Japan, Germany, and the United States

Labor Markets in Times of Crisis
A Comparative Perspective

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Japan, Germany and the United States: Labor Markets in Times of Crisis - A Comparative Perspective

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Summary

The late 2000s-recession caused massive damage to the global economy. High unemployment, low consumer confidence, declining asset prices and national debt crises were but a few hardships that countries worldwide had to sustain. In terms of unemployment Japan, Germany, and the United States - three of the world's biggest economies – were affected very differently. A look at unemployment levels reveal striking differences. In Germany, unemployment had for much of the 2000s endured levels far above eight percent, and at times close to twelve percent. When crisis hit in late 2007, however, unemployment remained remarkably low and remarkably stable, even dropping to seven percent at one point. Unemployment in the United States, on the other hand, had experienced a steady decline following the early 2000s-recession from six to four percent. When the crisis hit, the American labor market saw a precipitous rise in unemployment, which peaked at above twelve percent in late 2009. Japan, like the U.S., experienced a steady decline in unemployment leading up to the crisis. But unlike the U.S., Japan was able to keep its unemployment level below six percent when the crisis hit, despite a one percent rise.

My paper discusses the reasons for these different unemployment responses in the respective countries. Despite the economic grandeur these countries share, their labor markets are quite distinct from one another. Because of their different characteristics, economic downturns have different effects on unemployment. My investigation suggests that the observed responses can largely, although not exclusively, be explained by existing labor market characteristics. In short, the reason why the United States suffered a sharp rise in unemployment is that labor adjustment was about the only tool that American employers had (and have) at their disposal to deal with the crisis. Japanese and German employers, as my discussion suggests, were able to exploit other channels. Japanese and German labor markets could to a greater degree handle declining demand through transfers and wage and hour adjustments before resorting to layoffs. Furthermore, the governments of Japan and Germany engaged in massive work-share programs in order to prevent mass-layoffs. The American work-share effort, in contrast, was rather limited and ill-suited. In sum, Japan and Germany had more outlets available to relieve the labor market pressure caused by the crisis.

Preface

I would like to acknowledge my indebtedness to my supervisor, Professor Karen Helene Ulltveit-Moe, without whom this paper would not have come to fruition. Particularly important was her help in structuring the paper. My gratitude is also extended to Professor Nico Keilman for his help in econometric approaches and software use. Further, I gratefully recognize the helpful comments provided by my fellow students Anastasia Edakina, Kristin Rasdal, and Astrid G. Stavseng. Any mistakes or shortcomings are entirely my own.

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1.0 Introduction

The aim of this paper is to discuss the main factors behind the unique responses in (un)employment in the respective countries' labor markets. Schmitt (2011) lists three possible reasons for different experiences. The first is that the size of the shock may differ across countries. Since such shocks cannot be directly observed, one can never be sure. The second reason are different macroeconomic policy responses, which also vary across countries. Lastly, the structure of labor markets plays a role. Aside from the acknowledgement that shocks cannot be directly observed, uniqueness in labor market responses must necessarily stem from differences in fundamental characteristics of and policies implemented in these labor markets. A vast array of different characteristics can be detected, and these differences in turn help explain how the crisis impacted on the labor markets. My paper emphasizes the following: The empirical relationship between changes in output and changes in unemployment – also known as Okun's Law, wage flexibility/moderation, employment protection legislation, crisis-induced work-sharing programs, and lastly institutional and cultural characteristics across countries. My analysis combines regression analyses, formal-modeling methods, and qualitative investigation.

The analysis starts out in chapter 2 with Okun's law in, which describes the relationship between output and unemployment. This law is empirically found to be a negative relationship between the two. The relationship runs both ways. Changes in unemployment induce changes in output, or conversely, changes in output induce changes in unemployment. The elasticity of one variable with respect to another will tell us how sensitive the market is. The analysis in this chapter is carried out using Stata®. The ensuing chapters will in turn explore the institutional factors behind the elasticity.

Chapter 3 deals with wage flexibility. If wages are flexible, firms can cut wages instead of firing workers in the event of a downturn, and job loss can be mitigated. There are important differences in how wages are determined in the respective countries. While my analysis suggests that Japanese and German wages are more flexible than wages in the United States, other empirical results are conflicting.

The topic of discussion in chapter 4 is employment protection legislation (EPL). The ease with which firms can adjust their employment level is determined by law. The stricter EPL is,

the higher the firing costs incurred by the firm. Research on the matter not only highlights the relevance of differences in EPL strictness across countries and time, but also differences in strictness between temporary and permanent contracts. Over time EPL strictness has weakened considerably for temporary workers. Consequently, the share of temporary labor in the work force has gradually increased. Since temporary workers do not enjoy the same level of protection as permanent workers, unemployment is expected to respond more sensitively to shocks. Countries with lenient EPL would be expected to experience greater unemployment responses than countries where protection is higher, all else equal. A large share of temporary workers in the workforce pulls in the same direction as low levels of protection. This chapter discusses whether the labor market responses are consistent with the observed protection levels and the work force compositions in the respective countries.

Chapter 5 discusses the usage of government-induces short-time work programs. The severity of the Great Recession induced national governments to implement extraordinary policies to evade mass-unemployment. Differences in design, coverage, and participation criteria resulted in more extensive use in Japan and Germany than in the US.

Chapter 6 discusses the relevance of cultural characteristics and their roots in shaping the labor markets. Through a dive into the sociological realm, I will attempt to give reasons for the labor market differences highlighted in preceding chapters. In this context, the institutional configurations of the economies are endogenous; these are in turn conditioned by external factors, namely cultural characteristics. A lot of labor market literature puts very little emphasis cultural characteristics in explaining different institutional features. Conversely, when it does analyze cultural characteristics, it typically does not link it to labor market behavior. This chapter will try to bridge this gap by showing how different interpersonal relationships can affect labor market behavior. Distinct characteristics of the respective labor markets help explain why German and Japanese employers enjoyed greater flexibility, whereas US employers had fewer options available. The final chapter summarizes and concludes.

2.0 A Closer Look Into Okun's Law

The relationship between output growth and the change in unemployment, Okun's Law, is a widely accepted empirical regularity. It was first characterized and interpreted by economist Arthur Okun (Blanchard, 2006). It predicts a negative relationship between changes in output and changes in unemployment, or conversely, between changes in the unemployment rate and changes in output. Formally the relationship can take a variety of forms. An example of a simple form could be the following:

$$\text{Change in real output} = \alpha - \beta * \text{change in unemployment}$$

or conversely,

$$\text{Change in unemployment rate} = \alpha - \beta * \text{change in real output}$$

In the former equation α is an intercept coefficient, and β is the elasticity of output growth with respect to changes in unemployment. In the latter model α is the intercept coefficient, and β is the elasticity of the unemployment rate with respect to output.

2.1 An Empirical Approach

In its simplest form the Law appears as a two-variable function, as shown above. Commentators point to its insufficiency precisely because of its simplicity. In its original form the Law fails to take into account other important factors, such as lagged terms. Thus, the Law appears in many variants, and different authors use different specifications. Consequently, their conclusions on the impact of falling GDP on unemployment, or vice-versa, tend to differ. I will in the following use the specification put forth by Steinberg & Nakane (2011), to estimate the relationship between unemployment and output.

$$\Delta u_t = \propto + \beta_0 \Delta y_t + \beta_1 \Delta y_{t-1} + \gamma_1 \Delta u_{t-1} + \gamma_2 \Delta u_{t-2} + \gamma_3 \Delta u_{t-3} + \varepsilon_t$$

(2.1)

Δu is the change in the unemployment rate, and Δy is the change in output. Since firms may take some time to adjust its labor input, the estimation allows for lagged effects. The immediate effect of an output drop may not be very strong – unemployment may not even rise. A possible explanation is that firms are still providing goods and services from pending orders. However, as the economy finds itself in distress over a longer period, demand will diminish, and firms start adjusting their labor input. Hence, β_1 is expected to be negative. According to this model do not only present and past changes in output have an effect on present changes in unemployment, but also past changes in unemployment. In major industrialized countries it is reasonable to believe that unemployment oscillates around a natural level. So any change in unemployment in a given period is expected to be reversed in later periods. I have run ordinary least squares (OLS) regressions with the above specification for the three countries, and reached the following estimates[1]:

Table 1: Regression Results, Model (2.1)

		$\propto$	β_0	β_1	γ_1	γ_2	γ_3	R^2
Japan	Coefficient	.0243668	-.0085706	-.0204748	-.2080493	-.1536245	-.1236923	0.1309
	S.E.	.0083034	.0083931	.0083952	.1198795	.1197487	.118323	
	t-statistic	2.93	-1.02	-2.44	-1.74	-1.28	-1.05	
USA	Coefficient	.0796797	-.0558652	-.0461674	-.4483932	-.099769	-.4232828	0.5382
	S.E.	.0176264	.0173836	.0188242	.1094934	.1063323	.0978384	
	t-statistic	4.52	-3.21	-2.45	-4.10	-0.94	-4.33	
Germany	Coefficient	.0331724	-.0229152	-.0195138	-.3105832	-.0837839	-.3729398	0.2806
	S.E.	.0112952	.0135636	.0133727	.1162582	.1198668	.1159288	
	t-statistic	2.94	-1.69	-1.46	-2.67	-0.70	-3.22	

[1] Data are collected from the OECD statistical database. Estimates are based on quarterly data in the period 1990Q1-2007Q4.

Next, I introduce a dummy variable D that takes the value 1 if the economy is in a state if recession, and 0 otherwise[2]. In order to account for possible interaction effects the original specification in (2.1) now looks like the following:

$$\Delta u_t = \propto_0 + \propto_{0*} * D + \beta_0 \Delta y_t + \beta_{0*} D * \Delta y_t + \beta_1 \Delta y_{t-1} + \beta_{1*} D * \Delta y_{t-1} + \gamma_1 \Delta u_{t-1} + \gamma_{1*} D * \Delta u_{t-1} + \gamma_2 \Delta u_{t-2} + \gamma_{2*} D * \Delta u_{t-2} + \gamma_3 \Delta u_{t-3} + \gamma_{3*} D * \Delta u_{t-3} + \varepsilon_t \quad (2.2)$$

In the case of recession, we have that:

$$\Delta u_t = (\propto_0 + \propto_{0*}) + (\beta_0 + \beta_{0*}) \Delta y_t + (\beta_1 + \beta_{1*}) \Delta y_{t-1} + (\gamma_1 + \gamma_{1*}) \Delta u_{t-1} + (\gamma_2 + \gamma_{2*}) \Delta u_{t-2} + (\gamma_3 + \gamma_{3*}) \Delta u_{t-3} \quad (2.3)$$

and the specification will look like (2.1) otherwise. The results are reported in table 2:

[2] The economy is considered to be in a recession if the GDP contracts for two consecutive quarters or longer.

Table 2: Regression Results, Model (2.2)

		$\propto_0$	$\propto_{0*}$	β_0	β_{0*}	β_1	β_{1*}	R^2
Japan	Coefficient	.01407	.0100927	.0012311	-.0413406	-.0172738	-.018952	0.2273
	S.E.	.0106246	.0711052	.0104218	.0557717	.0096435	.0236434	
	t-statistic	1.32	0.14	0.12	-0.74	-1.79	-0.80	
		γ_1	γ_{1*}	γ_2	γ_{2*}	γ_3	γ_{3*}	$AdjR^2$
	Coefficient	-.2379139	.0975071	-.0723095	-.9030197	-.0690334	.0381093	0.0832
	S.E.	.1254864	.5931212	.1239875	.51942	.1241646	.4775186	
	t-statistic	-1.90	0.16	-0.58	-1.74	-0.56	0.08	
		$\propto_0$	$\propto_{0*}$	β_0	β_{0*}	β_1	β_{1*}	R^2
USA	Coefficient	.0576761	.034913	-.0417858	-.0573859	-.0361842	-.0121153	0.5692
	S.E.	.0231667	.0445015	.0207792	.0704434	.0204017	.0647906	
	t-statistic	2.49	0.78	-2.01	-0.81	-1.77	-0.19	
		γ_1	γ_{1*}	γ_2	γ_{2*}	γ_3	γ_{3*}	$AdjR^2$
	Coefficient	-.4358789	-	-.0953168	-.2379477	-.3822687	-.6950326	0.4950
	S.E.	.1135116	-	.1118707	.4162641	.1015974	.4918653	
	t-statistic	-3.84	-	-0.85	-0.57	-3.76	-1.41	
Germany		$\propto_0$	$\propto_{0*}$	β_0	β_{0*}	β_1	β_{1*}	R^2
	Coefficient	.0236817	.1549986	-.012925	.2248848	-.0167758	.1481421	0.3319
	S.E.	.0139592	.1526157	.0157609	.3178313	.0163477	.1489639	
	t-statistic	1.70	1.02	-0.82	0.71	-1.03	0.99	
		γ_1	γ_{1*}	γ_2	γ_{2*}	γ_3	γ_{3*}	$AdjR^2$
	Coefficient	-.290525	-.1574238	-.0576923	-.0889439	-.3196363	-1.68376	0.1958
	S.E.	.1339816	.41789	.129017	.424862	.1245276	1.487807	
	t-statistic	-2.17	-0.38	-0.45	-0.21	-2.57	-1.13	

2.2 Comments on the Results

2.2.1 Japan

Specification (2.1): The estimation shows a negative relationship between changes in unemployment and changes in output growth. The elasticity of current unemployment with respect to changes in both current and lagged output is negative, but only β_1 is statistically significant. This suggests that unemployment does not react immediately to output changes. Further, the estimation shows a negative relationship between changes in unemployment and past changes in unemployment. The intuition behind this result might be the following: Japanese unemployment has generally stayed low the last twenty years (averaging 3.9 percent), never exceeding 5.5 percent (not even during the Great Recession), and remained close to 2 percent in the first half of the 1990s. Unemployment changes will be reversed in later periods. The regression results show, however, that no single lagged dependent variable is statistically significant. Furthermore, the proportion of variation in the dependent variable that is explained by the model is low.

Specification (2.2): The model fares even worse when it is extended. No single variable is statistically significant at the 95% significance level. This may result from the generally low volatility of Japanese unemployment. If we allow for a 90% significance level β_1, γ_1, and γ_{2*} become significant. In any event, the model seems ill-suited to explain unemployment changes in Japan.

2.2.2 The United States

Specification (2.1): Here, as in the case of Japan, the estimation again shows a negative relationship between unemployment and output changes, and between current and earlier unemployment changes. All but one variable are statistically significant. The estimation also shows that current unemployment almost exclusively reacts more sensitively with respect to output changes and previous unemployment changes in the United States than in Japan and Germany.

Specification (2.2): With the extended model current output changes have a significant effect at the 95% significance level, while lagged output has a significant effect at the 90% significance level. Out of the lagged dependent variables, unemployment lagged two quarters

is still the only insignificant one. Changes in unemployment are the most sensitive with respect to the right-hand-side variables in this specification as well. No single dummy variable is statistically significant.

2.2.3 Germany

Specification (2.1): The negative relationship between current unemployment changes and output changes, and between current unemployment and earlier unemployment changes, remains. The initial assumptions seem vindicated. Unemployment reacts significantly with respect to current output changes at the 90% significance level, and with respect unemployment changes lagged one and three periods at the 95% significance level.

Specification (2.2): The model fares poorly when the model is extended. The only significant variable (at the 95% significance level) is unemployment lagged one period. The dummy effect was not significant in any of the three cases.

2.2.4 The Long-Run Impact

If we assume a long-run equilibrium where

$$\Delta u_t = \Delta u_{t-1} = \Delta u_{t-2} = \Delta u_{t-3} = \Delta u$$

and

$$\Delta y_t = \Delta y_{t-1} = \Delta y$$

then (2.1) reads:

$$\Delta u_t = \propto + (\beta_0 + \beta_1)\Delta y + (\gamma_1 + \gamma_2 + \gamma_3)\Delta u \tag{2.4}$$

which gives the long/run impact

$$\Delta u_t = \frac{\propto}{1 - (\gamma_1 + \gamma_2 + \gamma_3)} + \frac{\beta_0 + \beta_1}{1 - (\gamma_1 + \gamma_2 + \gamma_3)} \Delta y \tag{2.5}$$

Following the same procedure, the long-run impact of a recession becomes:

$$\Delta u_t = \frac{\overbrace{(\propto_0 + \propto_{0*})}^{\propto_{0*}}}{1 - \left\{\underbrace{(\gamma_1 + \gamma_{1*})}_{\gamma_{1*}} + \underbrace{(\gamma_2 + \gamma_{2*})}_{\gamma_{2*}} + \underbrace{(\gamma_3 + \gamma_{3*})}_{\gamma_{3*}}\right\}} + \frac{\overbrace{(\beta_0 + \beta_{0*})}^{\beta_{0*}} + \overbrace{(\beta_1 + \beta_{1*})}^{\beta_{0*}}}{1 - \left\{\underbrace{(\gamma_1 + \gamma_{1*})}_{\gamma_{1*}} + \underbrace{(\gamma_2 + \gamma_{2*})}_{\gamma_{2*}} + \underbrace{(\gamma_3 + \gamma_{3*})}_{\gamma_{3*}}\right\}} \Delta y$$

$$= \frac{\propto_{0*}}{1 - (\gamma_{1*} + \gamma_{2*} + \gamma_{3*})} + \frac{\beta_{0*} + \beta_{1*}}{1 - (\gamma_{1*} + \gamma_{2*} + \gamma_{3*})} \Delta y \qquad (2.6)$$

Based on the above estimations, a 1% decrease in output yields the following changes in unemployment for the respective countries:

Table 3: The Long-Run Impact on Δu

	Δy	Δu spec (2.1)	Δu spec (2.2)
Japan	-1%	0.0195544%	0.0462058%
USA	-1%	0.0517552%	0.0518222%
Germany	-1%	0.0240077%	-0.0534588%

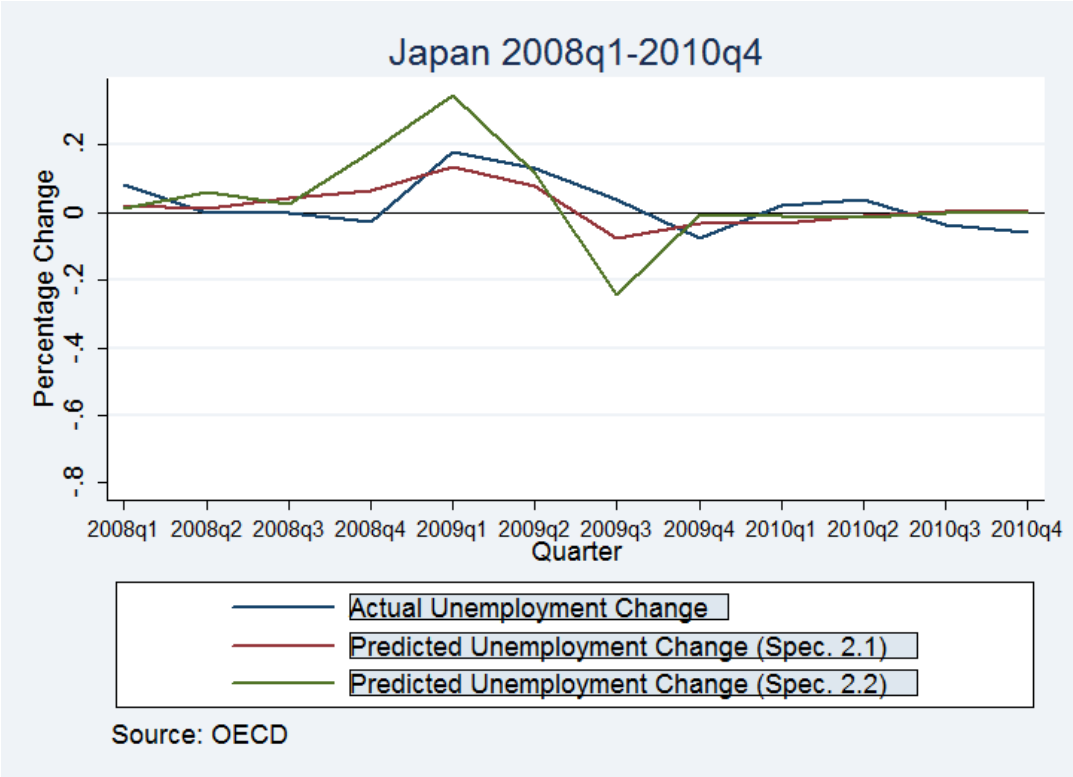
The estimates for specification (2.1) show that the US is the country where unemployment reacts the strongest to changes in output, and that unemployment responds weakest in Japan. According to the estimates, unemployment increases by more than double that of Japan and Germany. Blanchard (2006) holds that these results are consistent with firm behavior and employment relations across countries. His general argument is the following: Japanese firms offer a high degree of job security to their workers, so output variations have little effect on unemployment. Therefore it comes as no surprise that Japan experiences the smallest change in unemployment. The largest elasticity is found in the United States, which should not come as a surprise either. American firms face fewer constrains on their employment adjustment

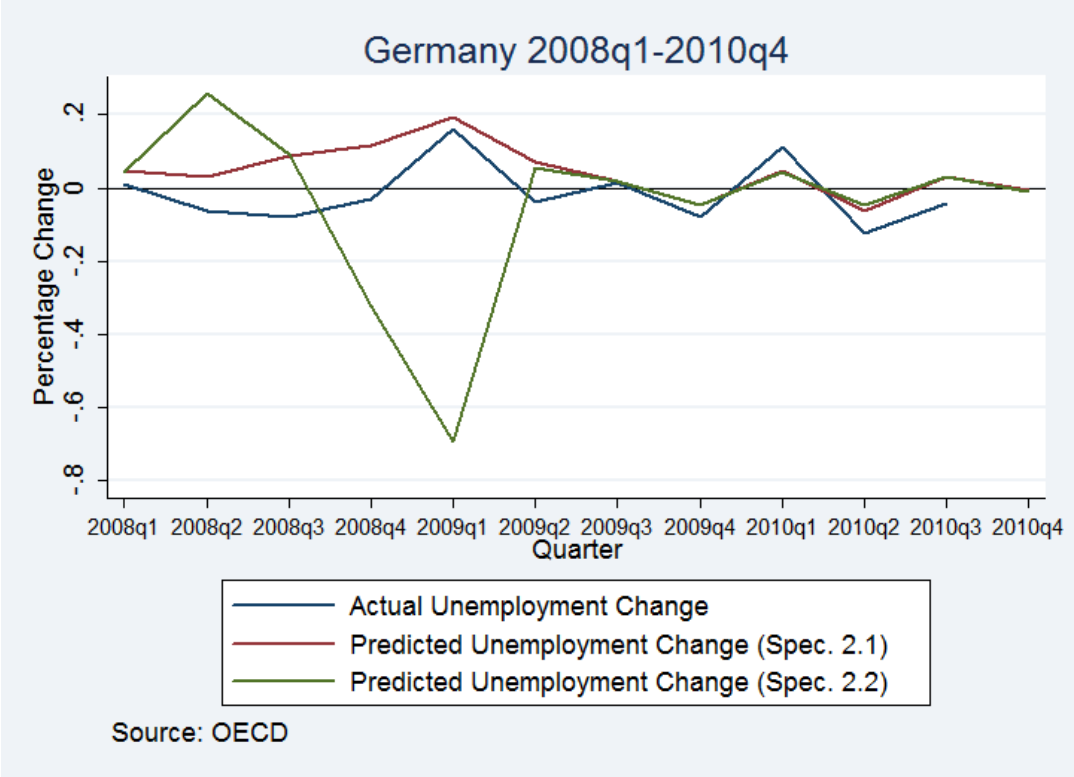
behavior. This leaves Germany in between Japan and the US. Again, this is to be expected because of legal restrictions on firing - from severance pay and the need for permission from the state to terminate employment. This is, as we will see, consistent with the findings in subsequent chapters. The results in specification (2.2) are somewhat surprising. While the U.S. exhibits slightly higher elasticity compared to Japan, the unemployment change induced by a fall in output is *negative* in Germany. This stands at odds with the initial assumptions, and also with the results obtained from specification (2.1). Steinberg & Nakane (2011), using regression analysis, find that the long-term elasticity is the lowest in Japan at slightly below 0.1. Germany and the U.S. exhibit about the same elasticity with respect to output at about 0.4.

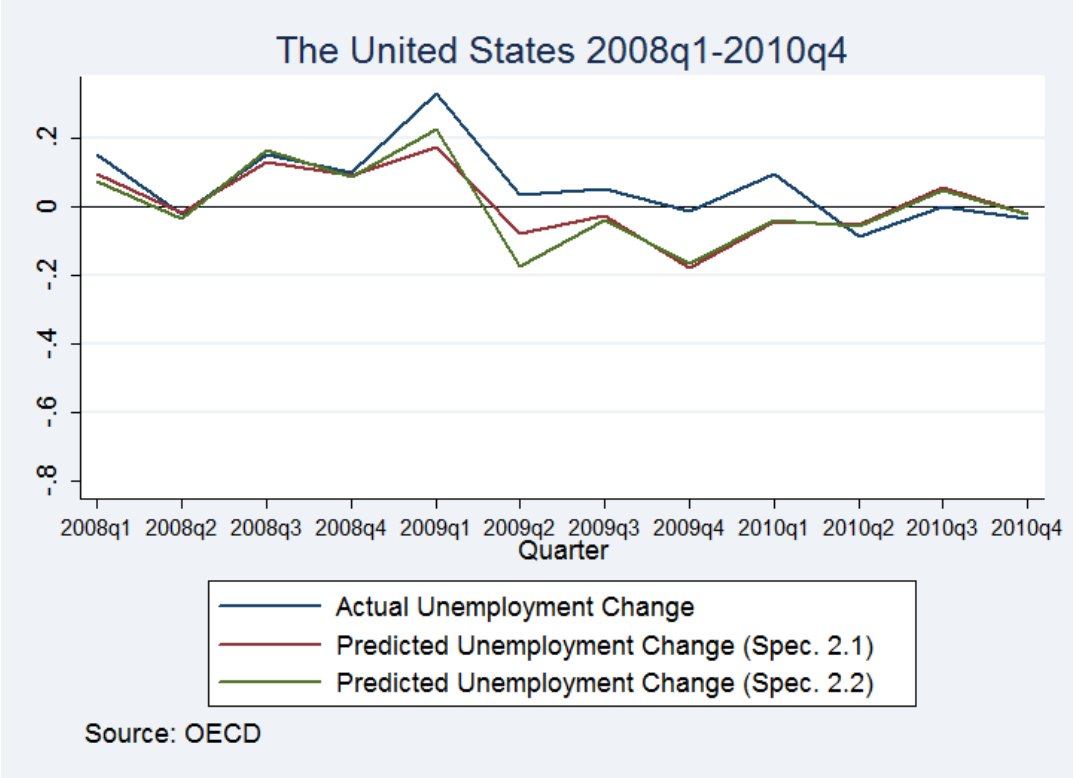
2.2.5 Testing the Estimates

Comparing actual data to the estimates gives the following developments in the respective countries:

Figure 1: Testing the Estimates for Japan, Germany, and the United States







In the case of Japan, both models capture the moves in unemployment fairly well between 2008q1 and the beginning of 2008q3, and from 2009q3 on. In between these periods they largely predict the direction of change correctly, but they are both somewhat imprecise.

Model (2.1) for Germany captures the movements of unemployment well overall, although with some imprecision. Model (2.2) fails miserably between 2008 and the beginning of the second quarter of 2009, both in terms of direction and precision. Coming out of the recession the model catches up with actual unemployment and follows the movements correctly, and the estimates lie closer to the actual data. In the United States both models correctly predict the sign of the changes overall. The estimates are imprecise between the end of 2008 and the beginning of 2009. Generally the models capture the movements of unemployment change well for all three countries (except for specification (2.2) in the case of Germany), but they all lack precision particularly in the 2008q3-2010q1 span. Clearly, there are crisis-related factors that the models do not take into account. The full effects of the worst slump since the Great Depression were not sufficiently identified.

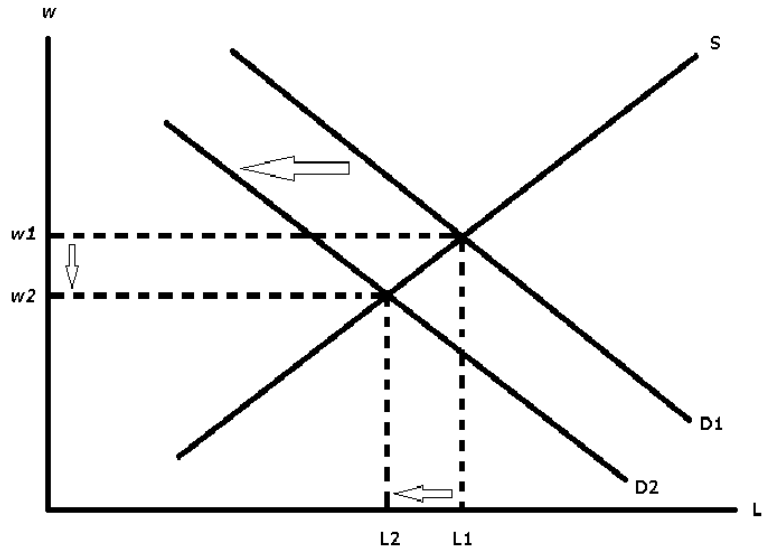
Unemployment does not only vary across countries; it also varies over time. Over time unemployment has become more responsive to output changes. These changes are also in accordance with firm behavior and regulations. Job security has diminished as a result of increased competition in goods markets since the early 1980s. Furthermore, firing restrictions have been considerably weakened as a result of firms' urging ((International Monetary Fund, 2010) The argumentation above is just something to give a general picture of the countries' labor markets. The next chapter will deal with the role of wages, and later I will in detail look into the structure of the labor markets and employment relations.

3.0 Wage Theory

The preceding chapter showed how changes in output were reflected in changes in unemployment, and demonstrated how sensitivity differs from country to country. However, that is all it does. As to explanations why the elasticity differs, the model comes up short. The next chapters will attempt to explain these differences. Wage flexibility and wage moderation are seen by researchers as important in mitigating labor market effects in the event of a downturn. Japan in particular is highlighted as a country with a very flexible wage setting regime. When the crisis hit Japanese employers were able to utilize this flexibility to cut wages instead of workers. Germany on the other hand is credited for its wage moderation prior to the crisis. German wage moderation was increasing demand for labor, and thus pushing German employment to a higher equilibrium. This upward transition mitigated the negative employment response to the crisis. Conversely, because of lack of such wage flexibility in American wages, employers shed workers instead of wages. The following starts out by giving wage flexibility/rigidity a theoretical framework. Later I will use this framework to explain the respective wage/unemployment responses.

The starting point for explaining wage flexibility theory is a fall in labor demand caused by reduced goods demand. Along the vertical axis we have wages, and along the horizontal axis employment. Labor supply is an increasing function of the wage rate. The higher the wage offered by the employer, the higher the labor supplied by the employee. Labor demand is a falling function of wages. The lower the going wage rate, the more labor is demanded. Figure 1 shows what happens when a negative demand shock (or a disequilibrium) for labor occurs. Reduced labor demand shifts the demand curve leftward. Assuming that labor supply remains constant, labor reduces from $L1$ to $L2$, and wages fall from $w1$ to $w2$. One has to keep in mind that the slope of the demand and supply curves will affect the impact on wages and labor. In figure 1 the disequilibrium is absorbed partly by reduced wages and partly by reduced labor utilization. In the following we will see one case in which wages are perfectly elastic and another in which they are perfectly rigid.

Figure 2: Wages and Labor Input – the General Case



Source: Goubert & Omey (1996)

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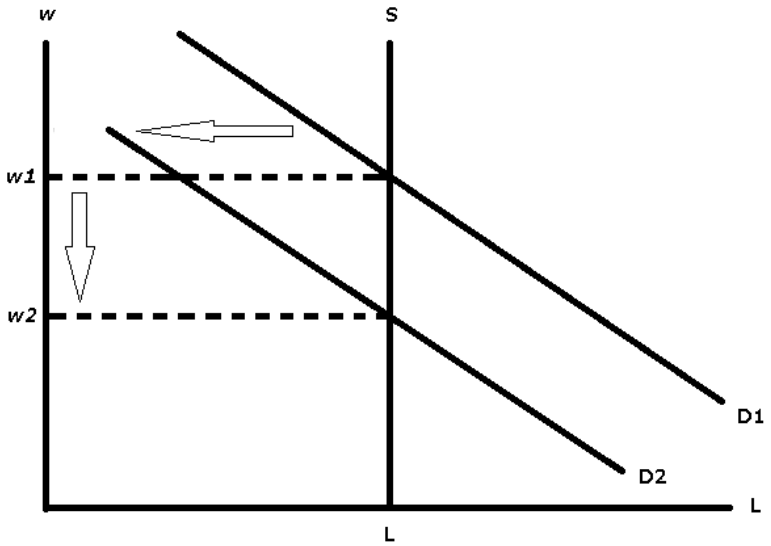
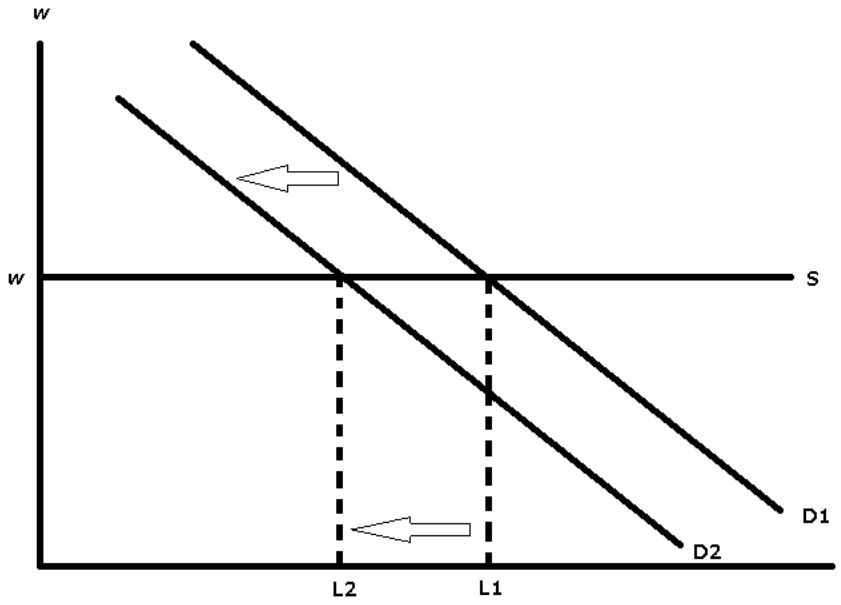
Figure 3: Wages and Labor Input – Flexible Wage Regime



Source: Goubert & Omey (1996)

Figure 3 displays the case in which wages are perfectly flexible. Workers supply labor L at any wage rate offered by employers. As before, a negative demand shock causes the demand curve to shift leftward. There will be no response in labor utilization. L remains the utilized amount of labor. Wages, on the other hand, respond to the negative demand shock by falling from $w1$ to $w2$. The entire shock is absorbed by reduced wages.

Figure 4: Wages and Labor Input – Rigid Wage Regime



Source: Goubert & Omey (1996)

Figure 4 shows the perfectly rigid wages case. At wage rate w labor is supplied by an infinite amount. As before the negative demand shock shifts the demand curve leftwards. Now the response is seen in lower labor utilization. Labor falls from $L1$ to $L2$. But since wages are perfectly rigid, there is no wage response to reduced labor demand. The shock is reflected by an increase in unemployment.

Faced with a sharp drop in output, firms can cut labor costs through the following actions:

- They can shed workers. If for instance annual wages are rigid, then keeping the workers might prove unsustainable, and the firm might be left with no other option

than to let workers go. This situation corresponds to figure 3, where wages stay constant but where labor utilization falls.

- They can reduce wages. This situation is described by figure 2. Employment can be kept constant if wages are allowed to fall.
- They can reduce the amount of hours worked. Even if hourly earnings are rigid, employers and employees can agree upon reduced work weeks to maintain employment while at the same running a viable business. Wages (hourly) remain the same, as does employment, but total labor utilization has fallen. This case falls between two stools, as neither figure 2 or 3 is able to perfectly describe it. Labor is maintained at a constant level, but labor *utilization* has fallen. This is a case not of wage flexibility, but of employment flexibility. If instead the horizontal axis shows labor utilization, figure 2 appropriately describes this situation. This section will concentrate on wage flexibility. Employment flexibility in terms of reduced hours is treated in the section on work-sharing.

The above framework views the wage response to labor demand shocks. The degree of flexibility determines how much wages and/or employment will fall in response to a negative labor demand shock. However, in this framework no relationship between wages and employment is established. The shock is caused by some outside factor (like a negative demand shock for goods). On the response side wages and employment act as substitutes, and the final adjustment is determined by degree of wage flexibility. A look at figures 2 and 3 will help clarify. In figure 2, perfect flexibility is assumed. The negative demand shock is fully absorbed by a wage reduction, and no change in unemployment occurs. Thus, although there is a relationship between the shock and the wage rate, no relationship between wage change and unemployment can be observed. For a highly flexible regime, even small differences in relative wage changes will give large differences in the wage change/unemployment ratio. In figure 3 wages are perfectly rigid. If we assume perfectly rigid wages, there is no reaction of wages to the decline of labor demand. The entire shock shows up through increased unemployment. Again, though there is a relationship between the shock and unemployment, no relationship between wages and unemployment can be discerned (Goubert & Omey, 1996).

This absence of any causal relationship between wages and unemployment, as presented above, is contested by some. On the one hand, wage rigidity is put forward as one of the main

causes of unemployment. An alternative proposition is that high unemployment is associated high wage flexibility. The argument is that higher levels of unemployment drive down the wages of the low-paid. Calistri and Galbraith (2001) find a positive correlation between unemployment and wage flexibility for a number of countries, including Japan and Germany. The US is the only country which exhibits a negative correlation. The discussion shows that even among economic authors there does not seem to exist a unanimous consensus on the measurement or the determinants of wage flexibility, or even which way causality runs.

3.1 The Determinants of Wages

Despite, or perhaps because of the debate the above discussion creates, a standard undergraduate text will be used to expresses wage determination in the following simple manner (Blanchard 2006):

$$W = P^e F(u, z)$$

The nominal wage W depends on:

- The expected price level P^e. The higher the expected price level, the higher the desired wage level.
- The unemployment level u. The higher the unemployment rate, the weaker the workers' position in bargaining, and the lower the wage.
- A catchall variable z that captures all other variables that may affect the wage setting outcome.

The z variable in the above equation contains a lot of important factors that contribute to the determination of wages. More complicated versions of Blanchard's model take into account a variety of factors that help explain wage responses. The following equation[3] will elaborate on Blanchard's model (See Heylen (1992) for a complete discussion).

[3] The wage equation used by Heylen (1992) is much more extensive than (3.1). His takes into account many more explanatory factors to explain wage flexibility. For the full model, please consult his work. There are

$$w_t = p^e_{t+1} + \mu(w-p)_{t-1} + (1-\mu)q_t - \beta(\delta,\gamma)u_t \quad (3.1)$$

All variables are expressed in logs. Here p^e_{t+1} is the price expected to prevail in the next period. Workers are interested in how much they can consume with their earnings. Hence, they are interested in the nominal wage relative to the prices of the goods they buy. Similarly, firms care about the wage payments relative to the prices of the goods that they sell. In other words, the real wage is what we care about. $(w-p)_{t-1}$ is the real wage in the previous period. Wage determination is based in part on what the real wage was in the previous period. q_t is labor productivity. Workers want their real wages to reflect their productivity. μ measures the persistence of the real wage ($0 < \mu < 1$). Hence the nominal wage set for the current period depends positively on prior real wage and productivity growth. Lastly, β is the unemployment coefficient (on u_t, not to be confused with μ), and takes on a negative value. The argument is that a marginal increase in unemployment will cause a fall in wages. β in turn depends positively on δ and γ. δ denotes the degree of *centralization* of wage bargaining. γ denotes the degree of *coordination* of wage bargaining. The next section will assess the effects of the institutional configuration, i.e. wage bargaining, on the elasticity of wages with respect to unemployment.

3.1.1 Wage Bargaining and the Unemployment Coefficient

In the wage equation above the unemployment coefficient depends on two characteristics of wage bargaining: centralization and coordination. The distinction between the two is subtle. If wage bargaining is highly centralized, the agreements are reached on a central level and carry overriding importance. When agreements are reached on company and plant level, then bargaining is decentralized. Agreements can be decentralized and at the same time highly (implicitly) coordinated. It would be *as if* agreements were centralized. On the other hand, if wage bargaining is centralized, coordination follows implicitly. This is because the agreements reached already apply on a central level (Boeri & van Ours, 2008).

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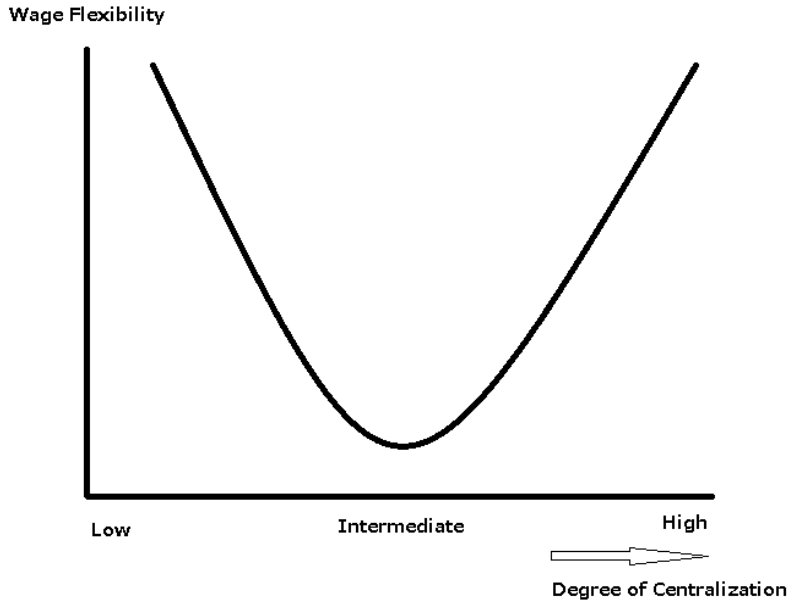
obviously a great number of factors that help explain wage flexibility. Heylen's model has been simplified and modified in order to highlight the contribution of centralization and coordination.

In centralized labor markets wage responsiveness to unemployment is higher than in decentralized markets. This is because centralized unions to a greater extent prioritize employment to wages. Centralized unions to a greater extent attempt to reach the dual goal of not only favorable wages, but also of employment to all workers. For labor markets where wage bargaining is centralized δ will take on a higher value, increasing wage flexibility of unemployment. For less centralized bargaining, on industry or firm level, unions no longer have the incentive to moderate wages for the sake of employment. This drives down δ. On the other hand, substitutability between products of different firms leads to high elasticity of labor demand. Thus, excessive wage claims may result in job loss. This will pull the δ up. On industry level product substitutability is smaller than on firm level, so the positive effect on δ is also smaller. Thus, we can view the relationship between wage flexibility and centralization as a U-shaped curve (Heylen, 1993).

Figure 5: Wage Flexibility and the Degree of Centralization



Source: Heylen (1992)

Wage flexibility also depends positively on γ, the degree of coordination in wage bargaining. The greater the degree of coordination, the greater the γ is, and the greater the flexibility. Because different countries have different bargaining systems δ and γ will vary across countries, depending on their degree of centralization and coordination. Boeri and van Ours

(2008) have indexed the degree of centralization and coordination for a number of countries. The scores for Germany and the United States are reported below.

The classification ranges from 1 to 5, where higher values indicate higher levels of centralization and coordination. The coding can thus be viewed as an indicator of the structural characteristics of the wage bargaining process. The indices are categorized as follows[4]:

	Centralization
1	Company and plant level pre dominant.
2	Combination of industry and company/plant level, with an important share of employees covered by company bargains.
3	Industry level predominant.
4	Predominantly industrial bargaining, but also recurrent central-level agreements.
5	Central-level agreements of overriding importance.

	Coordination
1	Fragmented company/plant bargaining, little or no coordination by upper-level associations.
2	Fragmented industry- and company-level bargaining, with little or no pattern setting.
3	Industry-level bargaining with irregular pattern setting and moderate coordination among major bargaining actors.
4	a) Informal coordination of industrial and firm-level bargaining by (multiple) peak associations.
	b) Coordinated bargaining by peak confederations, including government-sponsored negotiations (tripartite agreements, social pacts), or government imposition of wage schedules
	c) Regular pattern setting coupled by high union concentration and/or bargaining coordination by large firms.
	d) Government wage arbitration.
5	a) Informal coordination of industry-level bargaining by an encompassing union confederation
	b) Coordinated bargaining by peak confederations or government imposition of a wage schedule/freeze, with a peace obligation.

Table 4: Degrees of Centralization and Coordination (Boeri & van Ours, 2008)

	Centralization	Coordination
Germany	3	4
USA	1	1

Kenworthy (2001) scores the degree of coordination for the Japan, Germany, and the United States as follows:

[4] Index descriptions are as presented in Boeri & van Ours (2008).

Table 5: Degrees of Coordination (Kenworthy, 2001)

	Time Span	Coordination
Japan	1960-2000	5
Germany	1974-2000	4
USA	1960-2000	1

The index is similar to that of Tito and Boeri, with five different categories. Higher values denote a higher degree of coordination[5]. Kenworthy does not, however, score the degree of centralization. Nevertheless, as argued above, a high degree of coordination can occur without a high degree of centralization. As a result, a high level of coordination could act as a substitute for high centralization to the extent that centrally reached agreements carry overriding importance.

1	Fragmented wage bargaining confined largely to individual firms or plants.
2	Mixed industry- and firm-level bargaining, with little or no pattern-setting and relatively weak elements of government of government coordination such as setting of basic pay rate or wage indexation.
3	Industry-level bargaining with somewhat irregular and uncertain pattern-setting and only moderate union concentration. Government wage arbitration.
4	Centralized bargaining by peak confederation(s) or government imposition of a wage schedule/freeze, without a peace obligation. Informal centralization of industry- and firm-level bargaining by peak associations. Extensive, regularized pattern-setting coupled with a high degree of union concentration.
5	Centralized bargaining by peak confederation (s) or government imposition of a wage schedule/freeze, with a peace obligation. Informal centralization of industry-level bargaining by a powerful, monopolistic union confederation. Extensive, regularized pattern-setting and highly synchronized bargaining coupled with coordination of bargaining by influential large firms.

3.2 Centralization, Coordination, and the Aggregate Effect on the Unemployment Coefficient in the Respective Countries

Based on the categorization in the previous subsection, I will attempt to assess the degree of wage flexibility with respect to unemployment in the three countries.

[5] Index descriptions are as presented in Kenworthy (2001). The reason for giving the index descriptions in their entirety is that the scores might have differed depending on the categorizations.

3.2.2 Japan

Although Japan is not included in Tito and Boeri's list of indexed countries, the fact that most collective bargaining in Japan is conducted at the plant level between an enterprise union and management (Shirai, 1984) would give it a centralization score of 1 or 2. All agreements reached are between firms and their own unions, but Japanese enterprise unions typically federate into sectoral organizations. With the 1989 merger of the country's four competing confederations into one single organization, Rengo, union wage bargaining became in effect centralized. Furthermore, wage is determined in the annual bargaining round, the so-called Spring Offensive. This facilitates a high degree of informal coordination of bargaining (Golden and Wallerstein, 1994 in Kenworthy, 2001). What we have here is in principle a very fragmented wage bargaining system, but in effect a very centralized one. So despite a very low score on the centralization index, a high score is assigned on the coordination index.

What are the implications of these characteristics on equation (3.1)? Despite a low degree of formal centralization, the high degree informal coordination makes the system effectively centralized. This means that to the extent that the degree of centralization and the degree of coordination differ, the coordination effect trumps the centralization effect. In the case of Japan wage-setting is highly decentralized, implying a high δ. At the same time wage-setting is highly coordinated, implying a high value on γ. The aggregate effect of these two is a high unemployment coefficient β. This structure in turn increases wage flexibility. Japan is emphasized as an economy with a highly flexible wages. An additional reason why are non-scheduled wage payments. A large share of bonuses and paid overtime in contracted pay enable firms to adjust wages downward in the face of adversity. Such non-scheduled wage payments account for an important share of the annual earnings of Japanese workers (Hashimoto, 1990). Such a wage composition helps cushion fluctuations in output.

3.2.3 Germany

Germany has a single dominant labor federation, the German Confederation of Trade Unions (DGB). Bargaining takes place predominantly at the industry level, and exceptionally at the firm level. Thus, as far as centralization is concerned the German score is not very high. Nevertheless, the DGB encourages other industries to follow the pattern set by IG Metall, the large metalworkers union. Furthermore, by law bargaining coverage is extended to nonunion firms. IG Metall acts in effect as an encompassing organization on behalf of a large share of

the work force. The pattern set by IG Metall is largely followed by other sectors (Kenworthy, 2001). In other words we have a considerable degree of pattern-setting, which explains a higher coordination score than centralization score in Tito and Boeri. The implications that the German structure has on wage flexibility is the following: The intermediate level of centralization (a 3 score in Tito and Boeri) yields a low δ due to the weakened employment incentive. Yet, a relatively high degree of coordination yields a high value for γ, implying more flexible wages than what the degree of formal centralization would imply.

3.2.4 The United States

Much of U.S. bargaining occurs on the firm-level. However, the national unions have considerable authority over the bargaining process. The American auto industry is a prime example. Bargaining is undertaken by the United Automobile Workers (UAW), which formulates the bargaining demands. The UAW picks one of the "big three" – General Motors, Ford and Chrysler – auto companies to bargain with first, according to where they expect to exercise the greatest influence. The agreement reached with the first company will be used as a standard for the other two. Further, there is little reliance on follow-the-leader bargaining (or pattern-setting). Lastly, unlike Japan, there are no annual or synchronized bargaining rounds; wage-setting is asynchronous (Soskice, 1990 and Lange, Wallerstein, and Golden, 1994 in Kenworthy, 2001). Hence, we have low scores on both the centralization and the coordination index. A low score on centralization implies, according to the argumentation above, a high degree of wage flexibility. This is because of the high substitutability between products. Thus, excessive wage demands could be penalized severely through a layoff. Similarly, since coordination is low, each firm, enterprise or plant is planning for itself. Little thought is given to the general employment level or possible disturbances to official anti-inflationary policy. Further, as already mentioned, bargaining rounds are asynchronous. And lastly, U.S. union contracts are set for three years ahead. Except for possible cost-of-living increases and pre-determined rates of annual increases, wages are not re-negotiated before expiration. This puts downward pressure on wage flexibility.

3.2.5 Other Empirical Work and Alternative Measures of Wage Flexibility

The countries' structures suggest that Japan is the country with the highest wage flexibility. On the opposite end of the flexibility scale we find the United States. In between we have Germany. Heylen (1992) has gathered estimates of the unemployment coefficient β from a wide range of researchers:

Table 6: Heylen's (1992) Compilation

	Authors							
Country	**GJL**[6]	**NS**[7]	**BLN**[8]	**OECD**[9]	**AM**[10]	**AND**[11]	**KwCh**[12]	**LNJ**[13]
Germany	0.77	0.36	3.31	0.11	2.12	2.20	0.14	1.01
Japan	8.09	3.22	41.00	1.87	14.72	2.75	1.66	14.50
U.S.	0.24	0.11	0.28	0.61	0.91	0.31	0.60	0.94

A notable feature of the above results is that almost without exception Japan comes out as the country with the greatest unemployment coefficient, and that the United States has the smallest coefficient. This is consistent with the qualitative argumentation made based on bargaining structures. Overall Japanese labor markets are characterized by the highest degree of flexibility, *ceteris paribus*, and American labor markets are characterized by the lowest.

Steinberg & Nakane (2011) have estimated wage flexibility in the following way:

$$\Delta w_t = \alpha + \beta_0 \Delta y_t + \gamma_0 \Delta w_{t-1} + \varepsilon_t \tag{3.2}$$

In the above equation Δw and Δy refer to changes in the real wage rate and the level of output growth, respectively. This equation decouples the link between unemployment and wage

[6] Grubb, Jackman and Layard (1983: Table 1).
[7] Newell and Symons (1985: Tables 6c and 6d).
[8] Bean, Layard and Nickell (1986: Table 3).
[9] Organisation for Economic Co-Operation and Development (1989: Table 2.6).
[10] Alogoskoufis and Manning (1988: Table 5).
[11] Andersen (1989: Table 4).
[12] Data for the small countries (except Spain): Kawasaki, Hoeller and Poret (1990: Table 2); data for the large countries (and Spain): Chan-Lee, Coe and Prywes (1987: Table 6).
[13] Layard, Nickell and Jackman (1991, chapter 9: Table 7)

flexibility. Instead, wage flexibility – or elasticity – is measured with respect to output fluctuations and wage rates from previous periods.

In the long run we have:

$$\Delta w_t = \Delta w_{t-1} = \Delta w$$

and

$$\varepsilon = 0$$

(3.1) transforms into:

$$(1 - \gamma_0)\Delta w_t = \alpha + \beta_0 \Delta y_t \tag{3.2}$$

and the expression for the long-run impact of an output shock reads:

$$\Delta w_t = \frac{\alpha}{1 - \gamma_0} + \frac{\beta_0}{1 - \gamma_0} \Delta y_t \tag{3.3}$$

This gives us an equation where the long run wage rate is a function of output fluctuations. Output shocks alter the demand for labor, and thus cause the labor demand curve to shift. If a positive goods demand shock occurs, firms will want to adjust the labor stock upward to keep up with increased demand, and the labor demand curve shifts right. In the case of a recession, for example, goods demand falls, and firms adjust employment downwards. The labor demand curve shifts left. Steinberg and Nakane present the following estimates for the output coefficient $\frac{\beta_0}{1-\gamma_0}$:

Table 7: Steinberg & Nakane's (2011) Estimates of the Output Coefficient

		Output Coefficient			Number of Lags/Recession Dummy Inclusion			
Country	Year/Quarter	Estimate	S.E.	t-statistic[14]	Δy	Δw	Recession Dummy	BIC
Japan	1985q3	0.220	0.711	0.31	1	3	Yes	-505.41
	1991q1	1.885	0.972	1.94	0	3	Yes	-545.59
	1997q2	0.242	0.088	2.75	0	0	No	-575.17
	2000q4	0.268	0.073	3.67	0	0	No	-590.00
	2007q3	0.291	0.073	3.99	0	0	No	-591.92
	2008q3	0.362	0.230	1.57	0	0	No	-482.65
Germany	1981q3	0.220	0.162	1.36	0	1	No	-516.52
	1992q1	0.485	0.804	0.60	0	3	Yes	-525.91
	1995q3	0.905	0.452	2.00	0	0	Yes	-518.68
	2002q3	1.161	0.631	1.84	0	0	Yes	-509.59
	2004q1	1.261	0.608	2.07	0	0	Yes	-509.64
	2008q1	0.001	0.152	0.01	0	0	No	-514.16
USA	1981q3	0.552	0.147	3.76	0	3	No	-602.32
	1990q3	0.248	0.087	2.85	0	1	No	-585.13
	2000q4	0.222	0.119	1.87	0	1	No	-492.73
	2008q2	0.540	0.178	3.03	0	1	No	-484.45

The output coefficient for Japan takes on its highest value at 1.885 in the early 90's, but at the onset of the crisis (late 2007-mid 2008) it lies (significantly) around 0.3. On the other hand, the United States has a statistically significant coefficient (0.540) at the onset of the crisis. Germany exhibits (doubtfully) statistically high flexibility in the early-to-mid-2000's, but the coefficient drops to zero at the onset of the crisis, and it is not statistically significant.

3.3 Concluding Remarks on the Chapter

The discussion on wage flexibility shows that wage flexibility can be measured in a number of ways. When the models differ, evidently the result does the same. My qualitative discussion of wage flexibility with respect to bargaining structures rendered Japan as the most flexible country, and the US as the least flexible one. Heylen's (1992) survey reached similar results. Steinberg & Nakane (2011) highlight Japan's flexibility in wages, as does the International Monetary Fund (2010), but their finding that the US exhibits even higher wage flexibility stands at odds with my argumentation and findings in this and subsequent chapters.

[14] t-statistics were not reported in Steinberg and Nakane's IMF report. Reported values are my own calculations. Otherwise, the table is reported in its entirety.

4.0 Employment Protection Legislation and Temporary Contracts

Wage flexibility alone is insufficient in explaining unemployment responses. In chapter 3 it was shown that, if wages are completely flexible, then firms have an important instrument at their disposal insofar they are concerned about the outflow of skilled workers, or to the extent that they simply care about the well-being of their labor stock. In reality wages are seldom completely flexible. Wages are to a greater or lesser extent pre-determined upon contract settlement. If wages cannot be adjusted, then an adjustment of the employment level at the firm is another option. However, the ease with which firms can adjust their employment level is also determined by law. A firm's law-imposed costs of firing and rehiring will condition the firm's incentives for such adjustments. An employee is protected from the prospect of unemployment by the cost that the firm incurs upon layoff.

Employment protection legislation (hereafter EPL) consists of the rules and laws that govern the costs to employers of dismissing workers. In the event of early termination of a permanent employment contract, legal restrictions on the dismissal and worker compensation are imposed upon the employer. A number of procedures have to be followed in case of both individual and collective dismissals. The final decision on the legitimacy of a layoff may ultimately be made by a court ruling (Boeri & van Ours, 2008).

From an economic viewpoint EPL has two key components: tax and transfer. The transfer component consists of severance payments (compensation that is intended to provide financial support to ease the transition from one place of work to another) and a mandatory advance notice period (a period of time between notification of dismissal and actual dismissal). The tax component consists of trial costs (payments to legal advisors) and trial costs. Both the severance payment and advance notice are legal minima that apply to all employment relationships regardless of what is established by specific contracts. Beyond mandatory payments, collective agreements may specify larger severance payments for firm-initiated separations. EPL also requires that certain administrative procedures are followed prior to a layoff. In most countries the employer is required to discuss layoff decisions with workers' representatives. EPL clauses typically apply only to economic dismissals. Disciplinary dismissals i.e. worker's fault dismissals induced by serious, culpable breaches of

the employment contract on the worker's part, typically do not involve monetary transfers (ibid).

4.1 EPL Theory

We assume an environment in which wages are rigid. An introduction of EPL will therefore cause no readjustment of wages. Because the introduction of the severance payment cannot be accompanied by a wage reduction, labor supply remains unaffected.

In this environment two states of the world are possible: a good state and a bad state, denoted by superscripts *h* and *l*, respectively. These two states affect the marginal product of the firm. First we imagine an environment in which wages are flexible. The firm's profits are described by:

$$\pi^{\mathrm{F}} = A^{\mathrm{i}} \, log \, L - wL, \tag{4.1}$$

where L denotes labor and A^i is the price of output, which varies depending of the state of the world. If the world is in a good state, A^i assumes the value A^h, and if the world is in a bad state, then A^i takes on the value A^l. We have that $A^h > A^l$. In every period there is a probability p that the world is in a good state and a probability $(1-p)$ that it is in a bad state. The wage is fixed at w regardless of the state of the world.

The firm has to determine the optimal level of employment. With no EPL adjustments can take place at no cost, and the firm can freely choose the profit-maximizing employment level, where the marginal product of labor equals the wage rate in any state of the world. With EPL in place the firm is forced to keep the same employment level regardless of the state of the world. We assume that EPL is unboundedly expensive, and layoffs do not occur.

Without EPL, the firm chooses employment after having observed the productivity level. The first order condition for this problem is:

$$\frac{\partial \pi^F}{\partial L} = \frac{A^i}{L} - w = 0$$

(4.2)

Solving for employment we get:

$$L^F = \frac{A^L}{w} \text{ if } A^i = A^L$$

(4.3)

$$L^F = \frac{A^h}{w} \text{ if } A^i = A^L$$

(4.4)

The firm thus adjusts its stock by $\Delta L^F = \frac{A^h - A^L}{w}$ when the economy moves from one state to another. Since the economy on average experiences a fraction p of booms and a fraction $(1 - p)$ of recessions, average employment in the long run will be

$$\overline{L}^F = \frac{(1-p)A^l + pA^h}{w}$$

(4.5)

Now we turn to an environment in which EPL is in place, i.e. a rigid regime. Because layoffs are prohibitively expensive, the firm's best strategy is to choose an employment level that maximizes the expected value of the profits. This employment level is to be kept constant over time independent of cyclical conditions. The firm is faced with the following expected profit-maximization problem:

$$\pi^R = max^l\{[(1-p)A^l + pA^h]log\ L - wL\}$$

(4.6)

The first order condition of this problem gives in the rigid regime:

$$L^R = \frac{(1-p)\,A^L + pA^h}{w} \tag{4.7}$$

This optimal employment level in the rigid regime L^R is a weighted average of the levels of employment that would prevail in expansions and recessions in an environment without EPL. L^R coincides with the long-run level of employment in a flexible environment. In other words, the long-run level of employment is the same in the two regimes. During the cycle, however, the employment level will be lower during upturns and higher during downturns. Only when the economy is permanently in one of the two states of the world will L^R equal L^F, i.e. p=0 or p=1. We also have that $\pi^R < \pi^F$ even in the long run, since the firm is employing suboptimal levels in booms and recessions alike, and thus realizes lower profits.

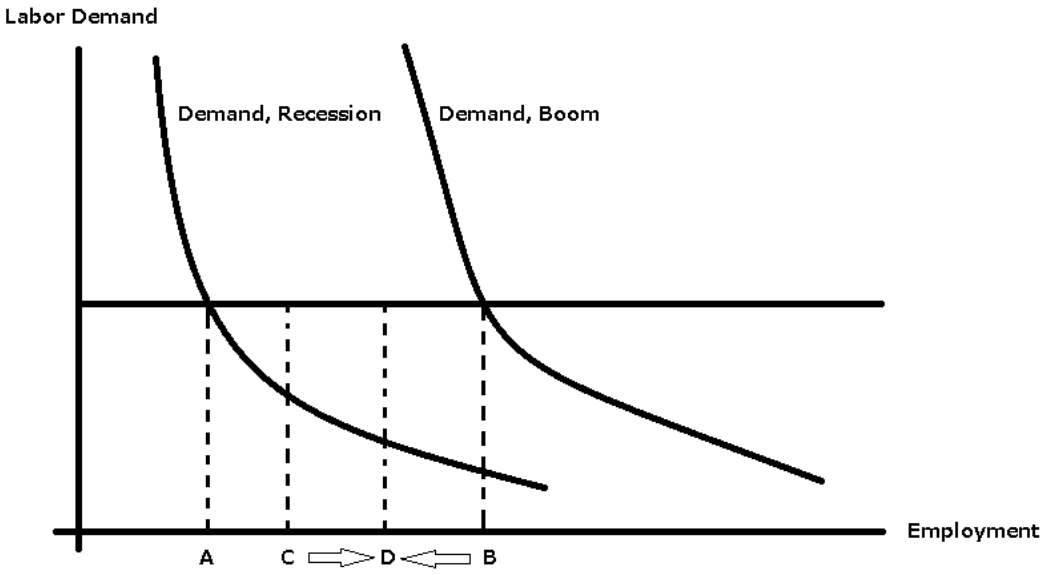
The conclusions to be drawn from the model above are the following:

1) EPL with fixed wages has no effects on average employment, but
2) it does lower the employment fluctuations over the business cycle, and
3) profits are reduced when EPL is in place (Boeri & van Ours, 2008).

For the purpose of the ensuing discussion, result 2) carries particular relevance. This result will be considered together with the effect of temporary contracts.

4.2 The Opposing Effects of EPL and Temporary Employment

Figure 6: Labor Demand, Employment, and the Effects of EPL and Temporary Employment

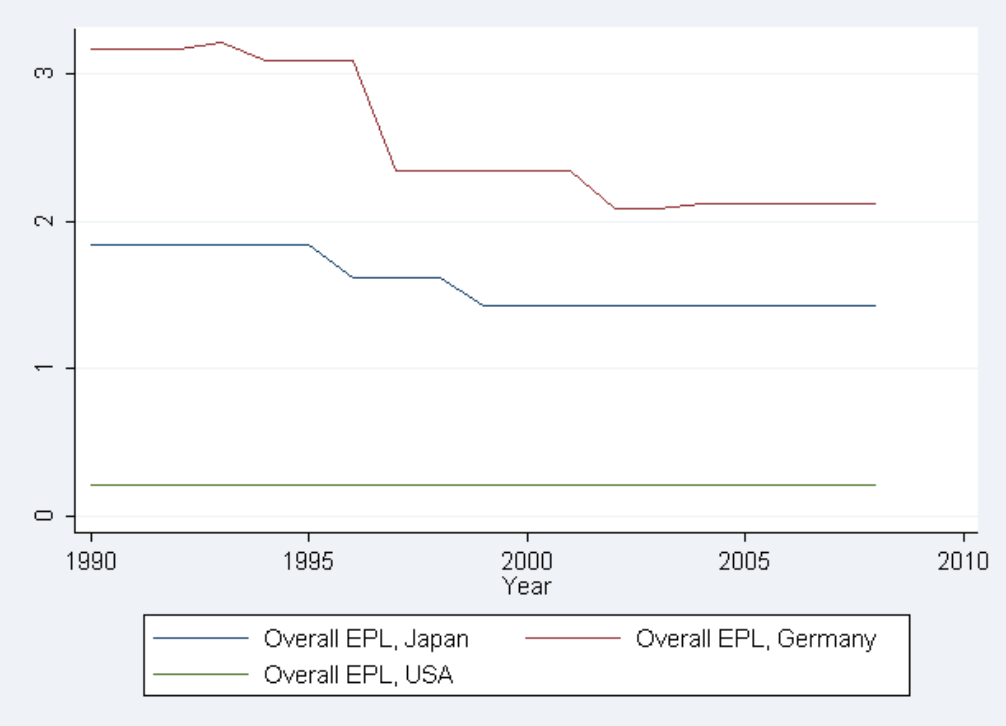


Source: Boeri & Garibaldi (2007) in IMF (2010)

In an economy where EPL is absent, the firm optimally hires at A when times are bad and at B when they are good. On the other hand, when EPL is strict (implying that hiring and firing are prohibitively expensive) the firm chooses to set average employment at C. The reason is increased dismissal costs borne by the employer when EPL becomes stricter. Next we introduce temporary employment to the environment. When temporary contracts are introduced, the firms can build up a stock of temporary workers when times are good. When times are bad, however, adjustment flexibility is not available to the employer because only temporary workers can be shed. Thus, during the cycle employment will adjust between B and C, leaving average employment at D. Hence, in countries with strict EPL firms will over the course of the business cycle adjust employment only to the extent that is allowed by natural reorganization. During an upswing, workers who willingly leave will be replaced. If times are bad those vacancies will remain unfilled. Employment falls by attrition. So,

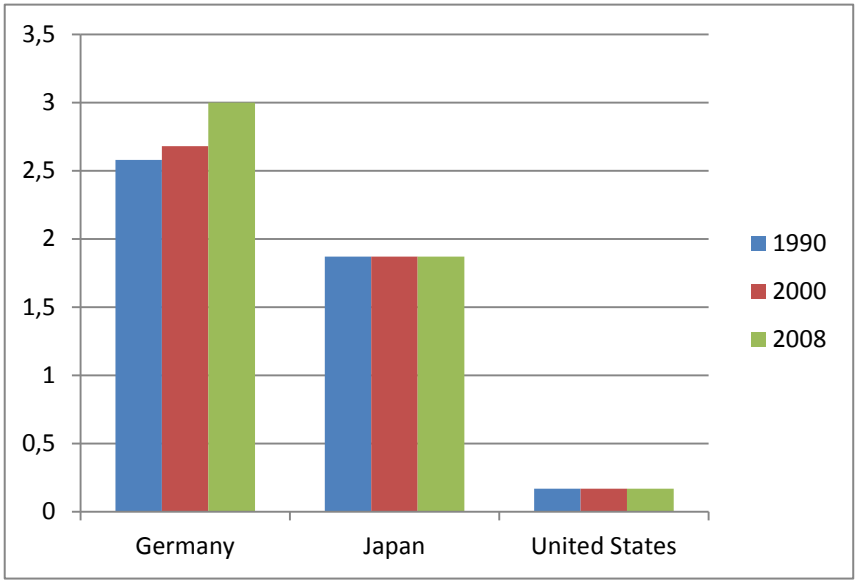
although the introduction of temporary contracts will increase responsiveness of employment, the temporality of these contracts will create a honeymoon effect. Labor is very welcome during an upswing, however, employer and employee will separate when demand falls. What we have are two opposing effects at work. While stricter EPL lowers the employment fluctuations over the business cycle, higher shares of temporary workers increase employment fluctuations (International Monetary Fund, 2010).The Organization for Economic Cooperation and Development (OECD) has developed a widely used index to measure EPL strictness based on an evaluation of national regulations. Over the past 20 years the majority of OECD countries have adjusted EPL toward reducing dismissal costs, above all in the countries that already had the strictest standards. These reforms have altered the procedures primarily for dismissing and temporary workers. The adjustments have changed the rules for new hires through the introduction of a wide range of flexible, fixed-term contracts. The scope for existing temporary contracts has also been expanded. On the other hand, open-ended contracts have barely been touched. In the rare cases in which changes have been made, rules have in fact been tightened (Boeri & van Ours, 2008). The standards across countries are shown in figures 7, 8, and 9. The incidence of part-time employment and the unemployment rate are shown in figures 10 and 11.

Figure 7: Overall EPL



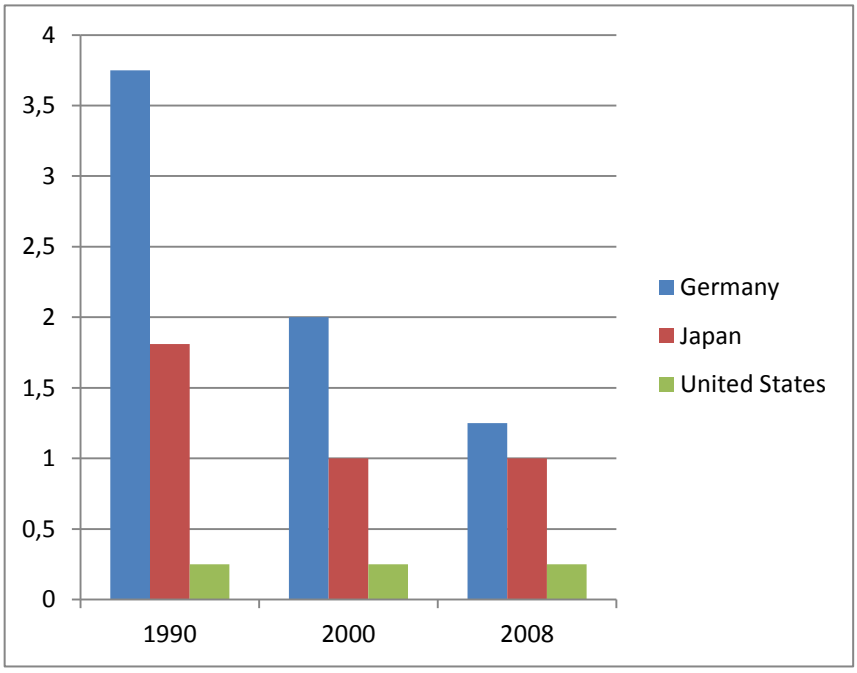
Source: OECD

Figure 8: Strictness of Regular Employment



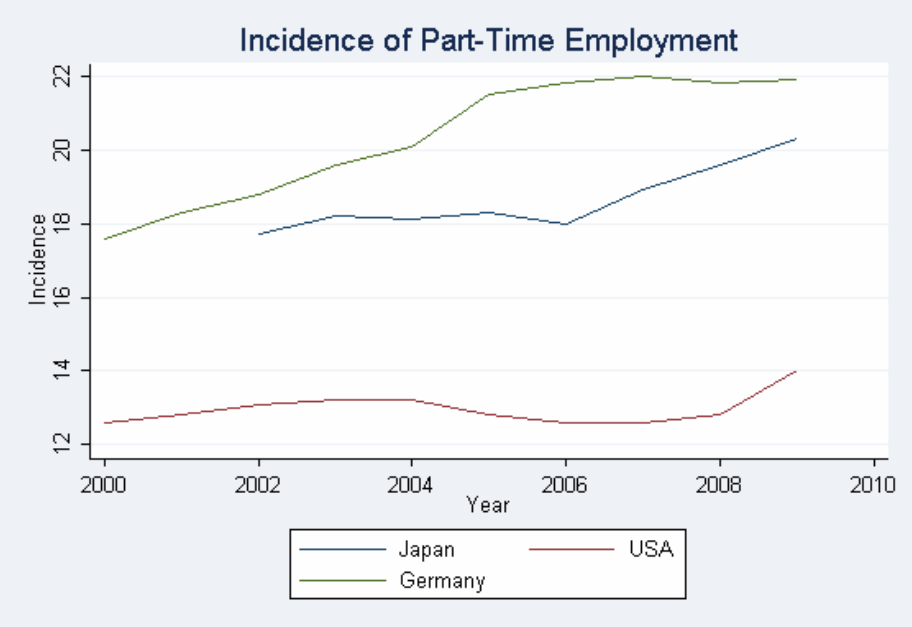
Source: OECD

Figure 9: Strictness of Temporary Employment



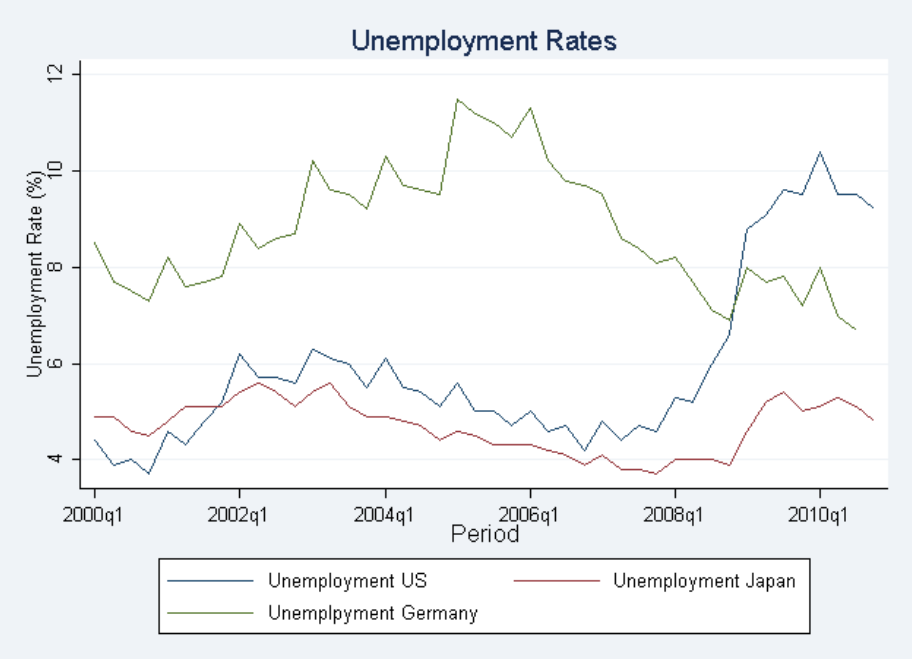
Source: OECD

Figure 10: Incidence of Part-Time Employment



Source: OECD

Figure 11: The Evolution of Unemployment



Source: OECD

4.2.1 EPL and Temporary Employment in the Respective Countries

4.2.2 Japan

Of the three countries, Japan is the country with the lowest unemployment for most of the 2000s, never exceeding 6 percent. During the crisis unemployment remained far below the levels in Germany and the US, rising only about 1 percent. Employment protection regulations have fallen for temporary labor since 1990, inducing an increase in temporary employment. Strictness standards for permanent employment, however, have remained the same. The previous theory section proposes that increased costs of firing and rehiring will reduce employment fluctuations, while a greater share of temporary employment will have the opposite effect. Unemployment seems to have remained relatively stable through most of 2008 before it hiked. Since the cost of firing workers on permanent contracts has stayed high for the past 20 years, it would be reasonable to assume that the increase to a great extent was caused by the dismissal of temporary workers.

4.2.3 Germany

Germany had up until the onset of the crisis experienced much higher unemployment levels than Japan and the United States, but when crisis hit unemployment surprisingly fluctuated in a relatively stable fashion around 7 percent. For both permanent and temporary employment Germany has offered the highest degree of protection for the past 20 years relative to the other two. Strictness for regular contracts has in fact increased since 1990. Restrictions on dismissals of temporary workers have, on the other hand, been relaxed. When we look at the incidence of temporary contracts, the largest share is found in Germany for the past ten years. Such a high share would suggest that German employers would have the option of adjustment flexibility, which in turn would imply greater unemployment fluctuations. However, strict regulations on permanent contracts would work in the opposite direction and mitigate those fluctuations. Standards on temporary contracts have come down, but compared to those in Japan and the United States they are still high. Figure 11 suggests that until the onset of the crisis unemployment fluctuations were greater in Germany than in the other two countries, but that fluctuations were much lower during the crisis. It seems as though the EPL effect did little to stagger unemployment fluctuations until the beginning of the crisis, or alternatively that the share-of-temporary-workers effect was stronger than the EPL effect on

unemployment. The relatively stable unemployment rate *during* the crisis, however, stands at odds with this proposition. One would think that German employers would exploit the flexibility of the large share of temporary contracts to cut losses in times of crisis. If that were the case one would expect to observe a hike or somewhat greater fluctuations in unemployment. My proposition is that the share-of temporary workers-effect in fact remains strong, but that the government-induced work-share program helped mitigate unemployment fluctuations. I suggest that without this government effort, one would have observed a greater response in unemployment. This will be further investigated in the next chapter.

4.2.4 The United States

The sudden unemployment hike can be explained by the generally low levels of employment protection. The costs of dismissing are low for both temporary and permanent contracts. Since the share of temporary workers in the economy was low to begin with, it is reasonable to assume that once this limited flexibility was exhausted, workers with permanent contracts were also sacrificed. The decreasing levels of unemployment and its low volatility for much of the 2000s can be attributed to the favorable economic conditions of that period.

4.3 Concluding Remarks on the Chapter

The laws that govern hiring and firing exert influence on the firms' employment decisions. Strict regulations make employment adjustments costly, and induce the firm to hoard rather than to hire and fire. This will reduce employment fluctuations. The share of temporary workers in the economy will increase the volatility of employment. Developments in Japan and the United States are largely consistent with theory. The large share of temporary employment in the German economy can help explain the volatility in unemployment in the period leading up to the crisis, despite the strict protection regulations. But in explaining the relatively low level of unemployment during the crisis, the theory comes up short. My proposition is that the contribution of government-induced work-share programs to maintaining German employment was not insignificant.

5.0 Work-Sharing

During the Great Recession Japan, Germany and the United States increased their short-time work programs as a tool to stabilize employment as a response to the large output declines. The following explains more precisely what these programs entail.

When demand for output falls, the firm's need for labor falls along with it. There are two ways in which a firm can reduce labor input. The firm can choose between dismissing some of the workers, and placing all workers on a shorter work week. Both strategies will reduce the total sum of hours worked by the same amount. Work-sharing short-time programs involve the latter program.

5.0.1 Costs and Benefits of Work-Sharing

Work-sharing can potentially save jobs and prevent unemployment from soaring. Under this program the financial burden of a downturn is spread across employers, workers, and taxpayers (Vroman et. al. 2009). More concretely, theoretical benefits that can be derived from this type of program are:

- The most vulnerable in the labor market - typically young, female, and minority workers – will be spared from the disproportionately adverse effects of a layoff. A modest reduction in earnings spread across a large pool of workers will mitigate the hardships that laid-off workers will experience.
- Employers are enabled to keep the work force intact. If skilled workers are allowed to stay even if the market is weak, the firm's recruitment and training costs when the economy recovers are reduced.
- The government benefits from keeping more people employed, motivated and productive.
- Deflationary wage pressures will be mitigated. Stabilizing employment and smoothing income during a downturn will help mitigate large shifts in domestic demand.

(International Monetary Fund, 2010), (Ridley, 2009), (Vroman & Brusentsev, 2009).

There are also costs associated with short-time work:

- Job lock could increase during a recession, as program participation requires the worker to maintain ties with his employer. This could result in workers staying with firms that are in fact not viable. This means that the program might be (ab)used to address structural layoffs rather than demand-related ones. This could prevent workers from acquiring skills that are required in growing sectors. When the economy picks up again unemployment might remain persistently high if workers with obsolete skills struggle to find new a job (International Monetary Fund 2010).

5.0.2 A Simple Theoretical Approach to Work-Sharing

We consider an exogenous transitory shock to the economy. This shock reduces demand. Consequently, the marginal productivity (MPL) of labor falls below the wage rate w. The firm will then demand less labor L. In the short run capital and labor are not substitutes, and as a consequence the only way for the firm to adjust to the demand fall is to lay off workers, i.e. reducing L.

Now the question the firm is faced with is which employees to fire. Human capital theory states that the worker in whom the firm has invested human capital is likelier to be kept than the worker with no such human capital. Here we distinguish between two types:

- Type-A workers with general, unspecified skills who earn w_A according to their marginal productivity.
- Type-B workers possess establishment-related human capital. These workers are paid a wage rate $w_B < MPL_B$.

The exogenous shock has caused a decline in MPL. If we assume that wages are fixed in the short run, the rational choice for the firm would be to lay off type-A workers and to keep type-B workers in the short run. This result comes from the assumptions $w_A > MPL_A$ and $w_B < MPL_B$.

In the medium run the firm would keep B even if $w_B > MPL_B$. This is because recruiting and training costs are still higher than costs of firing if the company returns to the previous production level after the downturn.

In the long run all employees characterized by $w > MPL$ will be laid off. Thus, work sharing does not apply equally for all employees within the firm. Naturally, a firm operating at $w > MPL$ in the long run is not a viable one.

So what should the employer do? He could try to maintain regular employment, which is not viable in the long run if the recession is long-lasting. Another option is labor hoarding. In this case the employer needs to contribute to the short-time work compensation. Additionally, there are potential costs of maintaining unused machinery. However, labor hoarding is still preferable to layoffs if the expected costs associated with a short-time work program are lower than the expected costs of firing and rehiring. Work sharing reduces the costs of labor for the firm, since it only has to pay for work actually performed. Furthermore, the firm avoids losing firm-specific human capital to other firms. Finally, internal turbulence may also be avoided.

What should the employee do? For the worker work sharing prevents or delays unemployment. The job is at risk, but the existence of work sharing indicates that the firm prefers keeping him to firing him. The price the employee has to pay for this arrangement is partial income loss. Thus, he is left with two options: To stay and participate in the work sharing program is one. The other is to leave the job. A rational individual will prefer work sharing to changing jobs if the costs of the former are lower than those of the latter. In leaving the firm for a new job the worker exposes himself to unemployment, uncertainty about future income, loss of social status and social network, and also psychological stress.

What is the government's approach to work sharing? The options it can choose between are 1) compensating the loss of work in order to stabilize employment, and 2) compensating for unemployment. Work sharing is only preferable if job losses are temporary and not due to structural deficits. If work sharing is ruled out, then unemployment insurance would have to grant benefits and labor market services. On the one hand work, sharing helps avoid deskilling and loss of human capital since it keeps workers employed. On the other hand, work sharing weakens the incentive to reallocate workers between firms. However, reallocation carries the risk of periods of unemployment, which may lead to deterioration of skills (Crimman et al., 2010).

5.1 Differences between Respective Work-Sharing Schemes

In the following we take a closer look at the extent to which the respective countries utilized work-sharing programs. The main findings suggest that the US to a lesser extent put to use such a program. In order to be able to give the reason why, we must examine the respective programs. It turns out that there are considerable differences in design, coverage, participation, and coverage.

5.1.1 Japan

The Japanese and German short-time program responses are similar in many respects, but some notable differences must be stressed.

Over the course of the recent crisis Japan experienced a dramatic fall in demand, and had to resort to work-sharing. On 23 March 2009 a tripartite agreement to attain employment security and creation was concluded between the Prime Minister, the Japan Business Federation, the Japan Chamber of Commerce and Industry, the National Federation of Small Business Associations, and the Japanese Trade Union Confederation. The declared goals of this agreement were the following: To promote employment maintenance, to consolidate employment safety nets through vocational training and job placement services, to secure the stability of livelihood for those struggling to find employment, and finally, to simply to create more jobs. The "Japanese-style work sharing program", tailored for the Japanese labor market, falls under the first of the goals in the agreement. With the tradition of lifetime employment serving as a cornerstone of the corporate culture, layoffs are considered a last resort remedy. A wide range of other measures will be tried before resorting to layoffs. This includes "reduction of overtime work, suspension of operations, education and training, and temporary transfer". The workers are urged to accept the necessity of transfers, often to other places (Japanese Trade Union Confederation (RENGO), 2009).

5.1.2 Germany

In Germany, much like in Japan, there is a long tradition of trustful and thoughtful cooperation between employers and workers. German work-sharing, called *Kurzarbeit*, can be divided into three groups:

- "Transfer-Kurzarbeit". This program is developed for permanent loss of employment caused by restructuring measures on the establishment level. This was a useful measure against mass lay-offs when a large share of the East-German industry collapsed in the aftermath of the German reunification.
- A seasonal short-time work program exists for the construction sector and other outdoor professions in order to compensate for low demand and weather conditions. Without this program seasonal workers would lose employment in the winter.
- The program most extensively used compensates for "temporary, unavoidable loss of employment due to economic factors or to an unavoidable event". This alleviates the burden of an economic crisis, so that firms can maintain employment.
- Work-sharing differs from unemployment benefits in the sense that compensation is granted to the employer and not to the individual (Crimman et. al. 2010)

5.1.3 The United States

In the US, short-time Compensation (STC) is administered by state unemployment agencies. A temporary national program was enacted in 1982, and permanent changes to federal laws allowing states to adopt STC programs were made in 1992. STC in the US works according to the following: Application procedures are developed by the state unemployment insurance (hereafter UI) agency for employers who anticipate the need to reduce work hours, but who at the same time wish to maintain employment. There is usually a minimum reduction in labor input, which can be specified in terms of the number of workers affected or a percentage reduction in work hours. There is also a maximum allowable reduction, typically 40 or 50 percent. If workers are covered by a collective bargaining agreement, then approval must be secured by the union.

The STC plan specifies the reduction in work hours, which unit of the plant will be affected and the duration of the program. For instance, if work hours need to be reduced by 20 percent, workers are placed on a four-day week. The workers can then apply for unemployment insurance benefits for the fifth day. If eligible, they receive one fifth of their weekly UI benefits for that day. Affected workers can, of course, receive benefits only for a limited span, for example 26 or 52 weeks within a 52-week benefit year. Benefit payments are deducted from total entitlement for that benefit year (Vroman & Brusentsev, 2009).

5.1.5 A Comparison of the Programs

Utilization of STC's in the US is low compared to that of Germany and Japan. At the beginning of 2009, only 19 out of the 50 states actually had STC programs, and these programs have been "consistently small" in all 19 states and in some practically in a state of inactivity. The reasons why STC is used on such a small scale are simply that many companies do not know about it, and that few states advertise it. Also, the tendency of employers to rely heavily on layoffs even STC programs are active is a feature in the US.

Furthermore, since in the United States STC payments are deducted from total entitlement for that benefit year, eligible workers may be reluctant to make use of the program if they think they are going to be laid off anyhow later on. For every STC dollar received a dollar is deducted from the unemployment benefit entitlement. This feature is not present in Germany or Japan. In these two countries one distinguishes between partial employment with benefits and complete unemployment. The unemployed has full entitlement to unemployment benefits regardless of previous utilization of STC. In other words, the worker's eligibility for regular unemployment insurance benefits is not affected if he participates in a short-time program for a while, but later loses his job entirely.

Additionally, US employers are subject to experience rating. This practice uses an employer's past claims to calculate future contribution rates. The more claims a firms makes, the higher are its contribution rates. This feature is also absent in the German and Japanese short-time work programs. The absence of such requirements increases the incentive to use the programs to smooth fluctuations in labor demand (Vroman & Brusentsev, 2009).

There are also differences in how the programs are financed. In Germany, both employers and employees help finance *Kurzarbeit* through payroll taxes. In Japan the Employment Adjustment Subsidy (EAS) is funded by employer contributions to a reserve, which is part of the Employment Insurance System.

Finally, due to the severity of the recession Germany and Japan decided to expand their short-time programs. In the US, on the other hand, no such expansion occurred. In the former two, expansion took place in two respects. Firstly, eligibility was extended in duration and came to include also non-regular workers. *Kurzarbeit,* which initially had a maximum duration of 12 months, was extended to 18 months, and then later on again to 24 months. Secondly, funding was increased. The Japanese *Employment Adjustment Subsidy* allowed for increases in the

subsidy component. Large corporations were allowed an increase from 67 percent to 75 percent, while small and medium-size firms were allowed an increase from 80 percent to 90 percent. Hijzen and Venn (2011) estimate that the programs saved 235 000 and 415 000 jobs in Germany and Japan, respectively.

Fact box on Short-Time Work Programs[15] (September 2008-September 2009)

	Peak usage, percent of labor force	Peak Usage	Change in Unemployment Rate	Eligibility	Duration	Experience Rating	Funding
Germany	3.5	April 2009	0.5	Yes	Yes	No	Payroll
Japan	3.8	July 2009	1.42	Yes	Yes	No	General fiscal
USA	0.5	May 2009	3.506	No	No	Yes	State, Payroll

5.1.4 Concluding Remarks on the Chapter

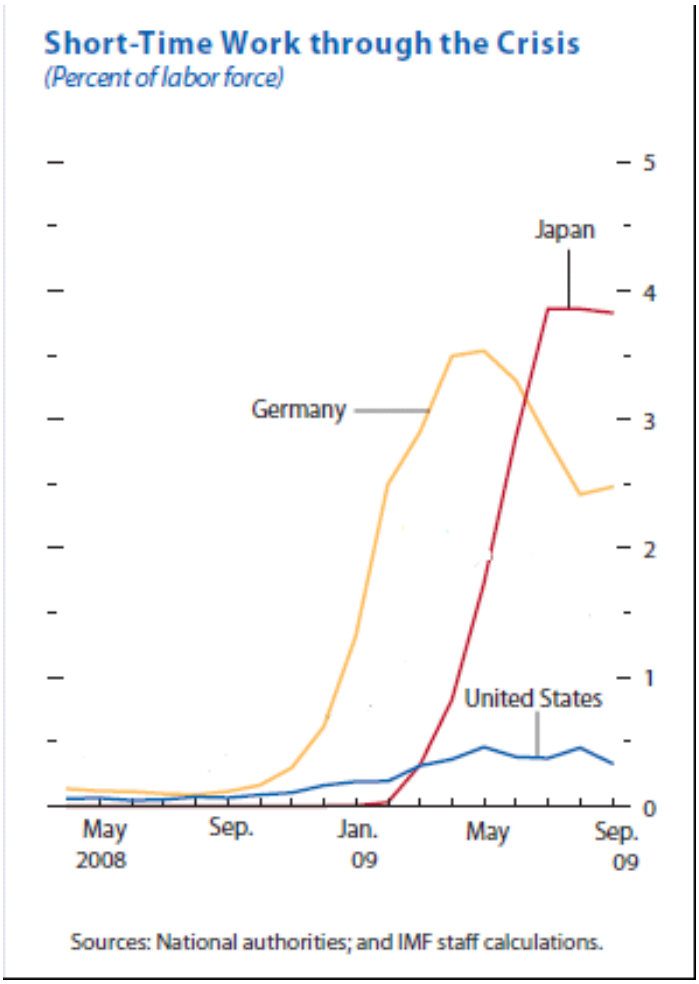
Figure 12[16] illustrates the differences in usage of short-time work programs between the three countries. One can see from the graph that the utilization of these programs was markedly greater in Germany and Japan than in the US. Following the low utilization throughout the summer of 2008, a sudden rise took place after global demand fell. Germany was the first country to experience a sharp increase, in which more than one and a half million workers joined the program at the peak. This increase was the largest since reunification. The Japanese reaction occurred a little later; however more than half a million enrollees joined the EAS program. Short-time work subsidies in May 2009 alone exceeded the annual subsidy in any year in the span 2003-2007. As can be seen, utilization was much smaller in the US, and this type of program was a much smaller component of firms' responses. However, participation within the US was much greater compared to previous downturns.

The discussion suggests that short-time work programs were much more successful in Japan and Germany than in the Unites States. The fact that not all states were covered resulted in limited availability for affected workers. Further, deduction from total entitlement and experience rating made both workers and employers reluctant to engage in the program. Funding through taxes or reserves made it easier to make use of such programs in Japan and Germany. This can be seen from the fact box above, where peak usage reached much higher percentages in Japan and Germany than in the United States. The efficacy of the work

[15] Presented as reported in International Monetary Fund (2010).
[16] The graph was collected from IMF International Monetary Fund (IMF), 2010, "Recovery, Risk, and Rebalancing" IMF Economic Outlook April 2010. The original graph as presented in the report includes Japan, Germany, the United States and Italy.

programs still seems difficult to measure, but the International Monetary Fund (2010) finds that "[] it is still likely that the sheer scale of short-time work programs in the current recession contributed to the smaller changes in unemployment rates relative to other countries." As for reasons why work-share programs were more extensively used, I propose that the cooperative nature of the Japanese and German labor institutions in the form of more on-the-job investment and mutual involvement made such programs more attractive to the authorities. This will be discussed in the next chapter.

Figure 12: Short-Time Work throughout the Crisis



Source: International Monetary Fund (2010)

6.0 The Institutional Characteristics and Their Cultural and Tradition-Related Roots

The above sections on employment protection, work-sharing schemes, unions, and wage flexibility have hopefully helped to understand the configurations of the respective labor markets. These characteristics in turn explain why labor markets responded to the Great Depression the way they did. In other words, sections 3 and 4 are primarily descriptive in nature. What these sections do not is give the underlying reasons why the labor markets are configured the way they are. The aim of this section is to fill this void. In order to gain an understanding of labor market differences across countries, one must look to the laws and regulations of the labor markets and the institutions of industrial relations. But laws and institutions are themselves endogenous, shaped by exogenous factors such as culture and tradition. Some problems arise in this connection. Culture and tradition are rather intangible factors and not easily quantified or easily included in formal models. Their contribution to economic analysis is in my view nevertheless important. This section shows that employment relations in Japan and Germany to a great degree are characterized by cooperation and mutual understanding. In these two countries this relationship is marked by the will to pull in the same direction while the employer-employee relationship in the United States is more adversarial. Labor and management in the former two play the roles of one another's watchdog, while at the same time working like a cooperative, while in the latter the parties seem only to be playing the roles of watchdogs, always trying to make sure the opposing parties do not move beyond the proper limits. A higher degree of cooperation leads to lower levels of tension and conflict, which in turn is suggestive of more flexible labor. To the extent that labor is flexible in terms of wages, hours, and job-rotation, firms may in the event of falling demand adjustments in pay, hours, and work organization before cutting employment.

6.1 Japan

6.1.1 Labor-Management Relations

The role of the union differs significantly between Japan and Germany on the one hand, and the United States on the other. While the United States was founded on the principle of capitalism and individualism, the Japanese and German societies to a greater extent place their beliefs in collectivism. The Japanese style of unionism in one in which employer and employees invest in information reliability. Through the enterprise union (the organization of a single trade union within one plant or multiplant enterprise rather than within a craft or industry) workers' shirking is controlled, and so are any harmful actions on the part of the employer. In order to promote mutual well-being, major decisions are made after close consultations between management and union. In many firms management and labor consult with each other throughout the year through a joint consultation system. Meetings take place on a regular basis. This type of system exists even in non-unionized sectors. Joint consultation advances the harmonization of individual and organizational goals (Hashimoto, 1990).

Disagreements do occur between labor and management, but in a comparison with the United States, these seem to be less frequent. Precisely because unions and management work closely together, legal disputes are settled through negotiation and mutual understanding. Further, grievances with no legal basis are settled by superiors in an informal manner. The number of labor cases reaching the public office for dispute settlement is considerably smaller in Japan than elsewhere. And if a case does go to dispute settlement, there is still heavy reliance on compromise and conciliation rather than on formal decisions. The number of labor-management disputes reaching public settlement is smaller in Japan than in the US (ibid).

6.1.2 Tenure and Earnings Profiles

A prominent feature of the Japanese labor market is so-called lifetime employment, a practice that became prevalent during the years of high economic growth, starting sometime in the first half of the 20th century. The introduction of assembly line production called for narrow-skilled workers who could work on particular machines rather than workers with a broad set of skills (Gordon, 1982). In order to have their training investment pay off firms moved to lifetime employment. Worker loyalty was attained through seniority-based wages. Previously mobile and independent Japanese workers thus became tied to their employer long-term. This

practice, although not guaranteed by statute or collective bargaining agreement, is long-established and works in the following way: The worker enters a firm after graduation and starts building his career at the bottom of the hierarchy of that company. The employer, if possible, does not lay off the worker even in bad times. In exchange, the employee sticks with his employer until retirement age. The worker derives the benefits of job security and good prospects for promotions and pay increases through a seniority wage system. The company, in turn, benefits from the reduced possibility of outflow of workers with firm-specific human capital. Workers with long tenure accumulate knowledge and technique acquired through training and experience (Hashimoto, 1990).

Long-term employment relations between firm and worker as such are not exclusive to Japan, and neither do Japanese long-term relations involve all types of workers. Lifetime employment is mainly concentrated in large firms and ends when the workers reach 55 years of age. Furthermore, it does not apply to women or employees sent from subcontractors. In the US as well does a large fraction of workers hold what are essentially lifetime jobs (Hall, 1980 in Gordon, 1982). It is the role of seniority rather than duration that distinguishes the Japanese system. In the Japanese system the seniority system is an important ingredient in conflict minimization. Gordon (1982) depicts the Japanese firm as a very harmonious place for both employers and employees alike. All employees are, whatever their talent, believed to be doing their best to serve the company, and therefore no one should be discriminated against. People who interact everyday and know they will be continuing to do so for the rest of their lives will develop a unique relationship (Ouchi, 1981 in Gordon, 1982). At the core of conflict minimization lies the high degree of egalitarianism. The social life at firm level is characterized by a egalitarian structure, in which no distinction is made between blue and white-collar workers, speech is informal and familiar as compared to more formal address with outsiders, no distinction is made between annual salaries and hourly pay, one-class company cafeteria, and communality of access to sick pay, sports clubs, and vacation resorts (Glazer, 1976 in Gordon 1982).

The tendency of Japanese long-term employment is not only a result of the way wage payments are made, but also of the type of work organization. A notable feature in Japanese firms is the job-rotation system by which workers are rotated among different tasks so that they can acquire a wide range of skills. Japanese workers are trained not only in technical skills, but also in skills that make them effective team players. The Japanese training practices

make workers flexible not only within their organization, but also in subsidiary organizations. With skills that are useful in many divisions within the company, a demand decline in one division does not necessarily lead to layoffs of affected workers. Thus, the investments that Japanese firms make in human capital lead to a decrease in job turnover of skilled workers (Hashimoto, 1990). In the United States, on the other hand, firms have since the post-war years tended to emphasize specialized skills and job demarcation (whereby job descriptions are formulated in detail). This environment has made it difficult to foster multifunctional workers. Japanese firms encourage the sharing of knowledge and tasks across workers, thereby enabling them to deal with new circumstances and new requirements. When a worker is trained in a wider array of tasks, the likelihood that he will oppose the introduction of labor-saving technology falls, since he can easily be transferred to perform another type of task. Then, since workers can easily be reassigned, the sensitivity of labor inputs to changes in demand should be less responsive. Since flexibility is to be found in worker multifunctionality, wages, work hours and inventory, firms can avoid making employment adjustments. Hashimoto (1990) finds that Japanese manufacturing firms to a greater extent rely on adjustments in hours and inventories relative to adjustments in employment. Common measures are cutting overtime, dismissing temporary workers, stopping new recruitment and not filling vacancies, and transferring workers to other plants or related companies or subidiaries (Koshiro, 1984). In ways similar to the Japanese system, German firms can also enjoy the flexibility of adjustments in hours. When faced with a demand shock, firms can exercise overtime reduction and working time accounts[17] (Crimman et. al. 2010). American employers rely to a greater extent on employment adjustments to deal with demand changes. The relative inflexibility of American workers is not the only reason why tenure is shorter. In both Japan and Germany, returns to additional peak later than in the US. This weakens the incentives for the American worker to stay attached to the same employer (Couch, 2003). Cullen (1985) points out that American firms also resort to retraining, work-sharing (in this context not government-sponsored), and interplant transfers, but this strategy seems to be used more narrowly.

[17] Working time accounts allow companies to deviate temporarily from the agreed weekly working time by compensating the worker with free time within a specified span.

6.1.3 Wage-Bargaining and Contract Settlement

In Japan bargaining takes place management and the enterprise union at each firm. Nevertheless, simultaneous negotiations during the so-called "spring offensive" have contributed to a standardization of wage increases across firms. The simultaneous and *annual* wage adjustments have been viewed as responsible for the prevalent wage flexibility in Japan. Furthermore, another manifestation of flexibility is the short, abstract, and often obscure nature of the collective agreements. The brevity emphasizes the flexibility: there exists a mutual understanding among the involved parties that contract terms may have to change in response to new circumstances, thereby making detailed stipulations unnecessary (Hashimoto, 1990). In the West it is considered important to formulate contracts in as precise and detailed a manner as possible. The greater degree of heterogeneity in the American labor market caused by massive immigration during the main industrialization period partially explains why everything is put into written contracts and why consequently a massive legal profession is established to interpret the nuances of such contracts (Gordon, 1982). Conflict avoidance is key in this context. The Japanese can allow for annual negotiations because costs are low. Gray (1978) argues that contract length is an increasing function of contracting costs. Along this line of argumentation, the shorter contract length in the Japanese labor market can be attributed to less costly negotiations. This helps explain why the Japanese have one-year wage contracts and why three-year contracts are prevalent in the US.

The existence of bonus payments is another indicator of flexibility. Bonus payments can be interpreted as a form of profit sharing, which in itself can be seen as conflict dampener (Hashimoto, 1979 in Gordon, 1982). When times are good the workers get to take part in the success, and when times are bad all share the burden of the downturn. This greater reliance on bonus payments can be seen as a result of the greater importance of firm-specific human capital. The average Japanese worker relies heavily on bonus payments as a dependable income source, and these bonuses make up a sizable share of the annual earnings of Japanese workers. Bonus payments for American production workers, on the other hand, are rare. Hashimoto (1990) reports that bonuses in the U.S. amounted to less than 1 percent of total compensation in the period between 1965 and 1981, whereas in Japan this share amounted to 21 percent. The presence of bonus payments plus the fact that wages are renegotiated every spring contribute to flexible wages. This feature of the Japanese earnings profile conforms to the findings in chapter 3.

6.2 Germany

6.2.1 Labor-Management Relations

Much like in Japan, the German ideal of cooperation and collectivism indeed harmonizes with the existence of unions. German employers willingly recognize unions, not because they are obligated by law, but simply because "this is how business is run" (Waldman, 2003). German labor-management relations seem by American standards *"[like] a worker's paradise. It even stands out in labor-friendly Western Europe, with its unions still retaining significant power and its workers enjoying more time off than those in most other countries*" (Landler, 2005). German work councils bring stability to the workplace and represent workers as one collective voice. American stewards do not bring these benefits to the same extent. German employers favor this system because works councils are entirely made up of workplace employees. Works council members are seen as "insiders" with loyalties in alignment with the goals of the firm, whereas unions, the "outsiders", are not involved in management decisions. While works councils work to protect the workers' interest, they also go against the union if they believe a decision is to the benefit of the firm. By making members of the works council share responsibility in decisions with management, employers can make sure the decisions made are optimal. At the same time, workers are assured that their best interests were considered. German workers' and management's interests are more closely aligned with each other. The result of this type of mutual understanding between employee and management is that German employees stay at the same firm much longer than in the United States. In the United States management is distrustful of unions because unions must negotiate over a broader range of qualitative issues. Employers view the unions as advancing beyond the proper limits into the management's decision-making power. On the shop floor level, American employers complain about the lack of commitment on the employees' part. However, many American workers are hired on an at-will basis. Employment-at-will is a common law doctrine and implies that employees can be fired for "good reason, bad reason, or no reason at all" (Waldman, 2003).

German employers have established their own associations in order to deal with the massive unions. Employer associations are responsible for negotiating wages and hours with the responsible union in the same industry. This way uniform wages and hours are more easily attained throughout an entire industry. U.S. employers, on the other hand, are generally not

willing to organize and bargain with unions collectively. This results in competition among union and non-union workers, and it also adds to the employer's hostility towards unions. Unions can typically negotiate higher wages for its members. Higher wages lead to increasing labor costs for the employer. Hostility prevails not only between unions and employers, but also between different unions. As a result workers are left with less collective power to negotiate with employers because limited resources are used to fight each other instead of for the benefit of the union members as a whole (ibid).

While German employers willingly accept agreements negotiated with industry-wide unions and even extend collective bargaining agreements to non-union members, in the Unites States the benefits of centralized bargaining are absent since industry-wide bargaining is not practiced to the same extent. Unions even struggle to get employers to apply agreements to union workers already in the first place. Thus, only a small share of workers is even covered by collective agreements. The majority of American workers, who are not union members, consequently have no collective voice and no workplace representation (ibid).

German law grants workers the right to participate in management decisions. These involve the hiring of managers and investment decisions concerning workers. Worker representatives sit on advisory boards in nearly equal numbers with shareholder representatives. These advisory boards elect members to the management board and also oversee the activities of the management board. Thus, German workers are very much involved in managerial decisions. This kind of interaction is non-existent in the United States. American unions want no part in management. While the union-management relationship is cooperative, unions in the United States view theirs as confrontational. While in the German system all involved parties will benefit from cooperation, in the U.S. system each party has opposing interests. The general attitude is that benefits can only be attained through concessions from the other parties (ibid).

6.3 The United States

6.3.1 Labor-Management Relations

The American ideal of capitalism and individualism does not harmonize with the existence of unions, which gives the workers a collective voice. Labels such as "communists" and "labor bosses" are not uncommon. The union must not only overcome resistance from employers, but also the workers' potential disinclination to a collective voice, since a collective voice still would conflict with the idea of individualism.

American unions handle both negotiation and administration of collective bargaining agreements, while German unions primarily deal with negotiation. In Germany it is not just the union that represents the interests of the workers; there are also works councils and worker representatives on the supervisory boards. Through the works councils the workers' interests in daily and social matters are considered, and through worker representatives on supervisory boards workers are given a voice in management decisions. The American system does not have an equivalent to this three-tiered system. American workers only have a union steward, the equivalent of works councils, to protect their interests (Waldman, 2003).

6.3.2 Wage-Bargaining and Contract Settlement

While the Japanese find it both impossible and unnecessary to make provisions for every possible eventuality, Westerners see no way a dispute can be settled without reference to a complete description of the rights and obligations of both parties (Hashimoto, 1990). US wage bargains feature longer-term contracts with cost-of-living protection, dating back to the 1948 contract between the United Auto Workers and General Motors. The years 1946-1948 were marked by annual strikes or threats of strikes in core industries, which made contract negotiations costly. The resulting compromise was management's acquisition of long-term contracts in return for protection against living costs. Hence, the determinant factor is the level of industrial conflict. Gordon (1982) argues that greater power and strike-inclination of American labor helps explain the persistence of staggered contract expiration dates. Again, using Gray's (1978) argumentation, longer-term contracts are the result of costly negotiations. For the years 1964-1976 the days lost from strikes were calculated to be far greater in the US

than in Japan (Smith, 1980 in Gordon, 1982). Government and management may be reluctant to allow for simultaneous expiration dates, as this makes possible a nationwide general strike.

6.4 Main Differences and Concluding Remarks on the Chapter

The American labor market seems to be characterized by an adversarial labor-management relationship, where labor and management are in effect opposing parties who more or less seem to antagonize each other. In contrast, Japanese and German labor-management relations are ones in which employers and employees strive to understand each other and reach a compromise in order to serve a mutual goal. This contrast between individualism and egalitarianism is reflected in various facets of the labor markets. The all-encompassing factor, namely the relationship between those on the shop floor and those who administrate, is more harmonious in Japan and Germany.

The relative ease with which contracts are settled upon is but one indicator of this harmony. Brief and obscure labor contracts that allow for continuous adjustment and annual wage negotiations stand in contrast with detailed and longer-term contracts that characterize the U.S. market. The more heterogeneous work force and the greater importance of industrial conflict in the U.S. play a significant role in explaining these differences.

Tenure is longer in the countries in which worker-management relationships are smoother, or where the workers are multi-functional. Hashimoto & Raisian (1990) point to the off-the-job activities that employers and employees engage in as an indicator of mutual commitment. Disputes are settled early and in an informal manner. By the same token, worker participation in managerial decisions and the willingness of German employers to accept agreements with industry-wide unions and even to extend them to non-union members shows the will to concede in order to achieve mutual goals. Such features are virtually absent in the U.S., where benefits can only be achieved at the expense of the opposing party. In addition to the closer relationships that characterize German and Japanese labor markets, returns to experience peak later in these countries than in the US. This also creates an incentive for German and Japanese workers to remain longer with their employers.

The relative versatility of Japanese workers makes it easer for firms to reassign them to other tasks, whereas the specialized skills of American workers make transfers a more difficult

strategy. Further, the relative ease with which German and Japanese firms can adjust work hours (after overtime hours have been reduced and fixed-term contracts have expired without prolongation) makes it easier to hoard labor.

Thus, the discussion suggests that the willingness of two parties to cooperate fosters flexibility on both sides that helps keep employment up in adverse times. The environment in which U.S labor and management deal with one another, on the other hand, leads to limited options for American firms.

7.0 Conclusion

The goal of this paper has been to demonstrate how different labor market characteristics have influenced the unemployment responses between Japan, Germany, and the United States. The first section suggested that U.S. unemployment would be expected to react the strongest to an output decline, while the weakest reaction would be found in Japan. Next, I have attributed these differences to different degrees of wage flexibility. The study of the nature of wage bargaining suggested that wages in Japan and Germany would be more flexible in times of declining demand and increasing unemployment. The discussion further suggests that American firms, because of low levels of coordination among firms and longer-term contracts, have little leeway in adjusting wages. The literature I have used for this section largely, but not unequivocally, concurs with my findings. Heylen's (1992) compilation almost unambiguously accorded with my conclusion on the matter. There were nevertheless some discrepancies. Particularly, while highlighting Japan as a high-flexibility country, Steinberg and Nakane (2011) present regression results in which the United States is even more flexible in terms of wages.

Further, I have considered the effects of worker protection and the share of temporary workers in the work force on unemployment sensitivity. Theory suggests that the higher EPL is, the more costly are firms' employment adjustments. Thus, countries where legislation is strict are expected to experience more sensitive responses than countries with lenient legislation. The literature points to the increase in temporary workers in the work force as a result of the relaxation of EPL for temporary labor. The greater the share of temporary workers with little protection, the greater the unemployment response. These effects have been considered against the evolution of unemployment in the respective countries. My discussion suggests that in Germany, where both EPL is strict and the share of temporary workers is high, the share-of-temporary-workers effect is the strongest. In the case of Japan, where EPL is slightly more lenient in than in Germany (but still way stricter than in the United States), and where the share of temporary workers is high as well, the temporary-labor effect predominantly accounts for the unemployment increase. In the United States the unemployment response can be attributed to the overall low levels of worker protection.

The severity of the crisis induced national authorities to implement large-scale work-sharing programs. These programs were intended to help firms hold on their employees. By

distributing the burden of the downturn on employers, workers and taxpayers, firms were enabled to evade mass-layoffs, and unemployment was kept from soaring. In the countries where this strategy was implemented, namely Japan and Germany, unemployment was contained much better than where it was not. The success of the programs in the two former indicates that had the U.S. program followed their example, it could have helped curb the unemployment increase.

Finally, I have discussed the relevance of cultural differences in explaining the institutional characteristics. Here, the literature points to contrasts between the cooperative nature of labor-management relations in Japan and German, and the more adversarial environment that characterizes those of the United States. Cooperation fosters flexibility on both sides, whereby other options are available to firms before dismissing their workers. These differences in interpersonal relationships in turn rest upon the different intangible ideals of individualism and collectivism.

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Appendix

Regression results for tables 1 and 2 are reported below. To check for heteroskedasticity I have first estimated the error term $\hat{e}$. Next, I have estimated the function $\widehat{\varepsilon^2} = \propto +\beta_0 \Delta y_t + \beta_1 \Delta y_{t-1} + \gamma_1 \Delta u_{t-1} + \gamma_2 \Delta u_{t-2} + \gamma_3 \Delta u_{t-3} + v_t$ by least squares. The results are reported below the table results. Further, a Lagrange multiplier test has been performed to see if heteroskedasticity exists.

Definitions:

Changeinunemployment (Japan & Germany), percentageunemploymentchange (USA)	Δu_t
gdpgpsa	Δy_t
gdpgpsalag1	Δy_{t-1}
unemploymentlag1	Δu_{t-1}
unemploymentlag2	Δu_{t-2}
unemploymentlag3	Δu_{t-3}
dyDUM	$D * \Delta y_t$
dyDUMLag1	$D * \Delta y_{t-1}$
duDUMLag1	$D * \Delta u_{t-1}$
duDUMLag2	$D * \Delta u_{t-2}$
duDUMLag3	$D * \Delta u_{t-3}$
recession	D

Regression Results, Table 1, Japan

```
reg  changeinunemployment gdpgpsa gdpgpsalag1 unemploymentlag1 unemploymentlag2
unemploymentlag3


      Source |       SS       df       MS              Number of obs =      71
-------------+------------------------------           F(  5,    65) =    1.96
       Model |  .028321975     5  .005664395           Prob > F      =  0.0967
    Residual |  .188014513    65  .002892531           R-squared     =  0.1309
-------------+------------------------------           Adj R-squared =  0.0641
       Total |  .216336488    70  .003090521           Root MSE      =  .05378


------------------------------------------------------------------------------
changeinun~t |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     gdpgpsa |  -.0085706   .0083931    -1.02   0.311    -.0253327    .0081915
 gdpgpsalag1 |  -.0204748   .0083952    -2.44   0.017    -.0372412   -.0037084
unemployme~1 |  -.2080493   .1198795    -1.74   0.087    -.4474652    .0313666
unemployme~2 |  -.1536245   .1197487    -1.28   0.204    -.3927792    .0855302
unemployme~3 |  -.1236923    .118323    -1.05   0.300    -.3599997    .1126152
       _cons |   .0243668   .0083034     2.93   0.005     .0077838    .0409499
------------------------------------------------------------------------------
```

```
reg  e2 gdpgpsa gdpgpsalag1 unemploymentlag1 unemploymentlag2 unemploymentlag3


      Source |       SS       df       MS              Number of obs =      71
-------------+------------------------------           F(  5,    65) =    0.41
       Model |  .000018535     5  3.7070e-06           Prob > F      =  0.8430
    Residual |  .000593674    65  9.1334e-06           R-squared     =  0.0303
-------------+------------------------------           Adj R-squared = -0.0443
       Total |  .000612209    70  8.7458e-06           Root MSE      =  .00302


------------------------------------------------------------------------------
          e2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     gdpgpsa |   .0000242   .0004716     0.05   0.959    -.0009177    .0009661
 gdpgpsalag1 |  -.0003505   .0004717    -0.74   0.460    -.0012926    .0005917
unemployme~1 |  -.0081382   .0067363    -1.21   0.231    -.0215916    .0053152
unemployme~2 |  -.0021794    .006729    -0.32   0.747    -.0156181    .0112593
unemployme~3 |   .0017413   .0066489     0.26   0.794    -.0115374      .01502
       _cons |   .0028485   .0004666     6.10   0.000     .0019166    .0037803
------------------------------------------------------------------------------
```

The χ^2-distribution with 70 degrees of freedom is:

$\chi^2 = N \times R^2 = 71 \times 0.0303 = 2.1513$

The 5% critical value is 90.531. Thus, again we conclude that heteroskedasticity is not present.

Regression Results, Table 1, Germany

```
reg  changeinunemployment gdpgpsa gdpgpsalag1 unemploymentlag1 unemploymentlag2
unemploymentlag3


      Source |       SS       df       MS              Number of obs =      66
-------------+------------------------------           F(  5,    60) =    4.68
       Model |  .110661493     5  .022132299           Prob > F      =  0.0011
    Residual |  .283708375    60  .004728473           R-squared     =  0.2806
-------------+------------------------------           Adj R-squared =  0.2207
       Total |  .394369868    65  .006067229           Root MSE      =  .06876


------------------------------------------------------------------------------
changeinun~t |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     gdpgpsa |  -.0229152   .0135636    -1.69   0.096    -.0500464    .0042161
 gdpgpsalag1 |  -.0195138   .0133727    -1.46   0.150    -.0462632    .0072355
unemployme~1 |  -.3105832   .1162582    -2.67   0.010    -.5431342   -.0780323
unemployme~2 |  -.0837839   .1198668    -0.70   0.487    -.3235532    .1559853
unemployme~3 |  -.3729398   .1159288    -3.22   0.002     -.604832   -.1410476
       _cons |   .0331724   .0112952     2.94   0.005     .0105787    .0557662
------------------------------------------------------------------------------
```

```
reg  e2 gdpgpsa gdpgpsalag1 unemploymentlag1 unemploymentlag2 unemploymentlag3


      Source |       SS       df       MS              Number of obs =      66
-------------+------------------------------           F(  5,    60) =    1.58
       Model |  .000318503     5  .000063701           Prob > F      =  0.1797
    Residual |  .002420163    60  .000040336           R-squared     =  0.1163
-------------+------------------------------           Adj R-squared =  0.0427
       Total |  .002738665    65  .000042133           Root MSE      =  .00635


------------------------------------------------------------------------------
          e2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     gdpgpsa |   .0004692   .0012527     0.37   0.709    -.0020366    .0029751
 gdpgpsalag1 |   .0016609   .0012351     1.34   0.184    -.0008097    .0041314
unemployme~1 |   .0029527   .0107377     0.27   0.784    -.0185258    .0244313
unemployme~2 |   .0009023    .011071     0.08   0.935    -.0212429    .0230475
unemployme~3 |  -.0247168   .0107072    -2.31   0.024    -.0461345   -.0032991
       _cons |   .0037017   .0010432     3.55   0.001      .001615    .0057885
------------------------------------------------------------------------------
```

The χ^2 −distribution with 65 degrees of freedom is:

$\chi^2 = N \times R^2 = 65 \times 0.1163 = 7.5595$

The 5% critical value is approximately 85. Thus, yet again we conclude that heteroskedasticity is not present. However, since the coefficient for Δu_{t-3} shows a high t-value, heteroskedasticity-robust standard errors are computed.

```
reg changeinunemployment gdpgpsa gdpgpsalag1 unemploymentlag1 unemploymentlag2
unemploymentlag3, vce (robust)

Linear regression                                      Number of obs =      66
                                                       F(  5,    60) =    5.69
                                                       Prob > F      =  0.0002
                                                       R-squared     =  0.2806
                                                       Root MSE      =  .06876

------------------------------------------------------------------------------
             |               Robust
changeinun~t |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     gdpgpsa |  -.0229152   .0173834    -1.32   0.192    -.0576872    .0118569
 gdpgpsalag1 |  -.0195138   .0127505    -1.53   0.131    -.0450187     .005991
unemployme~1 |  -.3105832   .0932404    -3.33   0.001    -.4970918   -.1240747
unemployme~2 |  -.0837839   .0984812    -0.85   0.398    -.2807757    .1132078
unemployme~3 |  -.3729398   .1045095    -3.57   0.001      -.58199   -.1638896
       _cons |   .0331724    .012789     2.59   0.012     .0075905    .0587543
------------------------------------------------------------------------------
```

Regression Results, Table 1, the United States

```
reg  percentageunemploymentchange gdpgpsa gdpgpsalag1 unemploymentlag1
unemploymentlag2 unemploymentlag3


      Source |       SS       df       MS              Number of obs =      69
-------------+------------------------------           F(  5,    63) =   14.69
       Model |  .364796564     5  .072959313           Prob > F      =  0.0000
    Residual |  .312953323    63  .004967513           R-squared     =  0.5382
-------------+------------------------------           Adj R-squared =  0.5016
       Total |  .677749886    68   .00996691           Root MSE      =  .07048


------------------------------------------------------------------------------
p~unemploy~e |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     gdpgpsa |  -.0558652   .0173836    -3.21   0.002    -.0906035   -.0211269
 gdpgpsalag1 |  -.0461674   .0188242    -2.45   0.017    -.0837846   -.0085502
unemployme~1 |  -.4483932   .1094934    -4.10   0.000    -.6671983    -.229588
unemployme~2 |   -.099769   .1063323    -0.94   0.352    -.3122572    .1127191
unemployme~3 |  -.4232828   .0978384    -4.33   0.000    -.6187972   -.2277684
       _cons |   .0796797   .0176264     4.52   0.000     .0444561    .1149033
```

```
reg  e2 gdpgpsa gdpgpsalag1 unemploymentlag1 unemploymentlag2 unemploymentlag3

      Source |       SS       df       MS              Number of obs =      69
-------------+------------------------------           F(  5,    63) =    0.85
       Model |  .000198542     5  .000039708           Prob > F      =  0.5190
    Residual |  .002939731    63  .000046662           R-squared     =  0.0633
-------------+------------------------------           Adj R-squared = -0.0111
       Total |  .003138274    68  .000046151           Root MSE      =  .00683

------------------------------------------------------------------------------
          e2 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     gdpgpsa |  -.0000646   .0016848    -0.04   0.970    -.0034315    .0033022
 gdpgpsalag1 |  -.0026291   .0018244    -1.44   0.155     -.006275    .0010167
unemployme~1 |   .0005702   .0106121     0.05   0.957    -.0206365    .0217768
unemployme~2 |  -.0004025   .0103057    -0.04   0.969    -.0209969    .0201919
unemployme~3 |  -.0122584   .0094825    -1.29   0.201    -.0312077    .0066909
       _cons |   .0065405   .0017084     3.83   0.000     .0031266    .0099543
------------------------------------------------------------------------------
```

The χ^2 −distribution with 68 degrees of freedom is:

$\chi^2 = N \times R^2 = 69 \times 0.0633 = 4.3677$

The 5% critical value is approximately 95. Thus, we conclude that heteroskedasticity is not present.

Regression Results, Table 2, Japan

```
reg changeinunemployment recession  gdpgpsa dyDUM gdpgpsalag1 dyDUMLag1
unemploymentlag1 duDUMLag1 unemploymentlag2 duDUMLag2 unemploymentlag3 duDUMLag3 in
1/72


      Source |       SS       df       MS              Number of obs =      71
-------------+------------------------------           F( 11,    59) =    1.58
       Model |  .049169344    11   .00446994           Prob > F      =  0.1294
    Residual |  .167167144    59  .002833341           R-squared     =  0.2273
-------------+------------------------------           Adj R-squared =  0.0832
       Total |  .216336488    70  .003090521           Root MSE      =  .05323


------------------------------------------------------------------------------
changeinun~t |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   recession |   .0100927   .0711052     0.14   0.888    -.1321885     .152374
     gdpgpsa |   .0012311   .0104218     0.12   0.906    -.0196228     .022085
       dyDUM |  -.0413406   .0557717    -0.74   0.461    -.1529395    .0702583
 gdpgpsalag1 |  -.0172738   .0096435    -1.79   0.078    -.0365703    .0020228
   dyDUMLag1 |   -.018952   .0236434    -0.80   0.426    -.0662623    .0283584
unemployme~1 |  -.2379139   .1254864    -1.90   0.063    -.4890116    .0131838
   duDUMLag1 |   .0975071   .5931212     0.16   0.870    -1.089326     1.28434
unemployme~2 |  -.0723095   .1239875    -0.58   0.562    -.3204079     .175789
   duDUMLag2 |  -.9030197     .51942    -1.74   0.087    -1.942377    .1363374
unemployme~3 |  -.0690334   .1241646    -0.56   0.580    -.3174862    .1794194
   duDUMLag3 |   .0381093   .4775186     0.08   0.937    -.9174032    .9936219
```

```
       _cons |     .01407   .0106246     1.32   0.191    -.0071898    .0353298
------------------------------------------------------------------------------
```

Regression Results, Table 2, Germany

```
reg  changeinunemployment recession gdpgpsa dyDUM gdpgpsalag1 dyDUMLag1
unemploymentlag1 duDUMLag1 unemploymentlag2 duDUMLag2 unemploymentlag3 duDUMLag3 in
1/72


      Source |       SS       df       MS              Number of obs =      66
-------------+------------------------------           F( 11,    54) =    2.44
       Model |  .130887116    11  .011898829           Prob > F      =  0.0150
    Residual |  .263482752    54   .00487931           R-squared     =  0.3319
-------------+------------------------------           Adj R-squared =  0.1958
       Total |  .394369868    65  .006067229           Root MSE      =  .06985


------------------------------------------------------------------------------
changeinun~t |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   recession |   .1549986   .1526157     1.02   0.314    -.1509774    .4609745
     gdpgpsa |   -.012925   .0157609    -0.82   0.416    -.0445238    .0186738
       dyDUM |   .2248848   .3178313     0.71   0.482    -.4123285    .8620981
 gdpgpsalag1 |  -.0167758   .0163477    -1.03   0.309    -.0495511    .0159994
   dyDUMLag1 |   .1481421   .1489639     0.99   0.324    -.1505126    .4467968
unemployme~1 |  -.2905251   .1339816    -2.17   0.035     -.559142   -.0219082
   duDUMLag1 |  -.1574238     .41789    -0.38   0.708    -.9952429    .6803953
unemployme~2 |  -.0576923    .129017    -0.45   0.657    -.3163558    .2009713
   duDUMLag2 |  -.0889439    .424862    -0.21   0.835     -.940741    .7628532
unemployme~3 |  -.3196363   .1245276    -2.57   0.013    -.5692992   -.0699735
   duDUMLag3 |   -1.68376   1.487807    -1.13   0.263    -4.666634    1.299114
```

```
       _cons |   .0236817   .0139592     1.70   0.096    -.0043048    .0516682
------------------------------------------------------------------------------
```

Regression Results, Table 2, the United States

```
reg percentageunemploymentchange recession gdpgpsa dyDUM gdpgpsalag1 dyDUMLag1
unemploymentlag1 duDUMLag1 unemploymentlag2 duDUMLag2 unemploymentlag3 duDUMLag3 in
1/72

note: duDUMLag1 omitted because of collinearity


      Source |       SS       df       MS              Number of obs =      69
-------------+------------------------------           F( 10,    58) =    7.66
       Model |  .385800441    10  .038580044           Prob > F      =  0.0000
    Residual |  .291949445    58  .005033611           R-squared     =  0.5692
-------------+------------------------------           Adj R-squared =  0.4950
       Total |  .677749886    68   .00996691           Root MSE      =  .07095


------------------------------------------------------------------------------
p~unemploy~e |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   recession |    .034913   .0445015     0.78   0.436    -.0541665    .1239924
     gdpgpsa |  -.0417858   .0207792    -2.01   0.049    -.0833799   -.0001917
       dyDUM |  -.0573859   .0704434    -0.81   0.419    -.1983936    .0836219
 gdpgpsalag1 |  -.0361842   .0204017    -1.77   0.081    -.0770225    .0046542
   dyDUMLag1 |  -.0121153   .0647906    -0.19   0.852    -.1418077     .117577
unemployme~1 |  -.4358789   .1135116    -3.84   0.000     -.663097   -.2086608
   duDUMLag1 |  (omitted)
unemployme~2 |  -.0953168   .1118707    -0.85   0.398    -.3192504    .1286168
   duDUMLag2 |  -.2379477   .4162641    -0.57   0.570    -1.071191    .5952954
unemployme~3 |  -.3822687   .1015974    -3.76   0.000     -.585638   -.1788993
```

```
   duDUMLag3 |  -.6950326   .4918653    -1.41   0.163    -1.679608    .2895427
       _cons |   .0576761   .0231667     2.49   0.016      .011303    .1040492
------------------------------------------------------------------------------
```