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PATTERNS IN REGIONAL LABOR MARKET ADJUSTMENT: THE UNITED STATES VS. JAPAN

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ABSTRACT

In this paper I examine regional labor market behavior in the United States and Japan. In contrast with the picture at the aggregate level, Japanese labor markets at the prefectural (regional) level appear to exhibit substantially more persistence than state level labor markets in the United States. The distribution (and positions of regions within the distribution) of wages, unemployment, employment growth, and migration remain remarkably constant in Japan for periods of up to 15 years. Although wages, unemployment, and migration appear to be driven by similar factors in both countries, wages appear to be slightly more sensitive while unemployment is less sensitive to demand shifts in Japan than in the U.S..

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I. Introduction

The past decade was a period in which the United States experienced a number of cyclical and secular shocks. While the early 1980's and 199O's were periods of recession, there was sustained growth in the mid-1980's. As seen in Table 1, the overall performance of the economy in the United States between 1985-90 was fairly strong in terms of job creation, 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 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 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 which is often thought to have a labor market characterized by extreme flexibility. In particular, I examine the extent and persistence of regional imbalance in Japan and whether unemployment, wages, and migration 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 being the product of government employment policy, the Nenko payment system (described below), the widespread usage of bonus payments, and

Life-Time 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 U.S.. Further, work by 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, preferably micro, data.

II. 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 in Japan compensation or wages are set by the Nenko wage 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 Shinto 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 wages in the U.S. that some author's attributed to the presence of long term overlapping contracts.[1]

The payment of bonuses is found in almost all Japanese companies and these bonus payments can account for up 20 percent of regular cash earnings. Theses bonuses generate a profit sharing mechanism similar to Weitzman's share payments and are seen as

providing a substantial degree of wage flexibility. This wage system facilitates or interacts with the often noted Life-Time-Employment system to generate a high degree of employment stability and job tenure.

The stability of Japanese employment has been attributed to a three prong 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. Secondly, firms reduce the use of subcontractors or temporary 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. Thirdly, workers receive reduced bonus payments, thereby cutting labor costs and reducing the strain on short term profits.

Abraham and Houseman (1989) find that Japanese employers are slower than their U.S. counterparts to adjust employment to output shocks and 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 for Japan is 3.112 but only .611 in the U.S. 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 appears to be differences in the nature and speed of labor market adjustments between Japan and the U.S. 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 countries, it is also conceivable that part of this difference 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 the government with the task of maintaining full employment (4% in the U.S. and 2% in Japan). In the United States the law gives equal weight to the goal of price stability and there is no mechanism for implementing the goal in the legislation. In contrast, the Japanese Ministry of Labour 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 (PESO). In the U.S. national, state, and local employment 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 it would appear that the job search assistance rendered in Japanese PESO is fairly extensive. In 1990, the Ministry of Labour 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 U.S., 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 U.S., 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 public employment system receives money to help <u>both</u> workers and firms, while in the U.S. money is provided only to workers. Japanese firms can get subsidies from the Employment Stabilization Fund if they are facing business fluctuations or if they are located in targeted regions 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 U.S., 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, was rather limited as less than 10 percent of the benefit recipients 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 U.S. there are also state level training and placement assistance programs for displaced workers and several states have implement advanced notice provisions to insure 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 or states have no formal programs for retraining or assisting displaced workers or firms.

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

Overall, there are a plethora of government programs in both countries which are all 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 earnings, unemployment, and migration.

III. 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]

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

where k is the nationally given level of utility, w* is 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:

$$(2)\quad w_j^* = w_j(1-u_j)$$

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 return to scale production functions implies that in equilibrium unit costs equal price (assumed to be unity) in all areas:

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

If local amenities enhance productivity (absence of blizzards) then $C_a<0$. Hall (1972) argues that both nominal 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:

$$(4)\quad w_j = f(u_j, r_j; a_j)$$

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, etc. 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:

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

where d_{ij} is the cost of moving between 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) 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 shocks 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 could 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.

IV. 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 corresponds 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 U.S. the boundaries on 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. Secondly, 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 U.S.. 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 46 prefectures in Japan are also used as they are the roughly analogous regional concepts to states in the U.S.. Like states they have fixed geographic boundaries and their own governmental structure. Although prefectural and municipal governments are thought to have less autonomy than state and municipal governments

in the U.S., they do have some independent taxing and spending authority.[10] 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.[11]

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 units in the two countries. I attempts 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 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 these other OECD countries. Prefectural mobility in Japan is higher

than regional mobility in the United Kingdom or county movement in Sweden, and is comparable to state mobility in the United States and county movement in the Netherlands. However, when compared to county migration rates in the U.S., which are more similar in size to Japanese prefectures, Japanese migration is 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 that in the United States. As seen in Table 3, the industrial distribution of employment at the aggregate industry level has changed much more dramatically in the U.S. than in Japan over the past 30 years. In Japan, manufacturing's share of employment has remain fairly constant while it has declined markedly in the United States. Although these number 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. In Tables 4 and 5 are annual net migration rates for selected prefectures and states in Japan and the U.S. respectively. The net migration rate for Japan is based on annual data and is defined as in-migrants minus out-migrants, divided by beginning of period population. Net migration rates for the U.S. are annualized values calculated using Census data on the number of net-migrants over various time intervals divided by beginning of period population. Overall inter-prefectural 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 U.S. where states like Illinois and Ohio have had negative net migration for almost 20 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 U.S..[12] Similarly, simple autoregressive estimates of regional net migrations rates reinforce this conclusion of greater persistence in regional migration in Japan.[13]

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 6 and 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 6 for each variable in Japan, indicate there is substantial persistence even after five years in all the labor market variables. Unemployment growth and earnings having lagged coefficients of around .9. For the U.S., the estimates in column (1) of Table 7 for each variable again show evidence of persistence at 5 year intervals, especially in earnings and unemployment. There appears to be less serial persistence in the U.S. 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 looking at the rank correlations of prefecture or state labor market data. The rank correlations of area earnings are in excess of .70 in both countries even over 15 year intervals.[14] The rank correlations of prefectural unemployment in Japan are also over .90 at 15 year intervals. Although the rank correlations of employment growth rates in Japan are lower than for earnings or unemployment, they still exceed .40 at 15 year intervals. In contrast, the rank correlations of unemployment and employment growth rates

in the U.S. drop considerably over 15 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 can not discern whether this persistence represents the fact the distribution of earnings and unemployment rates in Japan represents 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 U.S.[15] Adding prefecture fixed effects to these regressions takes out the fixed amenity effects and shed some light on the degree of within area persistence. In columns (2) of Tables 6 and 7 are these results for Japan and the U.S. respectively.

In both countries there is substantially less persistence over time <u>within</u> local markets for all of the labor market variables. There appears to be no persistence in earnings at 5 year intervals in Japan while there is still evidence of persistence in the U.S.. Conversely, there is no evidence of persistence in employment growth or

unemployment at 5 year intervals in the U.S. 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 there remains within area differences in persistence 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 U.S. 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 by 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 U.S. using a wider variety of controls. Since micro or individual data is not available for Japan, I concentrated on estimating a simple Japanese labor market adjustment model and replicating it to as great as 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 8 and 9 respectively. All equations include fixed effects 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 (column 3) and unemployment equations (column 2) in the U.S. and the unemployment equations (column 2) in Japan. These regressions are estimated in difference form and used 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 premia may thus be more important than the compensating differential

notions suggested by Hall. The estimates also suggest that area earnings in Japan and the U.S. 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 they are negatively related in the U.S.. The fact that increases in employment growth are associated with reductions in relative wages was found in Blanchard and Katz (1992) when they use a sample period similar to the one use 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 estimated of area demand growth based on national one digit industry growth rates for Japan and the U.S.. This instrument is similar to that used by Bartik (1991) for the U.S. 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 do not appear to be sensitive to the use of these alternate proxies.[16]

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 can not replicate all of the results for Japanese labor markets. Overall these results suggest that relative regional earnings in both countries is sensitive to local demand conditions, unemployment, as well as the presence noncompetitive forces like unions.

In accessing flexibility it is important to know if 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 the unemployment elasticity of earnings. The long run values for this elasticity calculated from similar specifications (column 1 estimates in Tables 8 and 9) are -.15 for Japan and -.11 for the U.S..[17] The elasticity of earnings with respect to employment growth are .02 for Japan and -.02 for the U.S.. 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 U.S..

In the regional unemployment equations for both the U.S.

and Japan there is evidence that employment growth (or instrumented employment growth) are negatively and significantly related to unemployment. Interestingly, despite their positive effects on relative wages, we find no evidence that unions significantly increase unemployment rates in either Japan or the U.S.. 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 column (2) in the unemployment equations is .045 in Japan and .27 in the U.S..[18] In contrast to the findings for earnings, unemployment appears to be less sensitive to demand (employment growth) in Japan than in the U.S..

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 U.S.. The results from estimating these models without and with region fixed effects are reported in columns (1) and (2) of

Tables 10 and 11 for Japan and the U.S. 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 affect migration in Japan but some evidence for the importance of unemployment in the U.S.. In the fixed effect estimates (columns 2) high unemployment in an area increases out-migration in the U.S. 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 micro data in the U.S.. Matsukawa (1991) presents estimates of a place-to-place model of migration which allows migration rates from one area to another to be a function 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 U.S.. Beeson and Montgomery (1993), 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 U.S..

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 migration to new areas. The potential importance of commuting behavior in Japan can be seen by looking at prefectural data on the ratio of day time to total or night-time population. This ratio, which will exceed one if there is net commuting to an area, is presented for selected prefectures in Table 12. The Tokyo region experiences as much as 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 prefectures have up to 13 percent of their residents commuting out to jobs. Thus, there appears

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 if commuting behavior responds to local labor markets variables, the results from estimating of area commuting equations are presented in Table 10, where the ratio of daytime to nighttime population is the dependent variable. In the fixed effects specification (column 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 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.

V. 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 both in terms of 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 Japan. The most noticeable difference in the two countries is that there is very little correlation in area unemployment rates in the U.S. over ten year intervals while it remains high in Japan. The within state persistence of the labor market variable for the U.S. 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 the Harris and Todaro (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) is which worker wage premia 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 effect here, as has been found in studies of the behavior of wages over the business cyclical.

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 U.S.. This may suggest that regional employment growth differences were primarily supply driven in the U.S. but demand driven in Japan. Second, the long run unemployment elasticity of earnings is slightly lower in the U.S. than in Japan. Conversely, regional unemployment in Japan is less sensitive to employment growth than in the U.S..

Net migration rates are substantially higher in the United States than in Japan. Migration flows in Japan, however, are more

persistent than in the U.S. 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 U.S.. 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 U.S.. 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 U.S., 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 U.S.. Whether these same policies would have a pronounced effect in an economy with a different regional distribution of amenities remains an open question.

DATA APPENDIX

Description of United States Data

The U.S. data on wages, unemployment, and employment were provided by the INFORUM reseach 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 1970-90. Employment growth rates are calculated as differences in the log of employment in periods t and t-1.

Unemployment

The measure of state unemployment is from BLS Employment and Earnings. The data range is from 1976-90.

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 from 1971-90.

Union

The unionization measure is taken from CPS estimates of the percent of employment in each state that is covered by a union contract. The data are from Curme, Hirsch, and Macpherson (1990) and Kokkelenberg and Sockell (1985). The data range from 1976-88. Data for 1982 is derived from fitting a linear trend between the 1981 and 1983 series values.

Net Migration

There are two measures of net migration for the U.S.. One uses state level population from the Statistical Abstract, Bureau of Census, 1989. The data range from 1976-90. 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 number of net migration for the time interval 1987-80, 1970-80, and 1960-70. The number of net migrants was divided by beginning of period population to get a net migration rate and the annualized.

Description of Japanese Data

Wages are defined as average monthly contractual cash earnings per employee. The data are from establishments with more than 30 employees and are available for 46 prefectures (47 when data on Okinawa are available) every five years from 1970-85 in Annual Survey on the Wage Structure, Ministry of Labour, Japan.

Employment and Unemployment data are from the Labour Force Survey, Ministry of Labour, Japan. Unemployed persons are those over 15 years old who were able to, 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 46 prefectures (47 when data on Okinawa are available) are available every five years from 1960-85.

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

The following Japanese data were all taken from the Yearbook of Labour Statistics, Labour Statistics and Research Department, Ministry of Labour, Japan.

Union 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 that is in that industry. Data are available for 1970, 1975, 1979, and 1988.

Net Migration 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 1960-88.

Vacancies 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.

Night-time and Day-Time Population are taken from the Population Census. Night-time population is the number of residents of each prefecture. Day-time population is calculated by subtracting from the night-time population of each prefecture the difference between the number persons (15 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 1970-85.

CPI is a measure of relative cost of living differences. It is based on the Regional Difference Indexes of Consumer Prices which measures relative cost of living (Japan=100) for prefectural capital cities. The data are available annually for 1971-85.

Rent is defined as the average rental cost per month (in yen) of privately owned houses. The data are available annually from 1970-89 based on the Retail Price Survey.

Bibliography

Abraham, Katharine, and Susan Houseman. 1989. "Job Security and Work Force Adjustment: How Different Are U.S. and Japanese Practices?". *Journal of the Japanese and International Economies.* 3:500-521.

Bartik, Timothy. 1991. *Who Benefits From State and Local Economic Development Policies?.* W.E. Upjohn Institute. Kalamazoo, MI.

_____. 1989. "The Effects of Demand Shocks on Local Labor Markets". memo. W.E. UpJohn Institute. Kalamazoo, MI.

Beeson, Patricia and Edward Montgomery. 1993. "The Effects of Colleges and Universities on Local Labor Markets". *Review of Economics and Statistics.* forthcoming.

Björklund, Anders and Bertil Holmlund. 1989. "Job Mobility and Subsequent Wages in Sweden". in *Migration and Labor Market Adjustment.* edited by Jouke Van Dijk, Hendrik Folmer, Henry Herzog and Alan Schlottman. Kluwer Academic Publishers. The Netherlands. 201-216.

Blanchard, Olivier Jean and Lawrence Katz. 1992. "Regional Evolutions". *Brookings Papers on Economic Activity.* 1:1-75.

Blanchflower, Daniel and Andrew Oswald. 1992. "International Wage Curves". unpublished memo. Dartmouth University.

Curme, Michael, Hirsch, Barry and David Macpherson. 1990. "Union Membership and Contract Coverage in the United States, 1983-88". *Industrial and Labor Relations Review.* 44:5-33.

Eberts, Randall and Joe Stone. 1992. *Wage and Employment Adjustment in Local Labor Markets*. W.E. UpJohn Institute. Kalamazoo, MI.

Gabriel, Stuart, Shack-Marquez, Janice, and William Wascher. 1991. "Regional Labor Markets, Cost-of-Living Differentials, and Migration". working paper 91. Board of Governors of the Federal Reserve. Washington, D.C.

Hall, Robert. 1972. "Turnover in the Labor Force". *Brookings Papers on Economic Activity*. 3:709-764.

_____. 1970. "Why is the Unemployment Rate so High at Full Employment?". *Brookings Papers on Economic Activity*. 2:369-402.

Harris, J.R. and M.P. Todaro. 1970. "Migration, Unemployment, and Development: A Two-Sector Analysis". *American Economic Review*. 60:126-42.

Hashimoto, Masanori. 1990. *The Japanese Labor Market in a Comparative Perspective with the United States*. W.E. Upjohn Institute. Kalamazoo, MI.

Hsiao, Cheng. 1986. *Analysis of Panel Data*. Cambridge University Press. Cambridge, England.

Hughes, Gordon and Barry McCormick. 1989. "Does Migration Reduce Differentials in Regional Unemployment Rates?". in *Migration and Labor Market Adjustment*. edited by Jouke Van Dijk, Hendrik Folmer, Henry Herzog and Alan Schlottman. Kluwer Academic Publishers. The Netherlands. 85-108.

Hyclak, Thomas and Geriant Johnes. 1992. *Wage Flexibility and Unemployment Dynamics in Regional Labor Markets*. W.E. Upjohn Institute. Kalamazoo, MI.

Kokkelenberg, Edward and Donna Sockell. 1985. "Union Membership in the United States, 1973-81". *Industrial and Labor Relations Review*. 38:497-543.

Ito, Takatoshi. 1992. *The Japanese Economy*. MIT Press. Cambridge, MA.

Leigh, Duane. 1989. *Assisting Displaced Workers*. W.E. Upjohn Institute. Kalamazoo, MI.

Matsukawa, Isamu. 1991. "Interregional Gross Migration and Structural Changes in Local Industries". *Environment and Planning A*. 23:745-756.

Montgomery, Edward. 1992. "Evidence on Metropolitan Wage Differentials Across Industries and Over Time". *Journal of Urban Economics*. 31:69-83.

_____and Kathryn Shaw. 1985. "Long-Term Contracts, Expectations and Wage Inertia". *Journal of Monetary Economics*. 16:209-226.

Neumann, George and Robert Topel. 1991. "Employment Risk, Diversification, and Unemployment". *Quarterly Journal of Economics*. 106:1341-1366.

Roback, Jennifer. 1982. " Wages, Rents, and the Quality of Life". *Journal of Political Economy*. 90:1257-78.

Tachibanaki, Toshiaki and Kojiro Sakurai. 1990. "Labour Supply and Unemployment in Japan". memo. Kyoto Institute of Economic Research. Kyoto, Japan.

Topel, Robert. 1986."Local Labor Markets". *Journal of Political Economy*. 94:S111-S143.

Weir, Margaret. 1992. *Politics of Jobs: The Boundaries of Employment Policy in the United States*. Princeton University Press. Princeton, NJ.

Yoshikawa, Hiroshi, and Yoshiyuki Takeuchi. 1989. "Real Wages and the Japanese Economy". *Bank of Japan Monetary and Economic Studies*. 7:1-40.

ENDNOTES

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.

2. Although the there is greater flexibility in response to unemployment changes there is actually less responsiveness in Japan to output changes. The slopes of the implied AS curves are .084 in Japan vs. .227 in the U.S. respectively. 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 (1989) suggest that this effect is over 6 times as big in Japan as in the U.S.

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 U.S..

6. If a workers was eligible for 90 days benefits and used less than 45 he would get 30 days benefits as a bonus. If he were eligible for 300 days 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.

8. Migration will depend on the relative values of unemployment, wages, and rents in the two areas but it need not be the case that the effects are 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).

9. Thanks to Andrew Oswald for bringing this point to the authors attention.

10. Ito (1992) Chapter 6.

11. Grants account for 20 percent of the national budget in Japan versus 12 percent in the U.S. and 43 percent of individual taxes went to state and local governments in the U.S. 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.

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

13. The coefficients on net migration lagged five years were .451 and .001 for Japan and .262 and -.543 for the U.S. in autoregressive regressions without and with area fixed effects.

14. These results are available upon request.

15. 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 wages structure are if anything strengthened if per capita personal income is used instead of wages as the measure of compensation.

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

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

18. The elasticity using once lagged values of the dependent variable for the U.S. is .28.

TABLE 1

SELECTED COMPARATIVE ECONOMIC STATISTICS
AVERAGE ANNUAL RATES 1985-90

	U.S.	Japan	U.K.	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	2.0	1.6	2.0	1.9	2.4
Employment Growth 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, Bureau of Labor Statistics, 1991, Comparative Labor Force Statistics, Bureau of Labor Statistics, 1991 and Economic Report of the President, 1992. The data use U.S. concepts for labor force statistics.

TABLE 2

SELECTED INTERNAL MIGRATION RATES BY COUNTRY

	U.S.	U.K.	Netherlands	Japan	Sweden
Between Regions	2.1	1.01			
Between States	3.09				
Between Counties/Prefectures	6.55		3.0	2.9	1.5

Note: U.K. and U.S. are from Hughes and McCormick (1989), Gabriel, Shack-Marques and Wascher (1991), Japanese Bureau of Statistics, Björkland and Holmlund (1989) and Dijk, Folmer, Herzog, and Schlottman (1989). There are 9 census regions in the U.S. and 10 regions in the U.K.

TABLE 3

PERCENT OF EMPLOYMENT BY INDUSTRY

	Japan			U.S.		
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

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

Source: Management and Coordination Agency, Labor Force Survey 1989 and Economic Report of President, 1992.

TABLE 4

SELECTED ANNUAL PREFECTURAL NET MIGRATION RATES

	Year	
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 5

ANNUALIZED NET MIGRATION RATES FOR SELECTED 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 described in the Appendix.

TABLE 6

UNIVARIATE MODELS OF RELATIVE EARNINGS, UNEMPLOYMENT AND EMPLOYMENT FOR JAPAN

	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	$3x10^{-5}$	-.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. Standard errors are in parentheses. Column (2) estimates include prefecture fixed effects. All variables are deviations from national means.

TABLE 7

UNIVARIATE MODELS OF RELATIVE WAGES, UNEMPLOYMENT AND EMPLOYMENT FOR THE UNITED STATES

	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	$-7x10^{-5}$	$-8x10^{-5}$
	(.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. Standard errors are in parentheses. Column (2) estimates include state fixed effects. All variables are deviations from national means.

TABLE 8

RELATIVE PREFECTURAL UNEMPLOYMENT AND EARNINGS EQUATIONS FOR JAPAN

	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)
CPI		$6x10^{-6}$			
		(.01)			
Housing Rental Prices			.0001		
			(.0001)		
$\bar{R}^2$	.99	.99	.94	.97	.22
N	139	139	139	139	92

Notes: Data are for 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.

TABLE 9

RELATIVE STATE UNEMPLOYMENT AND WAGE EQUATIONS FOR THE UNITED STATES

	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

Notes: Data are described in the Appendix. All equations include prefecture fixed effects and time dummies controls. Column (2) for unemployment and column (3) for earnings include instrumental variable estimates for the lagged dependent variable.

TABLE 10

PREFECTURAL NET MIGRATION RATE AND COMMUTING EQUATIONS FOR JAPAN

	Annual Net Migration Rate		Day-Time/Night-Time 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

Notes: Columns (2) include prefecture fixed effects and time dummies. Data used are described in he Appendix.

TABLE 11

STATE NET MIGRATION EQUATIONS FOR THE UNITED STATES

	Annualized Log Population Change		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.

TABLE 12

SELECTED PREFECTURAL COMMUTING RATES

	Year	
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.