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4 Patterns in Regional Labor Market Adjustment: The United States versus Japan

Edward B. Montgomery

The past decade was a period in which the United States experienced a number of cyclical and secular shocks. While the early 1980s and 1990s were periods of recession, there was sustained growth in the mid-1980s. As seen in table 4.1, the overall performance of the U.S. economy between 1985 and 1990 was fairly strong in terms of job creation, gross domestic product (GDP) growth, low unemployment, and inflation. Although the United States lagged behind Japan in almost all measures of economic performance, it had greater employment growth and lower unemployment than most other Organization for Economic Cooperation and Development (OECD) countries. The ability to accommodate real-wage declines, rapid growth in employment, and falling unemployment have often been cited as signals of the greater flexibility of the labor market in the United States compared to other OECD countries.

Despite the fairly strong aggregate performance of the economy, the cyclical shifts in demand at the beginning and end of the decade interacted with relative-demand shocks within a number of industries to create a pronounced imbalance in the economic performance across regions of the economy. Unemployment rates varied substantially across states at both ends of the recent expansion. While some states had rates less than half the national average, others had double-digit unemployment rates for most of the decade.

These imbalances in regional growth raise questions about the flexibility of the labor market in the United States. *Flexibility,* in this paper, is taken to mean

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Table 4.1 **Selected Comparative Economic Statistics: Average Annual Rates, 1985–1990**

	United States	Japan	United Kingdom	Germany	Canada
Real GDP growth	2.7%	4.7%	3.2%	3.1%	3.0%
Inflation rate	4.3	1.4	6.7	2.2	4.9
Employment growth					
1985–90	2.0	1.6	2.0	1.9	2.4
1980–90	1.9	1.3	0.7	0.8	1.9
Unemployment rate	5.9	2.5	8.8	6.2	8.7
Nominal manufacturing compensation growth	2.7	3.9	7.1	4.0	5.3

Sources: International comparisons of hourly compensation costs for production workers in manufacturing, 1975–90 (1991) (Bureau of Labor Statistics); *Comparative labor force statistics* (1991) (Bureau of Labor Statistics); *Economic report of the president* (1992).

Note: The data use U.S. concepts for labor force statistics.

the sensitivity or speed of adjustment of labor markets to changes in market conditions. Because tests of this type of flexibility in the labor market at the aggregate level are likely to have little power, I investigate the labor market response to demand shocks at the regional level. I focus on two regional adjustment mechanisms: (1) relative wage changes and (2) worker movement, or migration, to other regions of the country. The flexibility of the labor market will be reflected in the extent to which these factors adjust. Clearly, flexibility along these dimensions will have implications for the persistence of differences in regional unemployment rates, so I also examine the sensitivity of regional unemployment rates to demand shifts.

I contrast the adjustment process in the United States with that of Japan, a country whose aggregate performance dominated the United States and whose labor market is often thought to be characterized by extreme flexibility. In particular, I examine the extent and persistence of regional imbalance in Japan and whether unemployment, wages, and migration there are more sensitive to demand shifts. Such a comparative analysis may yield insights into the roles of various government policies or institutions in affecting the speed and extent of market flexibility.

Cross-country differences in the dynamics of the regional labor market adjustment process may exist for a variety of reasons. Differences in preferences could alter labor supply elasticities, while variations in the extent of collective bargaining, regional concentrations of industries, and government social policies will influence the speed at which regional adjustments occurs. In the case of Japan, labor market flexibility is seen as the product of government employment policy, the Nenko payment system (described below), the widespread usage of bonus payments, and lifetime employment contracts. Thus, an examination of the nature of differences in how Japanese regional labor markets

adjust could provide some insights into whether alternate policy and institutional environments generate added flexibility in regional labor markets.

Previous studies by Montgomery (1992), Hall (1970), and others have looked at the determinants of the equilibrium structure of wages, unemployment, or migration across regions in the United States. Further, Beeson and Montgomery (1993) and Bartik (1989) have looked at the role of taxes and other government policies aimed at affecting regional growth. These studies have generally focused on only one element of the labor market adjustment process and have not looked at the relative importance of these competing adjustment mechanisms. Further, they have not looked at how this process varies under different institutional settings. This paper will contribute to the literature along both of these dimensions.

Given the myriad of economic and institutional differences between the United States and Japan, the analysis in this paper is only meant to be suggestive. More definitive treatments need to endogenize these labor market variables and require richer data, preferably microdata.

4.1 Institutional Details

In doing a comparative analysis, it is obviously critical to have some feel for how labor market institutions differ in the countries being studied. One of the most commonly cited differences between Japanese and U.S. labor markets is that compensation in Japan is set by the Nenko pay system. Under this system, pay is almost exclusively based upon seniority, with the intention of encouraging worker loyalty and investments in specific human capital. Further, pay adjustments occur during the *Shunto,* or spring labor offensive, with the major firms setting patterns for smaller companies to follow. This coordinated wage setting on an aggregate level is thought to prevent the type of rigidities in U.S. wages that some authors attribute to the presence of long-term overlapping contracts.[1]

The payment of bonuses is found in almost all Japanese companies. These bonus payments, which can account for up to 20 percent of regular cash earnings, generate a profit sharing mechanism similar to Weitzman's (1984) share payments and are seen as providing a substantial degree of wage flexibility. This wage system facilitates or interacts with the often noted lifetime employment system to generate a high degree of employment stability and job tenure.

The stability of Japanese employment has been attributed to a three-pronged strategic response on the part of employers. First, short-term profits are sacrificed to avoid the loss of skilled workers with substantial amounts of firm-specific skills. Second, firms reduce the use of subcontractors or temporary

1. For a more detailed discussion and analysis of the Japanese labor market, see Hashimoto (1990). Montgomery and Shaw (1985) show that long-term contracting is of limited importance for aggregate wage flexibility.

workers so that employment adjustments are suffered by a periphery or buffer stock of workers (typically females) and not by the firm's core workers. Third, workers receive reduced bonus payments, thereby cutting labor costs and reducing the strain on short-term profits.

Abraham and Houseman (1989) have found that Japanese employers are slower than their U.S. counterparts to adjust employment to output shocks and that the magnitude of the adjustment is less. Hours adjustments in the short and longer term appear to be the same across the two countries, which leads to the conclusion that Japanese employers use hours adjustments *relatively* more than U.S. firms. Overall, total labor input adjusts less in Japan. There is also evidence of differences in wage and price flexibility between Japan and the United States. Yoshikawa and Takeuchi (1989) found that the slope of a standard Phillips curve is 3.112 for Japan but only .611 in the United States. This supports the notion of greater wage flexibility in Japan in response to excess demand, as measured by the unemployment rate.[2]

Thus, at the aggregate level, there appear to be differences in the nature and speed of labor market adjustments between Japan and the United States. If regional labor markets react in similar fashions to relative-demand shocks in the two countries, then one might expect greater wage flexibility and less unemployment in response to demand shifts in Japan than in the United States.

Although private sector institutions may explain much of these differences in labor market dynamics across the countries, part of this difference conceivably is due to differences in the nature of government labor market intervention. Although there are a number of national and local employment programs in both countries, those in the United States tend to be more remedial and limited in scope. The Humphrey-Hawkins bill in the United States and the Employment Measures Law in Japan both charge government with the task of maintaining full employment (4 percent in the United States and 2 percent in Japan). In the United States, the law gives equal weight to the goal of price stability, and there is no mechanism in the legislation for implementing the goal. In contrast, the Japanese Ministry of Labor is required to formulate long-term basic employment measures plans as well as to form and implement short-term annual employment plans. The actual administration of these programs is done at the national level by the Employment Security Bureau, at the prefectural level by Employment Security Sections, and locally by public employment service offices (PESOs). U.S. national, state, and local employ-

2. Although there is greater flexibility in response to unemployment changes, there is actually less responsiveness in Japan to output changes. The slopes of the implied Aggregate Supply (AS) curves are .084 in Japan versus .227 in the United States. This difference comes from the fact that unemployment does not vary much over the cycle because labor force participation in Japan is strongly procyclical. As noted in Yoshikawa and Takeuchi (1989) and Tachibanaki and Sakurai (1990), unemployment may not be as good an indicator of labor market conditions in Japan as in other OECD countries. Labor supply, particularly female labor supply, falls substantially during downturns, with the result that measured unemployment does not rise as much. Yoshikawa and Takeuchi suggest that this effect is over six times as big in Japan as in the United States.

ment policies are generally set independently, with little coordination. State and local areas engage in a host of independent initiatives in response to local conditions without federal (national) linkages.[3]

In both countries the public employment service office provides information on job openings. On the surface the job search assistance rendered in Japanese PESOs appears fairly extensive. The Ministry of Labor was to begin publication of a magazine listing job openings with detailed job descriptions and to prepare a computerized data base on job seekers and information on various employer subsidies and other support systems. However, as in the United States, the public employment service in Japan is not widely used. In a recent survey of firms, 30 percent claimed they never use the PESO. Over half of the firms responded that they could not get the appropriate types of workers, while workers consistently complained about the low quality of the jobs available.

In both countries, local public employment offices also serve to administer the unemployment insurance program. In the United States, eligibility and unemployment benefit levels are set at the state level, while Japan has a national structure. In both countries the unemployment insurance system is financed by a payroll tax on workers and employers. In Japan the system receives money to help *both* workers and firm; in the United States, money is provided only to workers. Japanese firms facing business fluctuations or located in targeted regions can get subsidies from the Employment Stabilization Fund if they agree to minimize layoffs and provide retraining. There is also money to help workers relocate or to get firms to locate new plants in depressed areas.

In both countries the government provides additional monies to ease the labor market impact of import competition or structural shifts. In the United States, the Trade Adjustment Assistance Act (TAA) provides training and supplemental unemployment benefits to *workers* who are unemployed because of imports.[4] The retraining component of this program, however, is rather limited, as less than 10 percent of the benefit recipients have received retraining or placement assistance.[5] Despite recent revisions in the law, it remains the case that displaced workers are only encouraged and not required to enter training programs.

In the United States, there are also state-level training and placement assistance programs for displaced workers, and several states have implemented advance-notice provisions to ensure that workers get prior notice of plant closures. Finally, states and local areas often give property and corporate tax abatements as incentives for firms to locate or remain in their area. These local initiatives have had limited success, and it remains true that the vast majority of states have no formal programs for retraining or assisting displaced workers or firms.

The structure of unemployment insurance benefits also differs across these

3. See Leigh (1989) for a discussion of these programs.
4. See Weir (1992) for a further discussion of employment policy in the United States.
5. See Leigh (1989) for a further description of displaced worker programs in the United States.

two countries. In Japan, experienced workers receive benefits of between 60 percent and 80 percent of their basic daily wage (which excludes bonus payments) when they become unemployed. This exceeds the typical U.S. replacement rate of 40–50 percent. In both countries, workers in high-unemployment areas can get extended benefits. One potentially important difference between unemployment insurance in Japan and in the United States is the fact that a worker in Japan who gets reemployed quickly or who is in a training program receives extra benefits.[6]

Overall, both countries have a plethora of govemment programs designed to help the unemployed. The focus on employment stabilization and the regional component of many of the Japanese programs would lead one to expect less regional dislocation in Japan. The relocation and retraining benefits should reduce mobility costs within and across local labor markets. Thus, the structure of private and public institutions in Japan would lead one to expect greater flexibility in terms of eamings, unemployment, and migration.

4.2 Model

Following Harris and Todaro (1970), Hall (1972), and Roback (1982), the long-run, or static, equilibrium structure of regional labor markets depends on the underlying distribution of nontraded goods (amenities). These amenities may enter the workers' utility function and/or the firm's production function. In equilibrium, workers must be indifferent to all locations, or, analogously, expected utility (V) is constant across areas j:[7]

$$V(w_j^*, r_j; a_j) = k \quad V_{w^*} > 0, V_r < 0, V_s > 0, \tag{1}$$

where k is the nationally given level of utilty, w^* is the effective wage rate, r_j is the rental price of land in region j, and a_j is the value of local amenities. As in Hall (1972), the effective wage rate reflects expected wage or wages, adjusted for the likelihood of being employed:

$$w_j^* = w_j(1 - u_j), \tag{2}$$

where the unemployment rate, u_j, is used to measure the probability of being employed and w_j is the real wage rate.

In the long run, firms must also be indifferent across locations, which for firms with constant retum to scale production functions implies that, in equilibrium, unit costs equal price (assumed to be unity) in all areas:

$$C(w_j^*, r_j; a_j) = 1 \quad C_{w^*} > 0, C_r > 0. \tag{3}$$

6. If a worker was eligible for ninety days of benefits and used less than forty-five, he would get thirty days of benefits as a bonus. If he were eligible for 300 days of benefits and used less than 100, he would get a bonus of 120 days.

7. Capital is assumed to be perfectly mobile and unaffected by amenities. Thus, the rate of return is equalized across areas and can be omitted from the expression.

If local amenities (e.g., absence of blizzards) enhance productivity, then $C_a < 0$. Hall (1972) argues that both real wages and local unemployment affect employer costs, as turnover costs are lower when the unemployment rate is high.

Equations (1) and (3) can be used to solve for w^* and r as functions of amenities, given k. The reduced-form hedonic wage equation is thus:

$$w_j = f(u_j, r_j; a_j). \tag{4}$$

Equilibrium in this model need not imply equalization of wages or unemployment rates across areas. As long as amenities affect productivity or utilities, there is no reason to expect constant wage or unemployment rates. Long-run market equilibrium is thus consistent with persistent differences in wages, unemployment rates, or rental prices. The observed distribution of these factors across areas need only be conformable with utility and profit equalization across areas. The correlation between wages and unemployment in this long-run compensating differences model should be positive. Work by Blanchflower and Oswald (1992), however, suggests that in a world with efficiency wages this correlation could be negative. Efficiency wage payments may be lower in areas where the cost of job lost (unemployment) is high, and firms may also be hesitant to locate in high-unemployment areas due to inferior services, higher taxes, and so on. Whether these considerations will dominate is ultimately an empirical question.

Migration of workers or firms occurs to equalize utility or unit costs across areas in response to long-run shifts in tastes or technology. If migration is costly (due to transportation, opportunity, and psychic costs), the instantaneous flow of migrants will be less than the long-run response. We can thus express the migration rate between regions i and j in any period as a function of wages, unemployment, rents, and amenities in the two areas:

$$mig_{ij} = g(u_i, u_j, w_i, w_j, r_i, r_j, d_{ij}; a_i, a_j), \tag{5}$$

where d_{ij} is the cost of moving betwen i and j, and mig_{ij} is the net migration rate between these areas.[8]

In this model, migration serves to maintain the long-run spatial equilibrium. In the short run, however, mobility costs may impede the instantaneous adjustment of labor markets to changing conditions. Topel (1986) considers such a dynamic model where, in the presence of mobility costs, permanent and transitory local-demand shocks affect migration rates, relative wages, and unemployment rates. Permanent (or anticipated) shifts in local demand get arbitraged away by migration, leaving the long-run spatial distribution of wages and unemployment described in the static models. Transitory (unanticipated)

8. Migration will depend on the relative values of unemployment, wages, and rents in the two areas, but the effects need not be symmetric. Previous research has rejected the restriction of symmetry or that it is only the difference in the values of these variables that determines migration (Hughes and McCormick 1989).

shifts in demand, in the presence of mobility costs, mean that current values of wages and unemployment adjust to local shocks and hence differ from their long-run values. A transitory negative shock to demand would reduce wages below long-run values and raise unemployment above its long-run values. Thus, a negative correlation between current wages and current unemployment can exist if mobility costs are important in the face of transitory demand shifts.[9] We now turn to an empirical analysis of these reduced-form spatial labor market models.

4.3 Stylized Facts and Empirical Results

The choice of the geographical unit for a study of regional labor markets is not clear-cut. Using cities or standard metropolitan statistical areas (SMSAs) might be preferred, as they correspond most closely to the area within which agents have good information and transportation costs are relatively minor. There are a number of problems, however, with using SMSAs as the geographical unit of analysis. First, in the United States the boundaries of SMSAs have changed over time in ways correlated with economic growth. This was particularly true in 1982, when many growing SMSAs had counties added to them to reflect the growing linkages across previously outlying areas. Second, some SMSAs extend over state lines (e.g., New York) so that residents in one part may face a different set of government policies than those in another part. To avoid this problem, I use states for my measure of regional labor markets in the United States. Clearly, mobility and information issues can be important within an area the size of a state, so the notion that a state represents a homogenous labor market is false. Where possible, I check the sensitivity of my results to the choice of geographic unit of analysis.

The forty-six prefectures in Japan are also used, as they are roughly analogous in concept to U.S. states. Like states, they have fixed geographic boundaries and their own governmental structure. Although Japan's prefectural and municipal governments are thought to have less autonomy than state and municipal governments in the United States, they do have some independent taxing and spending authority (Ito 1992, chap. 6). While grants to local governments from the national government are a more important source of local spending in Japan, individuals pay roughly similar proportions of their taxes to local jurisdictions in the two countries.[10]

Given the fact that the population of Japan is about 50 percent of the United States while it has only about 4 percent of the land size, there are substantial differences in the average population density and distance between the regional

9. Thanks to Andrew Oswald for bringing this point to the author's attention.

10. Grants account for 20 percent of the national budget in Japan versus 12 percent in the United States, and 43 percent of individual taxes went to state and local governments in the United States in 1987, while 36 percent went to prefectural and municipal governments in Japan. See Ito (1992) for a further discussion of fiscal policy in Japan.

units in the two countries. I attempt to standardize regional labor markets by adding controls for prefecture population and size to some of the Japanese analysis. Unfortunately, data limitations prevent checking the sensitivity of the Japanese results to the choice of regional labor market measure.

Since migration plays a crucial role in local labor market adjustments, it is useful to examine the magnitude and patterns of regional migration in the two countries. Table 4.2 presents migration rates for the United States and several other countries. The overall level of migration in the United States is higher than in Japan and the other OECD countries shown. Prefectural mobility in Japan is higher than regional mobility in the United Kingdom or country movement in Sweden and is comparable to state mobility in the United States and county movement in the Netherlands. However, when compared to migration rates of U.S. countries, which are more similar in size to Japanese prefectures, Japanese migration takes place at less than half the U.S. rate.

Migration may be less in Japan because shocks to the Japanese economy have been smaller than in the United States. Further, even if the level of shocks is similar across countries, the regional distribution of them may be more homogeneous in Japan than in the United States. As seen in table 4.3, the industrial distribution of employment at the aggregate industry level has changed much more dramatically in the United States than in Japan over the past thirty years. In Japan, manufacturing's share of employment has remained fairly constant, while it has declined markedly in the United States. Although these numbers hide within industry movements, they suggest that part of the difference in the level of regional labor market mobility may be due to differences in the size or regional distribution of shocks in the two countries.

For migration to help in labor market adjustment, it must also go in the right directions. Tables 4.4 and 4.5 show annual net migration rates for selected prefectures and states in Japan and the United States, respectively. The net migration rates for Japan are based on annual data and defined as in-migrants minus out-migrants, divided by the beginning-of-period population. Net migration rates for the United States are annualized values calculated using census data on the number of net migrants over various time intervals, divided

Table 4.2 **Selected Internal Migration Rates, by Country**

	United States	United Kingdom	The Netherlands	Japan	Sweden
Between regions	2.1%	1.01%			
Between states	3.09				
Between counties/prefectures	6.55		3.0%	2.9%	1.5%

Sources: For the United Kingdom and the United States. Hughes and McCormick 1989, and Gabriel. Shack-Marquez. and Wascher 1991; Japanese Bureau of Statistics: Björklund and Holmlund 1989: Dijk et al. 1989.

Note: There are nine census regions in the United States and ten regions in the United Kingdom.

Table 4.3 **Percentage of Employment by Industry**

	Japan			United States		
Industry	1960	1980	1989	1960	1980	1989
Agriculture	30%	10%	9%	9%	4%	3%
Mining	1	<1	<1	1	1	1
Construction	6	10	9	5	5	5
Manufacturing	22	25	24	28	22	17
Transportation	6	7	6	7	5	5
Trade	20	23	22	19	22	23
Finance	—	2	6	4	6	6
Services	13	18	21	12	19	24
Government	3	4	3	14	17	16

Source: Management and Coordination Agency, Labor Force Survey 1989; *Economic report of the president* (1992).

Note: Numbers may not add to 100 because of rounding.

Table 4.4 **Japan's Selected Annual Prefectural Net Migration Rates**

Prefecture	1970	1985
Hokkaido	−1.5%	−0.4%
Tokyo	−0.9	0.0
Niigata	−0.9	−0.3
Kyoto	0.1	−0.2
Osaka	0.7	−0.2
Nara	1.8	0.6
Saitama	3.5	0.7
Chiba	3.3	0.6
Aichi	0.9	0.1
Kagoshima	−2.3	−0.3

Note: Data on migration are described in the appendix.

Table 4.5 **Annualized Net Migration Rates for Selected U.S. States**

State	1970–80	1980–87
California	1.0%	2.6%
Florida	5.1	9.1
Illinois	−0.6	−0.6
Massachusetts	−0.5	−0.1
Minnesota	−0.2	−0.3
New York	−1.1	−0.3
Ohio	−0.8	−0.8
Pennsylvania	−0.5	−0.2
Texas	1.6	2.0
Virginia	0.6	1.0

Note: Data on migration rates are desribed in the appendix.

by the beginning-of-period population. Overall interprefectural migration rates range from 2.6 to 4.1 percent in Japan, and there is substantially more gross than net migration. Even the high-unemployment regions of Hokkaido and Kagoshima had substantial in- and out-migration. These data do show, however, that there have been consistent net migration flows toward Nara, Saitama, and Chiba prefectures and away from the Kagoshima and Hokkaido regions during the sample period. Similar patterns emerge in the United States, where states such as Illinois and Ohio have had negative net migration for almost twenty years.

To look further at this persistence in regional migration rates, I calculate rank correlation coefficients for area migration rates. These correlation coefficients indicate that regions in Japan appear to be consistently growing or declining for longer periods of time than in the United States.[11] Simple autoregressive estimates of regional net migration rates reinforce this conclusion of greater persistence in regional migration in Japan.[12]

These results may indicate either slower market adjustments (perhaps due to higher mobility costs) or that migration is being driven more by secular factors in Japan. If mobility costs are higher, then other regional labor market variables will need to adjust more. The autoregressive (AR) structure of relative earnings, employment growth, and unemployment in the two countries gives a simple way to characterize the behavior of these other labor market variables. Tables 4.6 and 4.7 show simple lagged dependent variable regressions for unemployment, employment growth, and earnings for Japan and the United States, respectively. It should be noted that because Japanese data at the prefecture level are at five-year intervals, the U.S. results are also presented using five-year lags for comparability. All variables represent deviations from means. The data used for these estimates are described in detail in the appendix.

The estimates presented in columns (1) of table 4.6 for each variable in Japan indicate there is substantial persistence in all the labor market variables even after five years. Unemployment growth and earnings have lagged coefficients of around .9. For the United States, the estimates in columns (1) of table 4.7 for each variable again show evidence of persistence at five-year intervals, especially in earnings and unemployment. There appears to be less serial persistence in the United Stats than in Japan for each of these labor market variables, especially for employment growth. Nonetheless, high earnings and unemployment areas appear to remain so for long periods of time in both countries.

The high degree of persistence in regional labor market variables also shows up in the rank correlations of prefecture or state labor market data. The rank

11. These results are available from the author upon request.

12. The coefficients on net migration lagged five years were .451 and .001 for Japan and .262 and −.543 for the United States in autoregressive regressions without and with area fixed effects.

Table 4.6 **Univariate Models of Relative Earnings, Unemployment, and Employment for Japan (standard errors in parentheses)**

	Log Monthly Contractual Earnings		Unemployment		Log Employment Change	
	(1)	(2)	(1)	(2)	(1)	(2)
Constant	.031	−.828	−.017	4.52	−.006	.855
	(.09)	(.05)	(.06)	(.31)	(.12)	(.44)
Dependent variable lagged five	.926	−.007	.971	.208	.701	.439
	(.03)	(.02)	(.03)	(.05)	(.03)	(.05)
Time	−.009	.0004	.002	−.023	3×10^{-5}	−.005
	(.03)	(.07)	(.01)	(.01)	(.03)	(.03)
$\bar{R}^2$	.89	.99	.80	.89	.67	.71
N	139	139	278	278	231	231

Note: Estimates of univariate equations use data described in the appendix. Periods of estimation are 1970–85 for earnings, 1960–85 for employment, and 1955–85 for unemployment. Column (2) estimates include prefecture fixed effects. All variables are deviations from national means.

Table 4.7 **Univariate Models of Relative Wages, Unemployment and Employment for the United States (standard errors in parentheses)**

	Log Wages		Unemployment		Log Employment Change	
	(1)	(2)	(1)	(2)	(1)	(2)
Constant	−.044	−.020	−.036	−.685	.0009	.001
	(.006)	(.01)	(.29)	(.39)	(.002)	(.005)
Dependent variable lagged five	.873	.189	.532	−.199	.059	−.174
	(.01)	(.04)	(.04)	(.04)	(.03)	(.03)
Time	.003	.0008	.004	.005	-7×10^{-5}	-8×10^{-5}
	(.0004)	(.0004)	(.03)	(.02)	(.0002)	(.0002)
$\bar{R}^2$	.88	.92	.26	.74	.01	.21
N	703	703	499	499	735	735

Note: Estimates of univariate equations use data described in the appendix. Periods of estimation are 1971–90 for average weekly manufacturing earnings, 1976–90 for unemployment, and 1970–90 for employment growth. Column (2) estimates include state fixed effects. All variables are deviations from national means.

correlations of area earnings are in excess of .70 in both countries, even over fifteen-year intervals.[13] The rank correlations of prefectural unemployment in Japan are also over .90 at fifteen-year intervals. Although the rank correlations of employment growth rates in Japan are lower than for earnings or unemployment, they still exceed .40 at fifteen-year intervals. In contrast, the rank correla-

13. These results are available upon request.

tions of unemployment and employment growth rates in the United States drop considerably over fifteen years, so that in some cases the rank correlations are even negative. High earnings, unemployment, and growth areas tend to remain so in Japan, while in the United States the picture is one of greater regional flux.

Simple AR models are suggestive but cannot discern whether this persistence represents the fact that the distribution of earnings and unemployment rates in Japan represent an unchanging equilibrium distribution generated by the presence of local amenities or whether migration and mobility are more stilted so that the reaction to shocks is substantially more protracted than in the United States.[14] Adding prefecture fixed effects to these regressions takes out the fixed-amenity effects and sheds some light on the degree of within-area persistence. Columns (2) of tables 4.6 and 4.7 show these results for Japan and the United States, respectively.

Within local markets in both countries, there is substantially less persistence over time for all of the labor market variables. There appears to be no persistence in earnings at five-year intervals in Japan, while there is still evidence of persistence in the United States. Conversely, there is no evidence of persistence in employment growth or unemployment at five-year intervals in the United States, while there is some in Japan. High cross-region but low within-region persistence in the two countries is consistent with the presence of a constant equilibrium structure of wages and unemployment across areas. The fact that within-area differences in persistence remain may suggest differences in regional labor market responsiveness in the two countries.

To explore more systematically the question of whether wages and unemployment react differently in the United States and Japan, I estimate several variants of equation (4). The parsimonious nature of the estimated regressions is largely due to data limitations for Japan. Previous studies (Hyclak and Johnes 1992; Neumann and Topel 1992; Eberts and Stone 1992; Montgomery 1992; Topel 1986; and others) have estimated regional wage and unemployment models for the United States, using a wider variety of controls. Since microdata, or individual data, are not available for Japan, I concentrated on estimating a simple Japanese labor market adjustment model and replicating it to as great a degree as possible using U.S. data. It should be emphasized that these reduced-form estimates suffer from endogeneity and hence must be interpreted with caution. Structural estimation is needed before definitive conclusions can be drawn, but this must wait future research.

Estimates for the Japanese and U.S. regional labor market model are presented in tables 4.8 and 4.9, respectively. All equations include fixed effects

14. These conclusions for the United States are not the result of using states as the measure of regional labor markets. The rank correlations across SMSAs for these series are remarkably similar to those for states. Further, the conclusions about constant relative wage structure are, if anything, strengthened if per capita personal income is used instead of wages as the measure of compensation.

Table 4.8 **Relative Prefectural Unemployment and Earnings Equations for Japan (standard errors in parentheses)**

	Log Monthly Contractual Earnings			Unemployment Rate	
	(1)	(2)	(3)	(1)	(2)
Constant	13.54	13.54	13.37	1.769	.822
	(.30)	(.81)	(.98)	(1.01)	(.12)
Log employment change	.025	.038	.038	−.141	−.297
	(.02)	(.02)	(.07)	(.06)	(.10)
Unemployment	−.063	−.062	−.133		
	(.02)	(.03)	(.11)		
Dependent variable lagged five	.001			.857	−1.13
	(.02)			(.14)	(.58)
Prefectural vacancy rate		−.118	.082	.069	−1.15
		(.08)	(.10)	(.08)	(.48)
Prefectural unionization rate		3.02	4.66	−5.04	−7.44
		(.77)	(2.89)	(2.26)	(4.61)
Consumer price index		6×10^{-6}			
		(.01)			
Housing rental prices			.0001		
			(.0001)		
$\bar{R}^2$	.99	.99	.94	.97	.22
N	139	139	139	139	92

Note: Data used are described in the appendix. All equations include prefecture fixed effects and time dummies controls. Column (2) for unemployment includes instrumental variable estimates for the lagged dependent variable.

and time dummies to take out period and constant area effects. Hsiao (1986) noted that fixed-effect models with lagged dependent variables yield biased estimates unless the number of time periods is large. Consequently, instrumental variable estimates are also presented for the earnings (columns 3) and unemployment (columns 2) equations in the United States and the unemployment equations (columns 2) in Japan. These regressions are estimated in difference form and use twice-lagged values of the dependent variable as instruments.

In both countries, for all specifications, regional earnings are inversely related to the level of unemployment. This is contrary to the findings of Hall but is consistent with international evidence by Blanchflower and Oswald (1992). Outsider pressures on wage premiums may thus be more important than the compensating differential notions suggested by Hall. The estimates also suggest that area earnings in Japan and the United States are significantly affected by area demand conditions as proxied by the rate of growth of employment. Prefectural earnings are consistently found to be positively related to demand (employment) growth, while state earnings are negatively related in the United States. The fact that increases in employment growth are associated with reductions in relative wages was found by Blanchard and Katz (1992) when they

Table 4.9 **Relative State Unemployment and Wage Equations for the United States (standard errors in parentheses)**

	Log Weekly Manufacturing Earnings			Unemployment Rate	
	(1)	(2)	(3)	(1)	(2)
Constant	3.42	4.91	−1.69	4.82	−.923
	(1.24)	(.33)	(.12)	(.56)	(.26)
Log employment change	−.475	−.177	−2.63	−33.01	−50.33
	(.10)	(.10)	(.17)	(2.67)	(5.53)
Unemployment	−.010	−.007	−.040		
	(.002)	(.002)	(.003)		
Dependent variable lagged five	.404	.187	4.88	−.018	.309
	(.05)	(.06)	(.29)	(.04)	(.14)
State unionization		.002	.012	.033	.234
		(.001)	(.001)	(.02)	(.05)
$\bar{R}^2$	.97	.97	.68	.87	.45
N	682	563	318	399	149

Note: Data are described in the appendix. All equations include state fixed effects and time dummies controls. Columns (2) for unemployment and column (3) for earnings include instrumental variable estimates for the lagged dependent variable.

used a sample period similar to the one used here. It is conceivable that the employment growth measure may represent supply shifts and not just area demand effects. As a check on this I instrumented for demand growth, using an estimate of area demand growth based on national one-digit industry growth rates for Japan and the United States. This instrument is similar to that used by Bartik (1991) for the United States and should be a valid measure as long as industry employment is not too concentrated in a particular state or prefecture, which at the one-digit level is unlikely to be the case. The qualitative nature of these results does not appear to be sensitive to the use of these alternative proxies.[15]

Finally, the extent of area unionism is positively associated with area relative wages in both countries. Unfortunately, state-level housing rental prices, cost of living, and vacancy data are not available for the United States, so we cannot replicate all of the results for Japanese labor markets. Overall, these results suggest that relative regional earnings in both countries are sensitive to local demand conditions and unemployment, as well as to the presence of noncompetitive forces such as unions.

It is important to know, in accessing flexibility, whether there are differences in the size or magnitude of the responses of earnings to these factors. Blanchflower and Oswald (1992) indicate that one important measure of flexibility is

15. These results are available from the author upon request.

the unemployment elasticity of earnings. The long-run values for this elasticity calculated from similar specifications (column 1 estimates in tables 4.8 and 4.9) are −.15 for Japan and −.11 for the United States.[16] The elasticity of earnings with respect to employment growth is .02 for Japan and −.02 for the United States. Thus, the higher persistence in regional earnings in Japan does not indicate that they are any less sensitive to unemployment or employment growth than in the United States.

In the regional unemployment equations for both the United States and Japan, there is evidence that employment growth (or instrumented employment growth) is negatively and significantly related to unemployment. Interestingly, we find no evidence that unions, despite their positive effects on relative wages, significantly increase unemployment rates in either Japan or the United States. The key finding again is that, despite the evidence of strong serial persistence in area unemployment rates in Japan, area unemployment rates are sensitive to demand shifts in both countries. Nonetheless, the long-run elasticity of unemployment with respect to employment growth from the estimates in columns (2) in the unemployment equations is .045 in Japan and .27 in the United States.[17] In contrast to the findings for earnings, unemployment appears to be less sensitive to demand (employment growth) in Japan than in the United States.

Given the evidence that demand shifts affect both wages and unemployment, our theoretical model would lead us to expect this to generate regional migration. To examine the sensitivity of net migration rates, we estimate variants of equation (5) for both Japan and the United States. The results from estimating these models without and with region fixed effects are reported in columns (1) and (2) of tables 4.10 and 4.11 for Japan and the United States, respectively.

Workers in both countries tend to migrate to those areas where employment is growing. Across areas there is no evidence that area unemployment significantly affects migration in Japan, but some evidence exists for the importance of unemployment in the United States. In the fixed-effect estimates (columns 2), high unemployment in an area increases out-migration in the United States but not in Japan. Regional earnings do not appear to have much impact on net migration in either country.

It is possible that the aggregate nature of the migration equation is obscuring the relationship between migration and income. Beeson and Montgomery (1993) and others have found such a relationship, using microdata in the United States. Matsukawa (1991) presents estimates of a place-to-place model of migration that allows migration rates from one area to another to be a func-

16. In specifications using lagged-once values of the dependent variable, the elasticities with respect to unemployment and employment growth for the United States are −.19 and −.003, respectively. Unfortunately, it is not possible to estimate this specification for Japan.

17. The elasticity using once-lagged values of the dependent variable for the United States is .28.

Table 4.10 **Prefectural Net Migration Rate and Commuting Equations for Japan (standard errors in parentheses)**

	Annual Net Migration Rate		Daytime/Nighttime Populations	
	(1)	(2)	(1)	(2)
Constant	−.028	−.366	.923	.776
	(.01)	(.08)	(.06)	(.14)
Log employment change	.006	.009	−.026	.006
	(.001)	(.001)	(.004)	(.002)
Unemployment rate	.0005	.003	.003	.001
	(.0006)	(.001)	(.004)	(.002)
Log monthly earnings	.001	.001	.006	−.005
	(.001)	(.001)	(.005)	(.002)
Vacancy rate	.003	.006	.022	−.001
	(.001)	(.001)	(.008)	(.002)
Housing rental prices	-2×10^{-6}	-3×10^{-6}	-7×10^{-6}	6×10^{-6}
	(1×10^{-6})	(1×10^{-6})	(-8×10^{-6})	(2×10^{-6})
Distance from Tokyo	-3×10^{-6}	.0004	1×10^{-5}	.0003
	(-2×10^{-6})	(.0001)	(2×10^{-4})	(.0002)
$\bar{R}^2$	.62	.87	.26	.98
N	139	139	139	139

Note: Columns (2) include prefecture fixed effects and time dummies. Data used are described in the appendix.

Table 4.11 **State Net Migration Equations for the United States (standard errors in parentheses)**

	Log Population Change		Annualized Net Migration Rate	
	(1)	(2)	(1)	(2)
Constant	.027	.018	−.026	−.036
	(.01)	(.05)	(.02)	(.01)
Log employment change	.213	.197	.307	.013
	(.02)	(.02)	(.03)	(.013)
Unemployment rate	.0004	−.002	.002	−.0008
	(.0002)	(.0003)	(.0005)	(.0002)
Log weekly wage	−.003	.006	.004	.007
	(.002)	(.008)	(.004)	(.002)
State unionization	−.0002	−.0001	−.0006	−.00002
	(.0001)	(.0001)	(.0001)	(.0001)
$\bar{R}^2$	.25	.74	.15	.94
N	585	585	536	536

Note: Data are described in the appendix. Columns (2) include state fixed effects and time dummies.

tion of relative wages and demand conditions in each area. His results suggest that income differentials matter in explaining migration behavior in Japan.

High housing prices also have a significant deterrent effect on regional net migration in Japan. The results hold even when area fixed effects are included. Unfortunately there is no equivalent state-level time series data on average house price series for the United States. Beeson and Montgomery, however, estimate a micro logit migration equation, using data from the 1980 census, and find some evidence that high housing prices have some, albeit insignificant, effect on migration in the United States.

The small size of Japan, and the availability of good rail transport, may mean that Japanese workers are more able to respond to changing economic conditions by commuting rather than by migrating to new areas. The potential importance of commuting behavior in Japan can be seen by looking at prefectural data on the ratio of daytime to total, or nighttime, population. This ratio, which will exceed one if there is net commuting to an area, is presented for selected prefectures in table 4.12. The Tokyo region experiences as much as a 28 percent population surge during the day, while Osaka and Aichi add between 2 and 5 percent to their population. On the other hand, Nara, Saitima, and Chiba have up to 13 percent of their residents commuting out to jobs. Thus, there appear to be substantial amounts of mobility in Japan that may not be reflected in net migration rates.

The correlation between prefecture commuting and net migration rates is positive (controlling for area fixed effects), suggesting that commuting and migrating may be substitutes. To see whether commuting behavior responds to local labor markets variables, the results from estimating of area commuting equations are presented in table 4.10, where the ratio of daytime to nighttime population is the dependent variable. In the fixed-effects specification (columns 2), the effects of local conditions on commuting are similar to their effects on net migration. While workers migrate and commute to high-growth areas, area unemployment does not appear to be a significant deterrent to either

Table 4.12 **Selected Prefectural Commuting Rates**

Prefecture	1970	1985
Hokkaido	1.00	1.001
Tokyo	1.111	1.181
Niigata	1.00	.988
Kyoto	1.008	1.004
Osaka	1.045	1.051
Nara	.903	.877
Saitama	.881	.869
Chiba	.906	.878
Aichi	1.013	1.018
Kagoshima	1.000	1.005

Note: Ratio of day population/total population.

commuting or migrating. Although wages do not appear to affect net migration, workers seem to commute to areas with high relative wages, holding distance and demand constant.

4.4 Summary and Discussion

In this study, I have examined regional labor market behavior in Japan and the United States. In contrast to the picture at the aggregate level, Japanese regional labor markets appear to exhibit substantially more persistence than their U.S. counterparts. Relative wages, unemployment rates, net migration, and employment growth rates all show substantial persistence in terms of both the level and ranking of areas. Within-prefecture persistence is less for all these labor market variables, suggesting a fairly constant spatial labor market structure but fluid within-area markets.

In the United States there is evidence of persistence in both the ranking and level of these labor market indicators, although it is less than in Japan. The most noticeable difference in the two countries is that there is very little correlation in area unemployment rates in the United States over ten-year intervals, while it remains high in Japan. The within-state persistence of the labor market variable for the United States is less than the across-area persistence but is higher than in Japan.

Estimates of reduced-form area earnings and unemployment equations suggest that, broadly speaking, regional labor markets in the two countries respond to similar factors. In contrast to the predictions of Harris and Todaro's (1970) compensating differential model, area earnings and unemployment rates are negatively correlated in both countries. This seems supportive of the efficiency wage considerations outlined in Blanchflower and Oswald (1992), in which worker wage premiums are reduced in areas where the costs of job loss are great. To further test between these models, it would be useful to distinguish between the effects of permanent versus transitory shifts in unemployment on earnings. Further, aggregation bias may have important effects here, as studies of the behavior of wages over the business cycle have found.

There was evidence of some important differences in labor market behavior in the two countries. First, employment growth seems to be positively correlated with area earnings in Japan but negatively correlated with earnings in the United States. This may suggest that regional employment growth differences were primarily supply driven in the United States but demand driven in Japan. Second, the long-run unemployment elasticity of earnings is slightly lower in the United States than in Japan. Conversely, regional unemployment in Japan is less sensitive to employment growth than in the United States.

Net migration rates are substantially higher in the United States than in Japan. Migration flows in Japan, however, are more persistent than in the United States and are not sensitive to area unemployment rates. Despite these differences, net migration flows in both countries respond to employment growth

and wages in roughly similar fashions. There is some evidence that high housing prices have an important adverse effect on net migration in Japan, while they do not appear to have a significant effect in the United States. Perhaps because of high housing prices, commuting serves as a substitute for net migration in Japan.

This study finds only mixed evidence that regional labor markets in Japan are more fluid than in the United States. The lack of response in regional unemployment rates may reflect a greater regional homogeneity in demand shifts in Japan. Alternatively, if the valuation of location-specific amenities (such as being near Tokyo) are rising faster over time in Japan than in the United States, this could generate what appears to be a more limited regional response to short-run demand shifts. Conclusions about the importance of government regional aid and relocation policies based on this analysis must be tentative at best. Nonetheless, this study finds no evidence to support the conclusion that these policies succeeded in making regional unemployment rates in Japan more flexible than in the United States. Whether these same policies would have a pronounced effect in an economy with a different regional distribution of amenities remains an open question.

Appendix

U.S. Data

The U.S. data on wages, unemployment, and employment were provided by the INFORUM research group at the University of Maryland and are available via Internet.

Employment. The measure of employment is the establishment-based nonagricultural employment series from the Bureau of Labor Statistics (BLS). The data range is from 1970 to 1990. Employment growth rates are calculated as differences in the log of employment in periods t and $t - 1$.

Unemployment. The measure of state employment is from *Employment and Earnings* (BLS). The data range is from 1976 to 1990.

Wages. The measure of wages used is the BLS establishment-based average hourly earnings of manufacturing production workers from *Employment and*

Earnings. The data range is from 1971 to 1990.

Union. The unionization measure is taken from Current Population Survey (CPS) estimates of the percentage of employment in each state covered by a

union contract. The data are from Curme, Hirsch, and Macpherson (1990) and Kokkelenberg and Sockell (1985). The data range from 1976 to 1988. Data for 1982 are derived from fitting a linear trend between the 1981 and 1983 series values.

Net Migration. There are two measures of net migration for the United States. One uses state-level population from the *Statistical Abstract* (Bureau of the Census, 1989). The data range from 1976 to 1990. Population growth rates are calculated as differences in the log of state population in periods t and $t - 1$. The second measure is census estimates of state-level numbers of net migration for the time intervals 1980–87, 1970–80, and 1960–70. The number of net migrants was divided by beginning-of-period population to get a net migration rate and then annualized.

Japanese Data

Wages. Wages are defined as average monthly contractual cash earnings per employee. The data are from establishments with more than thirty employees and are available for forty-six prefectures (forty-seven when data on Okinawa are available) every five years from 1970 to 1985, in *Annual Survey on the Wage Structure* (Ministry of Labor, Japan).

Employment and unemployment. These data are from the *Labor Force Survey* (Ministry of Labor, Japan). Unemployed persons are those over fifteen years old who were able to work, wanted to work, and sought work actively. Employment growth is calculated as the average annual change in the number of persons at work and those with a job but not at work. The data for forty-six prefectures (forty-seven when data on Okinawa are available) are available every five years from 1960 to 1985.

Distance. This is the number of kilometers from the capital of each prefecture to Tokyo.

The following Japanese data were all taken from the *Yearbook of Labor Statistics* (Labor Statistics and Research Department, Ministry of Labor, Japan).

Union. This is a measure of prefectural unionization based on a weighted average of one-digit industry unionization rates, where the weights are the share of prefectural employment in that industry. Data are available for 1970, 1975, 1979, and 1988.

Net migration. This is defined as the difference between the number of immigrants to a prefecture and the number of out-migrants from that prefecture, divided by initial population. Data are available by prefecture annually from 1960 to 1988.

Vacancies. These are defined as the ratio of monthly average active openings to active applications for persons registered at public employment security offices. The data by prefecture are available for 1970, 1980, 1985.

Nighttime and daytime population. These are taken from the population census. Nighttime population is the number of residents of each prefecture. Daytime population is calculated by subtracting from the nighttime population of each prefecture the difference between the number of persons (fifteen years of age and over) in each prefecture who are employed or attend school in another prefecture and those who reside in another prefecture but are employed or go to school there. Data are available by prefecture every five years for 1970 to 1985.

CPI. This is a measure of relative cost-of-living differences. It is based on the Regional Difference Indexes of Consumer Prices, which measure relative cost of living (Japan = 100) for prefectural capital cities. The data are available annually for 1971 to 1985.

Rent. Rent is defined as the average rental cost per month (in yen) of privately owned houses. The data, available annually from 1970 to 1989, are based on the *Retail Price Survey.*

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