the long-run and typically a higher rate of unemployment.

The last two variables considered in this paper are public unemployment social expenditure and total public social expenditure. Positive relationships can be expected in both cases. An increase in public unemployment expenditure and an increase in duration of these benefits have been shown to distort incentives for the unemployed to find jobs (Jackman). In some circumstances, unemployed individuals receive more money from collecting unemployment benefits than they otherwise would from certain low- to moderate-paying jobs. This essentially gives the unemployed a reason to stop their job search and live off of the unemployment benefits they are collecting, which is an additional and growing cost to society and can ultimately result in a higher rate of unemployment.

An increase in total public social expenditure can be expected to have the same results. An increase in benefits received, if substantial enough and regardless of the source, can distort

incentives to return to work and instead encourage those individuals to continue living off of the benefits, increasing long-term unemployment. Governmental policies and the way in which the public views the government play crucial roles in the regulation of these expenditures. These concepts are ultimately the significant difference between benefit expenditures in the United States and most continental European countries. European citizens of these countries see economic well-being as the responsibility of employers, unions and the government, and "employers and unions are thus involved in areas of policy formation going beyond the employment contract," (Jackman). In contrast, the view held in the United States and for the most part in the UK is a more liberal one in which wages and production should be left to be determined by market forces; social objectives should be determined through a representative democracy and "implemented through the tax and social security systems," (Jackman).

4. Data

Data on the unemployment rate and the following explanatory variables were collected from the Organization for Economic Co-Operation and Development's website: average annual hours actually worked per worker; full-time employment; part-time employment; trade union density; strictness of employment protection—temporary contracts; strictness of employment protection—individual & collective dismissals (regular contracts); public unemployment social expenditure; and public total social expenditure. Data on the United States inflation rates were collected from the US Inflation Calculator website and data on the inflation rates in France, Germany, and Spain were collected from the inflation.eu website. Annual data is used for each variable for the France, Germany, Spain, and the United States from 1990 to 2012.

The OECD rate of unemployment expresses the number of unemployed persons as a percentage of the labor force, which is defined as the total number of persons employed plus unemployed. The rates of unemployment given in this paper are average annual rates. (OECD).

The given inflation rates for the United States are calculated using the current Consumer Price Index published monthly by the Bureau of Labor Statistics. They are annual averages expressed as a percentage. The inflation rates for France, Germany, and Spain are based on the Consumer Price Index, comparing the December CPI to the December CPI of the year before. They are expressed as a percentage.

The average annual hours actually worked per worker is expressed in number of hours worked per year per person in employment and is calculated as "the total number of hours worked over the year divided by the average number of people in employment" (OECD). Both part-time and full-time workers are included.

Full-time and part-time employment is expressed in thousands of persons. The number of persons is "based on a common definition of 30-usual weekly hours of work in the main job," (OECD). Trade union density data are expressed as percentages. They are expressed as the ratio of wage and salary earners that are trade union members divided by the total number of wage and salary earners and data is adjusted for non-active and self-employed members (OECD).

The strictness of employment protection for both temporary contracts and individual and collective dismissals for regular contracts are "synthetic indicators of the strictness of regulation on dismissals and the use of temporary contracts" (OECD). These indicators measure the procedures and costs involved in dismissing individuals or groups of workers and those involved

in hiring workers on temporary (fixed-term) contracts (Development). Data are expressed on a scale of 0 to 6 where the stricter the regulation, the higher the number.

Data on public unemployment social expenditure and public total social expenditure measure social spending on benefits for unemployment and total benefits, respectively. Total benefits, or the main social policy areas, include: old age, survivors, incapacity-related benefits, health, family, active labor market programs, unemployment, housing, and other areas. The data reported are expressed as a percentage of gross domestic product (OECD).

Table 1 presents the dependent variable and explanatory variables used in this model and their definitions.

Table 1. Dependent and independent variables defined.

VARIABLE	DEFINITION
Unemployment rate	Number of unemployed persons as a percentage of labor force (total number of persons employed plus unemployed)
Inflation rate	Annual averages expressed as a percentage, based on the Consumer Price Index
Avg. annual hrs. actually worked per worker	Number of hrs. worked per yr. per person in employment, including both part- & full-time workers; total number hrs. worked over the yr. divided by the avg. number of people in employment
Full-time employment	Expressed in 1000s of persons; number of persons based on common definition of 30-usual weekly hrs. of work in the main job
Part-time employment	Expressed in 1000s of persons; number of persons based on common definition of 30-usual weekly hrs. of work in the main job
Trade Union Density	Expressed as percentages; expressed as the ratio of wage & salary earners that are trade union members divided by the total number of wage & salary earners; adjusted for non-active & self-employed members
Strictness of employment protection—temporary contracts	Synthetic indicator of strictness of regulation on dismissals & use of temporary contracts; measures procedures & costs involved in dismissing individuals or groups of workers & those involved in hiring workers on temporary contracts; expressed on 0-6 scale where stricter regulation=higher number
Strictness of employment protection—individual & collective dismissals (regular contracts)	Synthetic indicator of strictness of regulation on dismissals & use of temporary contracts; measures procedures & costs involved in dismissing individuals or groups of workers & those involved in hiring workers on temporary contracts; expressed on 0-6 scale where stricter regulation=higher number
Public unemployment social expenditure	Measures social spending on benefits for unemployment; expressed as a percentage of gross domestic product
Public Total Social Expenditure	Measures social spending on total benefits, including: old age, survivors, incapacity-related benefits, health, family, active labor market programs, unemployment, housing, other areas

Table 2 presents the means and standard deviations for each variable used in this paper for the four countries combined.

Table 2. Summary statistics on variables.

VARIABLE	MEAN	STANDARD DEVIATION
Unemployment Rate	9.421	3.984
Inflation Rate	2.503	1.326
Avg. Hrs. Worked	1,633.728	144.672
Full-time Employment	41,459,402.174	35,649,802.45
Part-time Employment	6,717,380.435	5,640,704.429
Trade Union Density	15.454	6.663
Strictness---Temp	2.274	1.414
Strictnes--Reg	1.2	1.0483
Pub Unemp. Social Exp	1.568	0.922
Pub Total Social Exp	23.438	5.325

The following tables present the means and standard deviations for each variable used in this paper for the four countries individually.

FRANCE		
VARIABLE	**MEAN**	**STANDARD DEVIATION**
Unemployment Rate	9.106	1.005
Inflation Rate	1.812	0.751
Avg. Hrs. Worked	1538.826	63.303
Full-time Employment	20,148,565.217	1,411,155.904
Part-time Employment	3,147,608.696	255,828.554
Trade Union Density	8.274	0.698
Strictness---Temp	3.605	0.119
Strictnes--Reg	2.381	0.056
Pub Unemp. Social Exp	1.617	0.159
Pub Total Social Exp	29.413	1.906

GERMANY		
VARIABLE	**MEAN**	**STANDARD DEVIATION**
Unemployment Rate	8.194	1.554
Inflation Rate	2.03	1.177
Avg. Hrs. Worked	1,470.087	57.34
Full-time Employment	29,953,913.043	1,490,359.075
Part-time Employment	6,585,478.261	1,601,341.962
Trade Union Density	24.813	5.316
Strictness---Temp	1.979	0.95
Strictnes--Reg	2.737	0.115
Pub Unemp. Social Exp	1.53	0.242
Pub Total Social Exp	26.222	1.362

SPAIN		
VARIABLE	**MEAN**	**STANDARD DEVIATION**
Unemployment Rate	14.312	4.601
Inflation Rate	3.449	1.546
Avg. Hrs. Worked	1,711.826	29.79
Full-time Employment	14,133,435.783	2,027,266.023
Part-time Employment	1,390,521.739	602,340.954
Trade Union Density	15.67	1.133
Strictness---Temp	3.261	0.322
Strictnes--Reg	2.606	0.511
Pub Unemp. Social Exp	2.687	0.867
Pub Total Social Exp	21.991	2.263

UNITED STATES		
VARIABLE	**MEAN**	**STANDARD DEVIATION**
Unemployment Rate	6.07	1.625
Inflation Rate	2.722	1.101
Avg. Hrs. Worked	1,814.174	23.725
Full-time Employment	101,601,695.652	8,559,784.521
Part-time Employment	15,745,913.043	625,194.145
Trade Union Density	13.061	1.455
Strictness---Temp	0.25	0
Strictnes--Reg	0.26	1.70E-16
Pub Unemp. Social Exp	0.439	0.195
Pub Total Social Exp	16.126	1.778

5. Estimation Results

The regressions used in this research are presented in linear functional form.

Table 3. Regression estimates of Unemployment for selected countries from 1990 to 2012.

Dependent Variable: Unemployment Rate								
Independent Variable	**Expected Sign**	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Intercept		-16.348 (-1.394)	-9.413 (-0.670)	-12.277 (-0.827)	-58.707 (-5.258)[a]	-102.239 (-2.952)[b]	10.636 (0.152)	39.544 (2.596)[b]
Inflation Rate	-	-0.214 (-1.420)	-0.256 (-1.621)	-0.156 (-0.979)	-0.143 (-0.969)	-0.209 (-0.763)	0.118 (0.349)	-0.132 (-1.293)
Avg Hrs Worked	?	0.015[a] (2.726)	0.013[a] (2.297)	0.015[a] (2.660)	0.015[a] (3.256)	0.056[a] (3.003)	-0.002 (-0.060)	-0.024[a] (-3.401)
Full-time Employment	-	-1.699E-08 (-0.461)	-2.102E-08 (-0.565)	-6.2E-08 (-1.551)	-5.004E-07[a] (-2.442)	-1.141E-06[a] (-3.990)	-1.529E-06[a] (-3.677)	-3.105E-08 (-0.941)
Part-time Employment	?	-8.716E-07[a] (-3.024)	-1.134E-06[a] (-2.757)	-9.3E-07[b] (-1.867)	3.239E-06[b] (2.117)	2.776E-06[b] (1.918)	-1.529E-06 (-0.412)	-3.849E-07 (-1.470)
Trade Union Density	+	0.117[a] (4.407)	0.132[a] (4.226)	-0.037 (-0.270)	0.808 (1.209)	0.531[b] (2.086)	0.194 (0.571)	0.512[a] (2.145)
Strictness---Temp	-	-2.981[a] (-5.446)	-3.297[a] (-5.060)	-2.189[a] (-2.772)	0.317 (0.405)	-0.637 (-0.727)	-2.368 (-0.629)	0 (65535)
Strictness--Reg	+	-3.623[a] (-4.737)	-3.150[a] (-3.387)	-3.515[a] (-3.202)	8.110[b] (2.029)	1.622 (0.352)	-1.713 (-0.696)	0 (65535)
Pub Unemp. Social Exp	+	4.201[a] (8.910)	4.016[a] (7.794)	3.645[a] (6.116)	1.041 (1.336)	0.684 (0.481)	-0.521 (-0.331)	1.737[a] (2.406)
Pub Total Social Exp	+	0.603[a] (4.870)	0.639[a] (4.906)	0.777[a] (5.490)	0.529[a] (4.682)	1.057[a] (3.161)	1.892[a] (3.043)	0.728[a] (6.228)
European			-4.269 (-0.896)					
France				-9.685 (-1.636)				
Germany				-4.615 (-0.989)				
Spain				-6.671 (-1.191)				
F-Statistic N R^2 Adjusted R^2		90.366[a] 92 0.908 0.898	81.215[a] 92 0.909 0.898	71.412[a] 92 0.916 0.903	20.439[a] 23 0.934 0.888	9.578[a] 23 0.869 0.778	28.775[a] 23 0.952 0.919	105.404[a] 23 0.980 0.837

t statistics are in parentheses
[a] Significant at 0.05 level
[b] Significant at 0.10 level

Model 1presents regression data for the effects of the independent variables on the unemployment rate for the four countries collectively. With an F-statistic of 90.366, the overall model is statistically significant at the 0.05 level. The coefficient of determination for the model is 0.908, indicating that the independent variables explain approximately 91% of the variation in the rate of unemployment. The following independent variables are individually statistically significant in this model at the 0.05 level: average annual hours actually worked per worker; part-time employment; trade union density; strictness of employment protection—temporary contracts; strictness of employment protection—individual and collective dismissals (regular contracts); public unemployment social expenditure; and public total social expenditure.

Model 2 presents regression data for the effects of the independent variables on the unemployment rate, accounting for the collective effects of European Union countries against the United States while holding the other independent variables constant. The overall model is statistically significant at the 0.05 level with an F-statistic of 81.215. The coefficient of determination for the model is 0.909, indicating that the independent variables explain approximately 91% of the variation in the rate of unemployment. The following independent variables are individually statistically significant in this model at the 0.05 level: average annual hours actually worked per worker; part-time employment; trade union density; strictness of employment protection—temporary contracts; strictness of employment protection—individual and collective dismissals (regular contracts); public unemployment social expenditure; and public total social expenditure.

Model 3 presents regression data for the effects of the independent variables on the unemployment rate, accounting for the individual effects of France, Germany, and Spain against the United States while holding the other independent variables constant. The overall model is

statistically significant at the 0.05 level with an F-statistic of 71.412. The coefficient of determination is 0.916, suggesting that approximately 92% of the variation in the rate of unemployment can be explained by the independent variables. The following independent variables are individually statistically significant in this model at the 0.05 level: average annual hours actually worked per worker; strictness of employment protection—temporary contracts; strictness of employment protection—individual and collective dismissals (regular contracts); public unemployment social expenditure; and public total social expenditure. Part-time employment is statistically significant at the 0.10 level.

Model 4 presents regression data for the effects of the independent variables on the unemployment rate in France. The model overall is statistically significant with an F-statistic of 20.439. The coefficient of determination is 0.934, indicating that about 93% of the variation in the rate of unemployment is explained by the independent variables. Average annual hours actually worked per worker, full-time employment, and public total social expenditure are statistically significant at the 0.05 level. Part-time employment and strictness of employment protection—individual and collective dismissals (regular contracts) are significant at the 0.10 level.

Model 5 presents regression data for the effects of the independent variables on the unemployment rate in Germany. Overall the model is statistically significant with an F-statistic of 9.578. With a coefficient of determination of 0.869, the independent variables explain approximately 87% of the variation in the unemployment rate in Germany. Average annual hours actually worked per worker, full-time employment, and public total social expenditure are statistically significant at the 0.05 level, while part-time employment and trade union density are statistically significant at the 0.10 level.

Model 6 presents regression data for the effects of the independent variables on the unemployment rate in Spain. The model overall is statistically significant with an F-statistic of 28.775. The coefficient of determination for the model is 0.952, indicating that the independent variables explain about 95% of the variation in the unemployment rate. Full-time employment and public total social expenditure are individually statistically significant at the 0.05 level.

Model 7 presents regression data for the effects of the independent variables on the unemployment rate in the United States. The overall model is statistically significant with an F-statistic of 105.404. The coefficient of determination is 0.980, showing that 98% the variation in unemployment in the United States is explained by the independent variables. Average annual hours actually worked per worker, trade union density, public unemployment social expenditure, and public total social expenditure are individually statistically significant at the 0.05 level.

Evidence from this study indicates that the rate of inflation is not statistically significant in any of the models. Although a weak negative relationship was expected and the coefficients for all but one model are negative, it is not surprising that the rate of inflation is insignificant in these models. As referenced earlier in this paper, studies conducted by A.W.H. Phillips showed a consistent inverse relationship between the rate of inflation and the rate of unemployment. However Friedman and Phelps countered Phillips' findings, claiming that there is a short-run and long-run Phillips Curve that reflects the relationship between the rate of inflation and the rate of unemployment. Their findings suggest that the inverse relationship exists in the short run when inflation is fairly constant but in the long run workers adjust their expectations for inflation and their wages adjust accordingly, leading to a natural rate of unemployment for any given rate of inflation (Hoover). Therefore while there appears to be a negative relationship between the rate

of inflation and the rate of unemployment, previous research and recent data do not suggest a strong enough relationship to make the effects statistically significant.

Based on the findings in this paper, the effect average annual hours actually worked per worker is statistically significant in all models except model 6, representing Spain. A negative or positive relationship was expected between the average annual hours actually worked per worker and the rate of unemployment, and the statistically significant values for this variable show a small positive relationship. This relationship suggests that the number of working hours has perhaps remained the same and the number of people in the workforce has decreased, as opposed to the number of people in the workforce increasing, which would have been represented by a negative relationship showing a decrease in the rate of unemployment. Model 7 representing data for the United States was the only significant model showing a weak negative relationship. This could be explained by policies in the United States that differ compared to other countries in regards to regulation of working hours and benefits that would perhaps have a perverse incentive on individuals' decision to work.

However the coefficients for this variable are very small with values below 0.05, suggesting the average annual hours actually worked per worker does not have a strong effect on the unemployment rate. The coefficient for this variable is highest for model 5, representing data on Germany, and this finding is consistent with previous research conducted by Rinne and Zimmerman. These authors declare that over the past several years the number of average annual hours actually worked per worker has significantly declined in Germany, much more so than in other countries. Rinne and Zimmerman note that Germany used this approach in reducing working hours to stabilize the economy during the most recent recession and this can be subtly understood from the relatively higher coefficient for model 5. As suggested by the

positive sign of this variable in model 5, an increase in the average annual hours actually worked per worker would result in an increase in the rate of unemployment of 0.056% in Germany. This is consistent with previous research showing that it was actually a decrease in the average annual hours actually worked per worker in Germany that led to a decrease in the rate of unemployment. Additionally as what appears to be the case in Germany's labor market given the stable, and at times decreasing, rate of unemployment during the recession, and as Rinne and Zimmerman note, the total number of hours worked has decreased but the number of working persons has remained the same. These results in Germany show that a decrease in the average annual hours worked per worker could lead to a decreasing or stable rate of unemployment.

According to the aggregate data in model 1, this variable appears to have a moderately strong correlation with other variables particularly full-time employment, strictness of employment protection for regular contracts, public total social expenditure, and the European dummy variable. The correlation between average annual hours actually worked per worker and public total social expenditure is particularly strong (-0.87), indicating that the effect average annual hours actually worked per worker has on the unemployment rate is strongly connected to public total social expenditure. Average annual hours actually worked per worker in model 5, which accounts for data on Germany, has particularly strong correlation with part-time employment, trade union density, strictness of employment protection—temporary contracts, and strictness of employment protection –regular contracts. With a correlation of 0.97 with trade union density, it is logical to think that trade unions have significant bargaining power in terms of negotiating working hours, which could ultimately affect the number of people employed in the first- and second-tier markets and the strictness of these contracts. There is no proof of

causation however; simply that it is hard to distinguish the individual effects of these highly correlated variables.

The effect the number of full-time employees has on the rate of unemployment is statistically significant in only three of the seven models, representing the individual European countries. The coefficients for all models are negative, significant or insignificant. This result poses that the unemployment rate decreases when a higher number of people have a full-time job, which is consistent with previous research findings. This is due to higher firing costs associated with permanent contracts, significant loss of human capital, and cost and time associated with training new employees, which discourage employers from firing permanent employees (Tasci). The coefficients for each model, however, are very small negative numbers with values much smaller than -0.05. The correlation matrix of the aggregate data indicates that the full-time employment variable is very strongly correlated with the part-time employment variable, with a value of 0.97. This should be expected since typically if an individual is employed only part-time he may not be employed full-time and vice versa. However it is possible that one individual may have a full-time and a part-time job. Additionally, the full-time employment variable has a strong negative correlation with the strictness of employment protection for both temporary and regular contracts, public unemployment social expenditure, public total social expenditure, and the European dummy variable. It is logical to expect a high degree of correlation between full-time employment and the variables accounting for strictness of contracts because often times the strictness of the contracts determines how many individuals are employed in both the first- and second-tiers.

Evidence from this study indicates that the variable accounting for part-time employment is statistically significant at the 0.05 level in models 1 and 2, and is significant at the 0.10 level in

models 3, 4, and 5. In three of the significant models the coefficients are negative and in two of the models the coefficients are positive. Overall five of the seven models have negative coefficients, however these values are again very small numbers below 0.05 in absolute value. The small values suggest that the impact the part-time employment variable has on the rate of unemployment is very minimal. The presence of both positive and negative coefficients is consistent with ambiguous expectations put forth by Bentolila, et al. These economists explain that temporary contracts simultaneously lead to job creation and job destruction. This is due to the fact that temporary contracts entail lower dismissal costs so it is not as detrimental to a firm to fire workers. Additionally temporary contracts are often industry-focused and shift with the state of the economy, resulting in increased volatility and labor market risk over the long run. However the creation of temporary jobs could cause a decrease in the unemployment rate in the short run, so ultimately the impact this variable has on the rate of unemployment depends on the time period being analyzed as well as the strength of job creation versus job destruction (S. P. Bentolila).

It is particularly interesting to note that model 6 accounting for data on Spain is not statistically significant when analyzing the part-time employment variable. Bentolila, et al. note that the prevalence of temporary contracts in Spain is an important factor in explaining the unemployment rate differences between France and Spain. The authors explain that Spain has a much higher concentration of individuals working in the volatile construction industry and this fact was a significant factor in explaining Spain's higher rate of unemployment during the most recent recession. Bentolila, et al. explain this in terms of the employment protection legislation (EPL) gap. This measurement accounts for differences of the gap between the firing costs of workers with permanent and temporary contracts as well as regulation on the use of temporary

contracts. The lack of statistical significance could be attributed to the close relationship between part-time employment and strictness of employment protection for both temporary and permanent contracts, in which the EPL gap is also a factor. This appears to be a valid possibility as the part-time employment variable has as strong negative correlation with the strictness of employment protection variables for both temporary and permanent contracts. The part-time employment variable also has a strong negative correlation with the public unemployment social expenditure and the European dummy variables. Additionally, the correlation of this variable with average annual hours actually worked per worker, full-time employment, and strictness of employment protection for temporary contracts is strong in the model accounting for Spain.

Evidence presented in this paper indicates that the trade union density variable is statistically significant at the 0.05 level in models 1, 2, and 7, and is significant at the 0.10 level in model 5. All statistically significant models have a positive coefficient. This finding is consistent with previous research and expectations, which note that unions' collective bargaining power generally has a negative impact on employers because of their ability to demand higher wages and fewer working hours for employees. As a result, firms often try to limit their interactions with unions and this can lead to a lower rate of employment. Additionally, as Richard Jackman notes in his article, unions usually do not take into consideration the negative external effects their policies have on other firms which often lead to higher unemployment. This can be seen through reforms that took place in Spain in the 1980s. Union strength and inflexibility led to laxer temporary contracts rather than reforms on permanent contracts, and this ultimately contributed to the higher rate of unemployment in Spain during the Great Recession (Bentolila, Dolado and Jimeno).

It is important to note that this variable is statistically significant in the overall model, indicating similar effects of trade union density in both the European Union countries as well as the United States. The variable is also significant in model 2 which accounts for the European Union countries collectively; however it is not significant in model 3 which presents data on the European Union countries individually, nor is it significant in models 4 and 6 which present data on France and Spain, respectively. Bentolila, et al. state that both France and Spain "have the highest gaps in the OECD between the coverage of collective bargaining and union density," and that the two countries "are not very different in their wage setting institutions," (Bentolila, Cahuc and Dolado F163). This parallel between the two countries could impact why the model accounting for the EU countries collectively is significant but the models accounting for data on France, Spain, and the EU countries individually are not. Additionally, it is worth noting that the coefficient for the United States is about 0.39 units higher than that of model 1 and model 2 which account for the overall data and collective EU countries, respectively. This could be so because the strength of unions in the United States is typically smaller than that of unions in EU countries. Thus, an increase in union density in the United States could result in higher unemployment particularly for those individuals belonging to unions because U.S. firms have more flexibility in limiting union interaction than in EU countries and ultimately those workers belonging to unions in the United States would have a greater likelihood of not becoming employed.

The strictness of employment protection for temporary contracts variable in this paper is statistically significant at the 0.05 level in models 1, 2, and 3. The coefficients for each of the significant models are negative, which is consistent with previous research findings and expectations. Stricter employment protection legislation on temporary contracts would make it

harder for employers to fire these employees who are exposed to the volatility of the labor market and economy as part-time workers. Bentolila, et al. note that, particularly in Spain, there are very few "de facto" restrictions in regards to temporary contracts and that looser employment protection results in employers rarely being monitored to "ensure compliance with alleged reasons for hiring under temporary contracts" (Bentolila, Cahuc and Dolado). Therefore stricter policies could lead to lower rates of unemployment since much unemployment comes from the "second tier" of the labor market and stricter policies would reduce the labor market risk of these workers.

It is interesting to note, however, that the model accounting for data on Spain is not statistically significant for the strictness of employment protection for temporary contracts variable. Bentolila, et al. heavily focus on the differences in the EPL gap between Spain and France in their article "Why have Spanish and French unemployment rates differed so much during the Great Recession?" Knowing that the EPL gap is much larger in Spain than in France and that Spain relied heavily on the volatile construction industry, most notably during the Great Recession, one would expect a strong effect of this variable on the rate of unemployment. The authors, however, argue that there are "good reasons to think this average EPL index, based on legal regulations and not on their implementation, does not capture Spanish EPL satisfactorily," (S. P. Bentolila). They also indicate that "de facto EPL of temporary jobs is much weaker in Spain than in France, whereas the opposite holds for EPL of permanent jobs." The findings of this paper are consistent with this statement for the strictness variable as the coefficient for France is positive while Spain's is negative; however neither of these values is statistically significant. Additionally, there is a strong correlation between the strictness of employment protection—temporary contracts variable and the average annual hours worked per worker, part-

time employment, and strictness of employment protection—regular contract variables in the model accounting for Spain, indicating the effects of these variables are highly indistinguishable.

The strictness of employment protection of temporary contracts in the United States has remained constant over the time period observed in this paper. Therefore this variable does not have an impact on unemployment in the United States. However it is worth noting that models in which this variable is statistically significant are those accounting for the aggregate data and the EU countries collectively and individually, suggesting that differences in EPL in Europe and the United States has an impact on the rates of unemployment.

The strictness of employment protection for regular contracts, including individual and collective dismissals, is statistically significant in models 1, 2, and 3 at the 0.05 level and in model 4 at the 0.10 level. The expected sign for this statistic was positive, however evidence shows that this was the outcome only in models 4 and 5. A positive relationship was expected because stricter protection usually consists of generous benefits, fewer hours worked, entitlements, and difficulties in firing employees. Additionally, in the Euro region, firing employees on permanent contracts takes a significant amount of time due to "advance notice periods and the settlement of legal disputes," (S. P. Bentolila). Thus employers may be more hesitant to hire knowing that they will suffer severe costs if the employee does not perform at the expected level.

The statistically significant positive relationship in model 4, which presents regression data for the effects in France, is consistent with the findings of Bentolila, et al. In their article "Why have Spanish and French unemployment rates differed so much during the Great Recession?" they explain that a higher EPL gap tends to raise the unemployment rate, especially

during economic downturns. The authors claim that the EPL of permanent jobs is much weaker in France than in Spain particularly. This allows more flexibility for employers in terms of firing workers. However if this EPL strictness of permanent contracts were to increase in France by one unit, the rate of unemployment would increase by approximately 8%, as suggested by the results of the model 4 regression. These same observations could also describe the positive relationship in model 5 which accounts for data on Germany, although the model is overall not statistically significant. Rinne and Zimmerman explain in their article "Another Economic Miracle? The German Labor Market and the Great Recession" that Germany's labor markets have loosened over the years, allowing for more flexibility in hiring and firing. This fact is reflected in the findings of this paper, which suggest that a one unit increase in EPL strictness for regular contracts would result in a 1.6% increase in unemployment.

In contrast, the regression results for models 1, 2, and 3 do not reflect the expected positive relationship. For each of these models, presenting the regression results accounting for the aggregate data, the European Union dummy, and the individual European country dummies respectively, a one unit increase in EPL strictness for regular contracts would cause a decrease in the rate of unemployment of approximately 3.4%. These findings are inconsistent with previous research presented in articles by Jackman, Cazes and Nesporova, and Bentolila, et al. which declare that stricter employment protection in permanent contracts typically leads to a higher rate of unemployment because of the significant costs associated with firing an employee, leading employers to usually decrease the number of hires on permanent contracts. This ultimately leads to a higher rate of unemployment. However, the statistically significant unexpected results could be explained because of the strong correlation of the strictness of employment protection of regular contracts variable with many other variables in the model, including full-time and part-

time employment, average annual hours actually worked per worker, strictness of employment protection for temporary contracts, public unemployment social expenditure, and public total social expenditure. The strictness of employment protection of regular contracts variable is also highly correlated with the European Union dummy variable, which could account for the difference in the expected sign. It is important to note that the strictness of employment protection of regular contracts variable in the United States did not change over the observed time period. This has resulted in a statistically insignificant variable for model 7. However the variable is statistically significant in model 1 which presents regression results for the aggregate data, suggesting that the variable has an impact on the differences in unemployment rates between the European Union countries and the United States.

Based on evidence presented in this paper, the public unemployment social expenditure variable is statistically significant at the 0.05 level in models 1, 2, and 3. The coefficients for each of these models are positive with values of 4.201, 4.016, and 3.645 respectively, which is consistent with the expected sign for this variable. These findings suggest that a 1% increase in public unemployment social expenditure as a measure of GDP would result in an approximately 4% increase in the rate of unemployment. This can be expected because an increase in unemployment benefits, in addition to an increase in the duration of these benefits, has distortive incentives for the unemployed in regards to finding jobs. This is so because often times unemployed individuals receive more money from collecting benefits than they would from a job (Jackman).

While the regression results are statistically significant with the aggregate data for models 1, 2, and 3, the results for the individual country regressions are statistically significant only for the United States represented in model 7. With a coefficient of 1.737, this suggests that a 1%

increase in public unemployment social expenditure as a measure of GDP would lead to an increase in the rate of unemployment in the United States of approximately 1.7%. This coefficient for the United States is about 0.7 percentage points higher than the coefficient for France and more than one percentage point higher than that of Germany. The relatively lower coefficient for Germany could perhaps be explained by Rinne and Zimmerman's observations which claim that the number of people in Germany collecting long-term unemployment benefits is 20% lower than in 2006. This could be explained by stricter standards for collecting these benefits as well as more supportive services for job seekers. As a result the unemployed are "much more willing to consider lower pay or a longer commute to work," which has ultimately helped reduce the duration of unemployment (Zimmerman). Although the German public unemployment social expenditure coefficient is still positive, the German government has taken action and stabilizers have been implemented to help lower the rate of unemployment both in the short- and long-run, which can help explain responses to collection of unemployment benefits.

In regards to individual countries, it is interesting to note that the public unemployment social expenditure variable is only statistically significant for model 7 accounting for the United States and its coefficient is higher than that of the other models. According to previous research, one would expect the results to be higher and significant for the European countries. Jackman explains in his article "European Unemployment: Why is it So High and What Should be Done About it?" that European and American citizens view the government and its role in society in very different ways, which ultimately affects regulation of welfare expenditures. In general, European citizens believe the economic well-being of the country is a significant responsibility of the government while Americans have a more liberal view and believe economic well-being is determined by wages and production left to market forces. As a result of this heavy reliance on

government policies, unemployed Europeans are essentially promised "indefinite and effectively unconditional unemployment benefits" and this enables them to "abandon job search and to reconcile themselves to a life on the dole," (Jackman). As individuals continue to remain unemployed, the skills demanded for jobs evolve and those out of work typically cannot adapt to these changes since they have been out of employment for so long and have not learned these skills. The cycle thus continues and the unemployed continue collecting benefits. This view of the role of government and its policies is a crucial difference between expenditures in most EU countries and the United States.

A possible explanation for the insignificance of the European country models is the high degree of correlation of this variable with full-time and part-time employment, as well as the strictness of employment protection for temporary contracts. As previously mentioned, these variables are more important in the European countries and correlation would thus have a greater impact on the results for these models. An additional explanation is that many individuals in the United States may be receiving these benefits for the first time due to changing standards which would put them out of employment, whereas in Europe this increase may just be an extension for many people already out of work.

Based on the regression data for this paper, the public total social expenditure variable is statistically significant at the 0.05 level for all seven models. The coefficients are positive for each model, which is consistent with the expected sign for the variable. An increase in any kind of welfare benefits received can distort incentives to return to work and increase long-term unemployment. The models accounting for Germany and Spain with coefficients of 1.057 and 1.892 respectively have coefficients that are higher than that of the United States. The reasoning for this is essentially the same as that for the difference in public unemployment social

expenditure—the role of the government and beliefs on its policies is an important difference between most EU countries and the United States. With more demand for government intervention, protection policies, and benefits comes a greater effect on the unemployment rate because of greater disincentives. These benefits are ultimately greater in value and duration in Europe than in the United States. The addition of other sources of welfare that is captured by public total social expenditure as opposed to only public unemployment social expenditure can understandably cause the greater differences in the coefficients because it is more encompassing. Unemployment expenditure is included in this total expenditure value, however there is not strong correlation between the two variables for the aggregated data. There is strong correlation in the France model with public total social expenditure and part-time employment and trade union density, which could explain the relatively low coefficient in this model.

The European dummy variable in model 2 and the individual country dummy variables of France, Germany, and Spain in model 3 were not statistically significant. This finding indicates that holding the nine independent variables constant, there are no statistically significant differences between the effects on the rates of unemployment in these countries versus the United States. However each overall model was statistically significant and the significant variables in each model were the same. The previous analysis of each model and variable offer an explanation for the differences between the European countries and the United States that can be determined from the regression results.

Overall, the first three regression models accounting for the aggregate data on the four countries had more individually statistically significant explanatory variables than the four models accounting for the data on the countries individually. Respectively, the first three models had seven, seven, and six explanatory variables that were statistically significant while the last

four models respectively, had five, five, two, and four explanatory variables that were statistically significant. In combination with the fact that the seven regression models were overall all statistically significant and with high coefficients of determination for each model, these findings suggest that similar factors explain the variations of the rates of unemployment in the various countries but it is different combinations of these factors that account for the differences in rates between the countries.

It is significant to note that the sign of the coefficients of each of the explanatory variables in the model accounting for data on Germany matched the expected sign, and all but one variable in the French model matched the expected sign. Additionally, the signs of the coefficients of each of the explanatory variables in the U.S. model matched the expected signs except for the strictness of employment protection—temporary contracts and strictness of employment protection—regular contracts variables, and this was so because the strictness of these contracts remained constant over the given time period. In the model accounting for data on Spain, seven of the nine coefficients matched the expected sign however only two of the nine variables were statistically significant. The model is overall statistically significant and with the highest adjusted R^2 value and the second highest R^2 value, the lack of significant individual variables could be explained by the high degree of correlation between variables, particularly the strictness, average annual hours worked, and employment variables.

6. Summary and Conclusions

This paper used data on the rates of inflation, average annual hours actually worked per worker, full-time employment, part-time employment, trade union density, strictness of employment protection for temporary contracts, strictness of employment protection for

individual & collective dismissals (regular contracts), public unemployment social expenditure, and public total social expenditure for France, Germany, Spain, and the United States from 1990 to 2012 to attempt to identify and explain the differences in the rates of unemployment between these countries. Each of the seven regression models was statistically significant, along with several of the individual variables in each model. With coefficients of determination greater than 0.86 for each model and six of the seven having R^2 greater than 0.90, the findings indicate that the nine explanatory variables account for a substantial amount of the variation in the unemployment rate.

While the rate of inflation was not statistically significant for any of the models, public total social expenditure was statistically significant at the 0.05 level for each model. The data support previous research conclusions about the positive relationship between public social expenditure and the rate of unemployment and this is a similarity among the four countries observed in this study.

The data also support the trade-off between short-run and long-run unemployment which is a central difference between the unemployment rates in the United States vs. the Euro region countries. The average rate of unemployment in the U.S. over the years observed in this study is about 6.1%, whereas the average rates in France, Germany, and Spain are approximately 9.1%, 8.2%, and 14.3% respectively. However as noted in this paper, the 8% rate of unemployment in Germany during the Great Recession peaked at two percentage points lower than the 10% rate in the United States. This is an example showing that on average the short-run unemployment rates in the Euro region are often lower than the rate in the United States, but in the long-run the unemployment rate in the United States has shown to be lower than those in the Euro region countries. This is partially due to the flexibility of the labor market institutions. The U.S. has

very flexible institutions and experienced a large increase in unemployment during the recession, whereas many European countries have relatively rigid institutions and had smaller increases in unemployment during the recession (Tasci).

Although the short-run and long-run rates in Germany are essentially the same, this fact supports the findings of Rinne and Zimmerman who note that there is typically a trade-off between the rate of unemployment and GDP. These authors note that while Germany has maintained a stable rate of unemployment, the country suffered a much larger loss in GDP during the most recent recession than did France or the U.S. As Rinne and Zimmerman note, German firms were willing to incur higher costs in order to reduce employee working hours, and employees accepted government subsidies in return. These regulations in Germany helped keep the rate of unemployment low but resulted in a 4.7% reduction in GDP from 2008-2009 (Zimmerman). This trade-off between the rate of unemployment and GDP is ultimately decided by the countries' government and the strength the citizens of that country believe the government should have. Different government objectives are another explanation for the more stable, higher rates of unemployment in France and Germany compared to the U.S. As mentioned earlier in this paper, Europeans usually support more government intervention than Americans and this distinction is manifested in government decisions as well as in the data gathered for this study. The goal of European governments to reduce unemployment to a certain level, a goal the United States does not particularly have, leads to more government intervention which has proven to help in the short-run but ultimately makes matters worse in the long-run.

The findings of this paper suggest that possible difference between the rates of unemployment in the U.S. versus those in the Euro region revolve around the concept of the two-tier labor market as measured by strictness of employment protection, number employed in both

the first- and second-tier markets, and average annual hours worked per worker. Although not every variable was individually statistically significant in the models, and most importantly the individual variables measuring the strictness of employment protection were not significant, most of the resulting coefficient signs were consistent with the expected signs and previous research. The fact that each model was statistically significant overall but many of the variables were not significant in the individual country models but were in the aggregate models may be explained by the high degree of correlation between many of the variables.

Policy changes and government action have greatly impacted the fluctuations in employment protection strictness in the Euro region countries, whereas the strictness variable has remained constant in the United States, demonstrating the overall greater importance Europe as a whole places on protecting its employees. Fluctuations in strictness measures impact the number of workers in each tier as well as the number of hours worked per worker. There is, however, significantly strong correlation between many of the variables impacted by strictness measures in the models accounting for data on the individual countries except for the United States. This suggests that while the strictness of employment protection variables in the European country models are not statistically significant, the impact of strictness measures may be accounted for in the significant individual variables such as average annual hours worked per worker and full-time and part-time employment.

The effects of trade unions and social benefits on unemployment are more subtle than the effects of strictness measures; however this could again be attributed to the high degree of correlation found in this study. For example, as noted by Rinne and Zimmerman, Germany had a high rate of unemployment in the 1990s but after reforms in 2003 that encouraged older workers to return to work, created stricter standards to receive unemployment benefits, and

provided effective job search services, the rate of unemployment decreased. This fact is supported by the insignificance of the public unemployment social expenditure variable in the German model in this study. Additionally, many European governments were willing to strengthen union rights compared to the U.S. government and their regulations had a great impact in regards to hours worked, minimum wages, and other factors which ultimately led to higher rates of unemployment as seen in Spain and discussed earlier. As noted earlier, although the public unemployment social expenditure variable was not significant in the individual European country models, data support the increase in these benefits which will ultimately have a significant impact in the long-run.

Although it is clear that there are more differences between the U.S. and EU than amongst the EU countries, the findings of in regards to the variables accounting for strictness also explain differences amongst the European nations as supported by the literature used in this paper. Spain has a looser strictness of protection on temporary contracts than France and the opposite holds true for permanent contracts. This allows for severe fluctuations in the more volatile second-tier market in Spain, which it relies heavily on, and this proved to be detrimental in the form of unusually high rates of unemployment during the recession years. The strictness of permanent contracts is crucial to the rate at which temporary jobs are converted to permanent ones and with stricter protection of permanent jobs, this rate is very low for Spain. This impact can be seen particularly through Spain's larger EPL gap. This gap ultimately affects the rates of job creation and job destruction which in turn largely contributes to the rate of unemployment. Although the number of employees in the second-tier market has increased over time in Germany, it too along with France has a stronger protection of these employees than does Spain, resulting in a relatively lower rate of unemployment particularly during the recession years.

Policy implications of these results are noteworthy. Essentially there are many trade-offs that come with attaining a lower rate of unemployment and the objectives pursued depend upon the preferences of the country's government. As noted in this paper, governmental structures and policies significantly differ between European countries and the United States and these differences help explain a portion of the fluctuations in the rates of unemployment. Governments must also consider how exactly to approach changes in policies and pursue certain goals because as seen through this study, there is a high degree of correlation between several of the variables. Although perhaps a subtle and indirect consideration, differing beliefs held by U.S. and European citizens on the role of the government and these citizens' ability to influence politicians' decisions contribute significantly in explaining the differences between and fluctuations in the rates of unemployment in these regions. Many of these beliefs and values are engrained in the cultures so it may take serious reforms over a course of several years to considerably change current policies.

The analysis in this study depends on the data provided from the Organization for Economic Co-operation and Development from 1990-2012. Therefore the data selected was not a random sample but instead defined to capture the years leading up to the 2008 Great Recession and the years following. If given more time, perhaps a sample over the course of a longer time period would have provided different results. Additionally, it would have been useful to analyze a regression that accounted for data over the course of another recession that occurred before the Great Recession. After running the seven regressions in this model and realizing the high degree of correlation between many of the variables, it would also be beneficial to eliminate some variables from the models and run new regressions to attempt to narrow the effects of these variables. Lastly, it would prove valuable to add or use data on various other EU countries.

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