ESSAYS ON UNEMPLOYMENT DYNAMICS

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ABSTRACT

ESSAYS ON UNEMPLOYMENT DYNAMICS

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The main objective of this dissertation is to investigate the sources of unemployment fluctuations. Our main purpose is to assess the validity of debated conclusions of Shimer (2012) from a new perspective and re-analyze/re-harmonize his research question using alternative methods in five steps. First, we conduct a preliminary empirical exercise by replicating Baker (1992) with new data and find that Shimer's conclusion that "the movements in the exit rate from unemployment are the main determinant of unemployment fluctuations" is not that obvious. Second, we apply Shimer's method to demographic subgroups to see if his conclusions change at the group-level or not. We find that there is considerable heterogeneity across sub-groups in terms of the explanatory powers of the job finding probability versus the exit probability. Thirdly, we extended Shimer's model by incorporating a new labor market state, "self employment," to see if his conclusions change. We find that his results are mostly unaltered. But, we document important facts regarding the cyclical properties of the transition to and from self-employment. Fourth, we ask if his results are due to ignored measurement errors. We document that measurement errors have some role, but correcting for them does not alter Shimer's conclusions substantially. Finally, we take a closer look at the mechanics of Shimer's statistical model. We observe that focusing on rates instead of numbers may be underemphasizing fluctuations in entry and overemphasizing those in exit from unemployment

Keywords: Unemployment; Business cycles; Heterogeneity hypothesis; CPS.

ÖZ

İŞSİZLİK DİNAMİKLERİ ÜZERİNE MAKALELER

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Bu tezin temel amacı işsizlikteki dalgalanmaların kaynaklarını araştırmaktır. Temel hedefimiz Shimer (2012) tarafından ortaya konan tartışmalı sonuçların yeni bir perspektifle tekrar ele alınarak beş aşamada incelenmesidir. İlk olarak Baker (1992) tarafından ortaya koyulan amprik egzersizi yeni bir periyot için tekrar uygulayarak Shimer'ın işsizlikten çıkıştaki hareketler işsizlik dalgalanmalarının temel nedenidir" şeklindeki sonucunun o kadar da kesin olmadığını ortaya koyduk. Ikincisi, Shimer'ın kullandığı metodunu kendisinin sonuçlarının grup düzeyinde geçeliliğini görmek için demografik gruplar için uyguladık. Grup düzeyinde, işsizlikten çıkış ve işsizliğe girişin açıklayıcı güçleri açısından, ciddi bir heterojenlik olduğunu tespit ettik. Üçüncü olarak Shimer'ın modelini, bu modelin içersine yeni bir işgücü piyasası değişkeni olan kendi hesabına çalışma durumunu kendisinin sonuçlarının değişip değişmeyeceğini görmek için genişlettik. Sonuçların temelde değişmediğini gözlemledik; fakat kendi hesabıa çalışma durumuyla ilgili önemli döngüsel özellikler tespit ettik. Dördüncüsü, Shimer'ın sonuçlarının marjin hatalarını düzelttiğimizde değişip değişmeyeceğini sorguladık. Marjin hatalarının önemli rol oynadığını ama Shimer'ın sonuçlarını önemli ölçüde değiştirmediğini gözlemledik. Son olarak, Shimer'ın istatistiksel modeline daha derin bakarak oranlar üzerine odaklanmanın işsizlikten çıkışların etkisini daha yüksek gösterebileceğini ve işsizlik sürecine girişlerin etkisini ise daha düşük gösterebileceğini ortaya koyduk.

Anahtar Kelimeler: İşsizlik; Çevrimsel Dalgalanmalar; Heterojenlik Hipotezi; CPS

Dedicated to the memory of my grandmother, Müzeyyen İlhan.

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LIST OF ABBREVIATIONS

CPS: Current Population Survey

USA: United States of America

BLS: Bureau of Labor Statistics

ID: Identification

CHAPTER 1

INTRODUCTION

1.1 Motivation

Investigating the sources of unemployment fluctuations has been a longstanding research objective. This line of research has gained enormous importance recently, because, as Shimer (2005) has demonstrated, the textbook version of the celebrated Mortensen-Pissarides equilibrium search and matching model [see Pissarides (2000)] cannot generate the observed frequency of unemployment fluctuations for the USA. Knowing the exact sources of fluctuations would provide empirical guidance on how to modify the model and obtain the desired results. It is also important for practical and policy purposes, aside from the theoretical concerns.

The studies in focusing on the unemployment fluctuations mainly focus on the USA case. Early papers from this literature [see, for example, Darby, Haltiwanger, and Plant (1985)] argue that the rate of unemployment fluctuates mainly because of compositional effects in the USA. At the center of this argument lies the perception that job finding and exit probabilities are different across different groups in the worker population. The main idea is that the group-level job finding and/or exit probabilities do not change, but the composition of groups in the pool of unemployed varies over the business cycle, which is claimed to be the main reason behind unemployment fluctuations. This assertion is called the heterogeneity hypothesis in the macro-labor literature.

Papers including Sider (1985), Baker (1992), and Shimer (2012), on the other hand, have argued that the heterogeneity hypothesis is not valid empirically and the rate of unemployment fluctuates mainly because of fluctuations in the entry and exit probabilities for the USA. More precisely, Shimer (2012) have explicitly documented using both macro- and micro-level evidence that "the job finding probability has accounted for three-quarters of the fluctuations in the unemployment rate in the United States and the employment exit probability for one-quarter" since 1948. This result is in stark contrast with the conventional wisdom arguing that "the amplitude of fluctuations in the flow out of employment is larger than that of the flow into employment" [see Blanchard and Diamond (1990)]. A further implication of this conventional view is that the amplitude of the underlying fluctuations in job destruction is larger than that of job creation [Davis and Haltiwanger (1990, 1992) and Davis, Haltiwanger, and Schuh (1996)]. This implication has motivated a large volume of subsequent research starting with Mortensen and Pissarides (1994), whose model predicts—after feeding this implication in—that the employment exit probability should be significantly more volatile than the probability of job finding. Shimer argues that his results contradict the conventional wisdom that has guided the development of macroeconomic models of the labor market since 1990.

These results are of great theoretical importance, because knowing the exact sources of unemployment fluctuations would provide empirical guidance on how to modify the canonical Mortensen-Pissarides model for the purpose of fitting it to the basic business cycle facts for the case of the USA. Such a modified model would serve the profession by providing a more reliable means of macroeconomic policy analysis.

Shimer's results have been set as the new baseline stylized facts on the cyclical properties of unemployment dynamics. Our main purpose is to check the validity of Shimer's conclusions from a new perspective for the USA using the same data set. There are four points of departure. First, Shimer does not treat "self-employment" as an exclusive labor market status and includes all self-employed workers into the "employed" category. He uses the monthly Current Population Survey (CPS) data of the USA to derive the gross flows of workers across three

states: employment, unemployment, and inactivity (or not-in-labor-force). To calculate these flows, he follows the early literature and matches the responses of the common rotation groups in two consecutive months. After standard seasonal adjustment and detrending procedures, he feeds these gross flow series into a system of differential equations to solve numerically for the transition probabilities across the three labor market states. He then investigates the cyclical properties of these transition probabilities and concludes that fluctuations in the job finding probability explain around three-quarters of the fluctuations in the unemployment rate, which contradicts the conventional wisdom. Self-employment deserves special attention as a labor market state for two reasons: (i) transitions from and into self-employment status especially during downturns may exhibit certain patterns that may help us to further disentangle the sources of unemployment fluctuations and (ii) most self-employed workers are not subject to unemployment insurance or other certain social security coverage, which makes the transitions from and into the self-employed status particularly responsive to the institutional shocks besides macroeconomic shocks. We incorporate "self-employment" as a fourth labor market state – other than unemployment, wage employment, and not-in-labor-force – into Shimer's model and ask if Shimer's main results are preserved under the four-state version. This will be the first attempt to model labor market transitions within a four-state differential equations structure.

We find that incorporating self-employment reinforces Shimer's conclusions. Without self-employment, cyclical movements in the transitions from employment to unemployment (i.e., job finding probability) explain around 48% of unemployment fluctuations, while movements in the exit probability explain only 20%. After including self-employment, the explanatory power of job finding probability is slightly reduced (to 46%), whereas the exit probability now explains only 12% of unemployment fluctuations. We observe that cyclicality in the transitions from self-employment to unemployment, which accounts for 10% of unemployment fluctuations, is the main reason behind this change. We observe that this pattern invariably holds for almost all sub-groups of the population. We conclude that ignoring self-employment does not change the qualitative nature of Shimer's results.

What we have learned from this exercise is a striking policy conclusion. That the movements in exit probability explain 20% of unemployment fluctuations does not tell us much about the effect of business cycles on the well-being of the unemployed, as we believe that unemployed workers will receive unemployment benefits (which include a standard health and medical care coverage) for a certain time period that would give them enough room to find a new job. The finding that around a half of this 20% comes from transitions from self-employment to unemployment is an important result, because this tells us that self-employed people in the United States are subject to great work and income uncertainties, which reduce their well-being. This result suggests that the destructive effects of high unemployment periods on the society in the United States may be more severe than we think.

This is also important for theory. The standard Mortensen-Pissarides model does not recognize self-employment as a separate labor market status. Our finding suggests that a full explanation to the fluctuations in the rate of unemployment should incorporate what happens to the self-employed individuals over the business cycle. Thus, the macroeconomic models of the labor market should recognize self-employment as a distinct state variable both in modeling and calibration senses.

Second, labor market transitions extracted from the monthly CPS data suffer from margin errors. [see Abowd and Zellner (1985) and Poterba and Summers (1986)]. Margin error is a sort of a missing-data problem. It corresponds to the issue of missing labor force status of the individuals in the CPS rotation groups, which leads to matching problems in the data. Abowd and Zellner (1985) report that ignoring the margin error may lead to a loss of information about the labor force status of around 15% of all observations. One problem with Shimer's analysis is that he does not correct for the errors that can potentially arise during the process of matching workers in consecutive months of the CPS. Our purpose is to put together a comprehensive empirical framework to evaluate the potential impact of margin errors on the cyclical properties of unemployment dynamics. Taking Shimer's theoretical framework as the benchmark model, we perform a detailed analysis of the cyclical properties of transition probabilities adjusted for the margin errors. We

suggest that the extent and the contribution of these margin errors to the business cycle fluctuations are considerable. Our findings suggest that the explanatory power of the fluctuations out of unemployment on unemployment rate. The margin adjusted fluctuations from employment, on the other hand, are not as cyclical as the unadjusted ones. This result strengthens the result of the Shimer (2012).

Third, we move one step further and decompose Shimer's analysis into certain population sub-groups. In other words, we compare the transitional dynamics across different demographic groups, i.e., male versus female, black versus white, young versus old, both for the three- and four-state models. We ask if the facts documented by Shimer also hold for certain population sub-groups. We also analyze the error structures across demographic groups. The analysis for sub-groups will be a further test of the heterogeneity hypothesis. This is also novel, since no papers in the literature investigate the sources of unemployment fluctuations for different sub-groups using micro-level data, as detailed as this thesis.

We find that there is considerable heterogeneity across sub-groups in terms of the explanatory powers of the job finding probability versus the exit probability. However, the main conclusion of Shimer (2012) holds for all subgroups: movements in job finding probability can explain a larger fraction of unemployment fluctuations than the exit probability can explain. More specifically, we show that the explanatory power of the exit probability is largest for white (than black), male (than female), and older (than younger) workers (more than 20%). It is lowest for females, 11%, and largest for males 26%. The explanatory power of the job finding probability is consistently high for almost all sub-groups (lies between 43–49%): lowest for older workers, 43%, and highest for females, 49%. We also show that discouragement (measured in terms of the explanatory power of the unemployment to inactivity transitions) is most effective for older workers (18%) and for blacks (16%).

We also perform the decomposition analysis for the four-state version. Again, Shimer's result that movements in job finding probability have a large explanatory power on unemployment fluctuations holds for all sub-groups in the four-state model. But, we have to emphasize that the magnitudes are somewhat smaller,

ranging between 40–48%: lowest for older workers, (40%), and highest for females (49%). We also show that transitions from self-employment to unemployment have a significant explanatory power for all sub-groups. It is highest for younger and black workers (14% each) and lowest for females (7%). We further report that transitions from unemployment to self-employment are procyclical and the degree of procyclicality is the largest for older workers. The transitions from wage employment to self-employment are generally acyclical.

Fourth, we also ask if there is any flaw in Shimer's formulation that might possibly lead to a bias in his results and, accordingly, we took a closer look into the mechanics of the statistical model he constructs. This is a reasonable concern, because Shimer's conclusions suggest that the hiring behavior fluctuates more than the quit (both voluntary and involuntary) behavior; but, one would naturally expect that the quit behavior would be at least equally cyclical. We observe that Shimer focuses on transition "rates," which suggests that the denominator is smaller for the entry behavior than it is for the exit behavior, as the pool of unemployed is typically much smaller than the pool of employed. Holding the denominators constant, it would be natural to see that the entry rate fluctuates much more than the exit rate, when we vary the numerators at the same rate. Moreover, again because of the scale effects, the denominator fluctuates more for the entry rate than the exit rate. These observations suggest that focusing on rates may be overemphasizing fluctuations in entry and underemphasizing those in exit. To test this conjecture further, we focus on the "number" of transitioning workers rather than the rates. Back of the envelope calculations suggest that entry and exit are almost equally cyclical when we focus on the numbers. This finding provides us motivation for developing alternative calculation methods using numbers rather than rates in future research.

At this point, it will perhaps be useful to summarize the results of our preliminary empirical analysis, which raises doubts on the validity of Shimer's results, leads us to ask the fourth question mentioned above, and motivates this thesis. We start our analysis by testing the validity of the heterogeneity hypothesis using the most recent CPS data. We build on the empirical framework developed by Baker (1992), who analyzes the CPS data for the 1980–1989 period and rejects the

heterogeneity hypothesis in the United States. Most importantly, he shows that the rate of unemployment moves closely with the aggregate duration of unemployment, which suggests that cyclicality in the job finding probability is the major determinant of unemployment fluctuations. Using the 1996–2012 data, we show that the heterogeneity hypothesis is still rejected but the degree of co-movement between the rate of unemployment and the aggregate expected duration is somewhat weaker, which casts doubt on Shimer's conclusions. In this thesis, our main goal is to test whether adding self-employment as the fourth labor market state and accounting for the margin errors change Shimer's results. We also test if his results hold invariably for different population sub-groups or not. At the end, we will be able to understand if the discrepancy between the results reported by Shimer (2012) and our preliminary empirical investigation – which is basically an extension of Baker's paper – is due to ignored labor market transitions and/or measurement errors in Shimer's analysis.

1.2 Literature on Labor Market Fluctuations

The celebrated Mortensen and Pissarides (1994) model of job search is capable of explaining a large variety of labor market phenomena. In his seminal work, Shimer (2005) shows that the model cannot generate large fluctuations in the rate of unemployment, which is observed in the data. Why the model cannot match the cyclical properties of the unemployment data, although it can explain most of the other labor market facts, has been a puzzling question since then. Shimer (2005), Hall (2005), and Hall and Milgrom (2008) argue that the Nash bargaining assumption in the determination of wages imposes excess flexibility in wages, which absorbs most of the cyclicality that the model generates, and leaves little room for the unemployment rate to fluctuate. They conclude that a search model with sticky wages may be the right framework to work out. Gertler and Trigari (2009) present such a framework. Soon after this assertion, Pissarides (2009) shows, using microeconometric evidence, that it is very hard to say that wages are sticky in the United States. After this sharp conclusion, researchers have started to seek alternative ways to remedy this undesired feature of the Mortensen-Pissarides model. Hagedorn and Manovskii (2008) argue that incorporating household production may resolve the issue. Kennan (2010) shows that accounting for private information may be the

answer. Tumen (2011) claims that the lack of social interactions in the model may be the missing piece.

In search for a solution to this puzzle, Shimer (2012) takes a deeper look into the micro-data and realizes that, for the Unites States, the observed (large) unemployment fluctuations stem mostly from the variation in the exit rate from unemployment, not from the rate of entry into unemployment. This result connects to an older literature as follows. Sider (1985) argues that compositional effects (a.k.a. the heterogeneity hypothesis) could alone generate fluctuations in the rate of unemployment. Baker (1992) raises his objection and empirically shows that the source of fluctuations is the variation in the rate of entry to and exit rate from the pool of unemployed. He emphasizes the role of the entry rate (i.e., the job finding rate) as the main determinant.

These findings are inconsistent with the canonical search and matching literature in an important and striking way. The conventional wisdom that has motivated the development of the Mortensen-Pissarides model builds around research by Darby, Haltiwanger, and Plant (1985, 1986), Blanchard and Diamond (1990), and Davis and Haltiwanger (1990, 1992), that recessions are periods characterized primarily by a high exit rate from employment [Shimer (2012)]. This result motivated famous macroeconomic models of the labor market, including Mortensen and Pissarides (1994) and Caballero and Hammour (1994). In particular, papers in this line of research have concentrated on the reasons for job loss in recessions rather than difficulty of finding jobs. Baker (1992), Shimer (2012), and the other papers in the opponent literature, argue that finding jobs becomes much more difficult during recessions than the increased exit rates. Therefore, the conventional wisdom has been built on wrong fundamentals.

There is a separate branch of this literature mainly arguing that whether the job finding or the exit rate is the dominant force is not a universal phenomenon and differs across countries. For example, Hobijn, and Sahin (2009) show that movements in the job finding probability over the business cycle is the major determinant of unemployment fluctuations in the Anglo-Saxon countries, including

the United States and United Kingdom; but, in the continental Europe, movements in the exit rate is the main determinant. This piece of evidence alone is enough to motivate a re-examination of Shimer's results and conclusions from a different perspective, before blaming the theoretical models for being constructed on misleading fundamentals.

Fujita and Ramey (2009) criticize Shimer's work by asserting that the HP-filter parameter of 10000 used by Shimer oversmoothes the fluctuations and weakens the information content that comes from the data. They show that smaller parameters will yield results that favor exit rate rather than the entry rate to be the dominant factor. In another paper, Fujita and Ramey (2012) argue that accounting for job-to-job transitions, the volume of which is large in the United States, amplifies the role of exit rate in explaining unemployment fluctuations.

The results produced in this literature, including Shimer's work and the subsequent papers, are based on empirical models invoking strong assumptions and are subject to potential biases/measurement errors. A fresh look into the data and careful re-evaluation of the facts are needed to produce sharper estimates on what happens to entry and exit rates over the business cycle. This thesis aims at bringing a new perspective into the empirical results documented in this literature by focusing on the "self-employment" status as a separate labor force status, by investigating what happens to the entry and exit rates of certain demographic sub-groups over the business cycle, and by testing the role of certain measurement errors in affecting the findings regarding the sources of unemployment fluctuations.

1.3 Business cycles and recessions in the USA

This thesis aims at focusing on the relationship between the economic activity and labor market fluctuations. The expansions and recessions in our period are important for understanding the changes in economic activity. The USA economy experienced 4 recessions in the covered period from 1980 to 2011. First crisis initiated in 1979 was due to rising petroleum prices was in the era of regulated capitalism, as suggested by Kotz (2008). Verleger (1979) suggests that price increases can be regarded as normal if the decrease in the supply of petroleum

products is only taken into account. Verleger also argues that some policy tools may have been implemented by U.S. Department of Energy to discourage stock building behavior that limits the availability of the product.

This period is characterized by strong trade unions that caused rising real wages and declining profits as suggested by Kotz (2008). Kotz (2008) also argues that neo-liberal period changed the capital accumulation process. Furthermore, capital accumulation is characterized by the stagnant wages and rising profits, as suggested by Kotz. The consumer demand is also increasing although the wages are not rising. This results in a gap between consumption and income. Kotz argues that this gap is the major reason for the recessions following the expansions in neo-liberal era. Household debt increases continuously, stimulating the asset bubble which plays key role in the recessions in neo-liberal era.

Stagnant wages in neo-liberal area has some implications for this thesis focusing on labor market transitions. The effect of the last 2007 crisis on the labor market is beyond the level that one can expect in an environment of stagnant wages. One can not suggest decreasing the wage level to absorb the unemployed in such an environment as a policy tool.

Kotz (2009) argues that the financial crisis in 2007 is due to the fact that the value of mortgage related assets decreases. Kotz also suggested that this crisis must be regarded as a result of systemic nature of neo-liberal capitalism. Being a systemic crisis means that restructuring of the system is necessary to cope with the crisis as argued by Kotz (2009). On the other hand if a crisis is not a systemic crisis then it is possible to deal with the crisis by limited interventions on the market, as argued by Kotz.

This thesis contributes to explore the systemic results of the last crisis on the labor market in the USA economy. Interventions after the 2007 crisis to labor market couldn’t change the weak recovery. The transitions from unemployment to employment of all groups show moderate increases after 2007 crisis. Our thesis also shows that 2007 crisis is the most severe crisis of the neoliberal era when the transitions in the labor market is examined.

Davidson (2008) argues that the last crisis is not only a result of more fragile and risky financing. Actually, the major factor behind 2007 crisis is insolvency problem according to Davidson.

Spence and Hlatshwayo (2012) state that about 27 million new jobs are created from 1990 to 2008. They also state that almost all of this increase is accounted for by the non-tradable sector. Government and health care sectors are the first two sectors in their contribution to this employment growth. Manufacturing sector employment diminished between these years although the value added in this sector increased between 1990 and 2007.

The expansion that starts in the beginning of the 1990s lasting until 2000s was due to the increase in nonresidential fixed investment according to Kotz (2008). Kotz also state that the expansion was slow in the first half and faster in the second half of the 1990s. The crisis that started in 2000's was due to slowdown in the profit rates. This crisis can be more severe than experienced if the consumer spending starts to increase in this time.

The expansion after 2001 crisis differs from other expansion stages in the USA economy since all other expansions was driven by the increase in nonresidential fixed investment according to Kotz (2008). However in the last expansion the increase in consumer spending was the major factor, as Kotz (2008) argues.

CHAPTER 2

DATA

2.1 Introduction

The monthly Current Population Survey (CPS) data is used in all calculations and estimations performed in this thesis. The CPS dataset is designed by Bureau of Labor Statistics (BLS) of the United States in order to collect information on the labor force situations and earnings of the US population. Bureau of Labor Statistics releases technical papers to provide detailed information on the CPS data sets [see U.S. Bureau of Labor Statistics (2002) and U.S. Bureau of Labor Statistics (2006)]

On average, 60,000 households are interviewed in each month. The survey includes rotational groups interviewed for a consecutive 4 months before a break of 4 months, and re-interviewed 4 months following the break. Therefore, they are in sample for 8 months, the fifth month representing the first month after the break.

We follow outgoing rotation groups for tracking a person from month to month in order to observe the transition between unemployment duration categories, and labor market status categories in the chapter from the next to the end. We create personal identification (id) numbers to match the individuals from one month to the next by using household id numbers, individual line numbers, and the variables of personal characteristics such as sex, age, and race, since an individual identification number is not provided in the original dataset.

Our dataset captures the period from January 1980 to February 2012. The dataset consists of individuals from the civilian non-institutional population of age 16

and above. The CPS data contains information on the person, person's family, and person's household. We follow the person's record in order to get information on the labor market transitions, and unemployment duration.

CPS has witnessed sharp changes in the period we consider. 1989, 1992, 1994, and 1995 are the years when the definition and calculation of some major variables has changed. These changes are taken into account in the design of the data. The individuals are asked their unemployment duration every month when they are in the sample before 1994, while they are only asked unemployment duration in the first and fifth months of eight months when they are in sample. Unemployment duration variable is calculated automatically by adding 4 weeks to previous month's duration in the following months. The redesign of unemployment duration variable has influenced the measure of short term unemployment significantly. The individuals who are recorded as unemployed previous month, but employed at any time period to be exited until the next survey date are added to short term unemployment since their job experience are taken into account in the duration. The individuals are not asked their duration of unemployment apart from the first and fifth month after the redesign. The unemployment duration of individuals who are unemployed in previous month and, employed at any time period to be unemployed again until the next survey date is updated by adding four months to the duration of previous month. This means that the individuals experiencing short term transitions to employment between two survey dates are not taken into account in measuring the short term unemployment in post 1994 period. We take the redesign of the CPS into account for the estimation process by assessing the design as a benchmark in Chapter 3. We adjust the unemployment duration data by adding 4 weeks to the weeks announced in individual's first month in sample. The statistics provided below are from the original duration variable given by BLS.

CPS data is criticized for margin error. Davis and Haltiwanger (1998) suggest that the observations, which cannot be matched from previous month to the current month, constitute a problem for getting true information on the transitions of workers. We correct the margin error in chapter 5.

2.2 Unemployment Duration

In this thesis, Unemployment duration of the unemployed from civilian noninstitutional population whose ages are between 16 and 64 are examined to calculate expected average unemployment duration, and to analyze the cyclical features of unemployment duration in chapter 3. This analysis is implemented for two different time periods: the period from 1980 to 1989 and, then, from 1996 to 2012.

We have 630,463 observations from unemployed population in the period from the January of 1980 to December of 1988. The mean unemployment duration is 15.07 weeks in this period. One interesting feature of the data is the high number of observations in the weeks equal to an integer month. This means that the unemployed individuals have a tendency to announce their weekly duration by rounding it for representing an integer month. To illustrate, an individual whose actual unemployment duration is 3.5 weeks announce 4 week in the interview. Table 2.1 demonstrates this digit preference problem more clearly. The percentage of the 4 week duration is 11.84%, while that of 3 weeks is 9.66%, and 5 weeks is equal to 2%. Similarly, the number of observations in 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52 weeks are abnormally high relatively to the others.

Table 2.2 shows the average shares of duration categories for total data, females, and males for the 1980–89 period. One interesting feature of the duration data is the relatively high share of short term unemployment of females. This can be due to a decreasing trend in labor force participation of males in the second part of 1980's. Female labor force participation remains relatively high in these years. Thus, the short term unemployment is higher for females than males as a share to total unemployment. These trends will be discussed below in the analysis of transition dynamics properties of our data.

Table 2.1 The Percentages of Unemployment Duration by Weeks

Duration Category	Percentage
Number of weeks	
0-3 weeks	33.71 %
4 weeks	11.84 %
5-7 weeks	9.95 %
8 weeks	7.77 %
9-11 weeks	3.47 %
12 weeks	4.8 %
13-15 weeks	2.74 %
16 weeks	2.32%
17-19 weeks	2.1 %
20 weeks	2.05 %
21-23 weeks	1.47%
24 weeks	1.57%

Notes: The average percentages of the unemployment duration weeks announced by the individuals surveyed in CPS data for the period from January 1980 to December 1988.

Table 2.3 shows the average shares of duration categories in total unemployment for the period from 1996 to 2012. The redesign of the unemployment duration variable reduces the short term unemployment from 40% to 30%. The short term unemployment for females is still higher than that of males although the difference becomes lower over the years. The increase in the share of longer durations in the period from 1996 to 2012 for males and females attracts the attention. The share of unemployed for 53 or more weeks is doubled after 1996. This is partly due to the increase in the labor force participation over this period.

Table 2.2: Comparison of Unemployment Duration of Males and Females

Duration Category	Total	Male	Female
0-4 week	0.475	0.411	0.37
5-8	0.177	0.181	0.175
9-12	0.09	0.093	0.102
13-26	0.156	0.138	0.17
27-52	0.097	0.08	0.112
53+	0,055	0.037	0.071

Notes: The average percentages of the unemployment duration categories announced by the individuals surveyed in CPS data for the period from January 1980 to December 1988.

Table 2.3 Comparison of Unemployment Duration of Males and Females

Duration Category	Total	Male	Female
0-4 week	0.315	0.325	0.307
5-8	0.15	0.154	0.146
9-12	0.104	0.104	0.104
13-26	0.185	0.182	0.187
27-52	0.138	0.135	0.14
53+	0,105	0.1	0.116

Notes: The average percentages of the unemployment duration categories announced by the individuals surveyed in CPS data for the period from January 1996 to December to February 2012.

2.3 Transitional Dynamics

We analyze the transitions among three different employment states: employment, unemployment, and inactivity from the matched records of the data. We use sample weights to calculate the gross flows between employment states. Employment to employment, employment to unemployment, employment to inactivity, unemployment to employment, unemployment to unemployment, unemployment to inactivity, inactivity to employment, inactivity to unemployment, and inactivity to inactivity are our nine transitions for which we construct the gross flows. We calculate 9 entrance shares from the gross flows in a manner that each flow is divided by total flows from the initial state. To illustrate, share of employment to employment transition is calculated by dividing the gross employment to employment flow by the sum of employment to employment, employment to unemployment, and employment to inactivity transitions. Therefore the sum of the shares of transitions from employment is equal to one. Similarly, the shares of transitions from unemployment and inactivity equal to one.

Figure 2.1 shows the share of the flows from employment to employment in the total flows from employment from the January of 1980 to the February of 2012. The share of the transition from employment to employment increases from the beginning to the initial phase of 2000's when it becomes more stable. One other observed phenomenon is the decrease in the fluctuations in this share over time.

Figure 2.2 shows the share of the transition from employment to unemployment over time. A decreasing trend in employment to unemployment transitions are witnessed from the 1980 to the initial states of 2000's. The jump observed between 2009 and 2012 shows the effects of the last crisis on the transitions from employment to unemployment. The fluctuations in employment to unemployment transition also increase in the same period.

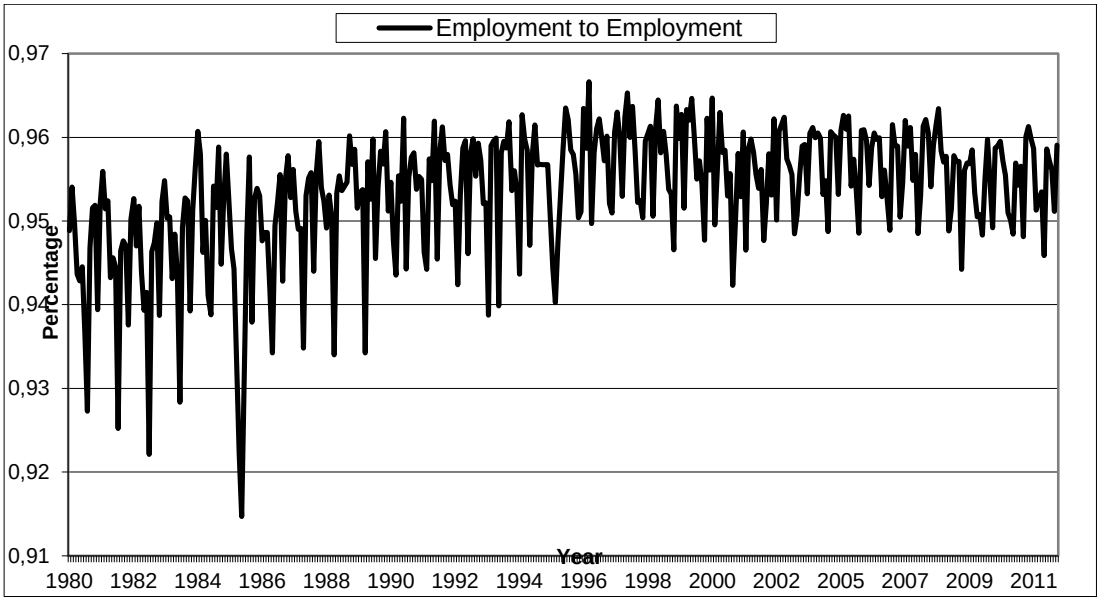

Figure 2.1: Monthly transition shares of employment to employment from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

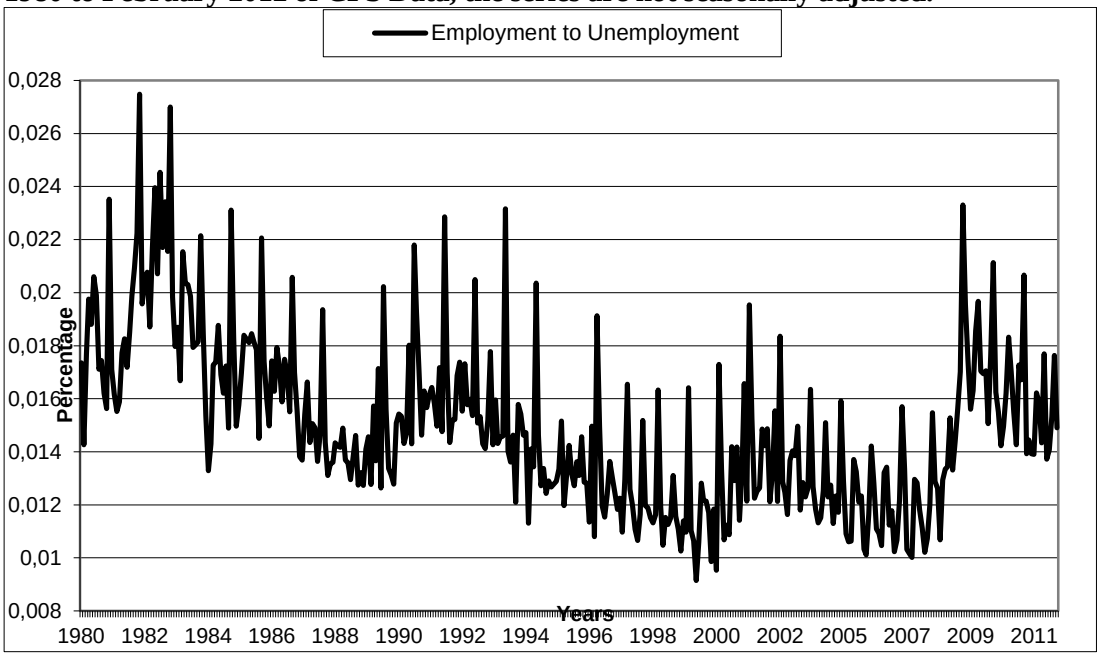

Figure 2.2: Monthly transition shares of employment to unemployment from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

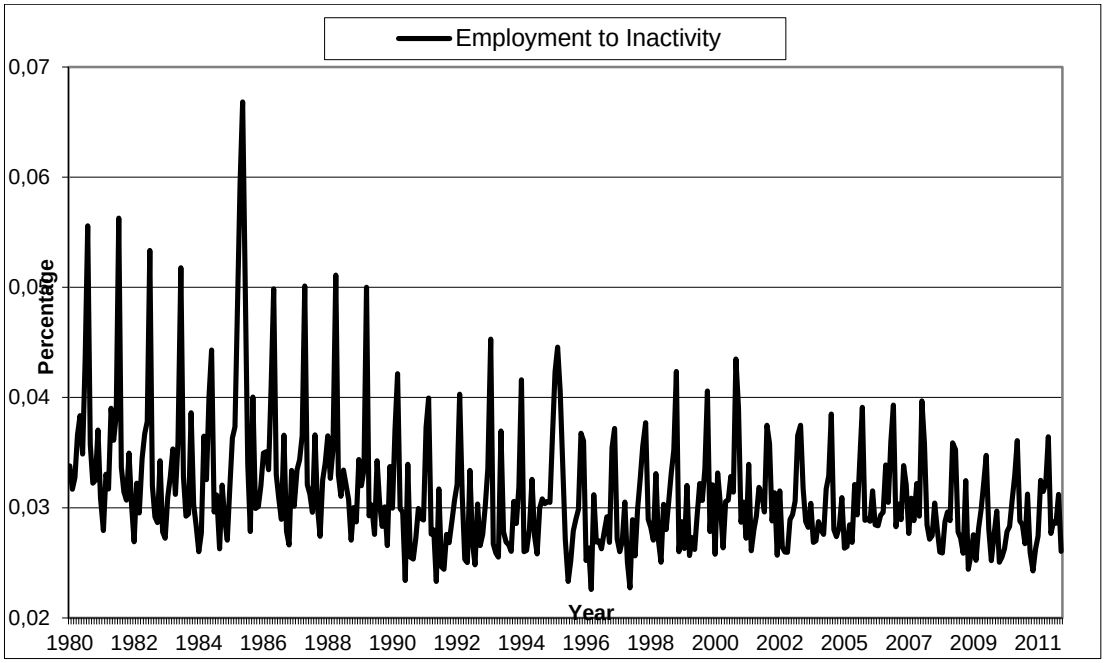

Figure 2.3: Monthly transition shares of employment to out of labor force from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

Figure 2.3 shows the employment to inactivity transitions over time. The fluctuations in this share decrease over time similar to employment to unemployment transitions. A weak decreasing trend between 1980 and 1990 is another feature of the employment to inactivity transitions.

The increasing trend in employment to employment transition in the period from 1980 to 2000 can be accounted for by the decreasing trend in employment to unemployment transitions in the same period. Another important fact is that the cyclicality of the transitions from employment declines over time except for the transition from employment to unemployment. The last crisis can be major explanation for the increase in the fluctuations of this share.

Figure 2.4 shows the shares of unemployment to employment transitions over time. An interesting feature of unemployment to employment transitions is that 3 increasing trends, the first between the early 1980's to 1990's, the second one between the early 1990's to 2000's, and the last one between the early 2000's to the last economic crisis, characterizes the unemployment to employment transitions. Unemployment to employment transition decreases to its lowest level in the last

economic crisis. Figure 2.5 and 2.6 show unemployment to unemployment and unemployment to inactivity transitions respectively.

Figure 2.4: Monthly transition shares of unemployment to employment from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

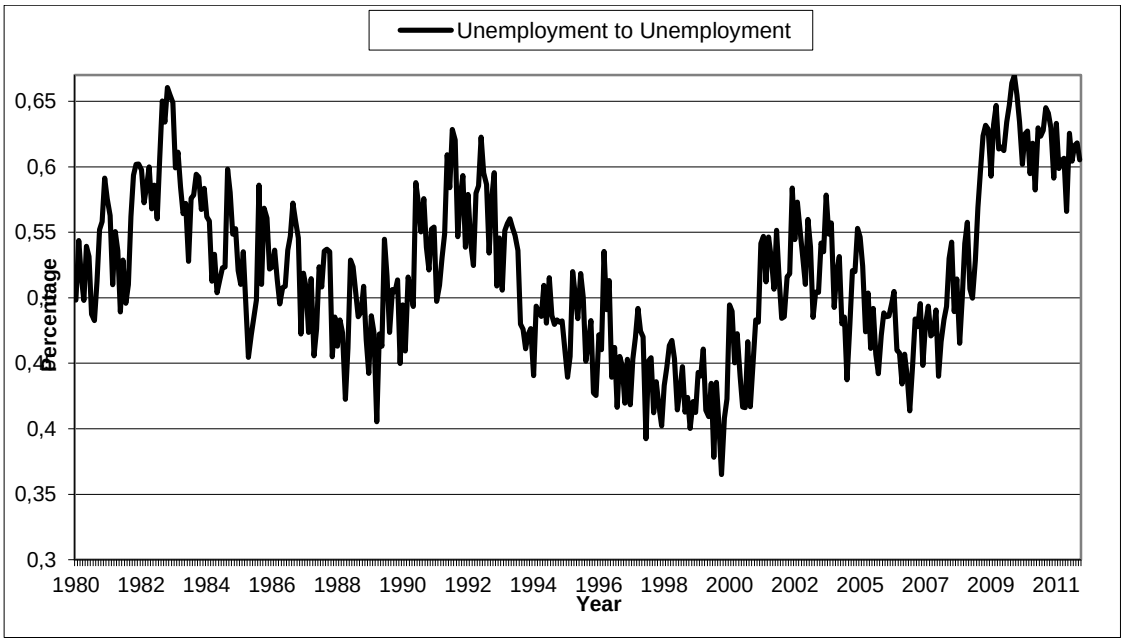

Figure 2.5: Monthly transition shares of unemployment to unemployment from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

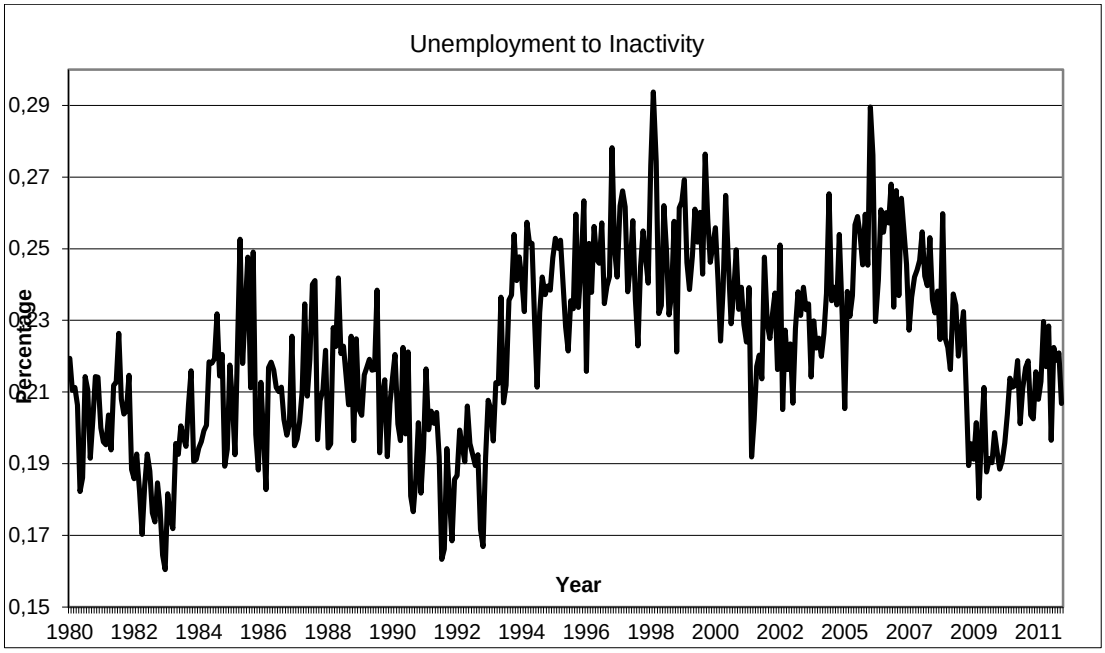

Figure 2.6: Monthly transition shares of unemployment to inactivity from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

Transitions from unemployment to unemployment decreases steadily until 2000's. This share starts to rise with the early 2000's. This share reaches its maximum after the last economic crisis.

The increasing trend between 1980 and 1990 in transition from unemployment to employment is consistent with the decreasing trend in the same years in the transition from unemployment to unemployment. Similarly, the decreasing trend in unemployment to employment transitions between the midst of the 1990's to the early years of 2000's can be explained by the increasing trend in unemployment to unemployment transitions. The last economic crisis increases the unemployment to unemployment transitions, whereas it reduces the unemployment to employment and unemployment to unemployment transitions, implicating that the individual insist on looking job despite the adverse effect of the last crisis on the probability of find job.

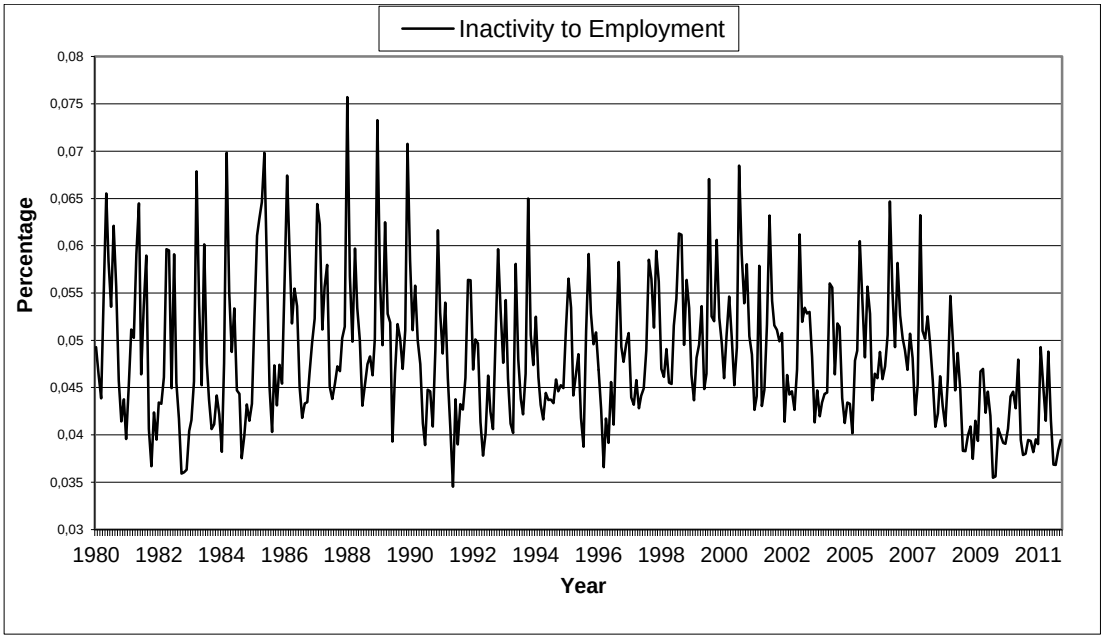

Figure 2.7: Monthly transition shares of inactivity to employment from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

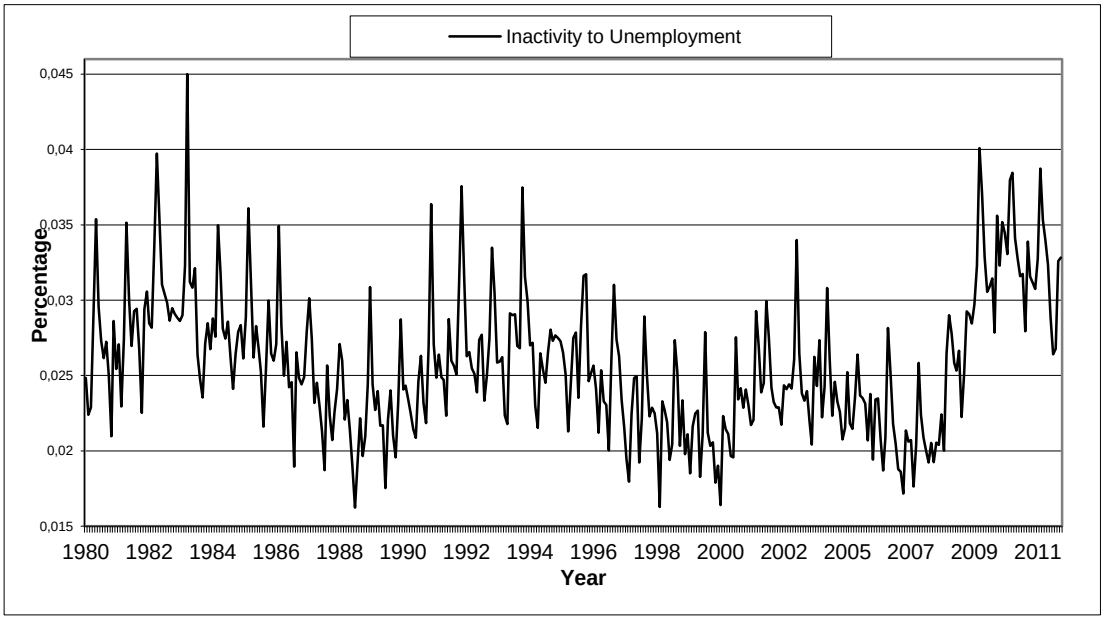

Figure 2.8: Monthly transition shares of inactivity to unemployment from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

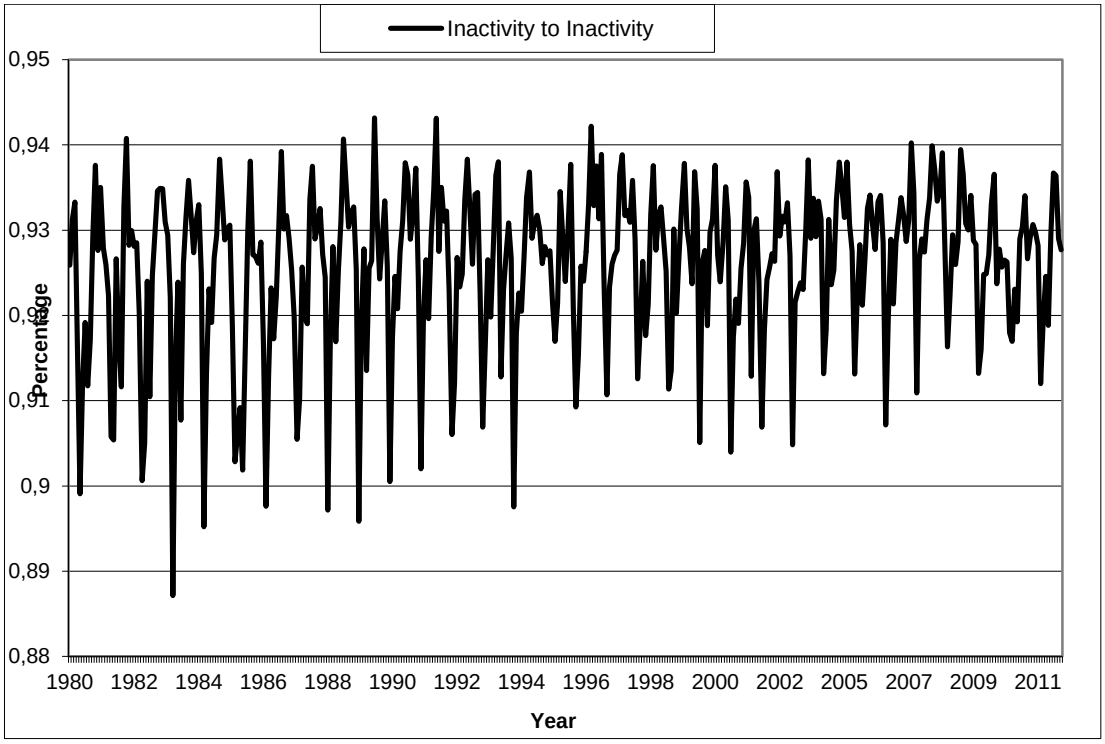

Figure 2.9: Monthly transition shares of inactivity to unemployment from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

Figures 2.7, 2.8, and 2.9 demonstrate that the cyclicality of the transitions from inactivity declines over the years apart from the inactivity to unemployment transitions. The jump in inactivity to unemployment transition observed after 2008 demonstrates that the last economic crisis increased labor force attachment of the population. On the other hand, the transition from inactivity to employment decreases as a result of the 2007 and 2008 economic crisis.

When we consider the male and female transition shares separately, we observe heterogeneity in the behavior of employment to unemployment transitions and inactivity to unemployment transitions. The effect of the recessions on the probability of the transition from employment to unemployment is higher for the males. The increases in employment to unemployment transitions of the males in the first part of 1980's and 1990's, and the post 2007 period are beyond the increase in the employment to unemployment transition of females, which can be seen from Figure 2.10. Another interesting observation is that the increases in the inactivity to unemployment transition in recessions are higher for males than females. Recessions increase the labor force attachment of males more than females.

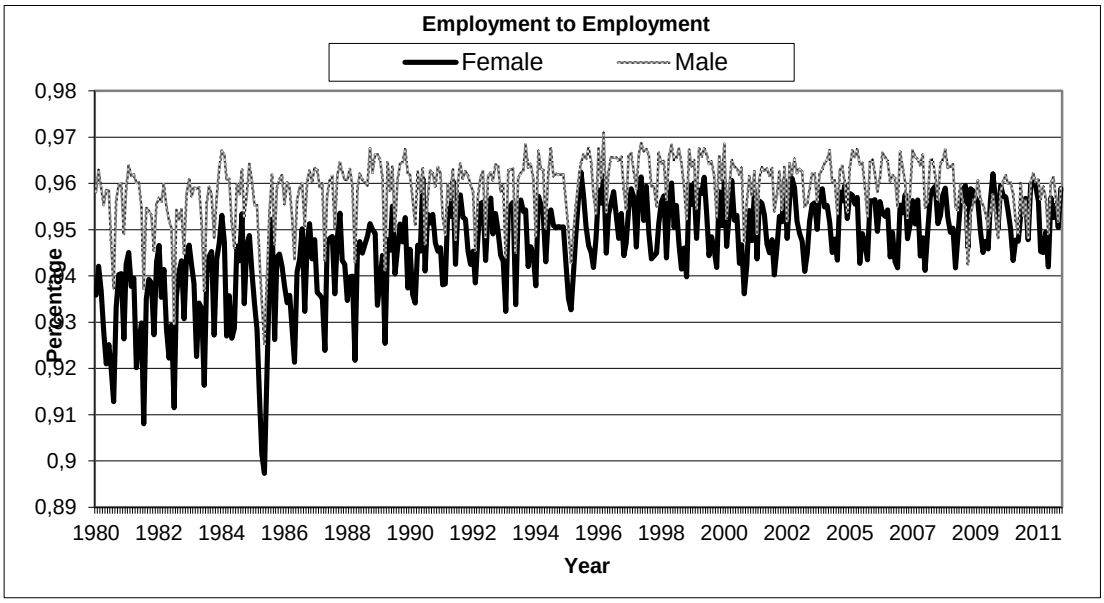

Figure 2.10: Monthly transition shares of employment to employment of the males and females from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

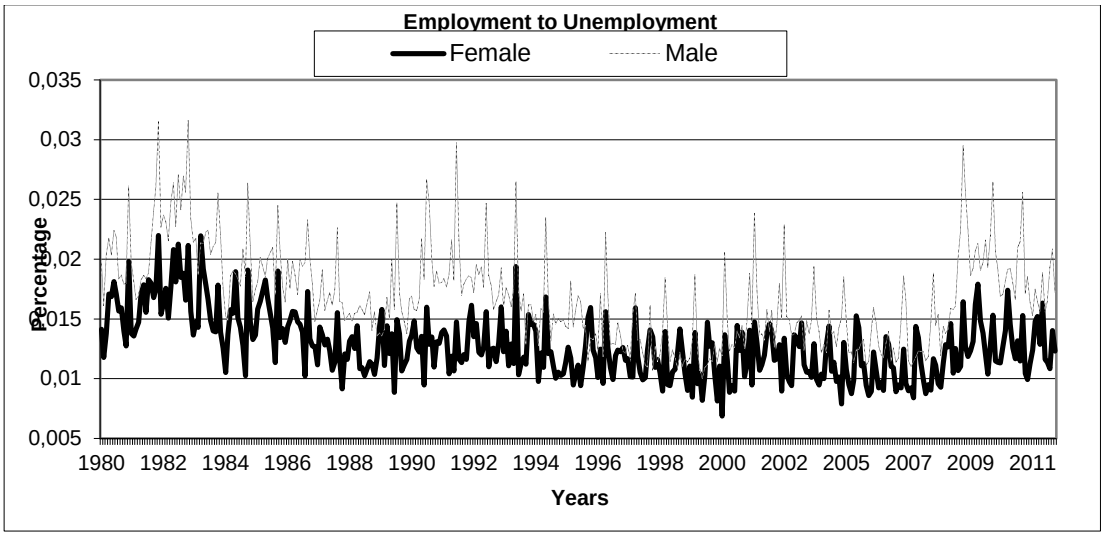

Figure 2.11: Monthly transition shares of employment to unemployment of the males and females from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

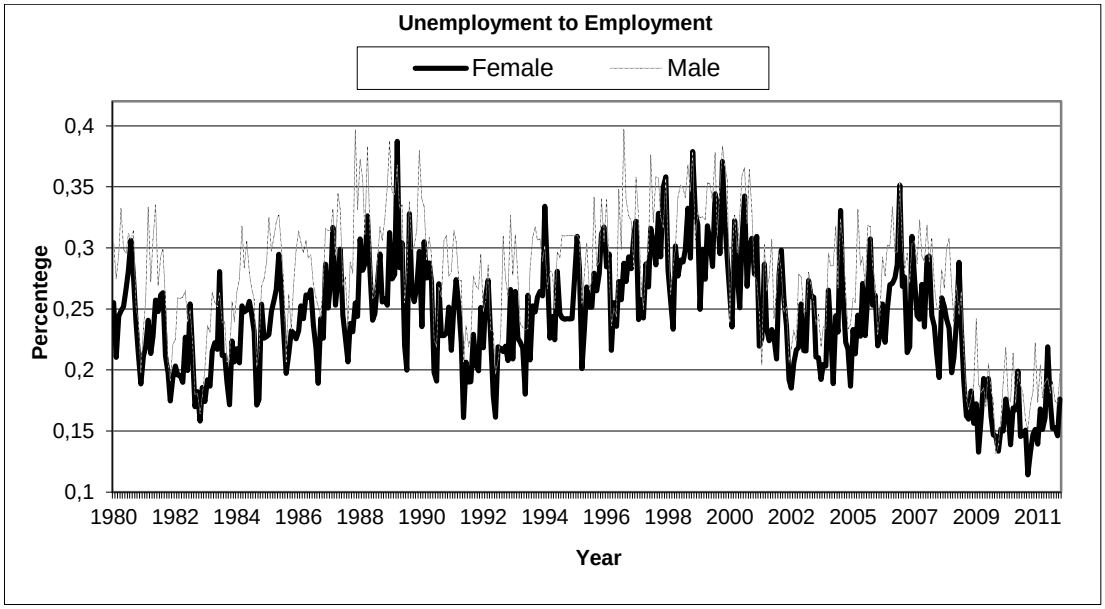

Figure 2.12: Monthly transition shares of unemployment to employment of the males and females from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

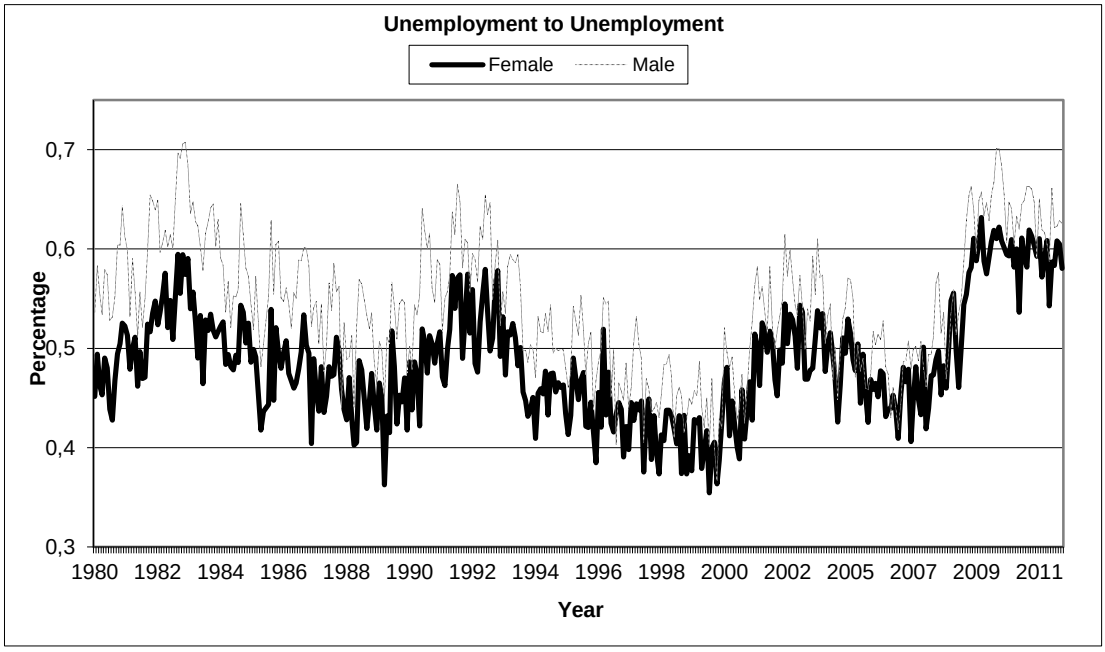

Figure 2.13: Monthly transition shares of unemployment to unemployment of the males and females from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

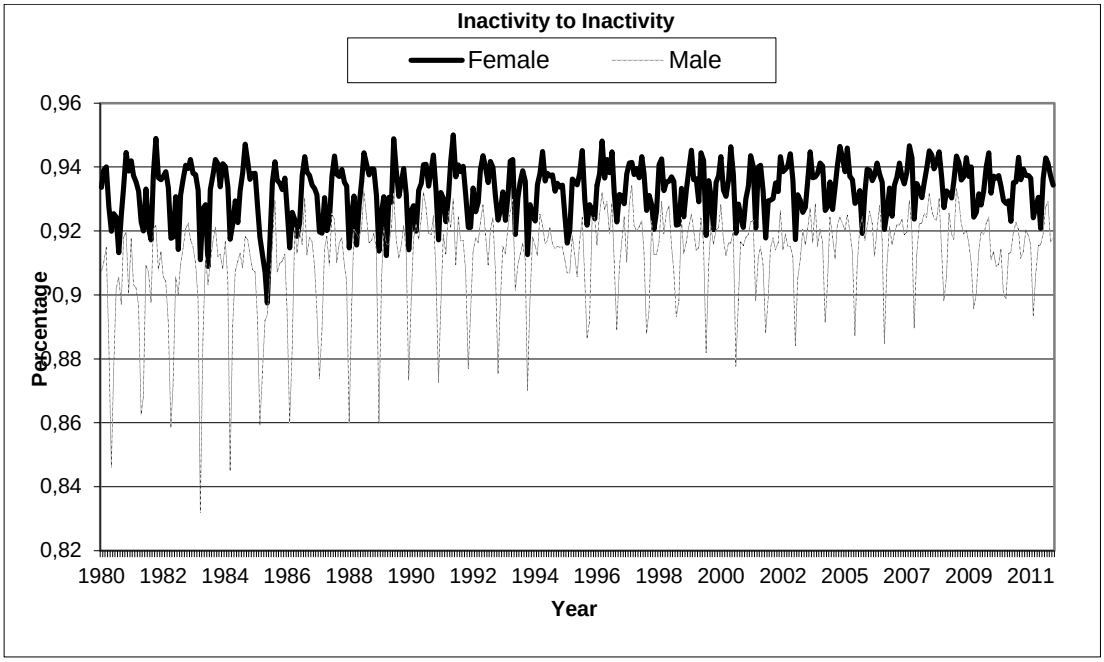

Figure 2.14: Monthly transition shares of inactivity to inactivity of the males and females from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

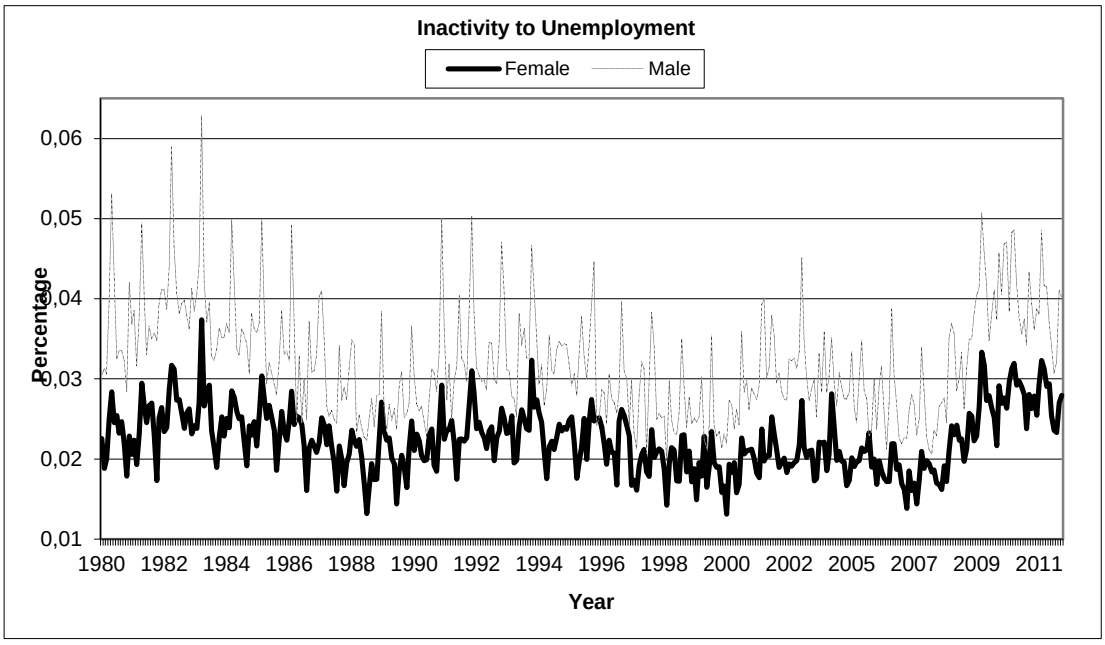

Figure 2.15: Monthly transition shares of inactivity to inactivity of the males and females from January 1980 to February 2012 of CPS Data, the series are not seasonally adjusted.

Employment to employment, unemployment to employment, unemployment to unemployment, and inactivity to inactivity transitions have similar cyclical patterns for males and females especially in recent years. Employment to employment and inactivity to inactivity transitions for males and females converge to each other over the years. Figure (2.11) and Figure (2.15) demonstrate that cyclicality of both transitions diminish for males and females especially after the second part of 1990's. However the transitions from employment to unemployment of the males differ significantly from that of females over the years which can be seen from Figure 2.11.

CHAPTER 3

AN EMPIRICAL ANALYSIS OF THE LINK BETWEEN UNEMPLOYMENT AND UNEMPLOYMENT DURATION

3.1 Introduction

We follow Sider (1985) and Baker (1992) to explain the relationship between the unemployment duration and unemployment rate. Average unemployment duration is determined by the number of individuals experiencing unemployment and the unemployment spells of these individuals. Equation (3.1) represents the average unemployment duration equation as a function of the uncompleted unemployment spells and the number of unemployed people constructing these spells. In Equation (3.1), F x refers to the number of unemployed individuals, suffers unemployment by x periods, where the maximum value of x is n .

$$D = \sum_{x=1}^{n} \frac{x\ F\ x-1\ -F\ x}{F\ 0} \qquad 3.1$$

$$p\ x+1\ = \frac{F\ x+1}{F\ x} \qquad (3.2)$$

$$D = \ 1 - p_1 \ + 2p_1 \ 1 - p_2 \ + 3p_1p_2 \ 1 - p_3 \ + \cdots$$

For an individual, who experiences x periods of unemployment, the probability to continue to be unemployed in the next period is represented by Equation (3.2). Substituting this probability into the average unemployment duration equation gives us Equation (3.3). Equation (3.4) is a more generalized version of Equation (3.1) and Equation (3.3), demonstrating that the average unemployment duration is the sum of the completed unemployment spells weighted by the spell lengths.

$$= 1 + p_1 + p_1p_2 + p_1p_2p_3 + \cdots \tag{3.3}$$

$$= \ \sum_{x=1}^{n} g \ x \ \ \ \prod_{j=0}^{n-1} p_j \ (1 - p_x) \tag{3.4}$$

The model characterized by the equations above enables us to find out average unemployment duration by observing the incomplete unemployment spells. Completed unemployment spell, which is defined as the unemployment duration of an individual from the start of unemployment to the time when the individual finds a job, is not available in the most of the data sets since calculating completed unemployment spell requiring information on the time when individual finds a job is a very hard task. The individuals should be interviewed very frequently in order to observe the time when the individual finds job. However, data sets are generally constructed in a manner that the individuals are interviewed by yearly, monthly or, at best, weekly intervals. Thus, the exact completed unemployment duration information is not available in the most of the data sets. This problem, known as right censoring in the literature, is one of the main shortcomings of the most of the survey's data sets.

The incomplete spell problem is handled with the use of the model characterized by the equations above since incomplete spells can be translated into

completed spells in the model. Calculating continuation probabilities also enables us to find out exit probabilities by subtracting these probabilities from unity. Then, it is possible to measure the share of individuals who exit unemployment after a specific time period. Multiplying this share with the spell length gives us the information on average duration of unemployment. The Equations (3.3) and (3.4) show that the unemployment duration is the sum of the shares of individuals who complete unemployment weighted by the completed unemployment duration.

The steady state assumption can be introduced into the model. An advantage of the steady state assumption in the data issues attracts the attention when the literature is analyzed. The model with steady state assumption can be estimated by using cross sectional data sets, panel dimension is not necessary in order to estimate a steady state model since we assume that the continuation probabilities are not allowed to fluctuate in time with this assumption, as Sider (1985) implicates. Therefore, steady state models provide simplicity in data issues.

The assumption that the unemployment continuation probabilities remain the same in the future enables us to calculate total unemployment depending on the average unemployment duration.

$$U = f\ 0\ + f\ 0\ p_1 + f\ 0\ p_1 p_2 + \cdots$$

$$U = Df\ 0\ .$$

The introduction of steady state assumption also affects the estimation procedure. Cross sectional data sets can be used to estimate the model with this assumption, whereas panel dimensional data sets should be used to estimate the model without steady state assumption.

The steady state assumption and the estimation of a steady state model with a cross sectional data sets can give biased results, as Sider (1985) argues. In the times

when unemployment is increasing, short unemployment spells dominates the cross sectional data, which can cause to underestimate the average unemployment duration. On the other hand, in expansion times, when unemployment rates are decreasing, long unemployment spells dominates the data, resulting in over estimating the average unemployment duration.

We choose non-steady state model not only for to hold unbiased results but also because we intend to observe the cyclical features of unemployment duration. The fluctuations of unemployment duration and its relationship with the unemployment level can be investigated by using a dynamic model in which continuation probabilities are allowed to change in time.

3.2 Estimation Procedure

The model allows us to estimate the continuation probabilities for certain specific groups. These demographic groups are constructed according to the sex, age, race, education, and the unemployment status of individuals. Dividing population to certain groups enables us to observe the difference in the duration behavior caused by Heterogeneity discussed in the previous section. We follow the synthetic cohort approach of Baker (1992) in order to estimate the expected average unemployment duration. We refer $p_i\ x,t$ as the demographic group i's probability to continue unemployment after x period of unemployment in time t, and i denotes the specific group of individuals. The estimated continuation probability is demonstrated in Equation (3.5), where n denotes the sample estimate of the number of unemployed individual in a certain group with x incomplete unemployment spell. Average expected duration of unemployment is then estimated by substituting the estimated probabilities into Equation (3.6).

$$p_i\ x,t\ = \frac{f_i(x,t)}{f_i(x-1,t-1)} \tag{3.5}$$

$$D_i\ t\ = 1 + p_i\ 1,t\ + p_i\ 1,t\ p_i\ 2,t\ + p_i\ 1,t\ p_i\ 2,t\ p_i\ 3,t\ + \cdots \tag{3.6}$$

We follow Baker (1992) in order to estimate the relationship between unemployment and duration for the whole population and for the sub-groups constructed according to sex, age, by reason for unemployment, and education. We test this relationship and heterogeneity hypothesis by employing the following econometric strategy. First, we calculate expected unemployment duration for each group using Current Population Survey (CPS) data for the 1980–1989 period. Then, we regress the log of this group-level duration variable on seasonal dummies, a trend term, and the log of seasonally adjusted unemployment rate for the civilian noninstitutional population. We perform this regression for each group. The purpose of these regressions is to understand the degree of the correlation between the rate of unemployment and the group-level duration of unemployment, for each group. If these group-specific correlations are sufficiently close to each other, then one can conclude that compositional effects are not so relevant and, therefore, the heterogeneity hypothesis should be rejected. Baker rejects this hypothesis by showing that the group-level correlations are indeed close to each other. This is the qualitative side of the story.

We estimate the model for two periods, as explained. First, the model is estimated for the period from 1980 to 1989, same period with Baker (1992), in order compare the results, and check the sensitivity of the results to the random selection applied for the digit preference problem explained below. Then, the model is estimated for the period from 1996 to 2012. This period is chosen due to the data discontinuities and matching problems occurred in the period from 1989 to 1996.

The 1980–89 period differs from the 1996–2012 period because of the redesign of the CPS in 1994. As discussed in the second section, the difference is mostly due to the construction of the duration variable. The individuals are interviewed for four months consecutively in the CPS. Then, the individuals quits from the survey for four months. The individuals are surveyed for four following months after this break. The individuals are asked their unemployment duration in every interview before the CPS redesign. On the contrary, the individuals are asked only in their first month's of their two four-month periods when they are in the sample. The duration variables in following months are created by adding 4 weeks to

the duration variable of the previous month. This difference in the duration variable can reduce the comparability of the results for two periods.

We apply the procedure implemented in 1994 redesign to the data from 1980 to 1986 in order to get rid of the discontinuity between the periods from 1980 to 1989 and the period from 1996 to 2012. The duration announced in the first month of the interview is taken as the correct information. The duration variable in the second, third and fourth months are calculated by adding 4 weeks, 8 weeks and 12 weeks to the announced first month's duration respectively for estimation.

Another problem of the data that should be taken into account for the estimation process is the digit preference problem. Digit preference problem is due to the tendency of individuals to announce their duration by rounding his/her actual duration to represent integer months. Baker (1992) corrects for the digit preference by reallocating 30% of respondents at 4, 8, 12, 16, and 26 weeks, 40% of those at 52 weeks, and 50% of those at 78 and 99 weeks in each month of the sample to adjacent later weeks. It is not clear from his paper what kind of a reallocation strategy he follows. In particular, who are reallocated to the adjacent months is not clear. The problem is that the group of workers who have reported, say, 4 weeks of unemployment is a mix of black/white, male/female, skilled/unskilled, married/nonmarried, urban/rural, etc. workers. Some of the workers need to be moved to the 5 weeks category to smooth out the digit preference problem. But there is not a unique way to move these workers. For example, one can use the population weights as the benchmark, while others may prefer using the weights for those in the 4 week category only or just simply allocate them randomly. Each of these procedures will yield different results and we observe that Baker's estimates are quite sensitive to the choice of the allocation mechanism.

To check the robustness of Baker's results, we combine our estimations with a simple simulation exercise. We draw 30% of the respondents randomly (i.e., using a uniform assignment) from weeks 4, 8, 12, 16, and 26, 40% of those at week 52, and 50% of those at weeks 78 and 99 to corresponding adjacent weeks. Then we estimate the model and record the estimates. We perform this random assignment exercise

1000 times (independently) and record the estimates for each of the groups that Baker analyzes. By the law of large numbers, this procedure tends to yield a normal distribution of estimates for each worker group. Then we calculate the mean estimate over these 1000 trials. We compare these means with Baker's estimates.

3.3 Estimation Results

Our estimates reported in the second and third columns of Table (3.1) are calculated based on the simulation exercise. We then compare our findings in column two with Baker's findings in column one. The results are rather surprising (in a positive sense): that is, our simulation exercise produces results that coincide with Baker's findings.[1] We conclude that his estimates are quite robust to the potential problems that could arise from a mistreatment of the digit preference problem.

At the end, we conclude that the heterogeneity hypothesis is rejected for both 1980–1989 and 1996–2012 periods. This is in line with Baker's qualitative results. On the quantitative front, we find some notable discrepancies between two periods. Using Baker's method, we show that the degree of correlation between the duration of unemployment and the unemployment rate is weaker for the 1996–2012 period. Using another technique, Shimer (2012) investigates whether Baker's quantitative results hold more generally for the 1948–2010 period and shows that Baker's quantitative findings are strongly valid. He emphasizes that this result is even stronger for the 1990–2010 period. Unlike Shimer, we show that the strength of Baker's findings has weakened during the last two decades. This casts doubt on the emerging consensus that the main determinant of unemployment fluctuations in the U.S. is the movements in job finding probability. The difference between our work and Shimer's is that we directly use Baker's method, while Shimer develops a method based on solving a differential system of unemployment dynamics. The gap between our and Shimer's results calls for additional empirical work in this literature.

[1] There are a few differences between Baker's and our estimates especially for small (non-core) worker groups such as female 16-24, black females, and male 45-64. For all of these groups, our estimates are closer to the general tendency than Baker's estimates. Data availability is rather scarce for these groups. So, lower estimates reported by Baker may be due to a mistreatment of the digit preference problem for these groups. In any case, our estimates are even stronger and reinforce Baker's results.

On the quantitative side, the key issue is the magnitude of these correlations. Baker shows that, on aggregate and for almost all subgroups, a 10% increase in the rate of unemployment is associated with approximately 6–7% increase in the duration of unemployment (see the first column in Table (3.1)).[2] This result suggests that, for the 1980–1989 period, the duration of unemployment and the unemployment rate are positively correlated and the degree of this correlation is quite high in the United States. An immediate implication is that the main determinant of unemployment fluctuations is the cyclical movement of the job finding probability.[3] In other words, a big chunk of the fluctuations in the rate of unemployment comes from the countercyclical variation in the duration of unemployment, which is a fact that invariably holds for almost all subgroups in the worker population. This suggests that procyclicality of job finding probability (rather than heterogeneity) is the major determinant of unemployment fluctuations in the United States. Recent findings by Shimer (2012) support Baker's results.[4]

Using the estimation/simulation strategy described below, our results are in line with Baker's original results both qualitatively and quantitatively (see the second column in Table (3.1)). We also check if his results hold for the 1996–2012 period. We find that the extended results hold qualitatively, while the quantitative results are somewhat weaker. In other words, the heterogeneity hypothesis is still rejected since the estimated correlations are similar across worker groups; but, the magnitudes of the correlations for the period 1996–2012 are significantly lower than the correlations estimated for the 1980–1989 period. More specifically, we find that a 10% increase in the unemployment rate is associated with around 4.3% increase in the duration on unemployment in this more recent period (see the third column in Table (3.1))

[2] The response of duration ranges between approximately 2% and 8%, but it is clear that the estimates for the core groups concentrate around 6-7%.

[3] The logic is as follows: if the entry rate were the dominant factor, then this would create a downward pressure on the correlation between the duration variable and the rate of unemployment.

[4] For similar results on the U.S., see Hobijn, and Sahin (2009). For arguments againts Shimer's findings, see Fujita and Ramey (2009).

Table 3.1 Estimation Results

Category	Baker	1980-89	1996-2012
Aggregate	0.619***	0.625***	0.434***
	(0.065)	(0.121)	(0.089)
Labor Market Status			
Job Losers	0.719***	0.805***	0.514***
	(0.156)	(0.153)	(0.108)
Layoffs	0.212	0.23	0.116*
	(0.224)	(0.478)	(0.089)
Quits	0.544***	0.562***	0.327 ***
	(0.193)	(0.140)	(0.107)
New entrants	0.516***	0.562***	0.327***
	(0.223)	(0.140)	(0.107)
Re-entrants	0.397***	0.629***	0.434***
	(0.095)	(0.128)	(0.089)
Gender & Race			
White-Males	0.672***	0.78***	0.456***
	(0.121)	(0.144)	(0.085)
White Females	0.552***	0.507***	0.362***
	(0.08)	(0.109)	(0.091)
Non-white males	0.703***	0.630***	0.525***
	(0.281)	(0.154)	(0.144)
Non-white females	0.249***	0.476***	0.456***
	(0.199)	(0.165)	(0.119)
Gender& Education			
Males 0-12 years	0.622***	0.613***	0.442***
	(0.135)	(0.170)	(0.091)
Females 0-12 years	0.491***	0.520***	0.370***
	(0.086)	(0.143)	(0.106)
Males 13 years & above	0.876***	0.822***	0.509***
	(0.184)	(0.131)	(0.105)
Females13 years & above	0.529***	0.582***	0.426***
	(0.172)	(0.122)	(0.094)
Gender & Age			
Males 16-24	0.689***	0.663***	0.348***
	(0.118)	(0.169)	(0.084)
Females 16-24	0.251***	0.510***	0.293***
	(0.090)	(0.118)	(0.083)
Males 25-44	0.706***	0.812***	0.475***
	(0.178)	(0.167)	(0.101)
Females 25-44	0.655***	0.446***	0.423***
	(0.133)	(0.123)	(0.108)
Males 45-64	0.296***	0.667***	0.577***
	(0.283)	(0.223)	(0.123)
Females 45-64	0.62***	0.613***	0.442***
	(0.291)	(0.171)	(0.130)

Notes: Following Baker's methodology, CPS rotation groups are used to construct the variables in all estimates. The first column is directly taken from Baker (1992). The second and third columns report our narrow results for the 1980–1989 period and the results for 1996–2012 period, respectively. Our estimation results are based on our simulations as we describe above (i.e., each cell reports the mean of the 1000 estimates for the corresponding group). Standard erros are reported in parenthesis. Standard erros are reported in parenthesis. *** indicates the variable is significant at 1%, and * indicates the variable is significant at 5% significance level.

This casts doubt on the emerging consensus in the literature that movements in job finding probability is the major source of unemployment fluctuations in the U.S. Although 0.43 may still be viewed as a somewhat strong correlation, such a magnitude means that, focusing on a more recent data period, there is ample room for other factors to have strong explanatory power. Combining the results from two periods and earlier work, we conclude that the main forces at work that affect unemployment fluctuations may be varying over the business cycle. The basic CPS rotation groups are used in our calculations and Baker's procedures are closely followed in data construction.

These results are of great theoretical importance because it is well known that the canonical Mortensen-Pissarides equilibrium search and matching model (see Pissarides (2000)) cannot generate the observed frequency of unemployment fluctuations[5] and knowing the exact sources of fluctuations would provide empirical guidance on how to modify the model and obtain the desired results. Our purpose is to check the validity of Baker's results and then extend his analysis using the most recent data. We evaluate and analyze the qualitative and quantitative predictions of this simulation exercise separately.

[5] See, for example, Shimer (2005).

CHAPTER 4

A DIFFERENTIAL MODEL OF UNEMPLOYMENT DYNAMICS

4.1 Introduction

In this chapter we analyze the transitions in labor market for the aggregate data and for the sub-groups. The former analysis is implemented to check the validity of the Shimer (2012). The latter analysis provides a perspective to find out the experience of the groups in the recession and in the boom times.

This chapter investigates the transitions in the USA labor market for subgroups of age, sex, race and education. The analysis covers the period from the January 1980 and to the February 2012. This exercise provides the features of the cyclical behavior of labor market transitions over time. The USA economy experienced 4 recessions which influences labor market in the concerned period. The analysis of transitions of sub-groups enables us to discover which groups are hit harder during these recessions. We will focus on the last recession, which is the most severe one among the four recessions that are considered. The study is important for labor market theories, and the literature which was built upon empirical findings.

2007 crisis is regarded as "great recession" in the literature since the deterioration in the labor market is beyond the crises after World War 2. The unemployment rates persistently reached to levels, at which Elsby, Hobijin, and Sahin (2010) argues that the historical beveridge curve relationship is harmed. Between 2007 and 2010, payroll employment decreased to the levels at which 10,6

million new job are required to return to pre-crisis employment levels according to Katz (2010). Our findings show that the effect of the 2007 crisis is beyond the rest three crises in our period. The increase in the inflows into unemployment and the slowdown in the outflow rates are beyond the levels witnessed in the beginning of the 1980s, 1990s and 2000s

Elsby, Hobijin, and Sahin (2010) state that this recession results in steeper increase in the unemployment levels of male workers, younger workers, less educated workers, and the workers from minorities. Sahin, Song, and Hobijin (2010) states that 2007 downturn hit male workers more severely than females when the employment levels and unemployment rates are considered. Katz (2010) also suggests that the 2007 crisis disproportionately deteriorated the population of young, less educated. There is an agreement in the literature that males, the young workers, and the less educated workers and the minorities are more severely influenced by the recessions than the rest of the groups. Our results are in line with the study for males and females. However, we argue that older workers, more educated workers and the workers from majorities are affected by the recession of 2007 at least as much as the younger workers, less educated workers and the workers from majority of the population. To illustrate, the unemployment to employment transition probability of the college graduates decreased to under college education level. The relative advantage of being an university graduate in job finding seems to be disappeared. Shimmer (2011) reports that the flows out of unemployment plays more crucial role than flows into unemployment to explain the unemployment rate in business cycles.

Blanchard and Diamond (1990) suggest that unemployment rate camouflages transitions in the labor market. Feng, Shuaizhang, and Hu (2013) state that the unemployment levels in the USA are under estimated officially due mainly to the misclassification errors. Katz (2010) suggests that labor market stress is understated, a considerable increase in the number of discouraged workers and high growth in the underemployment are not reflected by unemployment rates. Therefore unemployment rates alone are not enough to infer the changes in the labor market. In this Chapter we analyze the labor market by not only focusing on the unemployment rate but also the fluctuations hidden by unemployment rates. Some transitions can

also deteriorate the situations of the sub-groups by not increasing unemployment to very high levels. To illustrate the transitions to out of labor force cannot increase the unemployment rate as much as the transition to unemployment pool could. However, the transitions into labor force can be an indicator for discouraged workers among such groups. Therefore, one should analyze the changes in each transition separately to infer the effect of the crisis.

Elsby, Hobijin and Sahin (2010) and Elsby, Michaels and Hobijn (2013) investigate the sources of the flows in their study. These studies implement a two state model to analyze the transitions in the labor market. They focus on the transitions from unemployment and to unemployment. Elsby, Michaels, and Solon (2009) use also two state model to analyze the labor market flows. A significant departure of our study from their study is that we compute at least a three state model. We analyze all the transitions in the labor market. The studies assuming two states ignore the importance of the transitions from and to out of labor force. Shimer (2012), Sahin, Song and Hobijin (2010) uses three state model in their studies. However, Shimer doesn't analyze the consequences of 2007 crisis. Further, group analysis of the labor market transitions is not computed. Sahin, Song and Hobijn (2010) implement a 3 state model but only for the males and the females. This study, therefore, represents the most detailed investigation of the all categories of transitions and sub-groups.

Mortensen Pissarides search and matching model predicts that employment exit rates are more volatile than the unemployment exit and job finding rates. In this framework, employment exit rates are the main responsible factor behind the unemployment rates. This theoretical consideration is contradicted with empirical findings of the studies that suggests a positive relationship between unemployment duration and incidence. Darby, Haltiwanger and Plant (1986) suggest that the number and the types of entries to unemployment pool is the most important factor in unemployment incidence. According to their heterogeneity hypothesis the exit from employment and the entries to unemployment, are the main essential elements in the explanation of unemployment rates. Empirical findings on positive relationship between unemployment duration and incidence are mainly due to different types of

exits from employment. Slow searchers can dominate unemployment pool in bad times, by rising the average unemployment duration. Although there is no change in group level unemployment duration, the average duration is increased. This finding explains implications of empirical phenomenon suggesting that there is positive correlation between unemployment duration and incidence. Actually there is no change in unemployment duration by time. Analysis of labor market transitions of groups enables us to check whether the heterogeneity analysis explains the labor market of USA. Our results suggest that labor market transitions in the USA do not verify heterogeneity hypothesis. Sub-groups with higher expected unemployment durations are not those who are mostly affected by the recessions. The groups with higher job finding rates are more sensitive to the recessions, especially in 2008 recession.

Shimmer (2012) states that the flow rates into unemployment are almost acyclical whereas the flows from unemployment are procyclical with the economic activity. Shimmer also states that the cyclical movements of the flows out of unemployment are the most essential factor accounting for the cyclical fluctuations in unemployment rate. Shimmer (2012) can be regarded as an opposition to the study of Darby, Haltiwanger and Plant (1986) suggesting that the inflow to unemployment is the main important factor in explaining the unemployment rate fluctuations. Elsby, Hobijin and Sahin (2009) report that 20 percent of the fluctuations in the unemployment rate is accounted for by the inflows to unemployment whereas 80 percent of the fluctuations in the unemployment rate is driven by the flows out of unemployment. Elsby, Michaels, and Solon (2009) find that the cyclical movements of the unemployment rate are determined by a combination of countercyclical movements in inflow rate and procyclical movement of the outflow rate. They suggests that inflows into unemployment can increase unemployment pool. In increased unemployment pool, to find job gets harder. In this way, inflows can decrease the outflows from unemployment. Our study is important for the debate over the cyclicality and explanatory power of the movement of the outflows and inflows. We observed that employment exit rates cannot be regarded as acyclical. The response of the employment to unemployment transition probability to the crises

is generally a sudden increase. This response is not homogenous for all groups. We investigate the argument of Elsby, Michaels and Solon whether an increase in inflows decrease outflows from unemployment. We observed that the groups with higher inflow rate are those whose outflow rates decrease more than the other groups.

Tansel and Taşçı (2004) is important to compare our results with a developing country case, Turkey. Tansel and Taşçı state that unemployment durations of women are above the men. Age decreases and education increases the exit from unemployment. Our reasults are in line with Tansel and Taşçı (2004) for males and females. On the other hand, our results indicate tahat there are opposite conditions in the Case of the USA for age and education groups after 2007 crisis.

Tansel and Taşçı (2005) argues that the job finding probability of the younger individuals are higher than the older individuals but the transition probability from employment to unemployment is also higher for the young individuals in Turkey. These results are in line with our results until 2007 crisis in the USA. A convergence betwee the transitions of the young and olds decreases the gap between the transitions from unemployment to employment of both groups in the USA. The transitions from unemployment to employment are simillar before 2007 for Turkey and the USA as suggested by this thesis and Tansel and Taşçı (2005). This convergence also observed for college and university graduates after 2007 cirisis.

Tansel and Tasci (2010) show that the labor market in Turkey shows similar characteristics with developed and developing countries. Our comparison for the demographic groups shows that labor market transitions in the USA and Turkey exhibit some similar characteristics.

In this chapter, we also analyze the transitions to self-employment by defining it as a distinct labor market state from wage employment unemployment and out of labor force. This analysis provides a perspective for better understanding of the dynamics of job creation and destruction. The main finding is that the explanatory power of the transitions from employment to unemployment on unemployment rates is lower in the model including self-employment. We find that

the transitions from employment to self-employment follows nearly acyclical pattern in business cycle.

Evans and Leighton (1989) argue that the transitions into self-employment follow a procyclical pattern but not very powerfully. Evans and Leighton also suggest that the baby boom generation becomes older. This has a negative impact on the unemployment rate. The manufacturing sector is declining over the years whereas the service sector is developing. This trend has a positive impact on the self-employment rate.

Taylor (1999) demonstrates that the 40 percent of the individuals who made transitions into self-employment is not able to survive for even one year in self-employment. The individuals with a job experience and an asset accumulation process before their self-employment experience are those who are more successful to survive in the state.

Carrosco (1999) demonstrates that the probability of transiting to self-employment from unemployment increases when the unemployment rate rises. However, wakening economic conditions reduce the survival in the sef-employment. The former effect is dominated by the latter. This means that net transitions to self-employment from unemployment is procyclical. Unemployment benefits reduce the transitions from unemployment to self-employment. Carrasco (1999) shows that the largest number of transitions to self-employment is from unemployment. The more educated and middle aged persons among them are more likely to achieve in the self-employment according to Carrasco.

Blanchflower (2000) argues that the increase in unemployment rate reduce the transitions in self-employment for the most of the OECD countries including the USA. This means that the transitions into self-employment are procyclical. Blanchflower (2000) also demonstrates that the unemployment rate has a negative impact on the transitions to self-employment. This means that the transitions into self-employment from unemployment are procyclical.

Bruce and Schuetze (2004) argues that tax policies and USA Small Business Administration create favorable conditions to transit into self-employment, however, the survival years in self-employment are low. Besides, the individuals who return from the self-employment to wage sector experiences reductions in their wage level compared to their experience in this sector before self-employment according to Bruce and Schuetze . This is due to the fact that they lose some of skills acquired and used in wage sector before their self-employment term.

Thurik, Caree, Stel and Audrestch (2008) suggest that there are two dynamic relationship between transitions into self-employment and unemployment. The first is that the increased unemployment stimulates the transitions into self-employment. This effect is regarded as "refugee effect" by Thurik, Caree, Stel and Audrestch. The second, "entrepreneurial" effect is from self-employment to unemployment, the transitions into self employment reduce the unemployment. They argue that the first effect is more powerful than the second.

Fairlie (1999) suggests that transitions of whites into self-employment are as twice as the transitions of African Americans into self-employment whereas the transitions from this state for whites are lower than the transitions out of self-employment among African Americans. The former fact can be explained by the lower level of asset accumulation and the lower level of the individuals who have a self-employed father among the non-white population. However the latter fact cannot be explained by these factors.

Dunn Hoatz-Eakin (2000) discover that the effect of financial assets of young on the transition of them from jobs in wage sector to self-employment is significant although the amount of the effect is moderate. On the other hand, the assets and the self-employment experience of their parents influence this transition remarkably.

Rissman (2003) suggests that self-employment is a state for younger workers that protect them from the deteriorated conditions in wage sector. For whites and non-whites, the transitions to self-employment are increasing with the unemployment rate. Hipple (2010) suggests that males, whites and Asians, and the older aged population are more likely to involve in self-employment.

Zissimopoulos and Karoly (2007) state that the probability to transit into self-emlployment is increasing with age. This probability reaches the maximum at 66 and 65 for females and males respectively. They also state that the health conditions have a considerable impact on the probability to switching into self-employment. The health conditions that limit the wage work can stimulate the transitions to self-employment. Pension benefits and health coverage decreases the probability of switching to self-employment.

Hughes (2003) argue that the literature underestimates the effect of the factors pushing the females into self-employment. The push factors such as economic constraints, and decrease of the secure jobs, pushes some women into self-employment transitions even though these factor are not a primary reason for them.

The studies above generally suggest or indicate that the transitions into self employment are procyclical. Our results suggest that the transitions from unemployment to employment follow a weak procyclical pattern. This indicates that the push factors in self-employment are not valid for the case of the USA. This result is in line with Evans and Leighton (1989). The transitions from wage work to self-employment follows acyclical pattern. The transitions from self-employment to unemployment are countercyclical and this effect is stronger than the effect of the transitions from unemployment to self-employment. This means that the successful transitions into self-employment are procyclical when the survival in self-employment is also considered. This result is in line with Carosco (1999) arguing that countercyclical transitions from self-employment dominate the procyclical transitions.

The addition of self-employment to the model reduces the explanatory power of the employment to unemployment transitions on unemployment rate. For older age group the transitions from employment and out of labor force to self-employment follows acyclical pattern whereas the transitions from unemployment to self-employment follows a procyclical pattern. For the younger age group, almost all transitions to self-employment shows acyclical pattern. Countercyclical fluctuations in self-employment accounts for 0.14 percent of the fluctuations for the younger age

group whereas this parameter is 0.10 percent. This finding can verify the Rissman (2003) suggesting that the lots of the younger workers who transit into self-employment go back to jobs with wage income. This parameter is also higher for the non-white population, 14 percent of the fluctuations in unemployment rate of non-whites is accounted for by the transitions from self-employment to unemployment indicating that the turnover is higher for non-whites. On the other hand, this parameter for whites is 10 percent.

Our most interesting result in self-employment analysis is that even the transitions from unemployment are not countercyclical. Carrosco (1999) states that unemployed individual's probability to enter self-employment is higher than the other groups. However the survival of these individuals in self-employment is lower than the individuals who transited into self-employment from employment. Thus the net transitions into unemployment follow a procyclical pattern. Our results, however, suggest that the transitions from unemployment to employment are procyclical. This means that the probability of an unemployed individual to transit into employment is increasing in the boom times and decresing in the recession times. Push factor explanation for self-employment is not valid for the case of the USA.

4.2 Theoretical Framework

In this section, we present the details of the theoretical framework we employ. Our main purpose is to develop empirically implementable measures for transition probabilities that will allow us to analyze the sources of unemployment fluctuations (i.e., whether unemployment fluctuations have rooted from the cyclical movements in the job finding probability or the exit probability). We characterize the job finding probability with F_t and the exit probability with X_t within a rigorous mathematical model of unemployment. For expositional purposes, we start with a two-state model, where the states are 'employed' and 'unemployed' only. The two-state model will enhance our understanding of the "time aggregation" problem, a concept that we develop in the next sub-section. Then, we extend the model to a more realistic three-state case, where the third state is "not-in-labor-force". This version is widely studied in the literature and many well-known results are based on

it. Finally, we introduce a fourth state, "self-employed", to check if the results obtained using the three-state model hold in the four-state version too. If the answer is no, then transitions to and from self-employment are an important determinant of unemployment fluctuations and should be studied exclusively. We follow Shimer (2012) to describe unemployment dynamics using a system of differential equations.

4.2.1 A Two State Model

We start by assuming that workers simply transit between employment and unemployment, ignoring any other state that the workers may potentially choose to switch. We also assume that there is no heterogeneity or duration dependence that leads to differences in transition probabilities across workers.

Following Shimer (2012), we work with a continuous-time model imposing the restriction that data are available only at discrete dates, $t \in \{0,1,2,\dots\}$. The time interval $[t, t+1)$ is referred to as the period t. The framework we use will help us recover a reliable time-series for the job finding probability $F_t \in [0,1]$ and the exit probability $X_t \in [0,1]$ using publicly available micro data. To be precise, F_t refers to the probability that a worker starting period t unemployed finds at least one job during the period. Similarly, X_t refers to the probability that a worker employed at the beginning of period t loses his job before the period ends. All unemployed workers find a job according to a Poisson arrival rate $f_t = -\ln\ 1 - F_t\ \geq 0$ and all employed workers lose their job according to another Poisson arrival rate $x_t = -\ln\ 1 - X_t\ \geq 0$.

Let $u_{t+\tau}$ denote, for any $t \in \{0,1,2,\dots\}$, the number of unemployed workers at time $t+\tau$, where $\tau \in [0,1]$ is the time elapsed since the last measurement date. We also let $u_t^s(\tau)$ denote "short-term unemployment", which refers to the number of unemployed workers at time $t+\tau$ but were employed at some time $t' \in [t, t+\tau]$, with $u_t^s\ 0\ = 0\ \forall\, t$. This formulation captures the within-period transitions which are unobserved from the viewpoint of the econometrician. We define $u_{t+1}^s = u_t^s(1)$ to be the total amount of short-term unemployment at the end of period t.

As a consequence, the number of unemployed workers evolves according to the law of motion as Shimer (2012) demonstrates,

$$u_{t+\tau} = e_{t+\tau}x_t - u_{t+\tau}f_t \tag{4.1}$$

and the number of short-term unemployed workers evolves according to

$$u_t^s(\tau) = e_{t+\tau}x_t - u_t^s(\tau)f_t, \tag{4.2}$$

where e is the number of employed workers and the notation u_t refers to the time derivative. Combining these two equations by eliminating the $e_{t+\tau}x_t$ term yields,

Define $u_{t+\tau} - u_t^s\ \tau\ = y_t$. Then the differential equation above can be rewritten as:

$$y\ \tau\ = -y\ \tau\ f_t,$$

which implies that $y\ \tau\ + y\ \tau\ f_t = 0$. Multiply both sides by $e^{f_t\tau}$ and integrate with respect to τ, which gives us

$$\int e^{f_t\tau}\ y\ \tau\ + y\ \tau\ f_t\ d\tau = 0.$$

Notice that $e^{f_t\tau}\ y\ \tau\ + y\ \tau\ f_t$ is the derivative of $e^{f_t\tau}y(\tau)$ with respect to τ. Thus,

$$e^{f_t\tau}\ y\ \tau\ + y\ \tau\ f_t\ = \frac{d}{d\tau}\ e^{f_t\tau}y\ \tau\ + c\ ,$$

where c is an arbitrary constant. Plugging this into the integral above yields $e^{f_t\tau}y\ \tau\ + c\ = 0$, which by rearranging gives

$$y\ \tau\ = -ce^{-f_t\tau}.$$

To solve for c, use $c = y\ 0\ = u_t$. Therefore, the solution to our differential equation is

$$u_{t+\tau} - u_t^s\ \tau\ = -u_t e^{-f_t \tau}.$$

Evaluating this equation at $\tau = 1$ and using $f_t = -\ln(1 - F_t)$ gives us

$$u_{t+1} = \ 1 - F_t\ u_t + u_{t+1}^s. \tag{4.4}$$

This equation suggests that the number of unemployed workers at time $t + 1$ is equal to the fraction of time t unemployed workers who could not find a job in period t plus the number of short-term unemployed workers, who are unemployed at time $t + 1$ but held a job at some point during period t. Solving this equation for F_t gives us the following formula for the job finding probability:

$$F_t = 1 - \frac{u_{t+1} + u_{t+1}^s}{u_t}. \tag{4.5}$$

4.2.2 An Extension to Three State Model

In this section, we relax the assumption that workers are either employed or unemployed at any time by introducing the possibility that they can switch out of the labor force (or to inactivity). We call this third state "not-in-labor-force" or "inactive" and denote the three states with letters E, U, and I. The time aggregation problem is also accounted for using a similar formulation. Let denote the Poisson arrival rate of a shock that moves a worker from state $A \in \{E, U, I\}$ to state B where $B \neq A$, where the transition occurs any point in the time interval $[t, t + 1)$. Let λ^{AB} denote the associated 3×3 Markov transition matrix. The following equations are used to calculate the transitions from the raw CPS data.

$$n_t^{EU} = \ {}_J n^{EJ}(\tau)\, \lambda_t^{JU} - n^{EU}(\tau)\ \ {}_J \lambda_t^{UJ} \tag{4.7}$$

$$n_t^{EI} = \quad {}_J n^{EJ}(\tau)\, \lambda_t^{JI} - n^{EI}(\tau) \quad {}_J \lambda_t^{IJ} \tag{4.8}$$

$$n_t^{UE} = \quad {}_J n^{UJ}(\tau)\, \lambda_t^{JE} - n^{UE}(\tau) \quad {}_J \lambda_t^{EJ} \tag{4.9}$$

$$n_t^{UI} = \quad {}_J n^{UJ}(\tau)\, \lambda_t^{JI} - n^{UI}\ \tau \quad {}_J \lambda_t^{IJ} \tag{4.10}$$

$$n_t^{IE} = \quad {}_J n^{IJ}(\tau)\, \lambda_t^{JE} - n^{IE}(\tau) \quad {}_J \lambda_t^{EJ} \tag{4.11}$$

$$n_t^{IU} = \quad {}_J n^{IJ}(\tau)\, \lambda_t^{JU} - n^{IU}(\tau) \quad {}_J \lambda_t^{UJ} \tag{4.12}$$

The equations from (4.7) to (4.12) characterize the law of motion of the shares of the transition between the states where:

$$n_t^{EU}\ \tau\ = \frac{N_t^{EU}(\tau)}{{}_J N_t^{EJ}(\tau)},$$

$$n_t^{EI}\ \tau\ = \frac{N_t^{EI}(\tau)}{{}_J N_t^{EJ}(\tau)},$$

$$n_t^{EE}\ \tau\ = \frac{N_t^{EE}(\tau)}{{}_J N_t^{EJ}(\tau)},$$

$$n_t^{UE}\ \tau\ = \frac{N_t^{UE}(\tau)}{{}_J N_t^{UJ}(\tau)},$$

$$n_t^{UI}\ \tau\ = \frac{N_t^{UI}(\tau)}{{}_J N_t^{UJ}(\tau)},$$

$$n_t^{UU}\ \tau\ = \frac{N_t^{UU}(\tau)}{{}_J N_t^{UJ}(\tau)},$$

$$n_t^{IU}\ \tau\ = \frac{N_t^{IU}(\tau)}{{}_J N_t^{IJ}(\tau)},$$

$$n_t^{IE}\ \tau\ = \frac{N_t^{IE}(\tau)}{{}_J N_t^{IJ}(\tau)},$$

$$n_t^{II}\ \tau\ = \frac{N_t^{II}(\tau)}{{}_J N_t^{IJ}(\tau)}.$$

The entrance share $n_t(\tau)$ matrix is a 3×3 matrix the sum of the columns of which is equal to one. On the other hand, λ_t is a 3×3 Markov transition rate matrix the sum of the columns of which is equal to zero.

This suggests that any state variable $s(t+\tau)$ evolves according to the law of motion

$$s\ t+\tau\ = \lambda_t s\ t+\tau\ . \tag{4.13}$$

Our purpose is to use the gross flows data from the monthly Current Population Survey to infer about the continuous-time transition matrix. We can construct the full-month Markov transition probability matrix n_t with entries n_t^{AB}, as described above, using the CPS data. Notice that this matrix is based on discrete time observations and the matrix to be estimated has entries in continuous time.

Suppose that we can divide the period t into $1/\Delta$ sub-periods of length Δ, as Shimer (2012) shows. In this formulation, the transition matrix in each sub-period would be $n_{t,\Delta}$. Given a matrix $n_{t,\Delta}$, one can compute n_t via matrix multiplication as Shimer demonstrates. Let $\mu_{t,\Delta}$ denote a diagonal matrix of eigenvalues of $n_{t,\Delta}$ with a unique matrix $p_{t,\Delta}$ having unique eigenvectors in columns. Then, obviously, $n_{t,\Delta} = p_{t,\Delta}\mu_{t,\Delta}p_{t,\Delta}^{-1}$. Matrix multiplication yields $n_{t,\Delta} = p_{t,\Delta}\mu^{1/\Delta}p_{t,\Delta}^{-1}$. Using this logic, and following Shimer (2012), one can also construct $n_{t,\Delta} = p_t\mu^{1/\Delta}p_t^{-1}$.

Shimer (2012) suggests that, as a matter of fact, we know that $\lim_{\Delta\to 0}\ \varepsilon^{\Delta} - 1\ /\Delta = \log(\varepsilon)$, which implies that $\lim_{\Delta\to 0}\ n_{t,\Delta} - I\ /\Delta = \lambda_t$, I being the identity matrix. Shimer (2012) also shows that If the eigenvalues of n_t are distinct, real, and positive, $\lambda_t = p_t \mu_t p_t^{-1}$, where μ_t is a matrix which is diagonal and having diagonal elements that is equal to the logarithm of the eigenvalues of n_t and p_t is the matrix of eigenvalues of n_t, and therefore certainly also of λ_t,Shimer (2012) shows that this provides two conditions for the matrix λ_t to be uniquely defined and to be a recipe for constructing.

4.2.3 An Extension to Four State Version

In this subsection, we add "self-employed" as the fourth state using the same procedure described above. We denote this fourth state with S. There are good reasons to believe that both employed and unemployed workers may switch to become self-employed especially during downturns. Our main purpose is to investigate whether the empirical results that can be obtained using a three-state version would change in this four-state version. If the answer is yes, then this can have consequences related to the determinants of the cyclical properties of the rate of unemployment.

In four state version of the model new entrance shares are added. These new entrance shares of the transitions from self-employment and to self employment are:

$$n_t^{WEU}\ \tau\ = \frac{N_t^{WEU}(\tau)}{{}_J N_t^{EJ}(\tau)},$$

$$n_t^{WEI}\ \tau\ = \frac{N_t^{WEI}(\tau)}{{}_J N_t^{WEJ}(\tau)},$$

$$n_t^{WEE}\ \tau\ = \frac{N_t^{WEE}(\tau)}{{}_J N_t^{WEJ}(\tau)},$$

$$n_t^{WES}\ \tau\ = \frac{N_t^{WES}(\tau)}{{}_J N_t^{WEJ}(\tau)},$$

$$n_t^{UWE}\ \tau\ =\ \frac{N_t^{UWE}(\tau)}{{}_J N_t^{UJ}(\tau)},$$

$$n_t^{UI}\ \tau\ =\ \frac{N_t^{UI}(\tau)}{{}_J N_t^{UJ}(\tau)},$$

$$n_t^{UU}\ \tau\ =\ \frac{N_t^{UU}(\tau)}{{}_J N_t^{UJ}(\tau)},$$

$$n_t^{US}\ \tau\ =\ \frac{N_t^{US}(\tau)}{{}_J N_t^{US}(\tau)},$$

$$n_t^{IU}\ \tau\ =\ \frac{N_t^{IU}(\tau)}{{}_J N_t^{IJ}(\tau)},$$

$$n_t^{IWE}\ \tau\ =\ \frac{N_t^{IWE}(\tau)}{{}_J N_t^{IJ}(\tau)},$$

$$n_t^{II}\ \tau\ =\ \frac{N_t^{II}(\tau)}{{}_J N_t^{IJ}(\tau)}.$$

$$n_t^{IS}\ \tau\ =\ \frac{N_t^{IS}(\tau)}{{}_J N_t^{IJ}(\tau)}.$$

$$n_t^{SWE}\ \tau\ =\ \frac{N_t^{SWE}(\tau)}{{}_J N_t^{SJ}(\tau)}.$$

$$n_t^{SU}\ \tau\ =\ \frac{N_t^{SU}(\tau)}{{}_J N_t^{SJ}(\tau)}.$$

$$n_t^{SI}\ \tau\ =\ \frac{N_t^{SI}(\tau)}{{}_J N_t^{SJ}(\tau)}.$$

$$n_t^{SS}\ \tau\ =\ \frac{N_t^{SS}(\tau)}{{}_J N_t^{SJ}(\tau)}.$$

We have now 4x4 markov transitions matrix instead of 3x3 transitions matrix of three state model. In four state version, the transition matrix in each sub-period

would be 4x4 $n_{t,\Delta}$ matrix. Given a matrix $n_{t,\Delta}$, one can also construct n_t using matrix multiplication as Shimer demonstrates. Let $\mu_{t,\Delta}$ show a diagonal matrix of eigenvalues of $n_{t,\Delta}$ with a unique matrix $p_{t,\Delta}$ having unique eigenvectors in columns. Therefore, $n_{t,\Delta} = p_{t,\Delta}\mu_{t,\Delta}p_{t,\Delta}^{-1}$. Matrix multiplication produces $n_{t,\Delta} = p_{t,\Delta}\mu^{1/\Delta}p_{t,\Delta}^{-1}$. Appliying the same logic to four state versions, and following Shimer (2012), one can also construct $n_{t,\Delta} = p_t\mu^{1/\Delta}p_t^{-1}$. From this point, the same procedure in four state version is applied to construct transition rates and the probabilities.

4.3 Results and Discussion

4.3.1 Results for Entire Population

Table 4.1 Decomposition of the Fluctuations

Decomposition of fluctuations	**Total**
Transition rate	Explanatory power
λ^{EU}	0.20
λ^{EI}	-0.04
λ^{UE}	0.48
λ^{UI}	0.15
λ^{IE}	0.08
λ^{IU}	0.12

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the accociated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1}+e_{t+1})$ and $u_t^{ij}/(u_t^{ij}+e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1}+e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

In this sub-section, we briefly discuss our estimation results for the entire population. Our analysis here is based on the framework developed in Shimer (2012). So, we expect to obtain results similar to his calculations. Table (4.1) shows that this conjecture holds; that is, our results are very similar to those reported in Shimer (2012).

To summarize, we show that around a half of unemployment fluctuations is explained by the movements in the job finding probability over the business cycle. But the cyclical movements in the exit probability can explain only a 20% of the fluctuations in the rate of unemployment. This result is important for two reasons. First, it suggests that the intuition that the Mortensen-Pissarides model is built on

(that exit rate has greater variance than the job finding rate over the business cycle) may not be correct. Second, it shows that recessions are dominantly characterized by increased difficulty in job finding rather than increased hazard of exit. These two reasons are in conflict with the conventional wisdom in the macro labor literature and should be evaluated with special attention.

Let us briefly summarize how Table 4.1 is constructed. Using the procedure described above, we show that the number employed (e), unemployed (u), and inactive (i) workers can be written as a function of the entry and exit rates as follows:

$$e = \lambda^{UE} + \lambda^{UI}\frac{\lambda^{IE}}{\lambda^{IE} + \lambda^{IU}},$$

$$u = \lambda^{EU} + \lambda^{EI}\frac{\lambda^{IU}}{\lambda^{IE} + \lambda^{IU}},$$

$$i = \lambda^{UI} + \lambda^{UE}\frac{\lambda^{EI}}{\lambda^{EI} + \lambda^{EU}}.$$

The rate of unemployment, $u/(u+e)$, can thus be approximated by the following formula:

$$\frac{\lambda^{EI}\lambda^{IU} + \lambda^{IE}\lambda^{EU} + \lambda^{IU}\lambda^{EU}}{\lambda^{EI}\lambda^{IU} + \lambda^{IE}\lambda^{EU} + \lambda^{IU}\lambda^{EU} \ + (\lambda^{IU}\lambda^{UE} + \lambda^{UI}\lambda^{IE} + \lambda^{IE}\lambda^{UE})}.$$

To estimate, let's say λ^{EU}, one needs to take the averages of all other transitions rates, while keeping the λ^{EU} variable. Then one needs to calculate the ratio of the covariance between $\mathrm{u}_{t+1}/(\mathrm{u}_{t+1} + \mathrm{e}_{t+1})$ and $u_t^{EU}/(u_t^{EU} + e_t^{EU})$ to the variance of $\mathrm{u}_{t+1}/(\mathrm{u}_{t+1} + \mathrm{e}_{t+1})$. This is simply a regression coefficient. This procedure yields the estimates reported in Table (4.1). Note that the final series used in the regression are constructed from the seasonally adjusted (using ratio-to-moving average technique) raw data and, then, are detrended using a Hodrick-Prescott filter with a smoothing parameter 10^5. See also Figures from (4.1) to (4.6) to observe the

explanatory powers of each transition rates on unemployment fluctuations over the business cycle.

From this point on, we try to understand what drives these results and what causes the discrepancy between our estimates in Section 3 and the results presented in this sub-section (i.e., Shimer's results). Next section provides a simple decomposition of these results by race, gender, and age categories. This is the first attempt in the literature providing such decomposition.

In Section 4.3, we incorporate self-employment as a fourth labor market state. Finally, Section 5 investigates if several well-documented margin adjustment errors in CPS labor market transitions drive these results or not.

4.3.2 Analysis of Subgroups

The graph below presents the employment transition probability from employment to unemployment of males and females. The level of this probability of males is higher than females. Both series follow a decreasing trend until 2007 recession. Transition probability of females decreases more consistently and steadily than males over time. The response of males' employment to unemployment transition probability to recessions differs from females in magnitude and pattern. While there are no significant differences in responses of both series to early 1980s recessions, in the recessions of early 1990s, males' employment exit rates started to increase more than that of females as a response to recessions. The increases in employment to unemployment transition probability of males are above the increase in this transition probability in early 2000s recessions. The employment to unemployment transition probability of males increases by 25 percent in 2008 and 2009 while the transition probability from employment to unemployment of females increases by 13 percent. The employment exit probability reaches its maximum in the first quarter of 2009 the year when the highest unemployment rate that is above 11 percent is observed among males. Transition probability of males could not return to its pre-crisis levels while the transition probability of females returns to its pre-crisis levels.

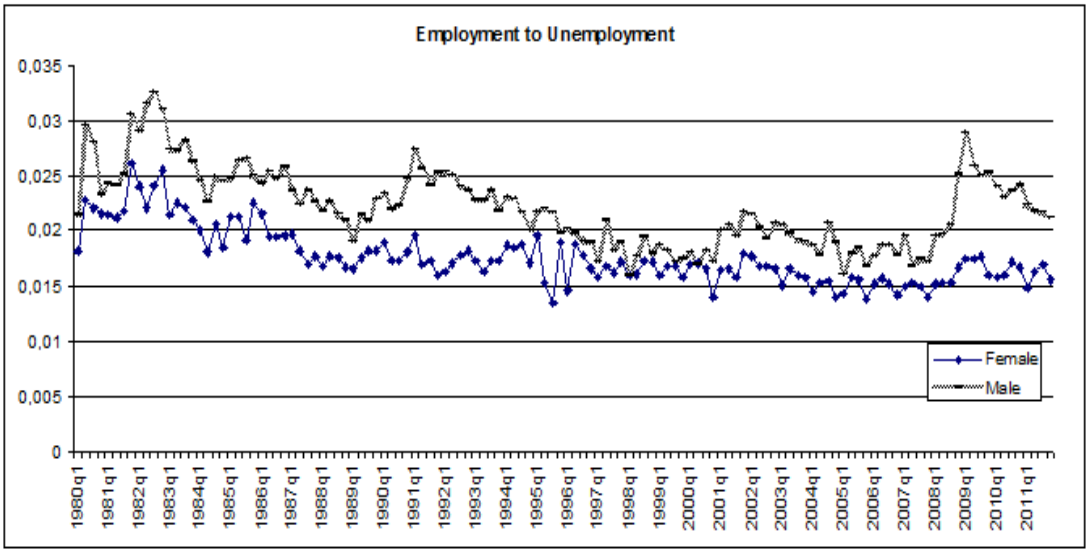

Figure 4.1 Transition probabilities from employment to unemployment of males and females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares..

The graph shows the transition probability from unemployment to employment of males and females. Although these series show similar patterns, it should be noted that the mean of the transition probability of males is 0,31 while it is 0,29 for females. Transition probabilities for males are more cyclical than females.

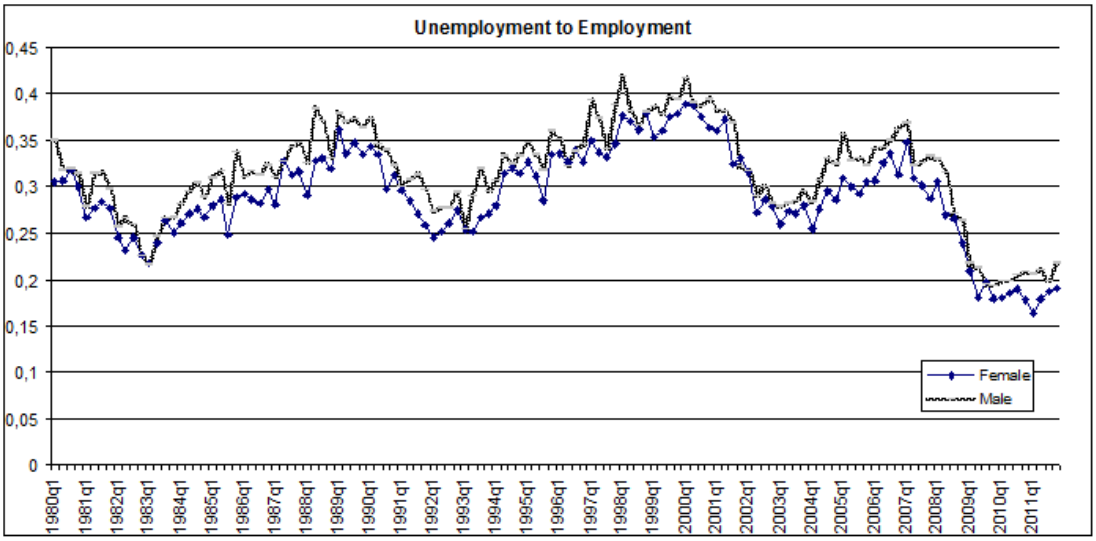

Figure 4.2 Transition probabilities from unemployment to employment of males and females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares..

Unemployment rate among males increased from about 6 percent to above 11 percent as a response to 2007 recession while the unemployment rate of the females increased to 9 percent levels. The difference in the increases in the unemployment rate of the males and females can be attributed to the sharper and steeper increase in the employment to unemployment transition probability of males in 2007 crisis. Therefore, we can conclude that difference in the unemployment rates of males and females is driven mostly by the employment exit rates since unemployment to employment transitions of males and females show similar characteristics.

The gender analysis of probability of transitions from employment to unemployment and unemployment to employment and transitions are shown in figure 4.1 and 4.2. Figure 4.1 shows that there exits a heterogeneity in exit rates in response to 2007 crisis. However this heterogeneity does not validate the heterogeneity hypothesis. Heterogeneity hypothesis suggests that the groups with lower job finding probability respond to crisis by higher exit rates. This means that the situation in 2007 is reverse of the predictions of the heterogeneity hypothesis. Males, with higher job finding probability are those who are influenced by the crisis at higher exit rates from employment. On the other hand, the gender analysis of labor market transitions reveals that employment exit rates plays crucial role in determination of unemployment rate for groups in the beginning of the recessions. One should be very careful to conclude that unemployment rates play the major role in Shimer's findings documenting that employment exit rates shows acyclic behavior compared to the unemployment exit rates. Although employment to unemployment transitions shows acyclical behavior its increases in a few observation that has little effect on cyclicality at the beginning of the recession can trigger the unemployment rates.

A convergence between the transition probabilities of unemployment to employment in both groups is witnessed, which can be seen from Figure 4.1. Unemployment to employment transition probability of the males, as a group initially hit harder than the females with an enormous increase in the employment to unemployment transition probability, decrease in the labor market adjustment from the beginning of the crisis. This can verify the argument of Elsby, Michaels, and

Solon (2009) who suggest that the increase in unemployment pool can reduce the outflows.

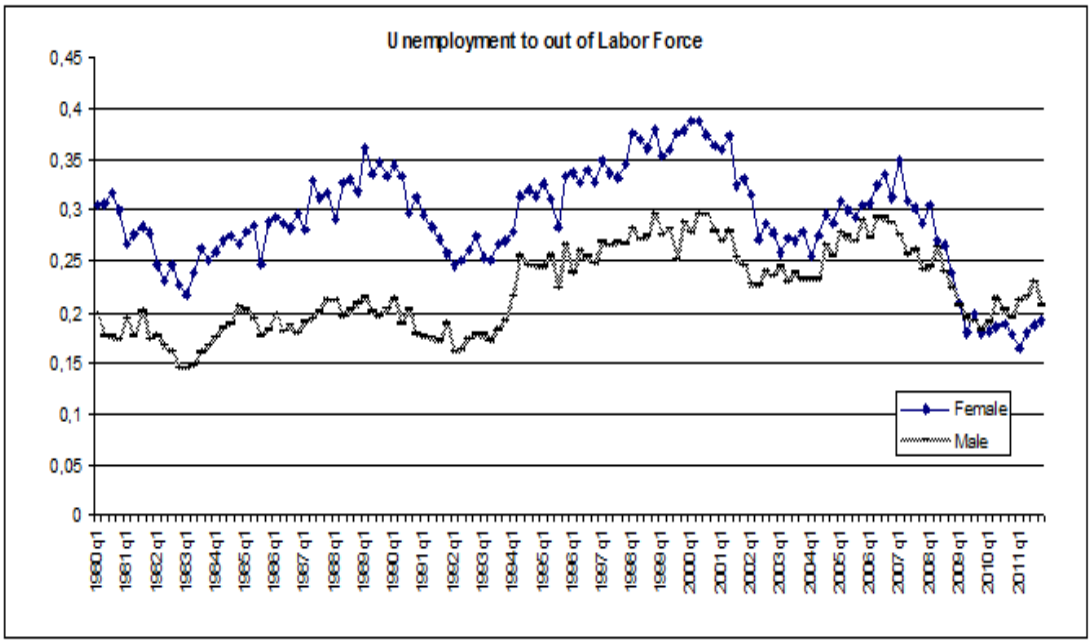

Figure 4.3 Transition probabilities from unemployment to out of labor force of males and females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Transitions from unemployment to out of labor force of the females decrease dramatically in 2007 recession period as can be seen from Figure 4.3. This transition of the males increases above the females for the first time as a response to the 2007 crisis for the first time. The decrease in the transitions from unemployment to out of labor force has a positive impact on the unemployment rate. The relatively high unemployment rates of the males cannot be attributed to unemployment to out of labor force transitions since this transition for the females decrease more than that of the males.

One can question whether the females transit into not in labor force employment status in recessions and whether this can be a reason for lower increase in employment exit rates of females. The Figure 4.4 presents the transition probability from employment to out of labor force of males and females. Both series show similar patterns. The transition from employment to not in labor force of females do not show a sharpen increase as a respond to recessions.

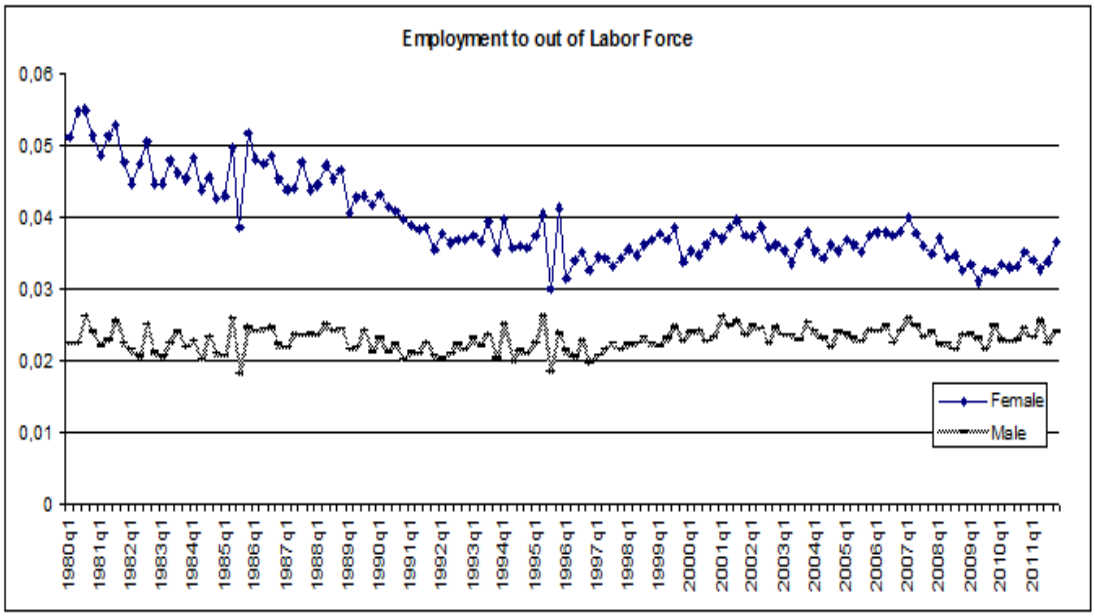

Figure 4.4: Transition probabilities from employment to out of labor force of males and females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares..

Transitions from out of labor force to employment and unemployment shown in Figures 4.5 and 4.6. The transitions from out of labor force to unemployment of the males experience steeper increase than that of females.

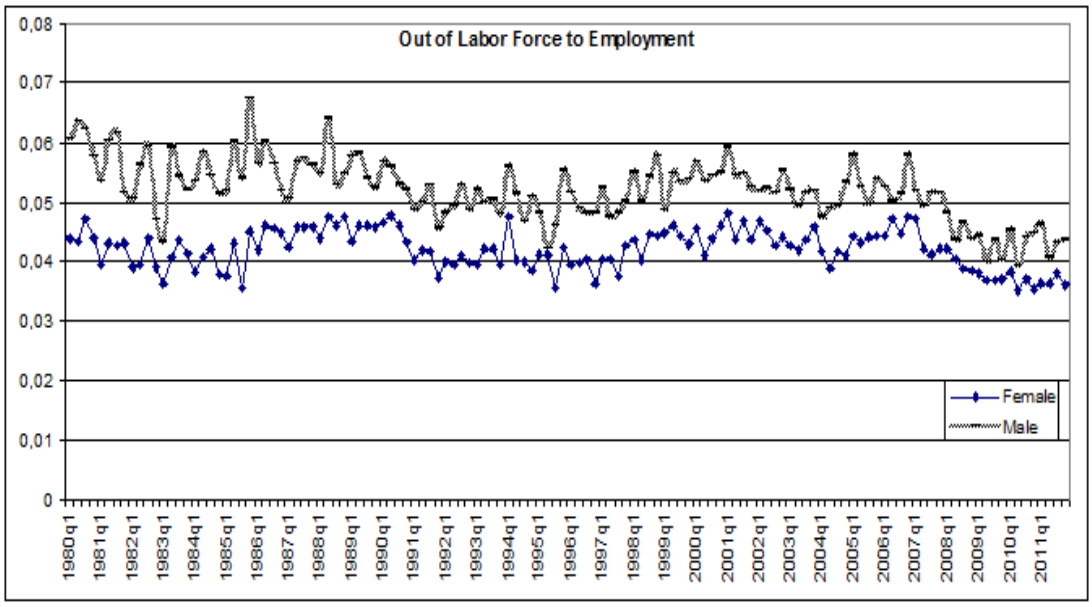

Figure 4.5: Transition probabilities from out of labor force to employment males and females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

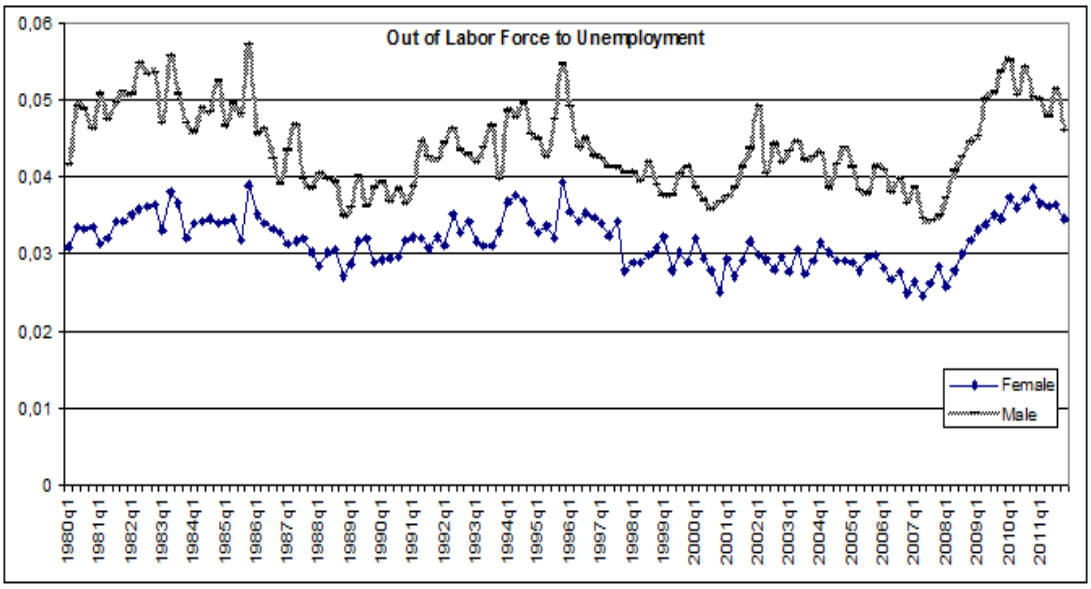

Figure 4.6: Transition probabilities from out of labor force to unemployment males and females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Table 4.2: Decomposition of the Fluctuations

Decomposition of fluctuations	**Male**
Transition rate	Explanatory power
λ^{EU}	0.26
λ^{EI}	-0.01
λ^{UE}	0.46
λ^{UI}	0.11
λ^{IE}	0.07
λ^{IU}	0.09

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the accociated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1} + e_{t+1})$ and $u_t^{ij}/(u_t^{ij} + e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1} + e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

Table 4.2 indicates that the employment to unemployment transitions of the males have more explanatory power on unemployment rate than that of females. The reason is that employment to unemployment transitions of males increase more rapidly in recession times. The explanatory power of the unemployment to employment transitions for the males and females are close to each other.

The explanatory power of the transitions from out of labor force and to out of labor force of the females on unemployment rate is above that of the males. The transitions from not in labor force to employment and unemployment accounts for the 30 % of fluctuations in unemployment rate while this is 16 percent for the males. The reason for this difference can be the increasing trend in the labor force participation of the females in the post 1980 area.

Table 4.3: Decomposition of the Fluctuations

Decomposition of fluctuations	**Female**
Transition rate	Explanatory power
λ^{EU}	0.11
λ^{EI}	-0.07
λ^{UE}	0.49
λ^{UI}	0.15
λ^{IE}	0.13
λ^{IU}	0.09

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the associated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1} + e_{t+1})$ and $u_t^{ij}/(u_t^{ij} + e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1} + e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

Transitions from unemployment to out of labor force of the females have more explanatory power on the unemployment rates than that of the males. Unemployment to out of labor force transition probability accounts for the 15 percent of the fluctuations of the unemployment rate whereas it accounts 11 percent of the fluctuations of the males.

The higher increase in the unemployment rate of the males can mainly be attributed to the higher increase in employment to unemployment transition probability since the effect of the unemployment to employment transition probability of both group on unemployment rate are close to each other.

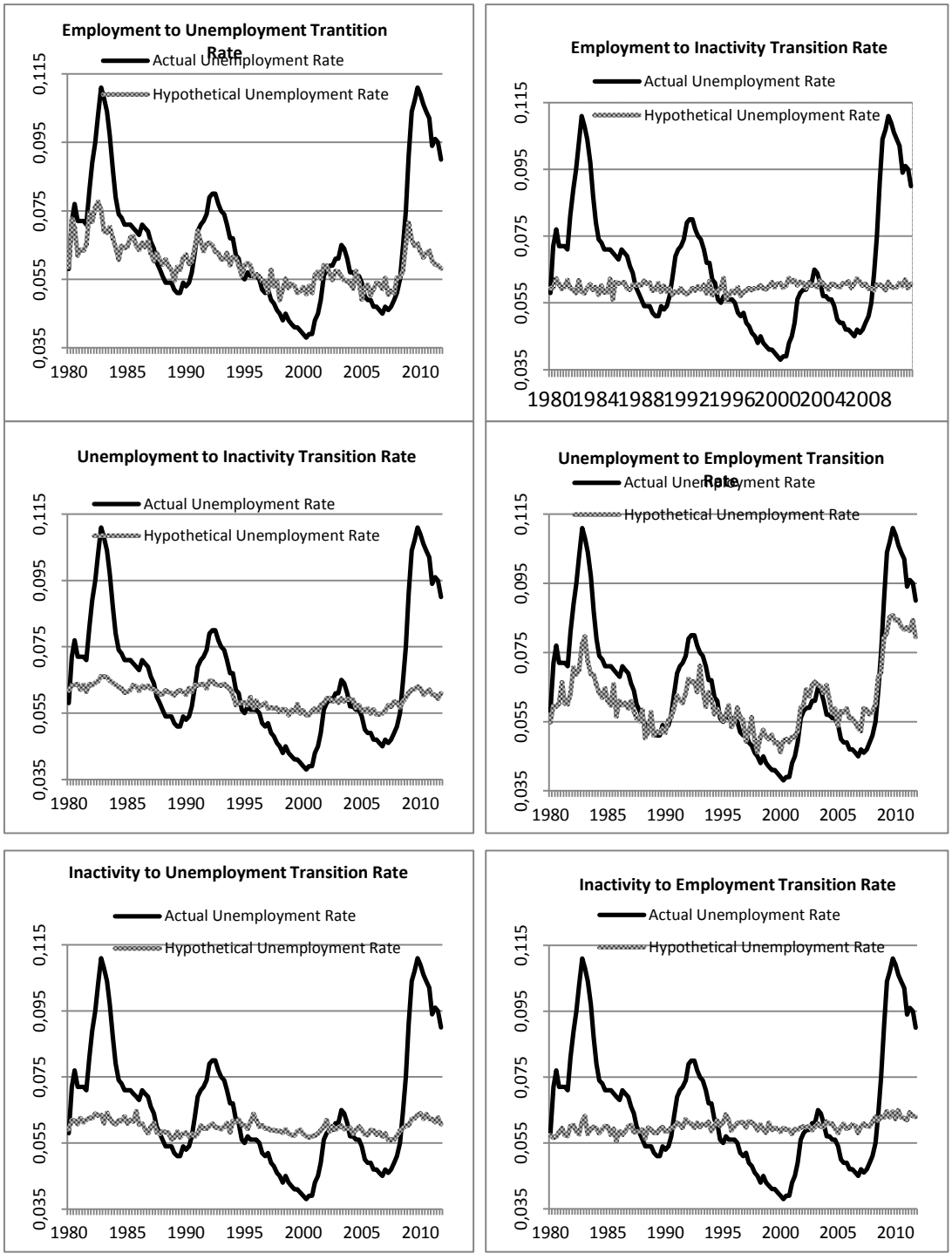

Figure 4.7: Contributions of the fluctuations in transitions rates for the males to unemployment rate. The quarterly averages from 1980Q1 to 2011Q4 are seasonally adjusted via ratio to moving average method and detrended using HP filter with parameter 10000 in all calculations.

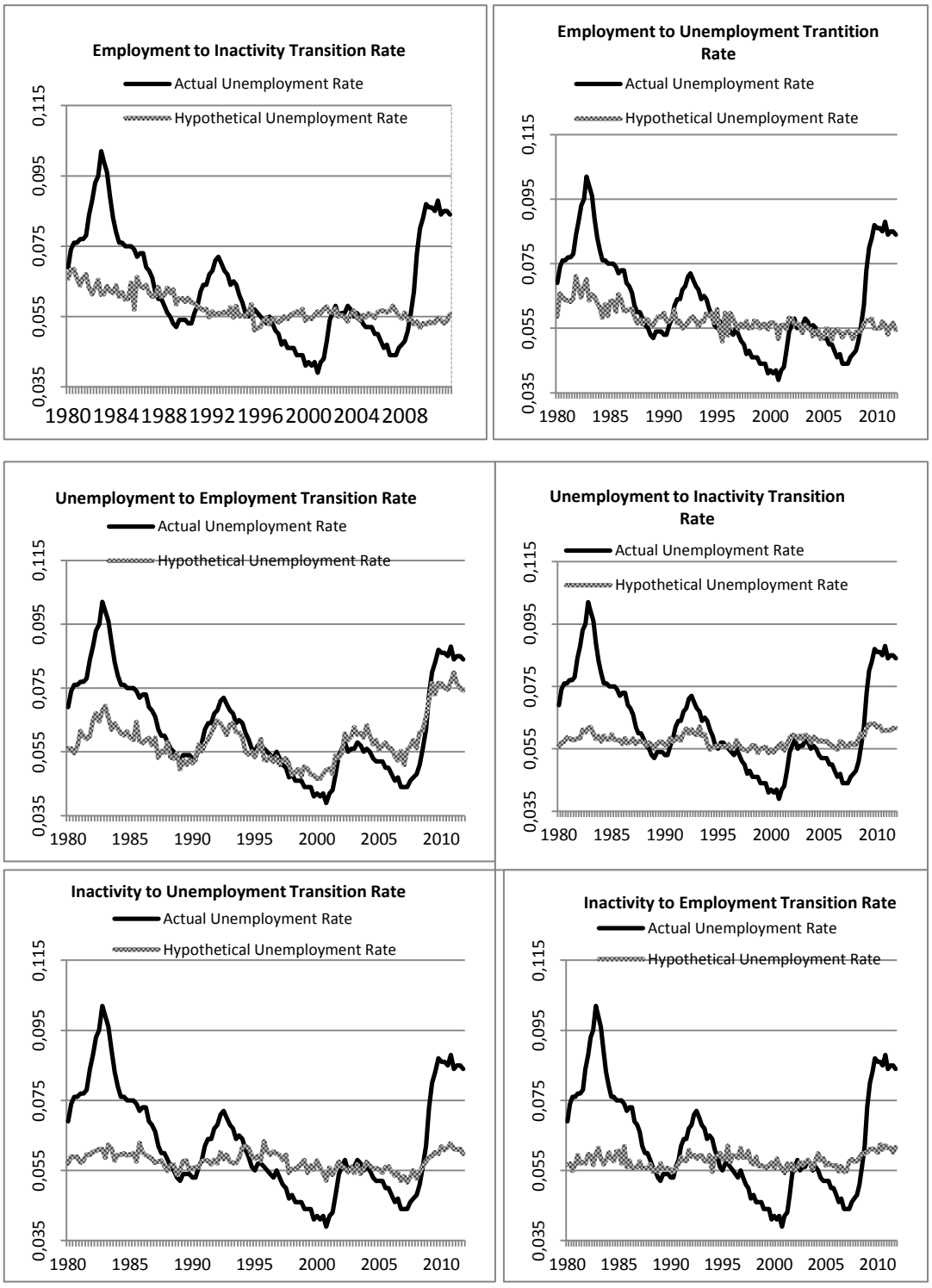

Figure 4.8: Contributions of the fluctuations in transitions rates for the females to unemployment rate. The quarterly averages from 1980Q1 to 2011Q4 are seasonally adjusted via ratio to moving average method and detrended using HP filter with parameter 10000 in all calculations.

The transition probability of employment to unemployment of whites has experienced an increase in this probability as a response to the crises of early 1980s, early 1990's, early 2000s, 2008 and 2009 more than the non-white population's employment to unemployment transition probability. Although the early 1980s recessions increase employment to unemployment probability of non-whites considerably, the effects of the recessions of early 1990s and early 2000s recessions are weak relative to the impacts of these recessions on employment to unemployment transition probability of whites The increase in the transition probability of whites in 2008 and 2009 is again beyond the increase in employment to unemployment transition probability of non-whites. Transition probability from employment to unemployment of non-whites decreases more consistently and steadily over years until 2008 recessions while employment exit rates of whites increases more than non-whites as a response to 2008-2009 recessions. Figure 4.9 below summarizes this case .

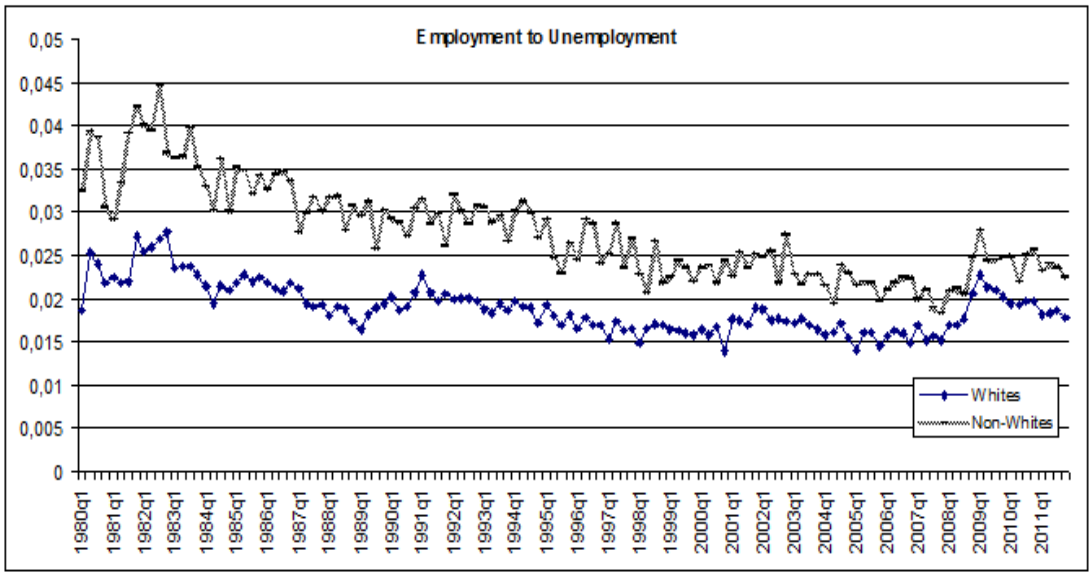

Figure 4.9 Transition probabilities of employment to unemployment of whites and non-whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

The employment to unemployment transition probability of whites increases by about 45 percent in early 1980s recessions while that of non-whites increases by about 35 percent. Meanwhile, the unemployment rate of the whites is doubled. The on-white population's unemployment rate reaches above 13 percent from pre-crisis

average of 8 percent. These findings suggests that we cannot agree with Elsby, Hobijin and Sahin (2010). In their study, they suggest that minorities are harmed more than Whites in 2007 recession. They draw this conclusion from comparing the the unemployment rate levels in pre-crisis, and post-crisis This recession damaged the labor market conditions of whites as much as non-whites when we analyze the transitions and the changes in the unemployment rate. Hence, we can argue that whites get worse off after the crisis when the rise in transitions to unemployment and unemployment rate are taken together into account.

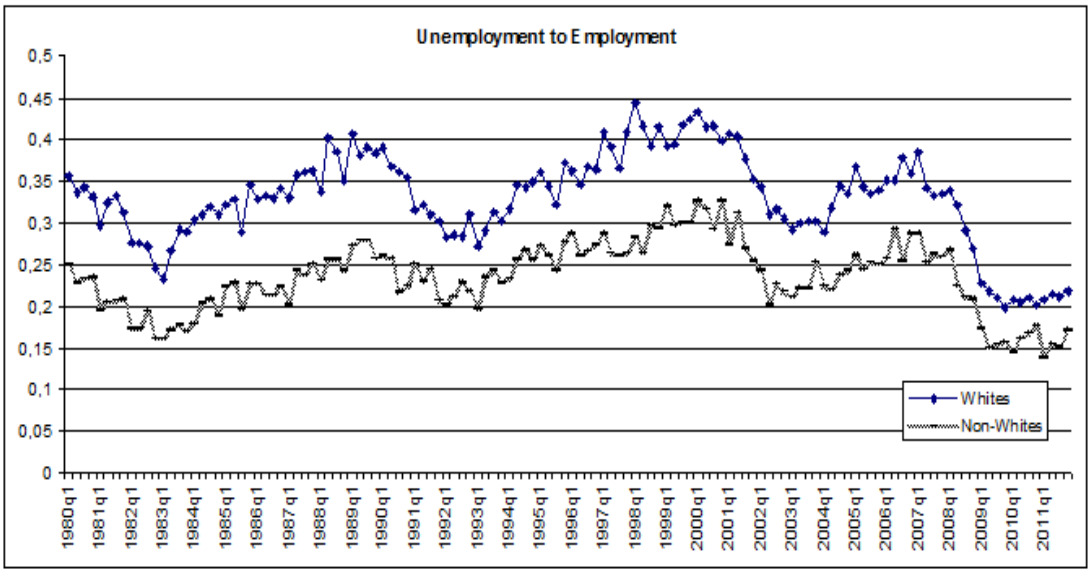

Figure 4.10: Transition probabilities of unemployment to employment of whites and non-whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

The increase in employment to unemployment transition probability of whites is about 20 percent in the early 1990s while the employment unemployment transition probability of non-whites does not show significant increase as a response to the early 1990s. The impact of the early 2000s recession on the employment to unemployment transition probabilities of both groups is not different than that of recessions in the early 1990s. The increase in employment to unemployment transition probability of whites is about 20 percent. The employment to unemployment transition probability of non-whites increases initially but then immediately returns to its pre-crisis level as a response to the early 2000s. Employment to unemployment transition probability of whites increases to 45

percent, in the 2008 and 2009. The increase in the transition probability of non-whites is about 20 percent as a response to the shock of 2008 and 2009.

Employment to out of labor force transitions of the non-white population is above employment to out of labor force transitions of the white population, which can be seen from Figure 4.11. The racial gap in employment to out of labor force transition probability is widened over the years.

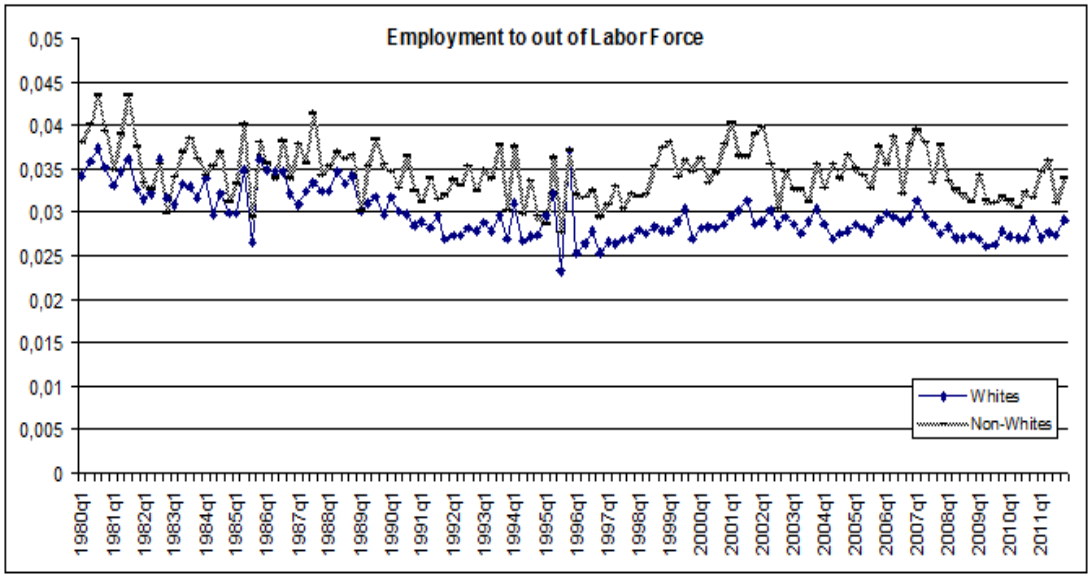

Figure 4.11 Transition probabilities of employment to out of labor force of whites and non-whites. . Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

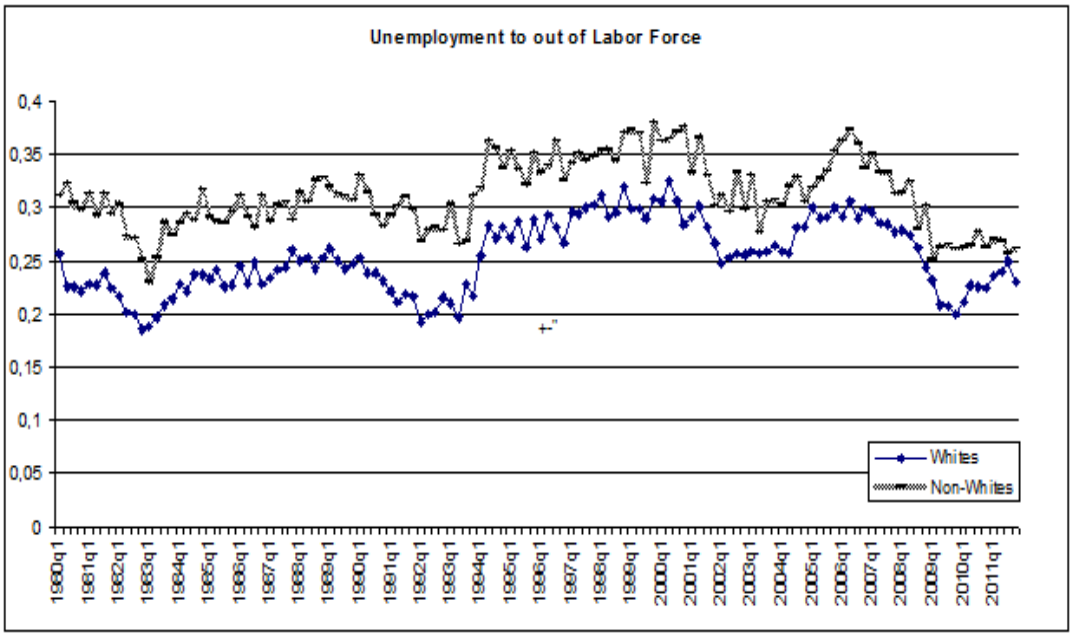

Figure 4.12: Transition probabilities of unemployment to inactivity of whites and non-whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Unemployment to out of labor force transitions decrease in the recession times, which can be seen from Figure 4.12. It decreases in the first stages of the crisis, after 2008, it becomes stable for the non-white population. On the other hand, unemployment to out of labor force transition probability of the whites decreases in the beginning of the 2007 crisis. It starts to increase in 2008 and reaches to the level of nonwhite population towards the end of the period.

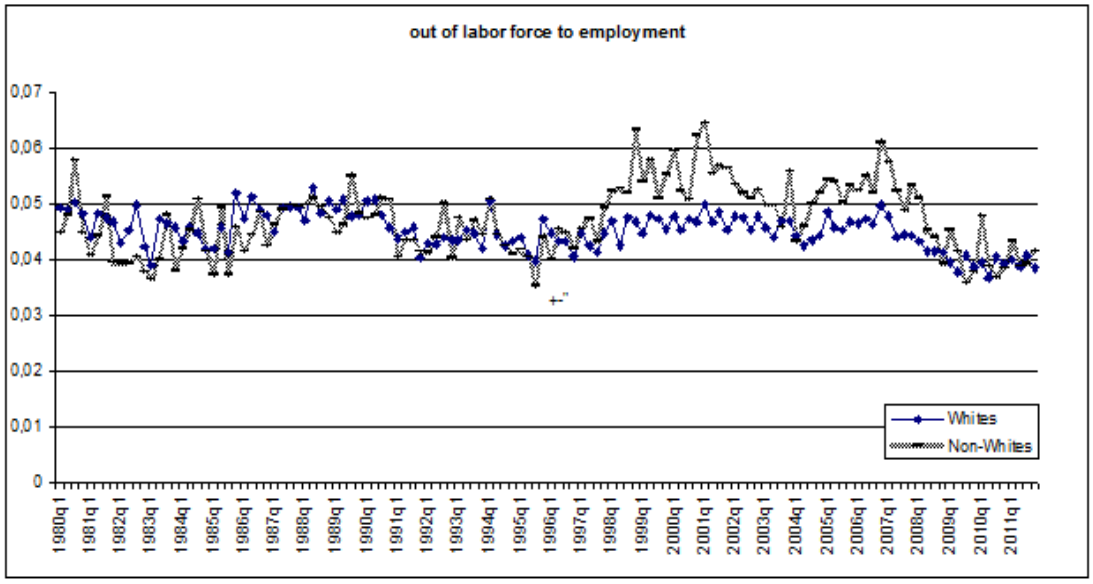

Figure 4.13: Transition probabilities of inactivity to employment of whites and non-whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Figure 4.13 suggests that out of labor force to employment transition probability of the whites are close to that of non-whites from the beginning of the period until the midst of 1990s. Then, the transition probability of the non-white population increases to higher levels. The transition probabilities of whites and non-whites converge to each other towards the end of the period. Both transition probability decreases as a respond to 2007 crisis. The decrease of employment to out of labor force transition of the non-white population is steeper than the decrease in this transition probability of the whites.

Out of labor force to unemployment transition probability of the non-white population is more cyclical than this transition probability of the white population, which can be seen from Figure 4.14. The transition probability of the non-whites increases more steeply than the whites as a response to 2007 crisis.

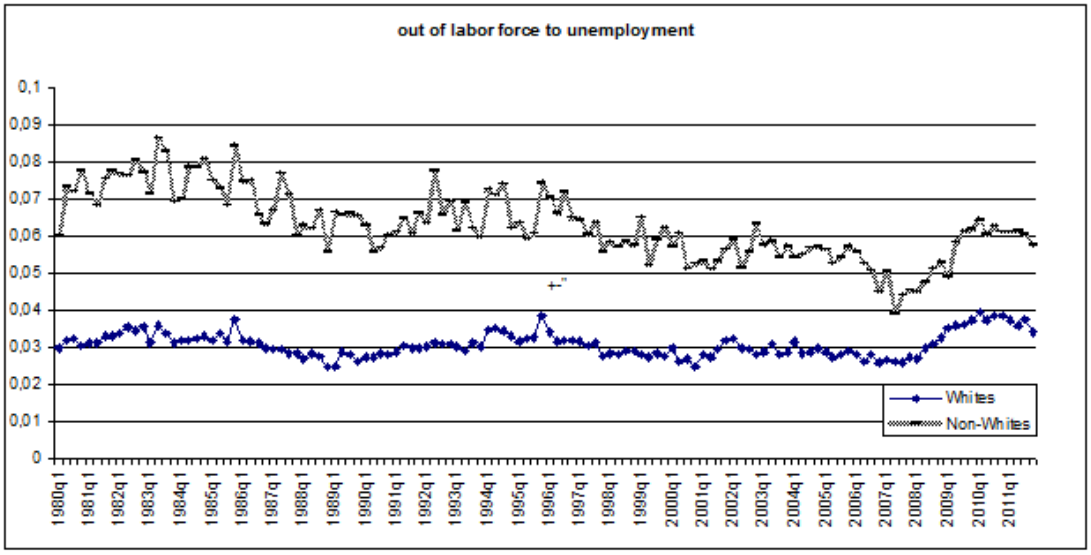

Figure 4.14 Transition probabilities of out of labor force to unemployment of whites and non-whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Table 4.4 Decomposition of the Fluctuations

Decomposition of fluctuations	**white**
Transition rate	Explanatory power
λ^{EU}	0.21
λ^{EI}	-0.02
λ^{UE}	0.48
λ^{UI}	0.13
λ^{IE}	0.07
λ^{IU}	0.11

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the associated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1}+e_{t+1})$ and $u_t^{ij}/(u_t^{ij}+e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1}+e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

Table 4.4 and 4.5 shows that the explanatory power of employment to unemployment transitions on the unemployment rate is higher for the white population. The higher cyclicality over the whole period and the higher increase of this transition probability as a respond to 2007 crisis are responsible factors for the higher parameter for the non-white population. Employment to unemployment transitions are more important for non-white population in explaining their unemployment rate fluctuations.

Out of labor force to employment transitions of non-whites decreases more than that of whites as a response to 2007. The decrease in this transition on unemployment rate is positive. On the other hand, the transition from inactivity to unemployment of non-whites increases more than that of whites during the crisis years, which has also a positive impact on the unemployment rate. These two transition probabilities drive almost 30 percent of the unemployment fluctuations for the non-white population.

Table 4.5: Decomposition of the Fluctuations

Decomposition of fluctuations	**Nonwhite**
Transition rate	Explanatory power
λ^{EU}	0.16
λ^{EI}	-0.04
λ^{UE}	0.43
λ^{UI}	0.16
λ^{IE}	0.15
λ^{IU}	0.14

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the associated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1}+e_{t+1})$ and $u_t^{ij}/(u_t^{ij}+e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1}+e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5

Although the white population is hit harder in the initial stages in the 2007 crisis by a higher increase in employment to unemployment transitions, the unemployment rates of non-whites are increased by a decrease in the inactivity to employment and increase in inactivity to unemployment transitions.

It is not easy to decide on whether the whites or non-whites are hit harder during 2007 crisis. There is no significant difference on the unemployment rate level changes due to the crisis. Among the transitions, the increase in the employment to unemployment transition probability of the whites reveals that the whites are losing more jobs on recession times. On the other hand transitions from inactivity to employment of nonwhites decreases dramatically from the high levels of 1990s.

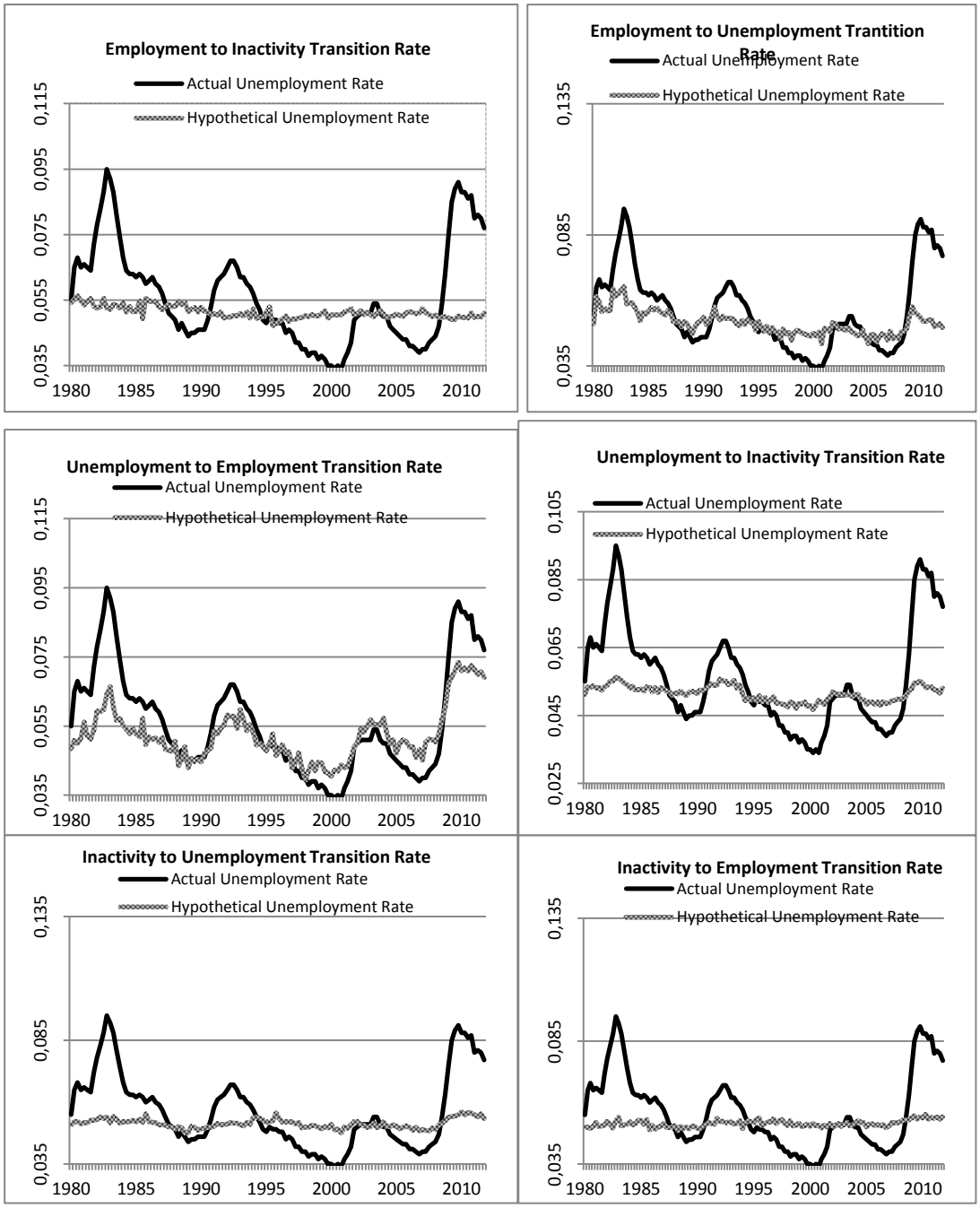

Figure 4.15: Contributions of the fluctuations in transitions rates for the whites to unemployment rate. The quarterly averages from 1980Q1 to 2011Q4 are seasonally adjusted via ratio to moving average method and detrended using HP filter with parameter 10000 in all calculations.

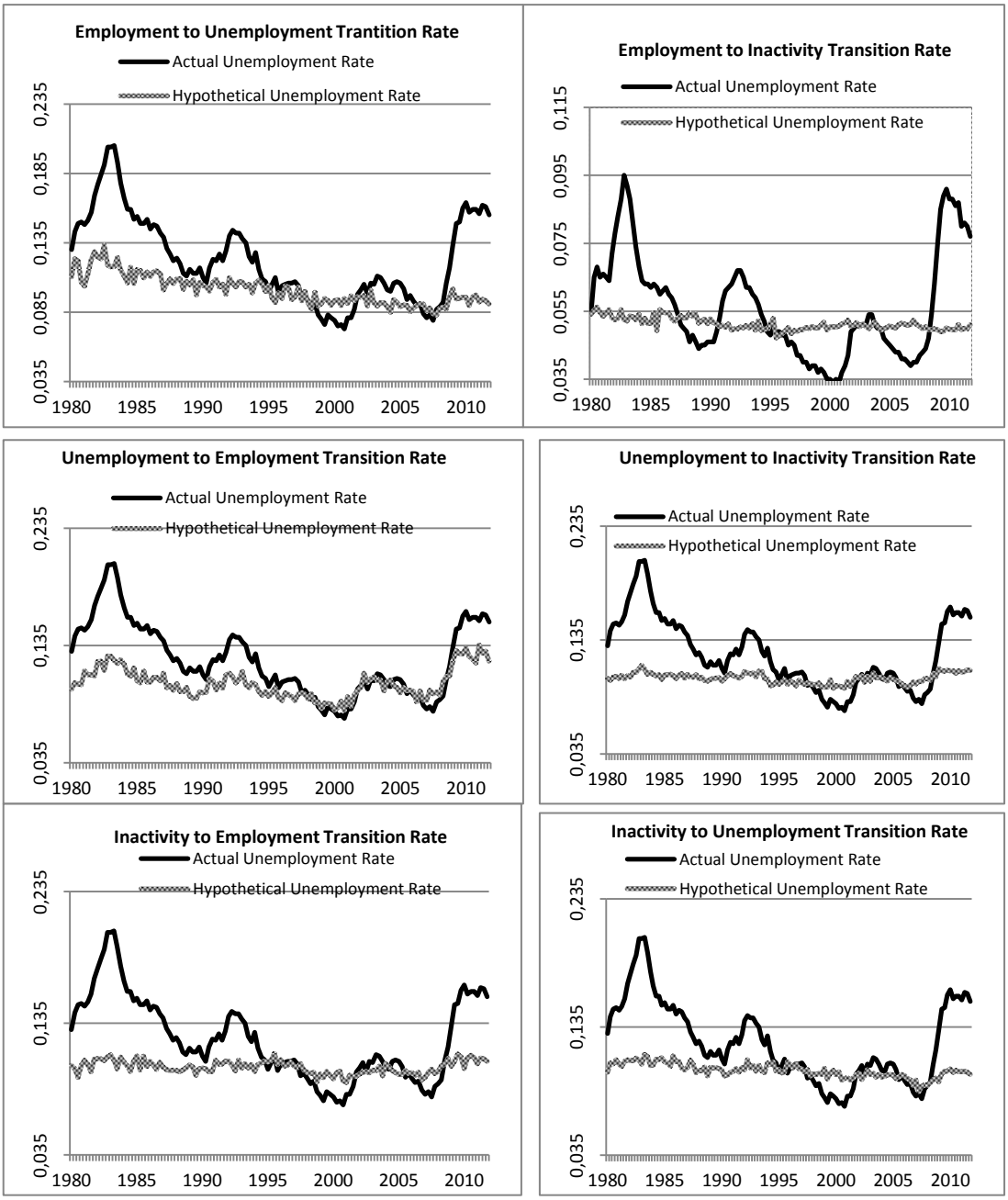

Figure 4.16: Contributions of the fluctuations in transitions rates for the nonwhites to unemployment rate. The quarterly averages from 1980Q1 to 2011Q4 are seasonally adjusted via ratio to moving average method and detrended using HP filter with parameter 10000 in all calculations.

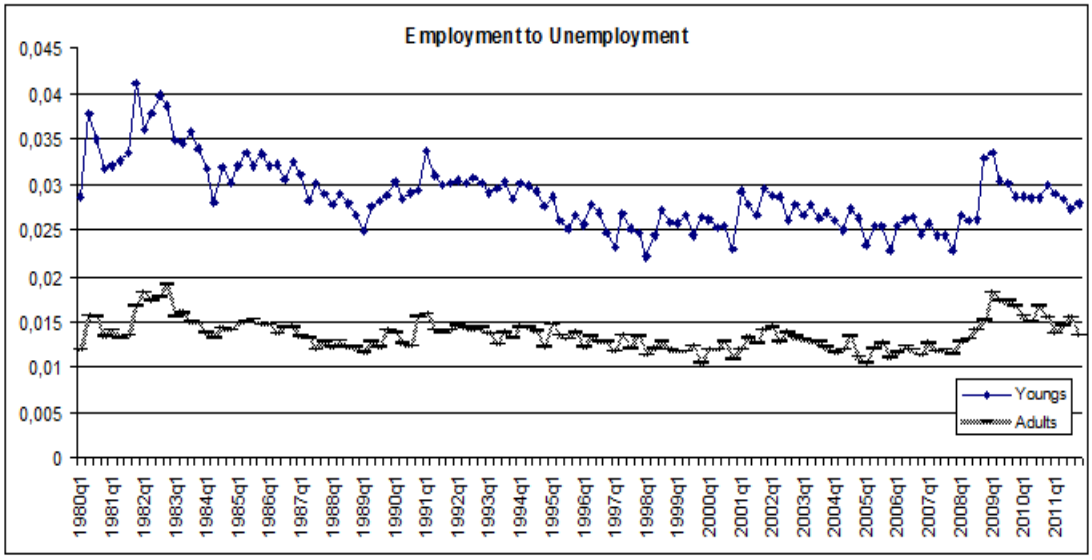

Figure 4.17 Transition probabilities of employment to unemployment of older and younger population. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

One can argue that we are only able to observe and analyze stock market manipulation cases that were detected and prosecuted.

We refer the individuals whose ages are below 35 as young and the individuals who are 35 and over as adults. The employment to unemployment transition probability of older age group and younger age group show similar characteristics until the great recessions of 2008 and 2009 which can be seen from Figure 4.17. The increase in the employment to unemployment transition probability of older age group is higher than that of the younger group.

The unemployment rate is doubled for the older age group in 2007 recession. The unemployment rate reached above 8,5 percent in 2008 and 2009 for the population aged below 35. The unemployment rate is almost doubled for younger group. The unemployment rate is above 12 percent in 2008 and 2009 while this rate is about 7 percent in pre-crisis period.

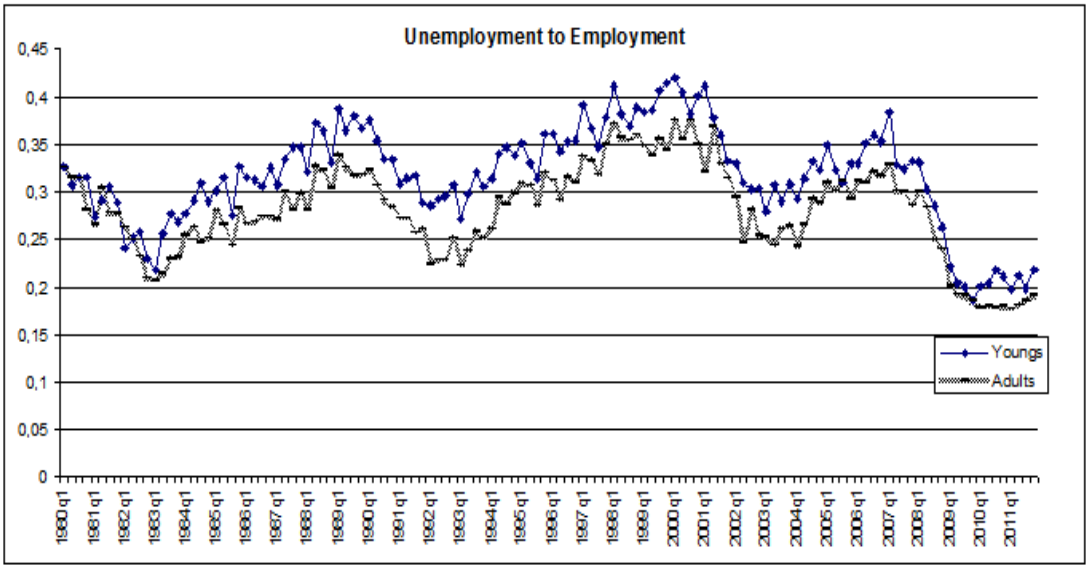

Figure 4.18 Transition probabilities of unemployment to employment of older and younger population. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Employment to out of labor force transitions for the younger population are higher than these transitions for older age group. 2007 recession stimulated a rise in employment to out of labor force transition probability while it does not have considerable effect on the employment to out of labor force transition for the older group. The younger group's unemployment rate would be higher than the realized levels if employment to out of labor force transitions did not experience such an expansion. This means that the younger groups are affected by the crisis more than it is perceived from.

Comparison of the pre-crisis and post crisis period implies that both groups are affected by the crisis similarly as implied by the labor market transitions. Employment to unemployment transitions of the older population increases more than the younger population whereas the employment to out of labor force transitions of younger group increases more than the older age group. The older population has more tendency to transit to unemployment in recession times. On the other hand the younger population has higher propensity to go out of labor force as a response to recession times.

Table 4.6 Decomposition of the Fluctuations

Decomposition of fluctuations	**Age >=35**
Transition rate	Explanatory power
λ^{EU}	0.22
λ^{EI}	-0.02
λ^{UE}	0.43
λ^{UI}	0.18
λ^{IE}	0.06
λ^{IU}	0.15

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the associated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1}+e_{t+1})$ and $u_t^{ij}/(u_t^{ij}+e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1}+e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

Table 4.6 and 4.7 implies that the employment to unemployment transition probability of older population is more important in explaining the fluctuations in the unemployment rate. This can be explained by the higher increase in employment to unemployment transitions of the older population in recession times. The unemployment to employment transition probability of the younger population is more important to account for the fluctuations in the unemployment rate. The explanatory power of the transitions from out of labor force is higher for the younger population.

Table 4.7: Decomposition of the Fluctuations

Decomposition of fluctuations	**Age <35**
Transition rate	Explanatory power
λ^{EU}	0.19
λ^{EI}	-0.05
λ^{UE}	0.48
λ^{UI}	0.13
λ^{IE}	0.14
λ^{IU}	0.11

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the associated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1} + e_{t+1})$ and $u_t^{ij}/(u_t^{ij} + e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1} + e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

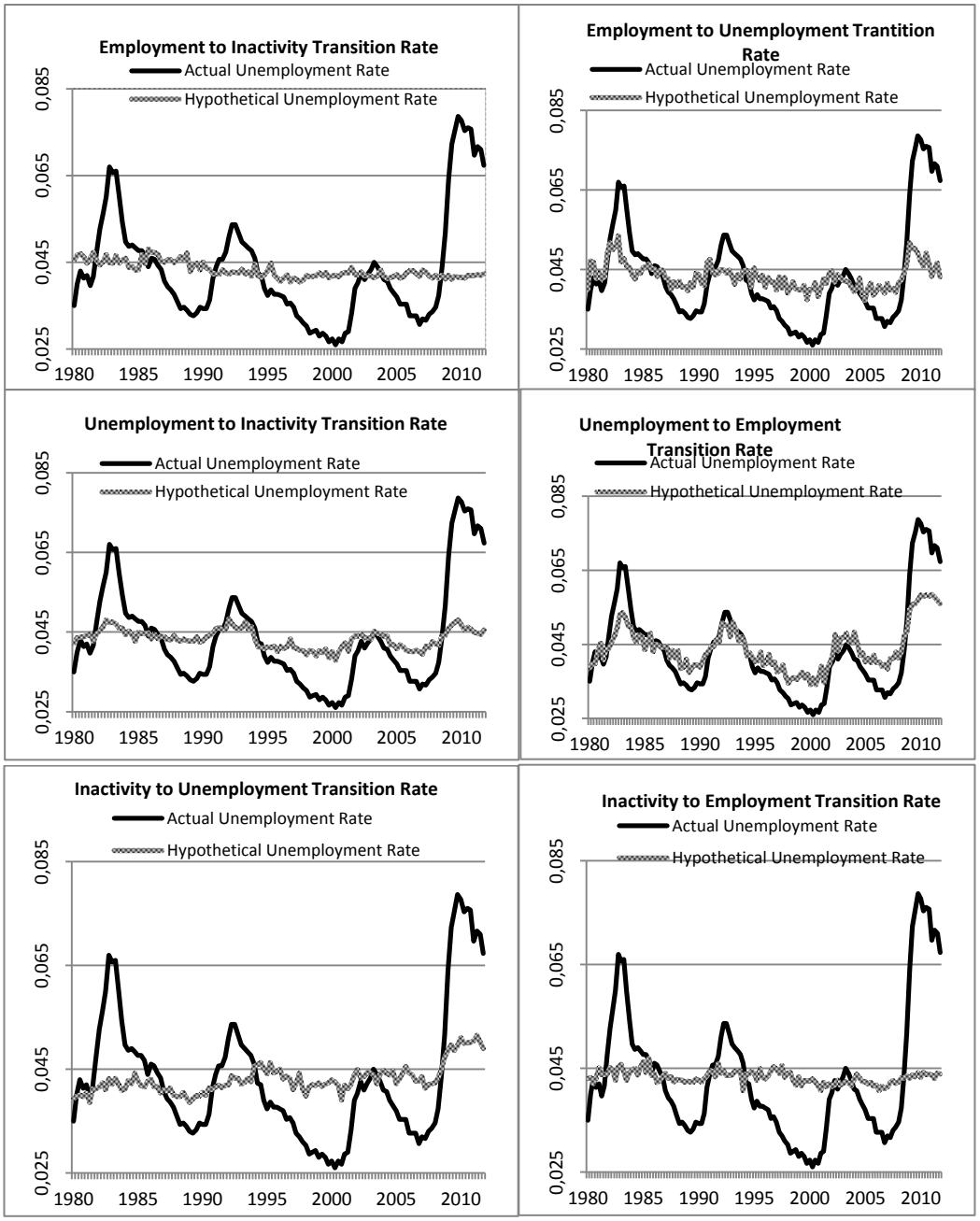

Figure 4.19: Contributions of the fluctuations in transitions rates for the people whose ages are equal or above 35 to unemployment rate. The quarterly averages from 1980Q1 to 2011Q4 are seasonally adjusted via ratio to moving average method and detrended using HP filter with parameter 10000 in all calculations.

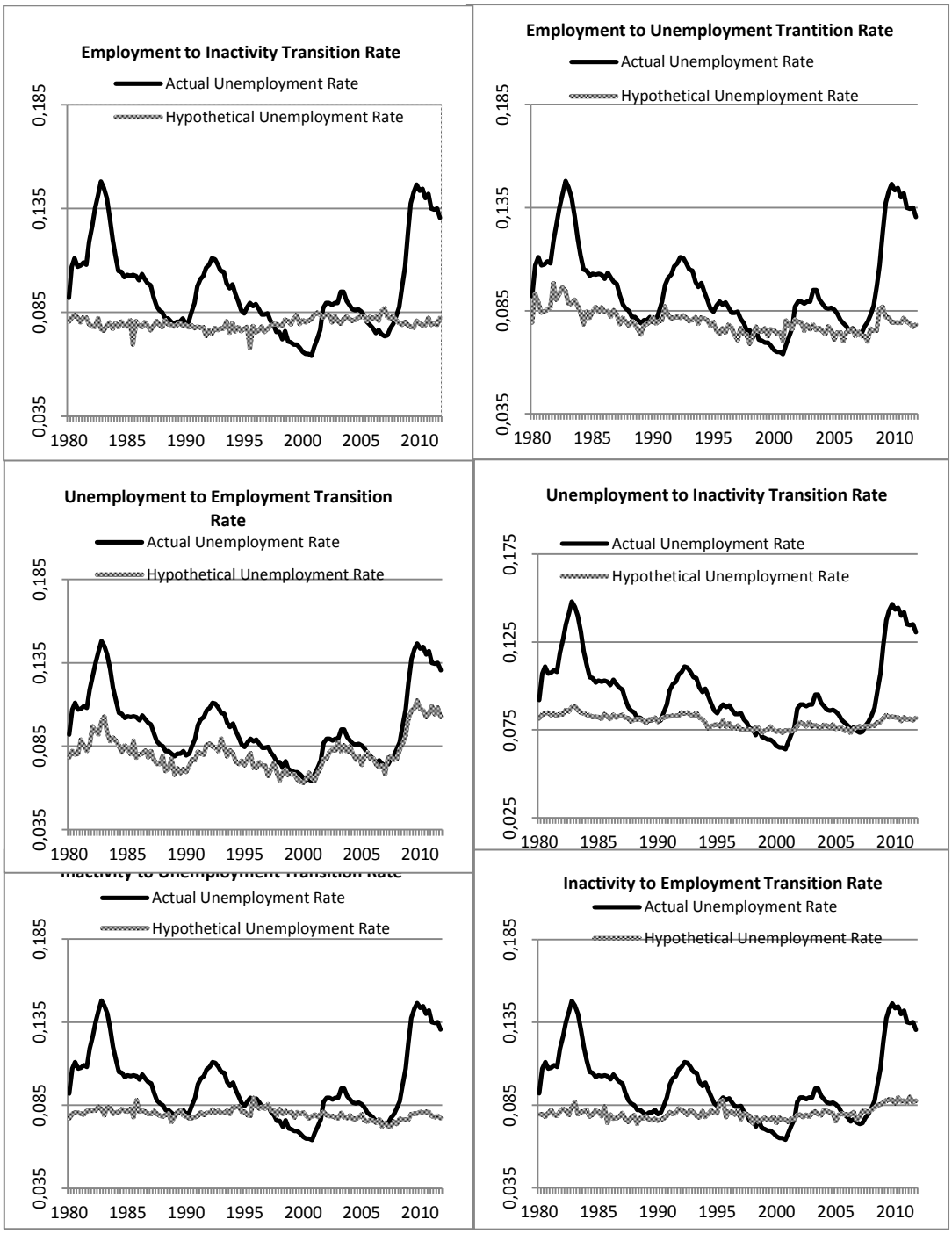

Figure 4.20: Contributions of the fluctuations in transitions rates for the people whose ages are below 35 to unemployment rate. The quarterly averages from 1980Q1 to 2011Q4 are seasonally adjusted via ratio to moving average method and detrended using HP filter with parameter 10000 in all calculations.

Employment to unemployment transition probability of college graduates and non-college graduates show similar patterns until the 2007 recession as can be seen from Figure 4.21. In 2008 and 2009, the increases of the transition probability of college graduates are beyond those whose education level is less than college degree. The increase in employment to unemployment probability of college graduates is more consistent and persistent than that of non-college graduates.

The sudden increase in the employment to unemployment transition probability is 60 percent for college graduates in 2008 and 2009. The increase in employment to unemployment transition probability of non-college graduates are 40 percent. The relatively high increase of college graduates partly stem from the fact that non-college graduates transitions from employment to out of labor force is increased as a response to 2007 recession. This means that the ratio of non-college graduates who do not start to search for new jobs after leaving employment stage is increased faster than college graduates.

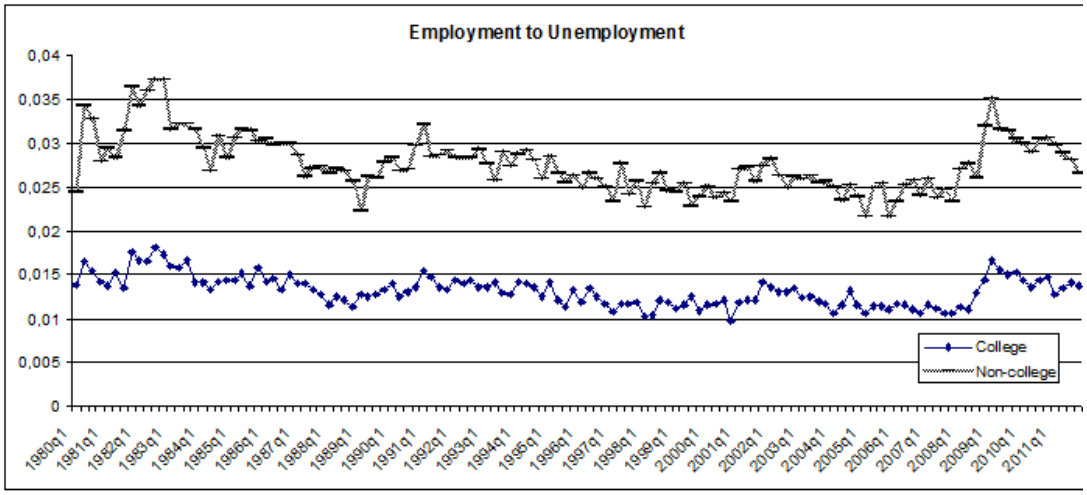

Figure 4.21 Transition probabilities of employment to unemployment of college and non-college graduates. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Figure 4.22 shows the unemployment to employment transition probabilities for college graduates and other education level groups. This figure implies that the gap in the job finding probabilities between the more educated group and the less educated group is closed. The job finding probabilities of these two groups are almost equalized in 2007 recession. This convergence between education groups are also reported in Elsby, Hobijin, and Sahin (2010).

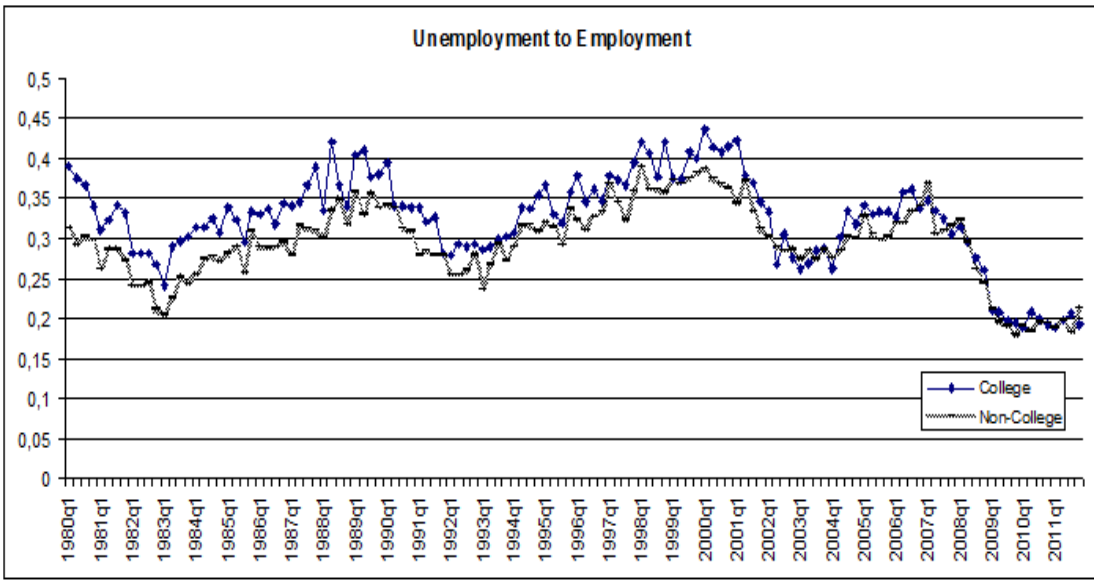

Figure 4.22 Transition probabilities of unemployment to employment of college and non-college graduates. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

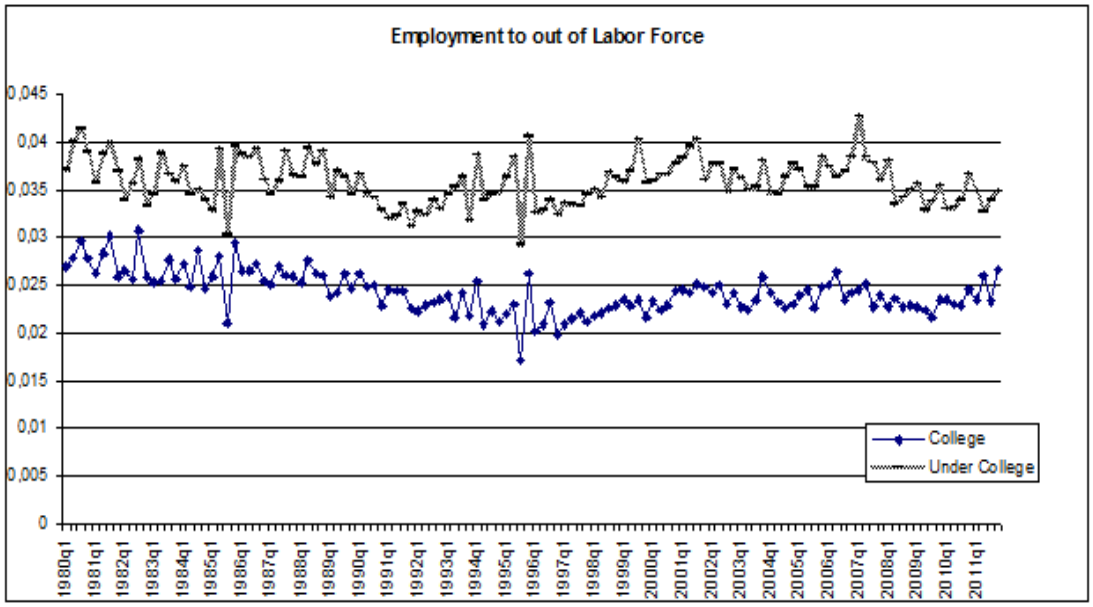

Figure 4.23 Transition probabilities of employment to out of labor force of college and non-college graduates. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Employment to out of labor force transition probability of those whose education level is below college is above those whose education level is equal or above college, which can be seen from Figure 4.23. Both series show similar patters over the period. Unemployment to out of labor force transitions are procyclical. This transition probability of the college graduates decreases much more than that of non-college graduates as a response to four crises in the period. Unemployment to out of labor force transition probability decreases from about 27 percent in the pre-crisis period to about 19 percent in 2010. Then, this transition probability for the college graduates increases to the levels very close to that transition probability of the non-college graduates. This increase can be a reflection of discouraged worker effect among the college graduates. Elsby, Hobijin and Sahin (2010) state that weak search effectiveness characterized the labor market adjustment after 2007 crisis. The rise in unemployment to out of labor force transition probability can be an indicator for a fall in the search efforts of the individuals.

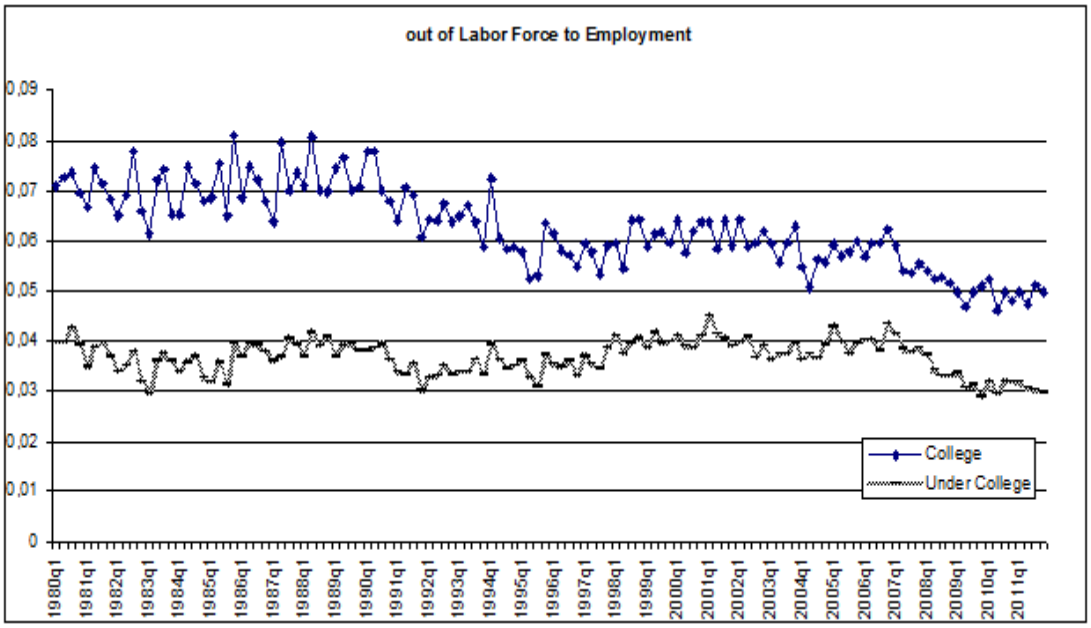

Figure 4.24 Transition probabilities of out of labor force to employment of college and non-college graduates. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

4.3.3 Results of Four State Model

Table 4.8: Decomposition of the Fluctuations

Decomposition of model including self employment.	**Total**
Transition rate	Explanatory power
λ^{EU}	0.12
λ^{EI}	-0.01
λ^{UE}	0.46
λ^{UI}	0.13
λ^{IE}	0.07
λ^{IU}	0.10
λ^{ES}	-0.02
λ^{US}	0.01
λ^{IS}	0.02
λ^{SI}	-0.02
λ^{SE}	0.02
λ^{SU}	0.10

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the accociated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1} + e_{t+1})$ and $u_t^{ij}/(u_t^{ij} + e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1} + e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

Table 4.9: Decomposition of the Fluctuations

Decomposition of model including self employment.	**Male**
Transition rate	Explanatory power
λ^{EU}	0.17
λ^{EI}	-0.01
λ^{UE}	0.44
λ^{UI}	0.10
λ^{IE}	0.05
λ^{IU}	0.07
λ^{ES}	-0.04
λ^{US}	0.02
λ^{IS}	0
λ^{SI}	-0.01
λ^{SE}	0.01
λ^{SU}	0.10

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the accociated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1} + e_{t+1})$ and $u_t^{ij}/(u_t^{ij} + e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1} + e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

The introduction of self-employment into the model reduces the parameter of employment to unemployment from 0.20 to 0.12, as can be seen from the Table 4.8.

The higher parameter for self-employment to unemployment transitions of the females indicates the vulnerability of self-employed females to recessions.

4.9 Decomposition of the Fluctuations

Decomposition of model including self employment.	**Female**
Transition rate	Explanatory power
λ^{EU}	0.07
λ^{EI}	-0.01
λ^{UE}	0.49
λ^{UI}	0.15
λ^{IE}	0.09
λ^{IU}	0.16
λ^{ES}	-0.03
λ^{US}	-0.01
λ^{IS}	0
λ^{SI}	-0.01
λ^{SE}	0.04
λ^{SU}	0.07

Table 4.10: Decomposition of the fluctuations in unemployment rate into the fluctuations of the accociated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1} + e_{t+1})$ and $u_t^{ij}/(u_t^{ij} + e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1} + e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5

Table 4.9 and 4.10 demonstrate the power of the cyclical fluctuations of transitions of males and females in unemployment rate respectively. This analysis indicates that the self-employed females are more likely to experience a transition from self-employment to unemployment in recession times. Our results contradict

with Hughes (2003) suggesting that the transitions into self-employment among the females are mainly driven by the push factors. Our results suggest that the transitions into self-employment of the females follows acyclical pattern.

Table 4.11: Decomposition of the Fluctuations

Decomposition of model including self employment.	**White**
Transition rate	Explanatory power
λ^{EU}	0.11
λ^{EI}	-0.01
λ^{UE}	0.48
λ^{UI}	0.12
λ^{IE}	0.05
λ^{IU}	0.19
λ^{ES}	-0.03
λ^{US}	-0.02
λ^{IS}	0
λ^{SI}	-0.01
λ^{SE}	0.02
λ^{SU}	0.10

Table 4.11: Decomposition of the fluctuations in unemployment rate into the fluctuations of the accociated transition rate: Each parameter in the second column shows the ratio of the covariance between $\mathrm{u}_{t+1}/(\mathrm{u}_{t+1}+\mathrm{e}_{t+1})$ and $u_t^{ij}/(u_t^{ij}+e_t^{ij})$ to the variance of $\mathrm{u}_{t+1}/(\mathrm{u}_{t+1}+\mathrm{e}_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

Table 4.12: Decomposition of the Fluctuations

Decomposition of model including self employment.	**Nonwhite**
Transition rate	Explanatory power
λ^{EU}	0.09
λ^{EI}	-0.01
λ^{UE}	0.42
λ^{UI}	0.14
λ^{IE}	0.13
λ^{IU}	0.11
λ^{ES}	-0.01
λ^{US}	0.01
λ^{IS}	0.01
λ^{SI}	0.01
λ^{SE}	0.01
λ^{SU}	0.14

Table 4.12: Decomposition of the fluctuations in unemployment rate into the fluctuations of the accociated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1} + e_{t+1})$ and $u_t^{ij}/(u_t^{ij} + e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1} + e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

Table 4.11 and 4.12 indicates that the explanatory power of the transitions from self-employment to unemployment is higher for the non-whites. Another interesting finding is that unemployment to self-employment transitions of the whites

follows acyclical paterrn whereas those of the non-whites follow weak procyclical pattern.

Table 4.13: Decomposition of the Fluctuations

Decomposition of model including self employment.	**Age>35**
Transition rate	Explanatory power
λ^{EU}	0.14
λ^{EI}	-0.01
λ^{UE}	0.40
λ^{UI}	0.14
λ^{IE}	0.15
λ^{IU}	0.11
λ^{ES}	-0.04
λ^{US}	0.03
λ^{IS}	0
λ^{SI}	-0.01
λ^{SE}	0.03
λ^{SU}	0.10

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the accociated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1} + e_{t+1})$ and $u_t^{ij}/(u_t^{ij} + e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1} + e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

Table 4.13 and 4.14 represents the age decomposition of the fluctuations. The most powerful procyclicality is observed for the older age group with a parameter of 3 percent for the unemployment to self-employment transitions. on the other hand unemployment to self-employment transitions are acyclical for the younger

population. This results are in line with Carrosco (1999) and Hiple (2010) indicating that the older aged population are more likely to enter and survive in self employment.

Table 4.14: Decomposition of the Fluctuations

Decomposition of model including self employment.	**Age<35**
Transition rate	Explanatory power
λ^{EU}	0.11
λ^{EI}	-0.01
λ^{UE}	0.48
λ^{UI}	0.11
λ^{IE}	0.11
λ^{IU}	0.08
λ^{ES}	-0.02
λ^{US}	0
λ^{IS}	0
λ^{SI}	-0.01
λ^{SE}	0.02
λ^{SU}	0.14

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the accociated transition rate: Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1}+e_{t+1})$ and $u_t^{ij}/(u_t^{ij}+e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1}+e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

Group analysis shows that the transitions from unemployment to self-employment are procyclical for the males, nonwhites, and older population whereas it is acyclical for the females, whites, and youngers. The most powerful effect is

observed for the older group. Probability of transition to self-employment is increasing with age. The results for the females are inconsistent with Hughes (2003) focusing on the importance of the push factors for the females. The finding for the age-groups are consistent with Carrosco (1999) and Hiple (2010) demonstrating that the self-employment is more common among the middle and older aged population.

The countercyclicality of the transitions from self-employment is higher for the females, non-whites, and youngers. This means that these self-employed groups are more vulnerable to crises than the males, whites and the olders. The finding for the whites is in line with Fairlie (1999) suggesting that the failure in self-employment is more common among the African Americans.

4.4 Summary and Policy implications

The analysis conducted in this chapter demonstrates that the labor market in the USA is characterized by inequalities in terms of the effects of the recessions on the duration of wage employment self-employment, unemployment among the sub-groups. Self employment analisysis shows that there are strong barriers for entry of young individuals, females, and the individuals from minorities into self-employment. The survival of these gropus in this state is also harmed by the recessions more than the other advantaged groups. This indicates some policy interventions should be taken into account to ensure equalities of entrepreneurs. The measures should be taken into account for providing the self-employed with lower asset accumulation with some new opportunities. Policies that ensure positive discrimination favoring the disadvantaged groups can be taken into account.

The analysis in this chapter also shows that positive discrimination in favor of females has contributed to their labor market conditions since 1980's as suggested by our transition analysis. The effect of the crises, especially 2007 crisis, was more severe for the males. Positive discrimination can partly be responsible for the better situation of the females. Similar tools for positive discrimination in favor of the other disadvantaged groups should also be taken into account.

The heterogeneity in the effects of 2007 crisis for the groups are important to draw some policy recomendations. The transitions of males from employment to unemployment increases a level higher than the other groups in this recession. The families with only one member who is employed can be taken into account for fighting with poverty. The unemployment insurances can no be enough policy tools for them to cope with the effects of the last recession.

The transitions from self-employment and from self-employment show that some groups experience shorter spells in self-employment. Crises limit the success of the non-whites, youngs, females.

CHAPTER 5

MARGIN ERROR ADJUSTMENT

5.1 Introduction

In this chapter, we implement the correction procedure introduced by Abowd and Zellner (1985) to the labor market transitions extracted from the CPS and check if Shimer's results are altered after correcting for the measurement errors in the calculation of transition probabilities. We start by describing several aspects of the CPS data, which will be useful in understanding the procedure we use.

Individuals are surveyed 4 months before a break lasting 8 months in the CPS. Then, they are surveyed for another 4 months consecutively following this break. We match the individuals observed in the consecutive months to compute labor market transitions and the associated probabilities. However, there are individuals who cannot be matched between previous and the current month. Abowd and Zellner explain that approximately 7.5 percent of the individuals from previous month are not traced in the current month in the CPS. Similarly, they report that approximately 7.5 percent of the individuals from current month are not in the data of previous month. This is called the "margin error." If these individuals are missing non-randomly, then the observed transitions would be biased.

Abowd and Zellner introduce a procedure to correct this error. We follow their procedure in computing margin-adjusted transition probabilities. Frazis, Robinson, Evans and Duff (2005) correct for the margin error by taking into account

the flows into and from the sample of the CPS. This procedure is called "raking." The raking method is also implemented by Robinson and Duff (2004). They correct the margin error by accommodating the flows and stocks in CPS controlling for the population outflows and inflows. Fujita and Ramey (2006) use SUR (i.e., Seemingly Unrelated Regression) method to minimize the inconsistency between the stock variables and the flow variables in the CPS similar to the study of Abowd and Zellner (1985). Their major departure from Abowd and Zellner (1985) is to run three regression by dividing the sample period into three sub-periods covering 10 years to let the parameters to change over time, while the Abowd-Zellner implements the estimation through the whole period. Blanchard and Diamond (1990) also use the adjusted series of Abowd and Zellner (1985) to analyze the dynamics of the flows from and into employment.

We observe sharp differences in the distribution of the missing data between the period before and after 1996. Thus, We also divide our period into two sub-periods in order to cope with constant allocation parameters of the model as similar to Fujita and Ramey. Accordingly, our first regression covers the period from 1980 to 1996 and the second one covers the period from 1996 to 2013.

Abowd and Zellner (1985) find that the number of transitions from employment to employment is increased when the margin errors are taken into account. Margin-adjusted employment to unemployment transitions are below the unadjusted transitions. But, it increases the employment to out of labor force transitions. Unemployment to out of labor force transitions are almost unchanged after implementing the margin adjustment procedure. Abowd and Zellner (1985) also reports that the transitions from out of labor force to employment and unemployment are increased by the margin adjustment procedure.

Our results show that employment to unemployment transitions in margin adjusted model is generally above the unadjusted transitions from employment to unemployment. This result suggests that Shimer's result potentially suffers from an upward bias, removing which potentially attenuates the explanatory power of the exit rate from unemployment. We first provide a descriptive analysis of how the margin

adjustment procedure alters the aggregate series and, then, we implement Shimer's regressions on the corrected series.

There are several other important papers in the error-correction literature dealing with the labor market transition data extracted from the CPS. For example, Poterba and Summers (1986) find that the measurement errors increase the amount of fake transitions. This result indicates that the transitions between different states are overestimated when the measurement errors are not taken into account. Therefore, the unemployment duration is underestimated in the models, when the classification errors are ignored.

Frazin, Robinson, Evans and Duff (2005) find that margin error correction reduces the amount of the transitions from employment to out of labor force, unemployment to employment, unemployment to out of labor force, and out of labor force to out of labor force. They also discover that the margin error correction increases the transitions from unemployment to unemployment, out of labor force to unemployment, and out of labor force to employment.

Robinson and Duff (2012) present similar results with the study of Frazin, Robinson, Evans and Duff (2005). They report that employment to out of labor force, unemployment to employment, unemployment to out of labor force, out of labor force to out of labor force transitions are reduced by margin error adjustment. On the other hand unemployment to unemployment, out of labor force to unemployment, and out of labor force to employment transitions are reduced by margin error correction in their study.

5.2 Estimation Procedure

We use a non-linear SUR approach to compute the margin-adjusted transition probabilities as described by Abowd and Zellner (1985). Multiplicative adjustment model is used in the estimation of margin adjusted proportions. z_{ij} denotes the unadjusted proportions of the transitions between state i and j. The parameter $\theta_{ij|iM}$ denotes the share of the individuals who actually transition from state i to j in the total number of people who were in state i in the previous month, and are missing in

the current month. Similarly, $\theta_{ij|Mj}$ denotes the share of the individuals who switch from state *i* to *j* in the total number of the people who were missing in the previous month and in state *j* in the current month. $\theta_{ij|iM}$ and $\theta_{ij|Mj}$ explain how much of the missing transitions are indeed from state *i*, and indeed to state *j*, respectively. π_{iA} denotes the population outflow whereas π_{Aj} denotes the population inflow. Abowd and Zellner explains that population inflow consists of the individuals who grow to be age 16, individuals who returns from military and non-institutional population to civilian institutional populations, and individuals who immigrate to the country. On the other hand, population outflow consists of the individuals died from previous month to current month, individuals who leave civilian non-institutional populations. Δ is the denominator function which is constructed to equalize the sum of the margin adjusted proportions to unity.

It is assumed that the number of information seekers for a potentially manipulated stock is determined by informed trader, either truthful or manipulator, with some unit cost for each information seeker.

Equation 5.1 is another representation of the equation 5.3. They both shows the margin adjusted flows as a function of the unadjusted flows with the allocation parameters explained above. Equation 5.7 and 5.8 shows the proportions of the labor market states in previous and current month respectively. By substituting the equations 5.4, 5.5, and 5.6 into 5.7 and 5.8 provides us 6 SUR equations and 18 parameters to be estimated.

$$\ln\pi_{ij}\ t = \ln z_{ij}\ t + \theta_{ij|iM}\ln z_{iM}\ t + \theta_{ij|Mj}\ln z_{Mj}\ t - \ln\Delta\ t \qquad 5.1$$

$$\ln\pi_{iA}\ t = 1 - \theta_{iE|iM} - \theta_{iU|iM} - \theta_{iN|iM}\ X \ln z_{iM} - \ln\Delta\ t \qquad (5.2)$$

$$\ln\pi_{Aj}\ t = 1 - \theta_{Ej|Mj} - \theta_{Uj|Mj} - \theta_{Nj|Mj}\ X \ln z_{Mj}\ t - \ln\Delta\ t \qquad (5.3)$$

$$\pi_{ij}\ t\ = z_{ij}\ t\ z_{iM}\ t\ ^{\theta_{ij|iM}} z_{Mj}\ t\ ^{\theta_{ij|Mj}} X \frac{1}{\Delta\ t} \tag{5.4}$$

$$\pi_{iA}\ t\ = z_{iM}\ t\ ^{1-\theta_{iE|iM}-\theta_{iU|iM}-\theta_{iN|iM}}\ X \frac{1}{\Delta\ t} \tag{5.5}$$

$$\pi_{Aj}\ t\ = z_{Mj}(t)\ ^{1-\theta_{Ej|Mj}-\theta_{Uj|Mj}-\theta_{Nj|Mj}}\ X \frac{1}{\Delta\ t} \tag{5.6}$$

$$x_{i+}\ t\ = \pi_{iE}\ t\ + \pi_{iU}\ t\ + \pi_{iN}\ t\ + \pi_{iA}\ t\ + u_{i+}\ t \tag{5.7}$$

$$x_{+j}\ t\ = \pi_{Ej}\ t\ + \pi_{Uj}\ t\ + \pi_{Nj}\ t\ + \pi_{Aj}\ t\ + u_{+j}\ t \tag{5.8}$$

We estimate the model for two time periods separately. Missing transitions change substantially with the 1996 redesign in the CPS. Table 5.1 presents the estimation results for the period from January 1980 to December 1995. Table 2 presents the results from January 1996 to the 2012.

We derive the margin adjusted series for transition probabilities by using the estimated parameters represented above.

Table 5.1 Estimation Results

	1^{ST} PERIOD	2^{ND} PERİOD
Allocation Parameter		
$\theta_{EE\|EM}$	-0.0051	-0.0012
	(0.0070)	(0.0033)
$\theta_{EE\|ME}$	0.0061	-0.0035
	(0.0070)	(0.0031)
$\theta_{EU\|EM}$	0.3939***	.3687***
	(0.0661)	(0.0414)
$\theta_{EU\|MU}$	-0.2397***	-0.2525***
	(0.0371)	(0.0223)
$\theta_{EN\|EM}$	-0.1710***	-0.2299***
	(0.0630)	(0.0388)
$\theta_{EN\|MN}$	0.0392	0.0498
	(0.0557)	(0.0358)
$\theta_{UE\|UM}$	-0.2363***	-0.2526***
	(0.0265)	(0.0230)
$\theta_{UE\|ME}$	0.3001***	0.4582***
	(0.0526)	(0.0458)
$\theta_{UU\|UM}$	-0.0862***	-0.0417*
	(0.0270)	(0.0235)
$\theta_{UU\|MU}$	0.0357	0.0102
	(0.0267)	(0.0238)
$\theta_{UN\|UM}$	-0.0486	0.0211
	(0.0453)	(0.03181)
$\theta_{UN\|MN}$	0.1175**	-0.0859**
	(0.0519)	(0.0399)
$\theta_{NE\|NM}$	0.0253	0.1344***
	(0.0423)	(0.0347)
$\theta_{NE\|ME}$	-0.0835*	-0.3067***
	(0.0513)	(0.0439)
$\theta_{NU\|NM}$	0.1805***	0.1805**
	(0.0413)	(0.0367)
$\theta_{NU\|MU}$	-0.1907***	-0.1907
	(0.0331)	(0.0308)
$\theta_{NN\|NM}$	-0.0124	-0.0124**
	(0.0097)	(0.0049)
$\theta_{NN\|MN}$	0.0156*	-0.0221***
	(0.0095)	(0.0051)

Notes: Estimation results of NLSUR model. First period covers the period from the January of 1980 to December of 1995, whereas the second estimation covers the years from the January of the 1996 to February of 2012. *** indicates 1%, ** indicates 5%, * indicates 10% level of significance.

5.3 Margin Adjustment of Aggregate Data

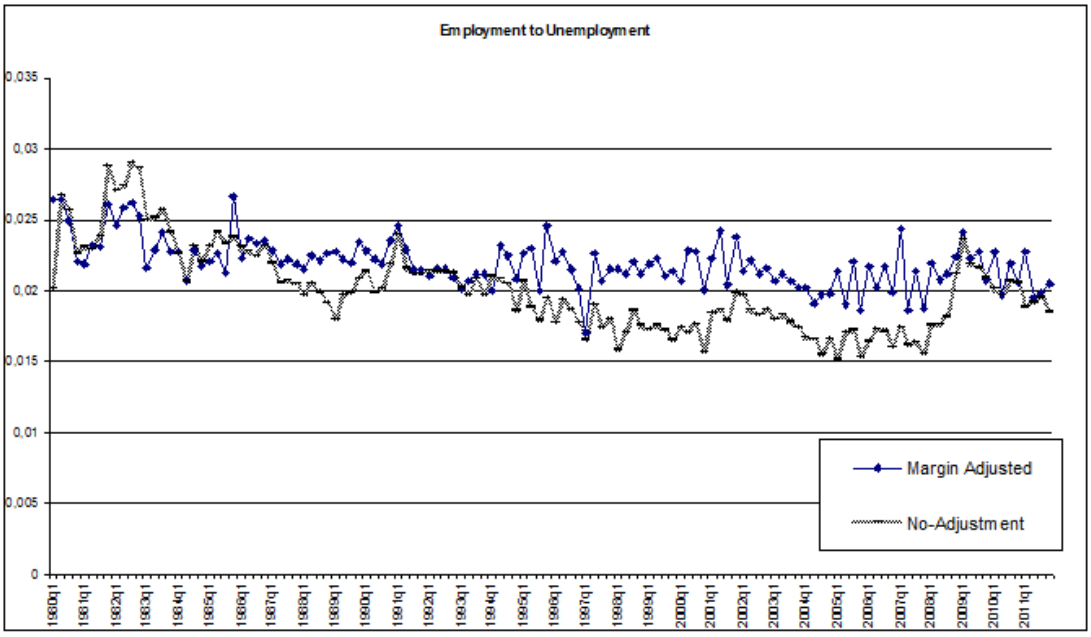

Figure 5.1 Transition probabilities of employment to unemployment of margin adjusted and unadjusted model. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Figure 5.1 shows the margin adjusted employment to unemployment transition probabilities and the unadjusted transition probabilities. The figure reveals that the increase in the employment to unemployment transitions in the beginning of the 1980's is overestimated in the model in which we assume that the missing transitions are random. The employment to unemployment transition probabilities that we derived from margin adjusted process are higher than the unadjusted series since the beginning of the 1990s. This result indicates that the transitions from employment to unemployment are underestimated if we assume that the missing transitions are random. Adjusted and unadjusted series converges to each other after 2007 crisis.

Figure 5.2 shows the employment to out of labor force transitions of the margin adjusted and unadjusted model. The employment to not in labor force transitions are higher in margin adjusted model. The relative high level of the

employment to unemployment and employment to out of labor force transitions in the margin unadjusted model indicates that most of the people employed in the previous month and missing in the current month has indeed become jobless. The margin adjustment procedure pulls the transitions from employment to employment down, while pushes the employment to unemployment and not in labor force transitions up. This means that the transitions from employment to employment, the number of people who is employed in the previous month and employed in the current month, is lower if we assume that all the transitions are not random.

Although the covered period of ours and Abowd and Zellner's study is different, it is essential to compare the results in order to see the changes in the dynamics of the missing data over time. Our results are in line with Abowd and Zellner for the employment to unemployment transitions. Margin adjusted employment to unemployment transition probability is below the unadjusted employment to unemployment transitions in the beginning of the 1980s. We find that employment to out of labor force transitions of margin adjusted model is above the unadjusted model as in Abowd and Zellner (1985). Our results for transitions from out of labor force are also similar with the Study of Abowd and Zellner which reports that margin adjustment increases the flows from out of labor force to employment and unemployment. Both transitions from out of labor force in margin adjusted model is above the unadjusted model. Our findings about transitions from unemployment differ from the study of Abowd and Zellner (1985). We find that the margin adjusted unemployment to employment transitions are above the unadjusted model until the midst of 1990s. Then, it becomes lower than the unadjusted model.

Our results for the transitions from out of labor force are also in line with Frazis, Robinson, Evans and Duff (2005), and Robinson and Duff (2012). The lower level of the margin adjusted unemployment to employment transitions from the midst of 1990s also verifies the Frazis, Robinson, Evans and Duff (2005), and Robinson and Duff (2012). The significant departure of the results of this study is the higher level of margin adjusted employment to out of labor force transitions. Frazis, Robinson and Duff (2004) and Robinson, Evans and Duff (2005) demonstrate that

the margin adjusted employment to out of labor force transitions are lower than the unadjusted transitions.

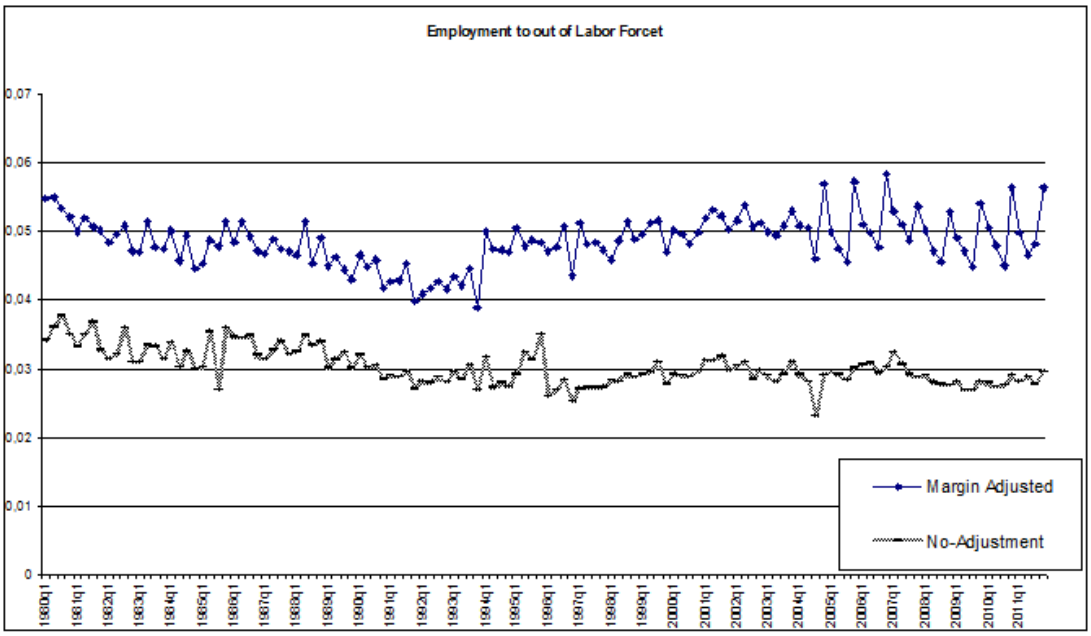

Figure 5.2 Transition probabilities of employment to out of labor force of margin adjusted and unadjusted model. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

The unemployment to employment transition probabilities of the margin adjusted model are lower than the probabilities of the model in which missing transitions are assumed to be random except in the 1980s. This means that the unemployment to employment transitions are underestimated in the 1980's and overestimated in the rest of the period in the unadjusted model. The unemployment to not in labor force transition probability of the margin adjusted model is below the unadjusted model until 1990s. The unemployment to out of labor force transitions reaches above the level of the unadjusted model in the period from 1990s to the 2010s.

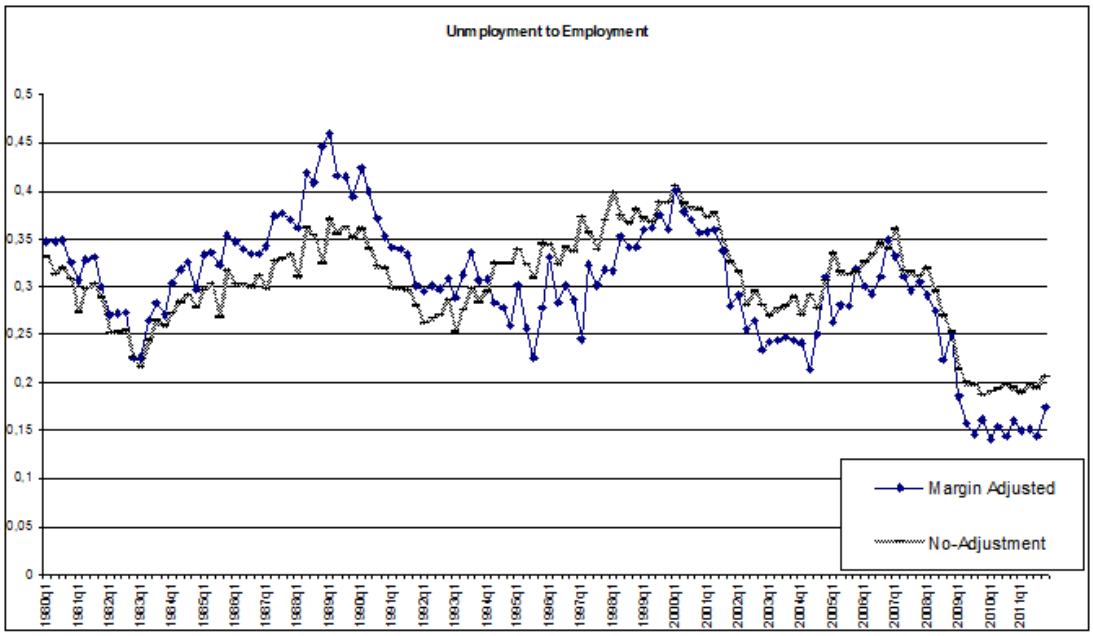

Figure 5.3 Transition probabilities of unemployment to employment of margin adjusted and unadjusted model. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

The estimation results indicate that most of the people who are unemployed in previous month and missing in the current month indeed switch to employment in 1980s. One explanation is that these individuals are missing in the data since they migrate to work in their new jobs. The estimation results for the post-1980 period suggest that the individuals who seem to be transitioned from unemployment to employment in the model, in which the transitions are assumed to be random, are indeed switched from unemployment to not in labor force or unemployment. Figure 5.4 shows the transitions from unemployment to out of labor force. Unemployment to out of labor force transitions exceed that of the unadjusted model in the midst of the 1990s. The relatively low level of the margin adjusted series for unemployment to employment transitions can be due to the increase in the unemployment to out of labor transitions.

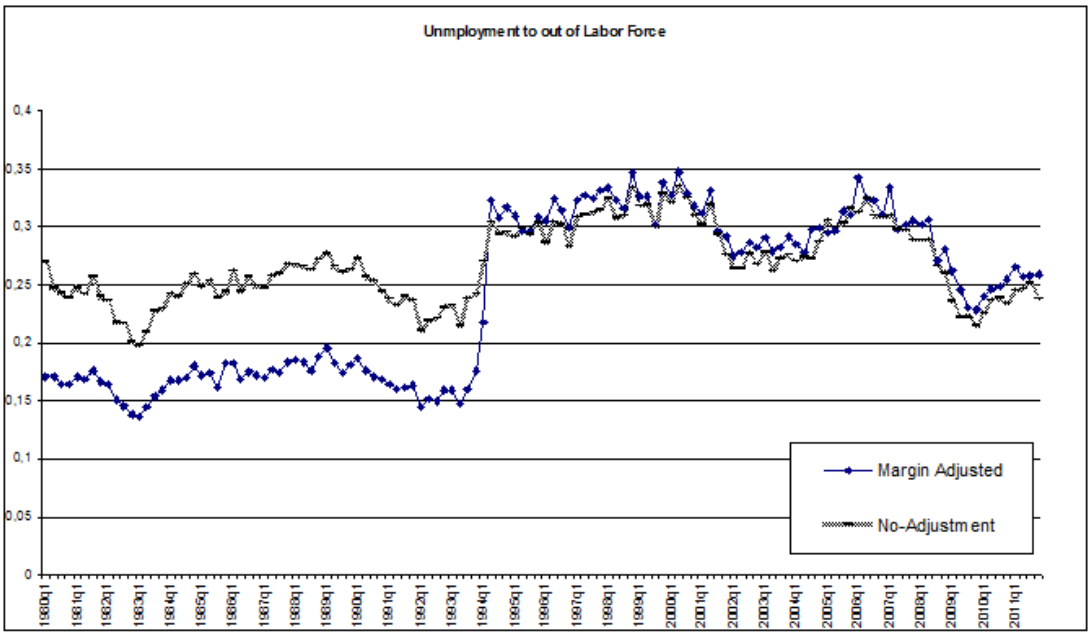

Figure 5.4 Transition probabilities of employment to unemployment of margin adjusted and unadjusted model. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

The transitions from unemployment to out of labor force in the margin adjusted model are lower than they are in the model in which all transitions are assumed to be random until 1990s, which can be seen from Figure 5.4. The transitions from unemployment to out of labor force are higher in the margin adjusted model in 1990s and 2000s. This indicates that in 1990s and 2000s some of the people who were unemployed in the previous month and missing in the current month is indeed out of labor force in the current month. Transitions from out of labor force to employment are higher in the margin adjusted model in the 1980- 2012 period.

We now test how Shimer's predictions are altered after correcting for the margin error using the procedure developed by Abowd and Zellner. We derive new series from the Abowd-Zellner method and then insert these series into Shimer's regressions and compare the adjusted versus unadjusted results. For simplicity, we drop the self-employment state and stick with the three-state model. The comparison is reported only for the aggregate series. Table 5.2 presents this comparison.

Table 5.2 Decomposition of the Fluctuations

Decomposition of fluctuations	Unadjusted	Adjusted
Transition rate	Explanatory power	Explanatory power
λ^{EU}	0.20	0.19
λ^{EI}	-0.04	-0.02
λ^{UE}	0.48	0.51
λ^{UI}	0.15	0.17
λ^{IE}	0.08	0.06
λ^{IU}	0.12	0.10

Notes: Decomposition of the fluctuations in unemployment rate into the fluctuations of the accociated transition rate. A comparison is presented for the unadjusted (Shimer's) series and adjusted (based on Abowd-Zellner) series. Each parameter in the second column shows the ratio of the covariance between $u_{t+1}/(u_{t+1} + e_{t+1})$ and $u_t^{ij}/(u_t^{ij} + e_t^{ij})$ to the variance of $u_{t+1}/(u_{t+1} + e_{t+1})$, where i and j denote the associated states. Estimation is implemented for the period from 1980Q1 to 2011Q4. The quarterly averages of transition share series are seasonally adjusted using ratio to moving average method to derive the transition rates. The final series are detrended using HP filter with a smoothing parameter 10^5.

The results show that correcting for the margin-adjustment error does not change Shimer's result. The correction procedure even reinforces Shimer's conclusions. As Table 5.2 suggests, the transition from unemployment to employment was explaining 48 percent of unemployment fluctuations in the unadjusted series. In the adjusted series, however, the explanatory power of the unemployment to employment transitions has increased to 51 percent. This means that the error-correction exercise amplifies the fluctuations in the unemployment-to-employment transitions, while it relatively smoothes out the cyclical movements in the transitions from employment to unemployment. Other transition probabilities have been affected from the correction exercise in negligible magnitudes.

What we have learned from this procedure can be summarized as follows. We conclude that the Abowd-Zellner correction procedure affects the "levels" of transition probabilities significantly, but it does not affect much the cyclical

properties of these probabilities (at least it does not alter Shimer's conclusions). We ignore the regression comparisons for the rest of the groups, as we conjecture that the main flavor of Table 5.2 will remain. Instead, we provide the graphs and some brief comments for the sub-groups in the next section.

5.4 Margin adjustment for Sub-groups

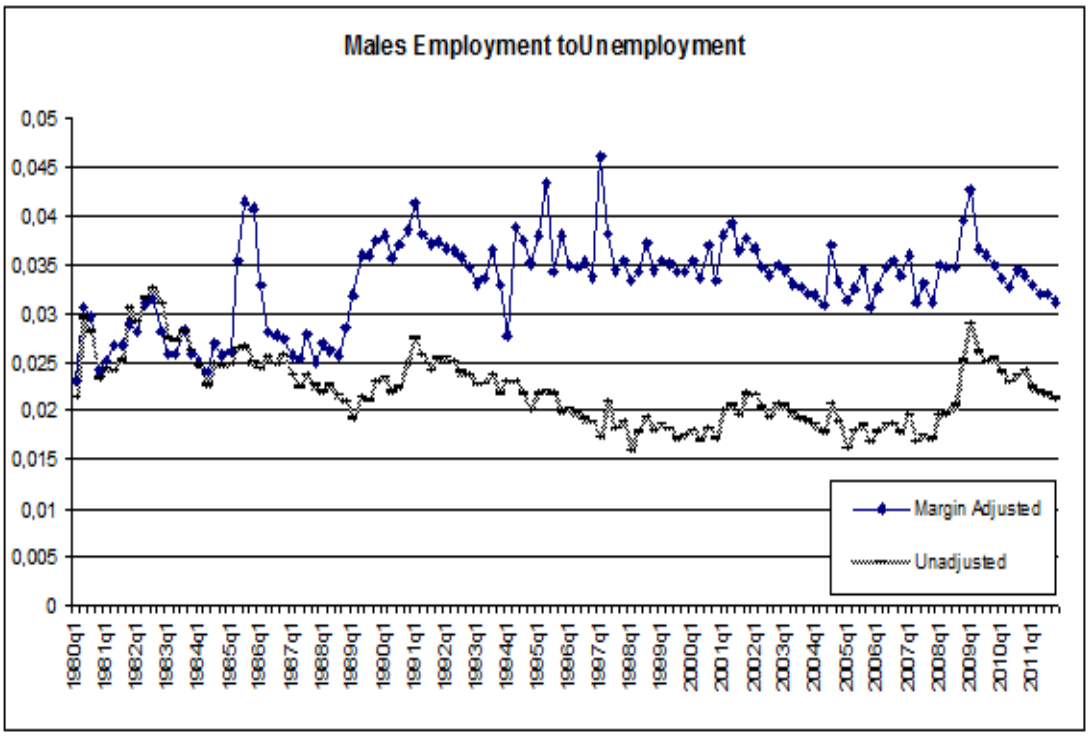

Figure 5.5 Transition probabilities of employment to unemployment of margin adjusted and unadjusted model of males. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Employment to unemployment transition probability for the males in margin adjusted model is above that of the unadjusted model. Margin adjusted series for employment to unemployment transition probability are close to unadjusted series in the beginning of the 1980s. However margin adjusted series exceeds unadjusted series after the beginning of the 1980s.

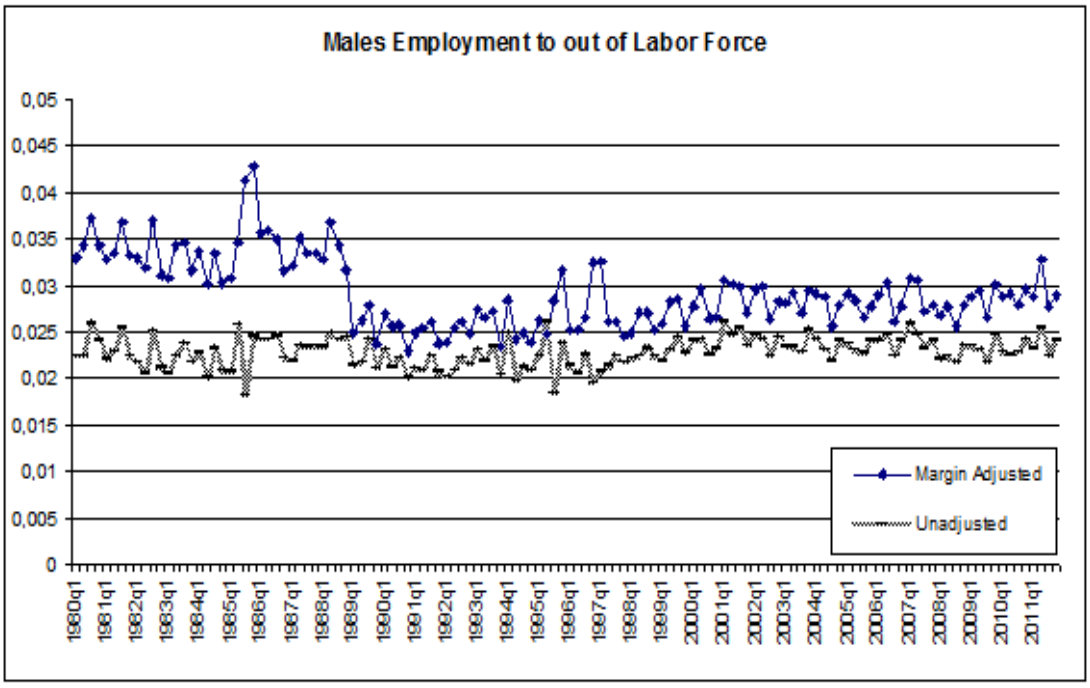

Figure 5.6 Transition probabilities of employment to out of labor force of margin adjusted and unadjusted model of males. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Employment to out of labor force transitions for the margin adjusted model is again above the unadjusted series, which can be seen from Figure 5.6. The difference is higher in 1980s than the rest of the period. The higher levels of employment to unemployment transitions and employment to out of labor force transitions of the margin adjusted model imply that a substantial amount of the missing transitions from employment, to unemployment, and to out of labor force are actually transitions from employment to out of labor force and to unemployment.

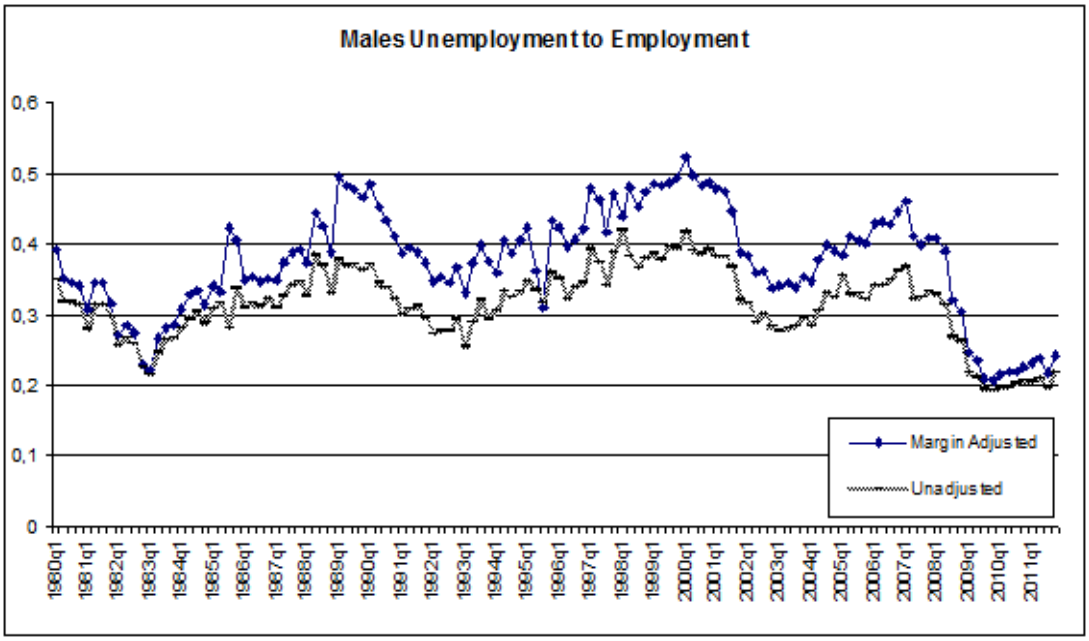

Figure 5.7 Transition probabilities of unemployment to employment of margin adjusted and unadjusted model of males. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Unemployment to employment transition probability of margin adjusted model is higher than unadjusted model. Margin adjusted transition probabilities are close to unadjusted model, in the beginning of the 1980s. Margin adjusted series start to exceed unadjusted series in the midst of the 1980s. The gap between these two series decreases towards the last part of the 2000s. The higher level of margin adjusted unemployment to employment transition probability implies that an important amount of the missing transitions from unemployment and to employment is actually transitions from unemployment to employment.

Unemployment to not in labor force transition probability of margin adjusted models is below that of the unadjusted model for the males,which can be seen from Figure 5.8. The difference between two model is higher from the beginning to the midst of the 1990s. The higher level of unadjusted unemployment to out of labor force transition probability implies that the amount of unemployment to out of labor force transitions in missing transitions from unemployment and missing transition to out of labor force are lower than the other transitions in the missing transitions.

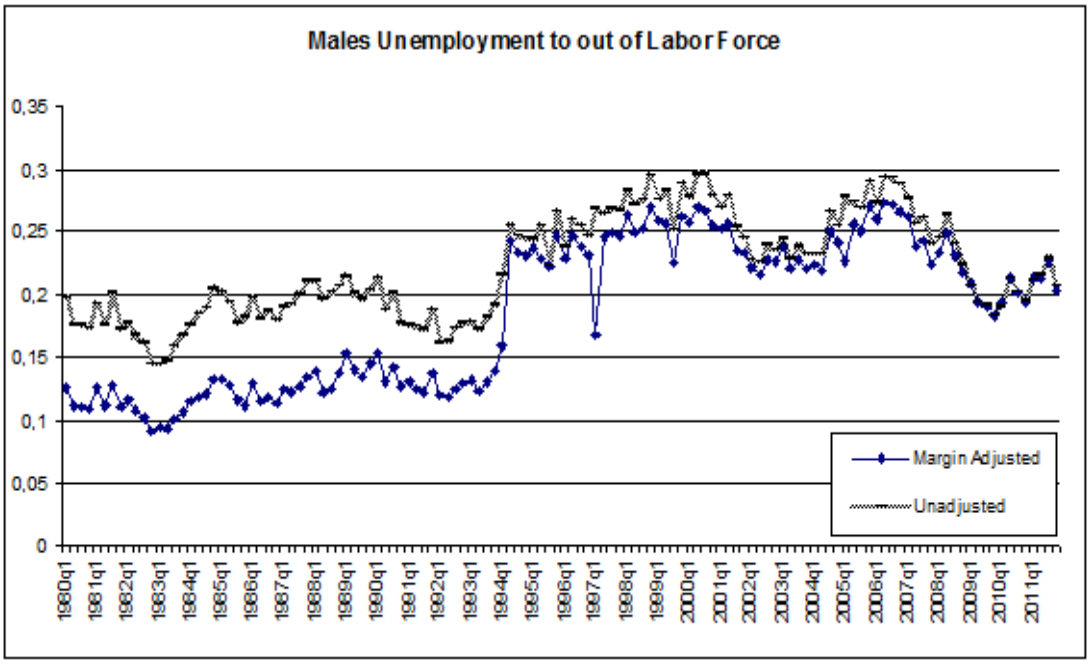

Figure 5.8 Transition probabilities of unemployment to out of labor force of margin adjusted and unadjusted model of males. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Transitions from out of labor force to employment of margin adjusted model are close to that of unadjusted model for the males as can be seen from Figure 5.9. Transitions from margin adjusted model are above transitions of unadjusted model in the first part of the 1980s. Margin adjusted transitions from out of labor force to unemployment is above the unadjusted model.

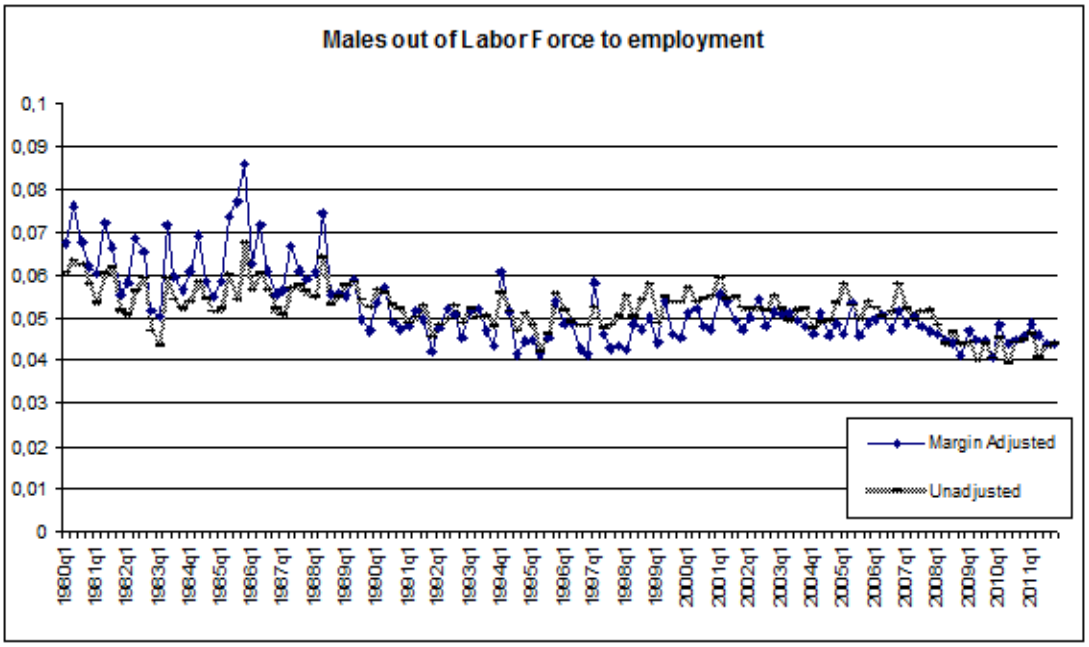

Figure 5.9 Transition probabilities of out of labor force to employment of margin adjusted and unadjusted model of males. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

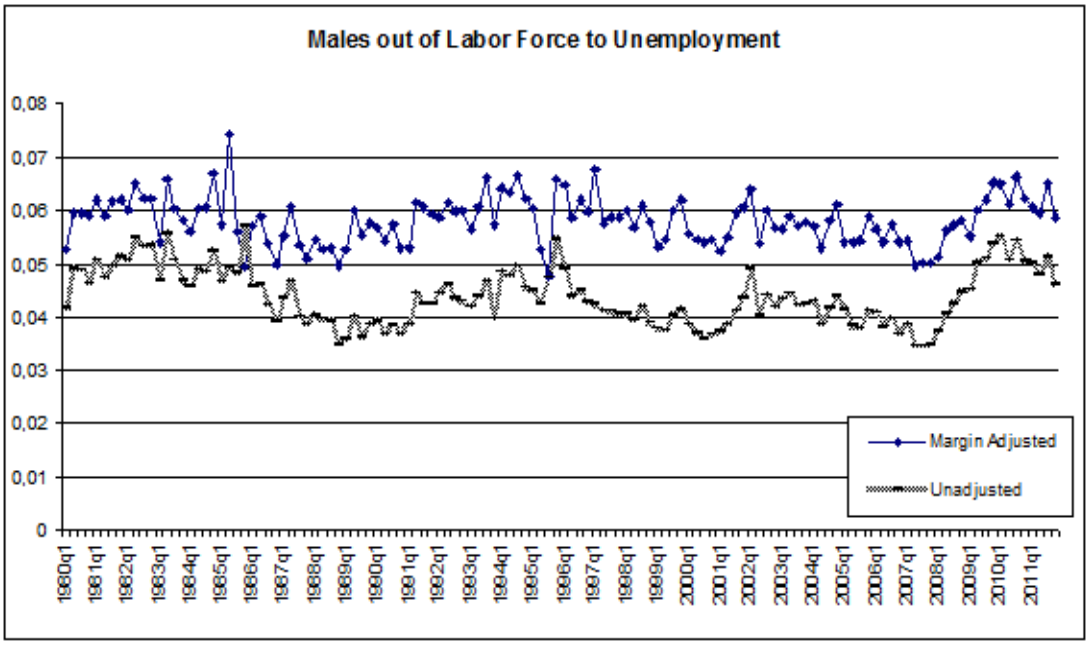

Figure 5.10 Transition probabilities of out of labor force to unemployment of margin adjusted and unadjusted model of males. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

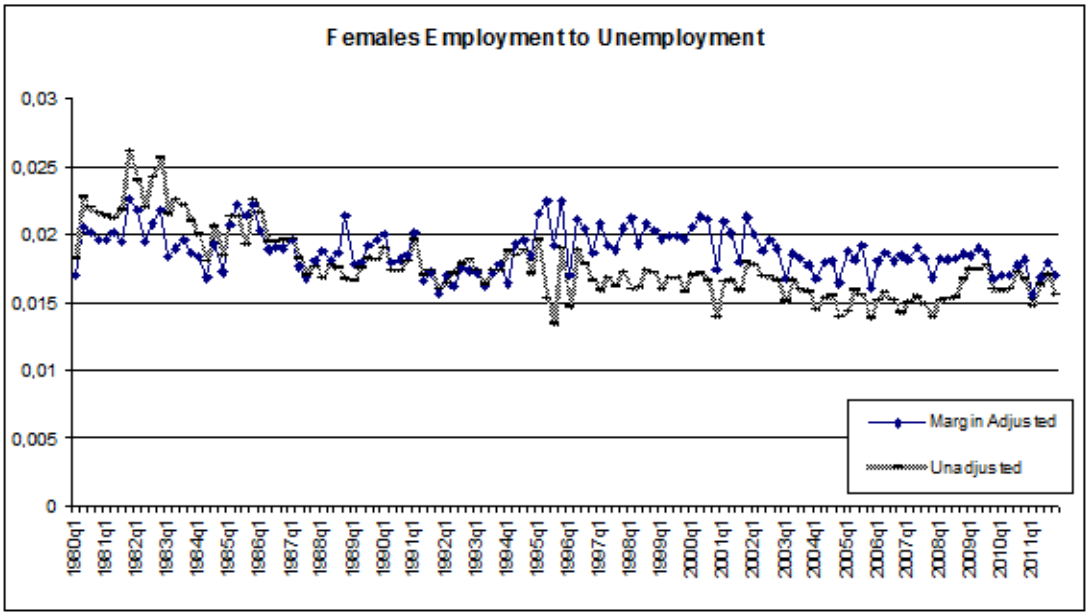

Figure 5.11 Transition probabilities of employment to unemployment of margin adjusted and unadjusted model of females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Figure 5.9 indicates that female's employment to unemployment transition probability in margin adjusted model is below the unadjusted model in the beginning of the 1980s. Margin adjusted probability gets closer to unadjusted model, after the midst of 1980s until the midst of the 1990s. Margin adjusted transition probability of employment to unemployment starts to exceed the unadjusted model after the midst of 1990s. Employment to unemployment transition probability is overestimated in the first part of the 1980s while it is underestimated after the midst of the 1990s.

Employment to out of labor force transition probability of margin adjusted model is above that of the unadjusted model for the whole period, which can be seen from Figure 5.12. This means that a substantial amount of employment to out of labor force transitions exists in the missing transitions from employment and to out of labor force for females.

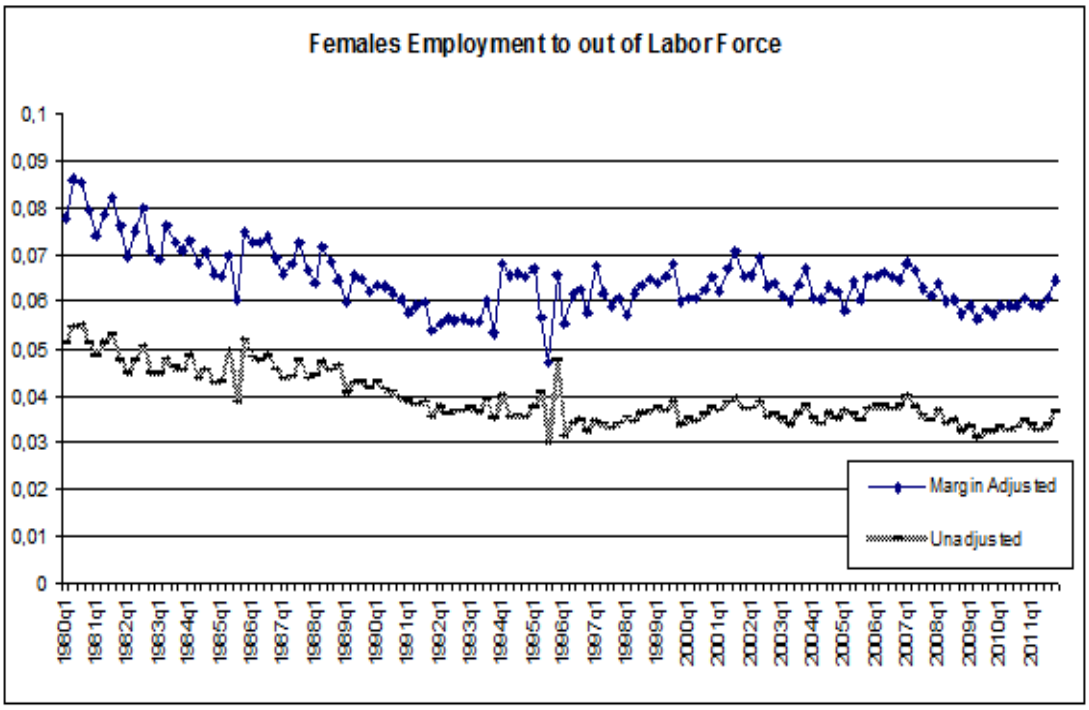

Figure 5.12 Transition probabilities of employment to out of labor force of margin adjusted and unadjusted model of females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Unemployment to employment transitions in margin adjusted model is above that of the unadjusted model midst of the 1990s, which can be seen from Figure 5.13. Transition probability of unadjusted model starts to exceed the transition probability of margin adjusted model in the midst of the 1990s. Unemployment to out of labor force transition probability of margin adjusted model is below the unadjusted model until the midst of 1990s. Unemployment to out of labor force transition probabilities of the margin adjusted and unadjusted model are almost the same after the midst of 1990s.

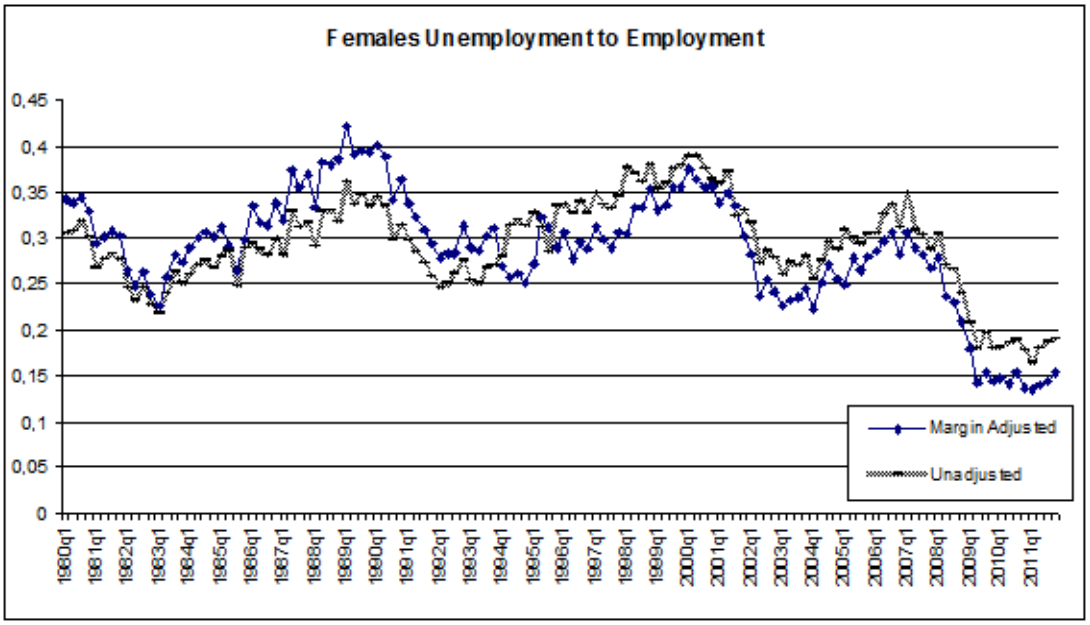

Figure 5.13 Transition probabilities of unemployment to employment of margin adjusted and unadjusted model of females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

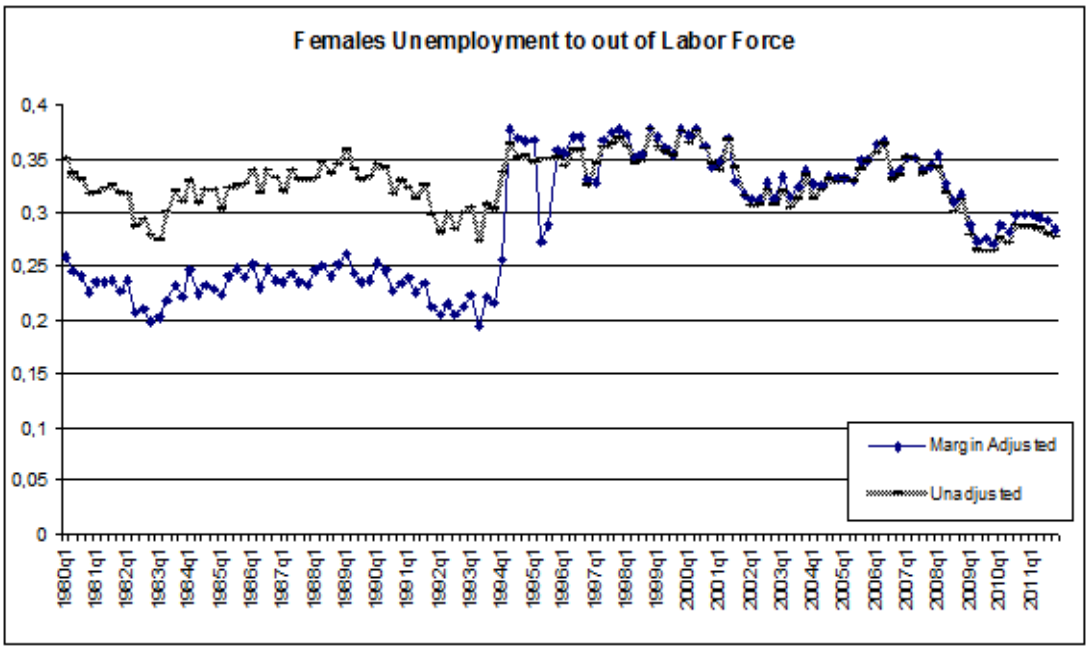

Figure 5.14 Transition probabilities of unemployment to out of labor force of margin adjusted and unadjusted model of females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

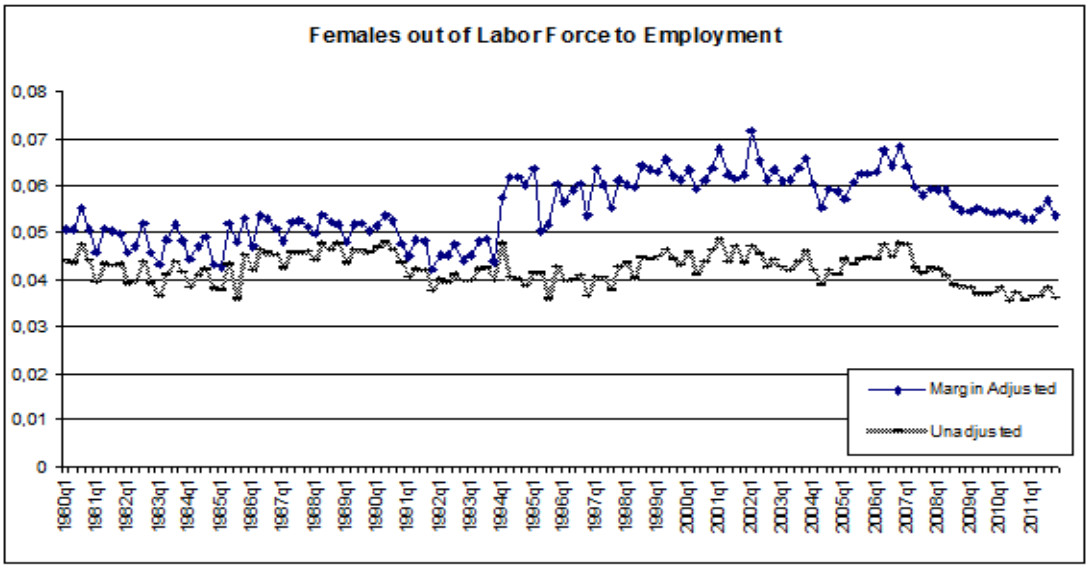

Figure 5.15 Transition probabilities of out of labor force to employment of margin adjusted and unadjusted model of females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

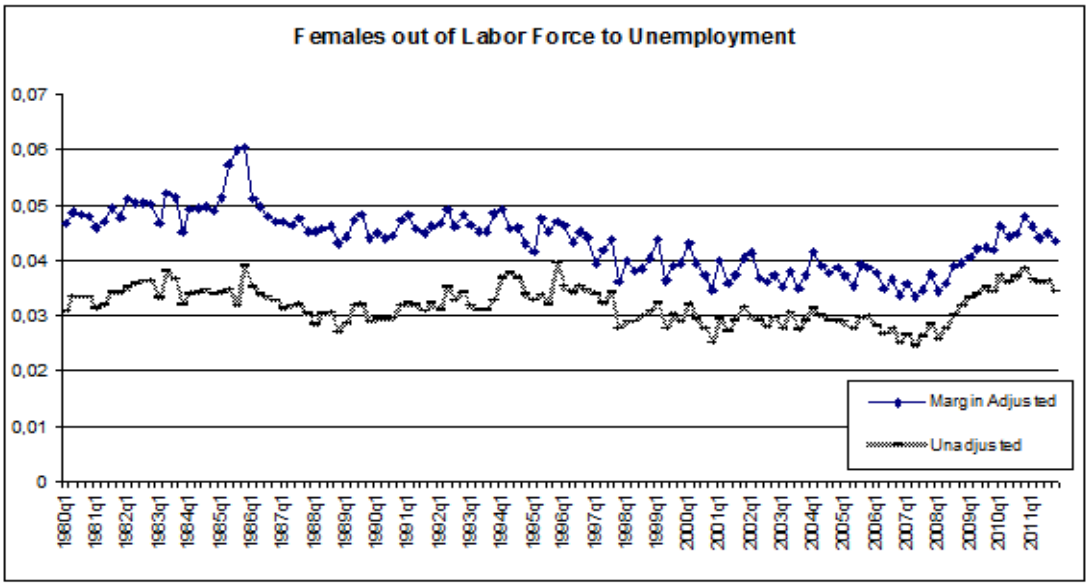

Figure 5.16 Transition probabilities of out of labor force to unemployment of margin adjusted and unadjusted model of females. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Transitions from out of labor force computed to employment and unemployment in margin adjusted model are above the transitions computed in unadjusted model. This means that a substantial part of the missing transitions from out of labor force.

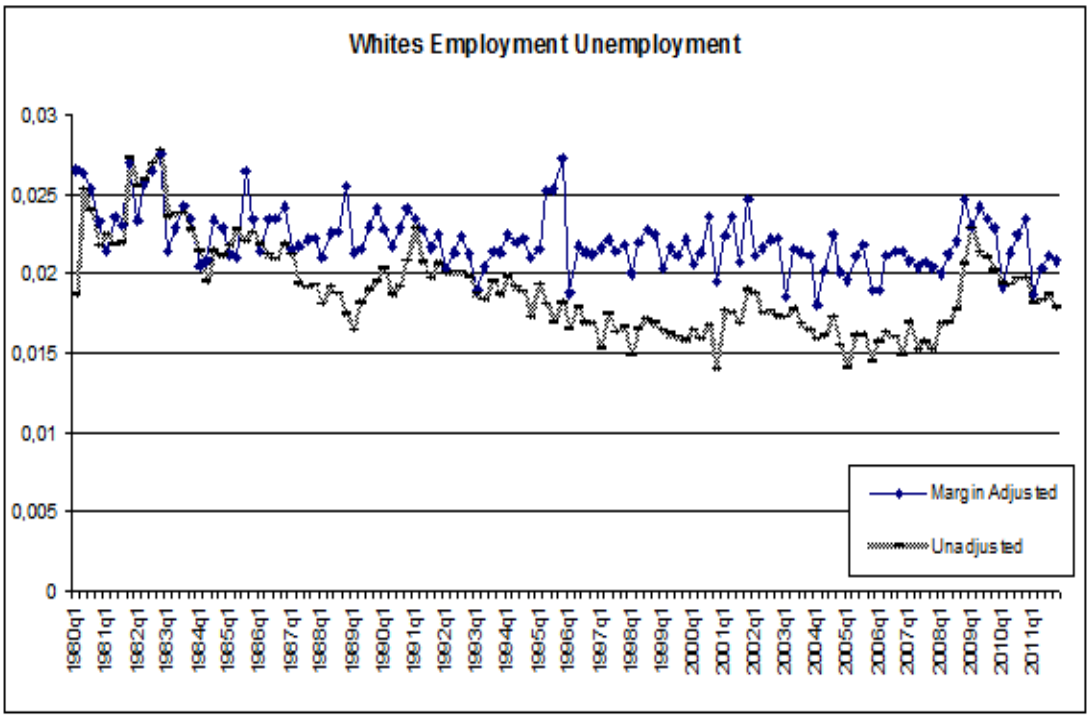

Figure 5.17 Transition probabilities of out of employment to unemployment of margin adjusted and unadjusted model of whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Margin adjusted employment to unemployment transition probability is almost the same as unadjusted employment to unemployment transition probability in the beginning of 1980s, which can be seen from Figure 5.17. Margin adjusted transition probability is above the unadjusted from the midst of 1980s to the end of the period. Margin adjusted transition probability and unadjusted transition probability is close to each other towards the end of the period. Employment to out of labor force transition probability of margin adjusted model is above that of unadjusted model in the whole period. This means that a significant part of the missing transitions from employment is from employment to unemployment and employment to out of labor force. Similarly, a significant part of the missing transitions to employment and unemployment is from employment.

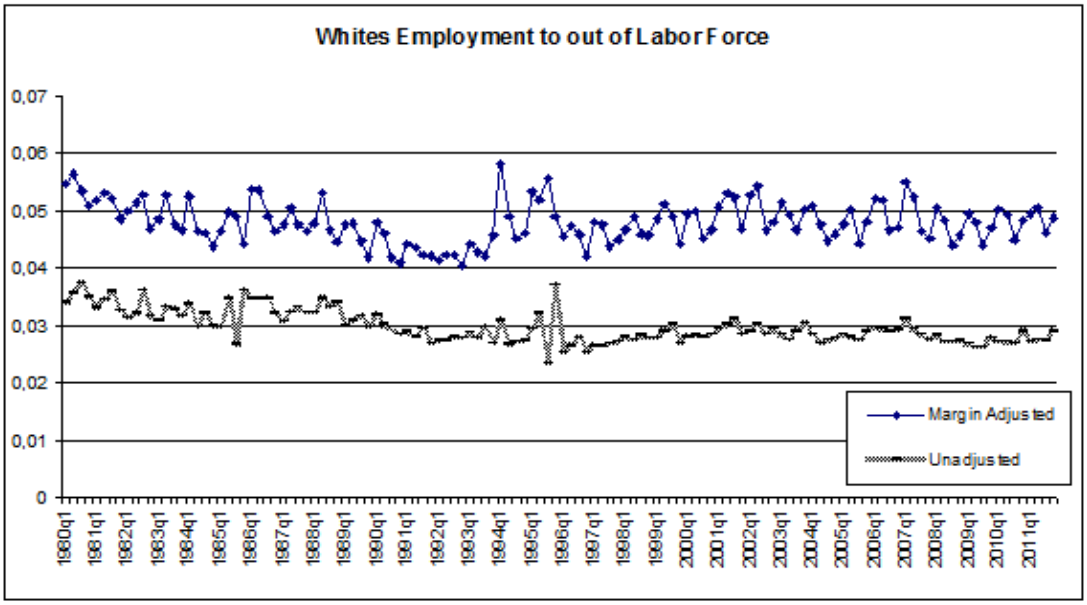

Figure 5.18 Transition probabilities of out of employment to out of labor force of margin adjusted and unadjusted model of whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Whites margin adjusted unemployment to employment transition probability is above the unadjusted model from the beginning to the midst of 1990s, which can be seen from Figure 5.19. Unadjusted transition probability starts to exceed the margin adjusted transition probability in 1990s.

Margin adjusted probability of transition from inactivity to employment is above the unadjusted proabability of transition from inactivity to employment, which can be seen from Figure 5.20. The gap gets wider in the midst of the 1990s. margin adjusted transitions from out inactivity to unemployment is also above the unadjusted transitions. Our results indicate that the transitions from inactivity to inactivity for the whites is over estimated in the model for which we assume that the missing transitions are random.

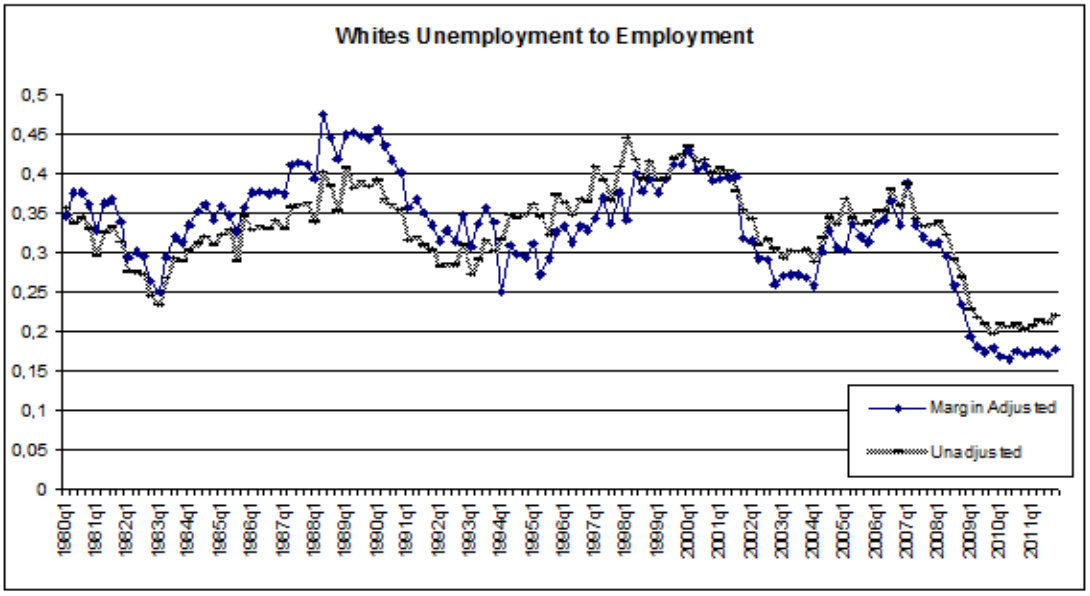

Figure 5.19 Transition probabilities of out of employment to out of labor force of margin adjusted and unadjusted model of whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

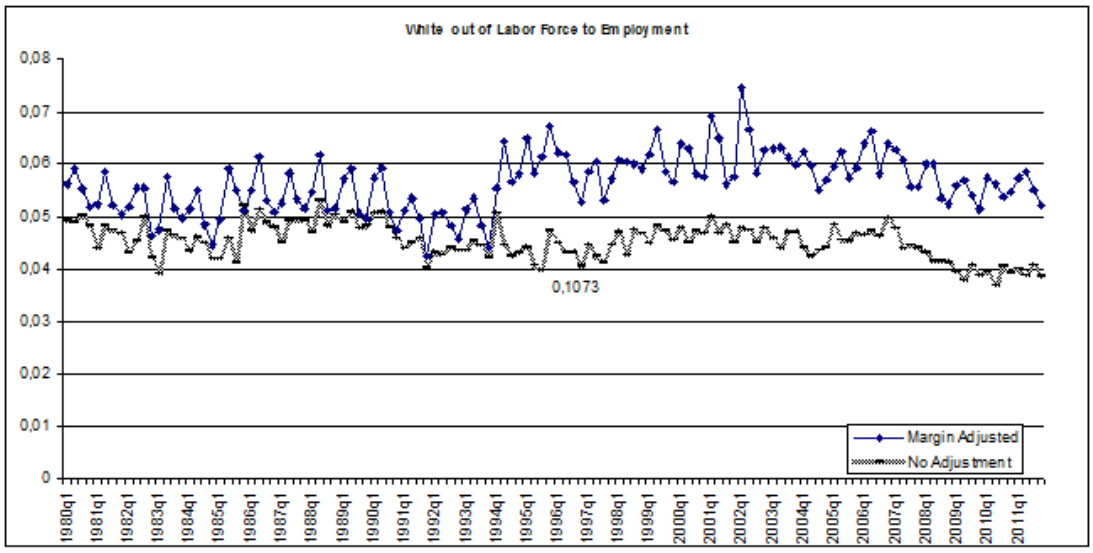

Figure 5.20 Transition probabilities of out of labor force to employment of margin adjusted and unadjusted model of whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

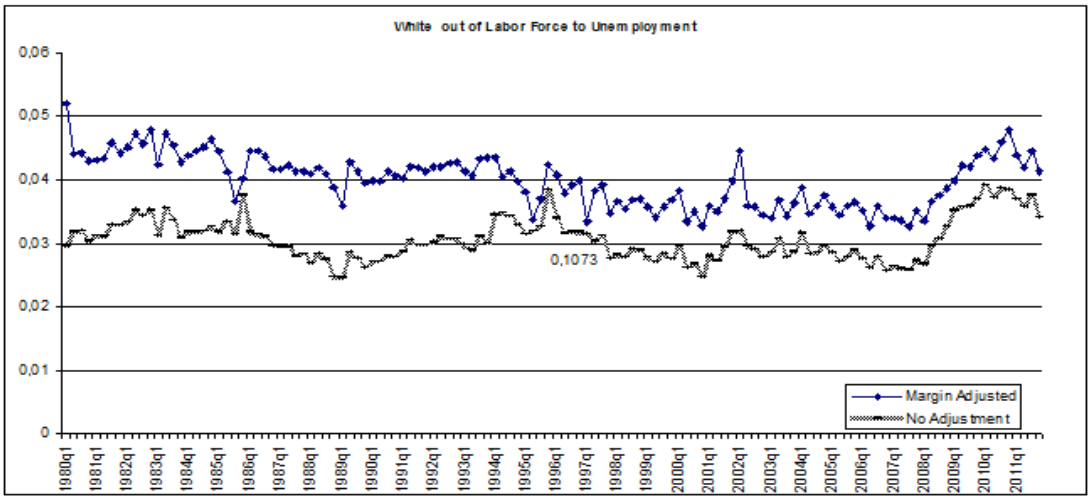

Figure 5.21 Transition probabilities of out of labor force to unemployment of margin adjusted and unadjusted model of whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Margin adjusted employment to out of labor force transition probability for the non-whites are above the unadjusted model. This indicates that a substantial amount of the missing transitions from employment and to out of labor force is indeed from employment among non-whites.

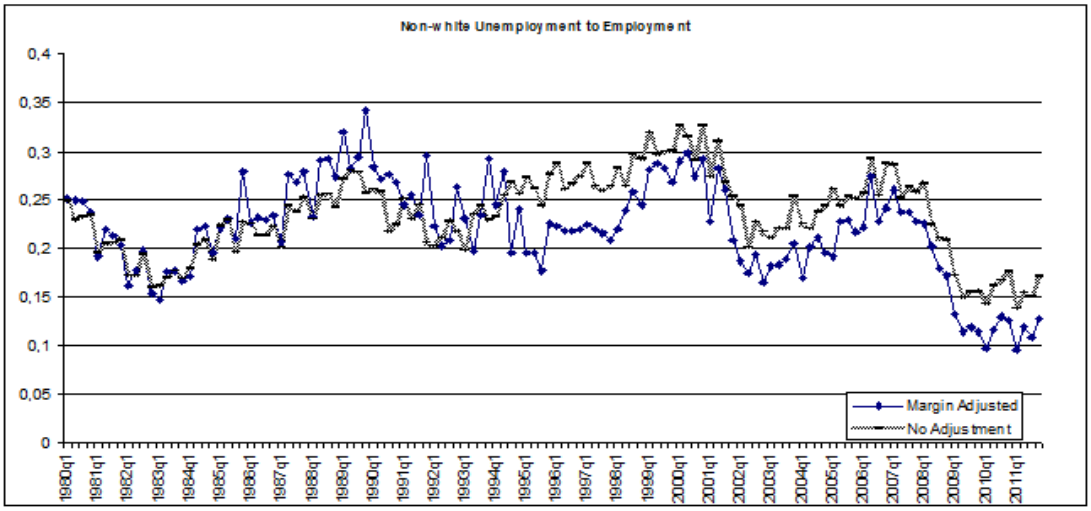

Figure 5.22 Transition probabilities of unemployment to employment of margin adjusted and unadjusted model of non-whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Unemployment to employment transition probability of the margin adjusted model is above the unadjusted model between the midst of the 1980s and the midst of the 1990s, then, unadjusted transition probability exceeds the margin adjusted

transition probability until the end of the period for the non-whites as can be seen from Figure 5.22

Margin adjustement procedure increased the transition from out of labor force to employment transitions for non-whites as can be seen from Figure 5.23. Margin errors for the white's transitions from inactivity to employment are close to that of the nonwhites. The errors for whites are higher than that of the non-whites but the amount of difference is very low.

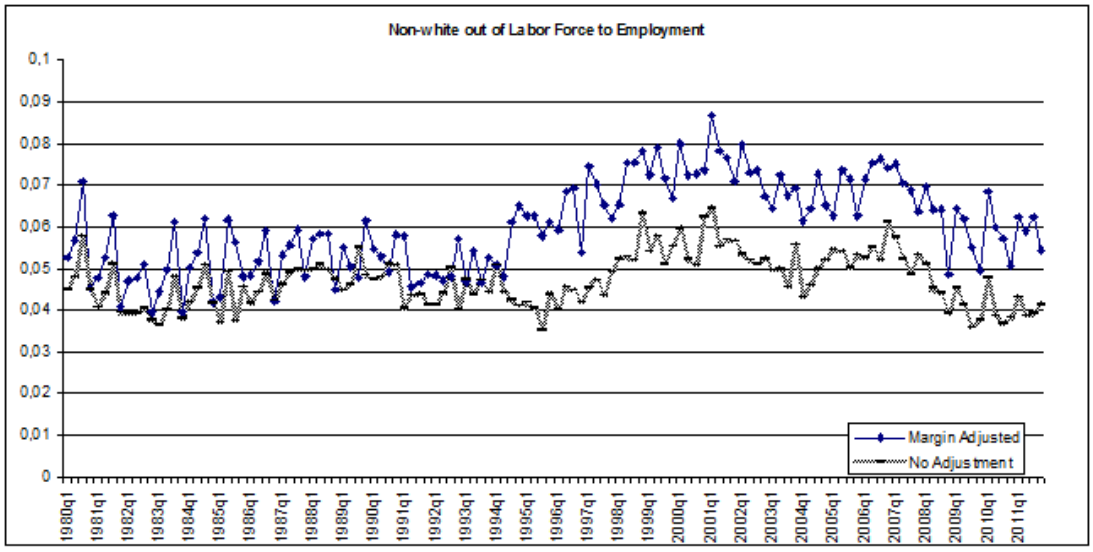

Figure 5.23 Transition probabilities of out of labor force to employment of margin adjusted and unadjusted model of non-whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

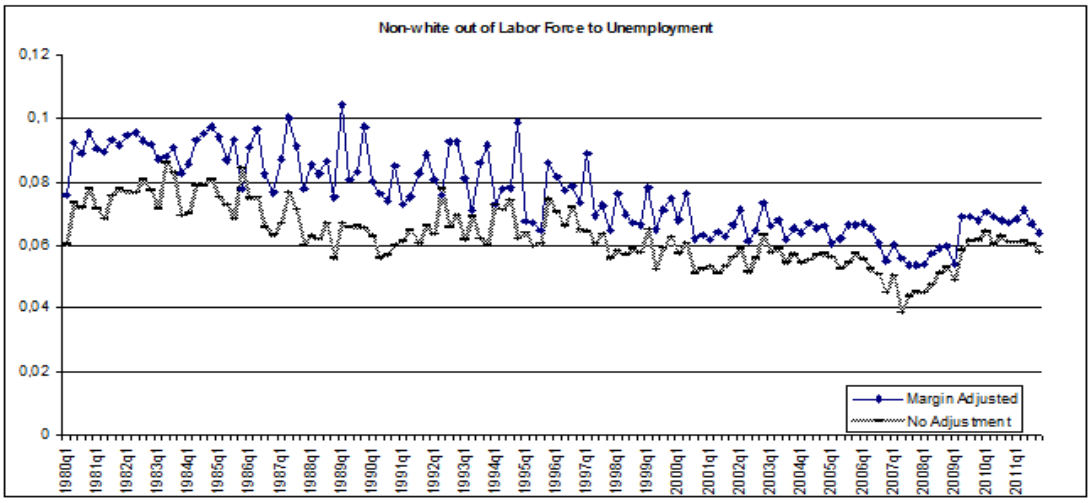

Figure 5.24 Transition probabilities of out of labor force to unemployment of margin adjusted and unadjusted model of non-whites. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

The margin adjusted transition probability from out of labor force to unemployment of the non-whites is higher than the unadjusted probabilities. However the errors in this transition probability for the non-whites are not as much as the errors in that of the non-whites.

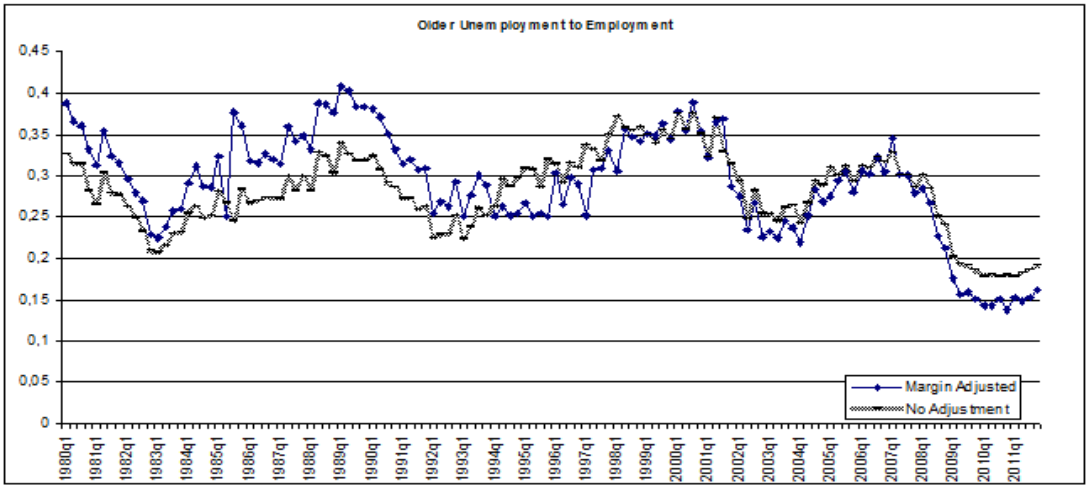

Figure 5.25 Transition probabilities of unemployment to employment of margin adjusted and unadjusted model of older. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Margin adjusted unemployment to employment transition probability of the older population is above the unadjusted from the begining of the period until the

midst of 1990s, which can be seen from Figure 5.25. Margin adjusted transition probability is below the unadjusted beween the midst of 1990's and end of the period. however the both series are very close to each other indicating that the margin erorrs are very low in the transitions from unemployment to employment in older aged population.

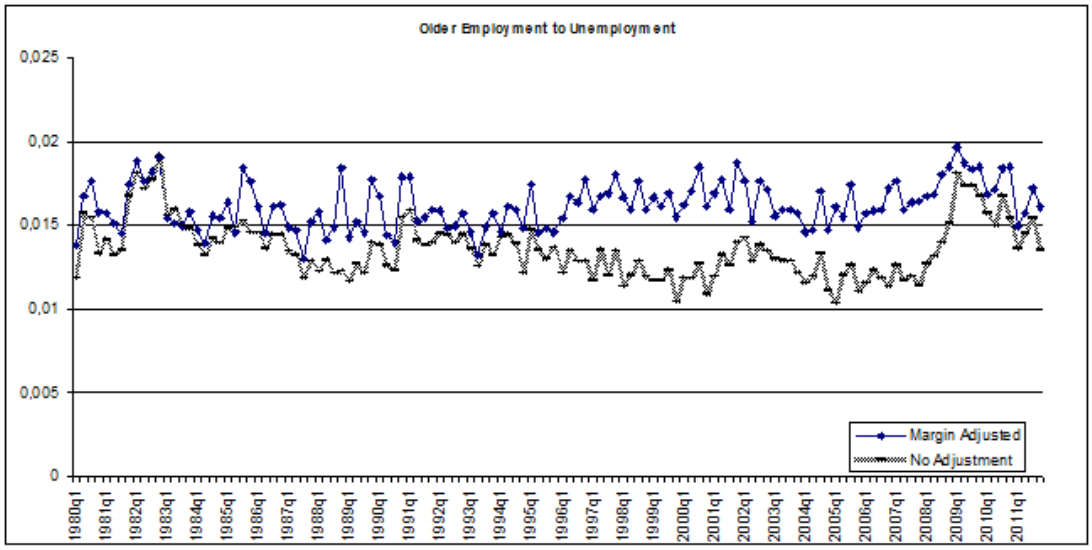

Figure 5.26 Transition probabilities of employment to unemployment of margin adjusted and unadjusted model of older. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Margin adjusted Employment to unemployment transition probability of the population aged above 34 is above the unadjusted employment to unemployment transition probability of this group, which can be seen from Figure 5.26. Cyclicalyty over time seems to be decreased and the new series are more stabe than the unadjusted series.

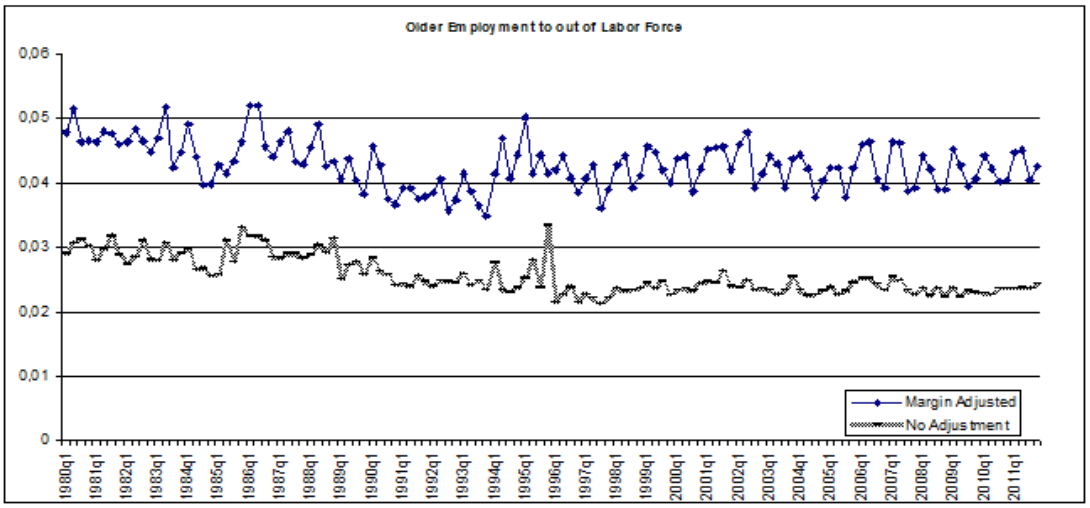

Figure 5.27 Transition probabilities of employment to out of Labor Force of margin adjusted and unadjusted model of older. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares.

Margin adjusted employment to out of labor force transition probability is above the unadjusted employment to out of labor force transition probability for the population aged above 34 years, which can be seen from Figure 5.27.

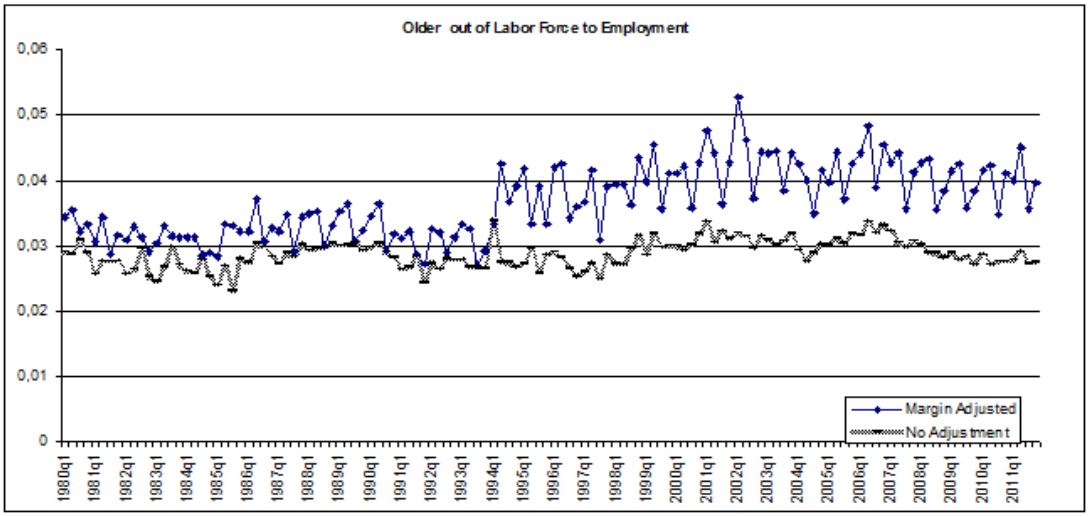

Figure 5.28 Transition probabilities of out of labor force to employment of margin adjusted and unadjusted model of older. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares

Figure 5.28 and 5.29 indicates that argin adjusted transitions out of labor force to employment and unemployment transitions are also above their unadjusted transitions from this state.

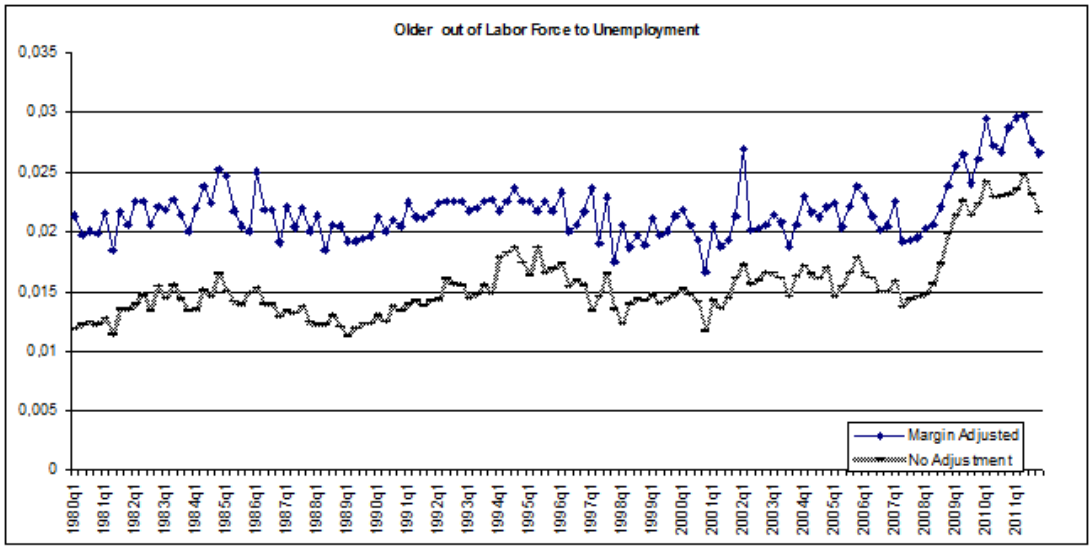

Figure 5.29 Transition probabilities of out of labor force to unemployment of margin adjusted and unadjusted model of older. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares

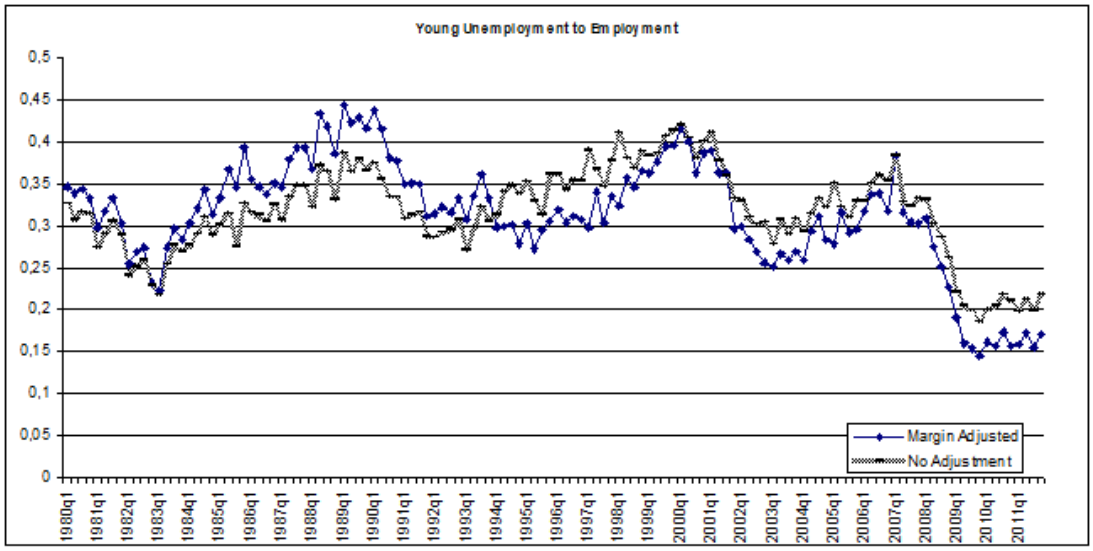

Figure 5.30 Transition probabilities of unemployment to employment of margin adjusted and unadjusted model of young. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares

Figure 5.30 indicates that the margin adjusted transition probability from unemployment to employment of the younger population is above the unadjusted

unemployment to employment transition probability until the midst of 1990s. Then, margin errors decrease the margin adjusted probability below the unadjusted level. The margin errors in the older population in the period from the beginning to the midst of the 1990s are higher than the younger population. There is no considerable difference in the margin errors of both groups in the rest of the period.

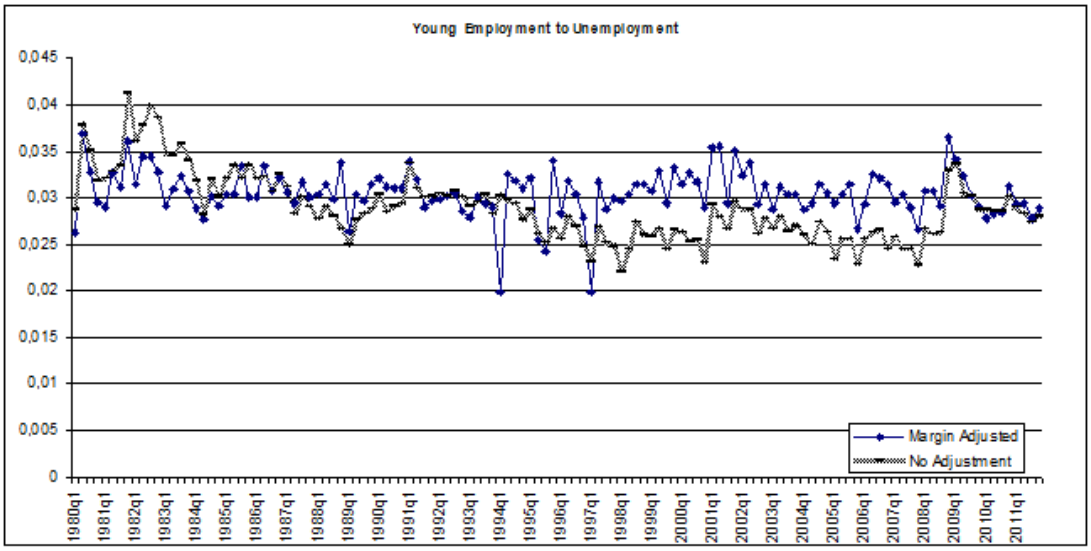

Figure 5.31 Transition probabilities of employment to unemployment of margin adjusted and unadjusted model of young. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares

Employment to unemployment transition probability of the younger population is above the unadjusted transition probability except the first few years in 1980s, which can be seen from Figure 5.31. Margin errors in this transition are lower than that of the population aged 35 or above.

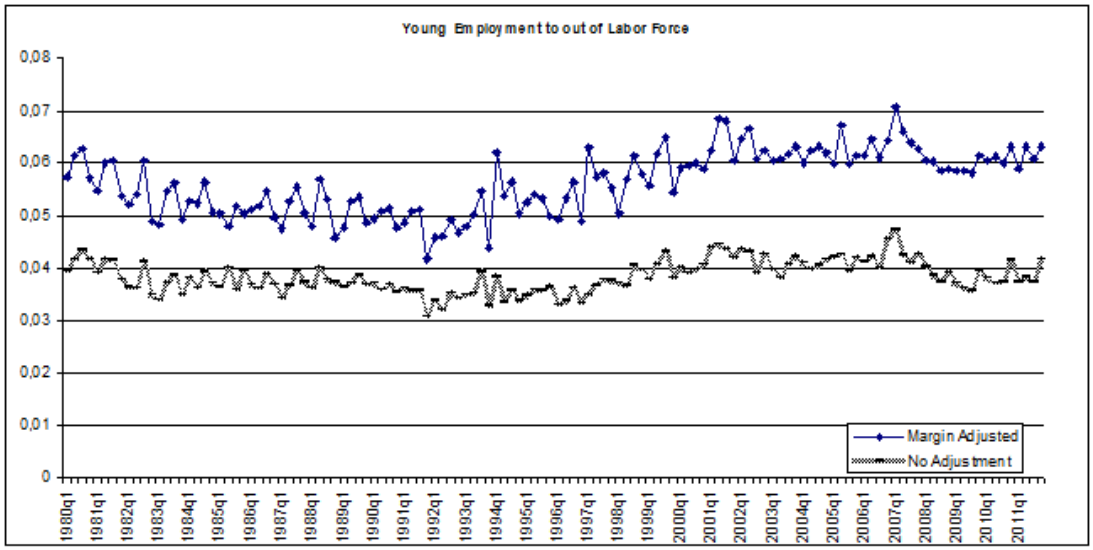

Figure 5.32 Transition probabilities of employment to out of labor force of margin adjusted and unadjusted model of young. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares

The employment to out of labor force transitions are above the unadjusted transition probability, which can be seen from Figure 5.32. The margin errors increase the transitions as in the agrregate data. The margin errors for the older population is below than the younger population in employment to out of labor force transition probability. As can be seen from the figure.

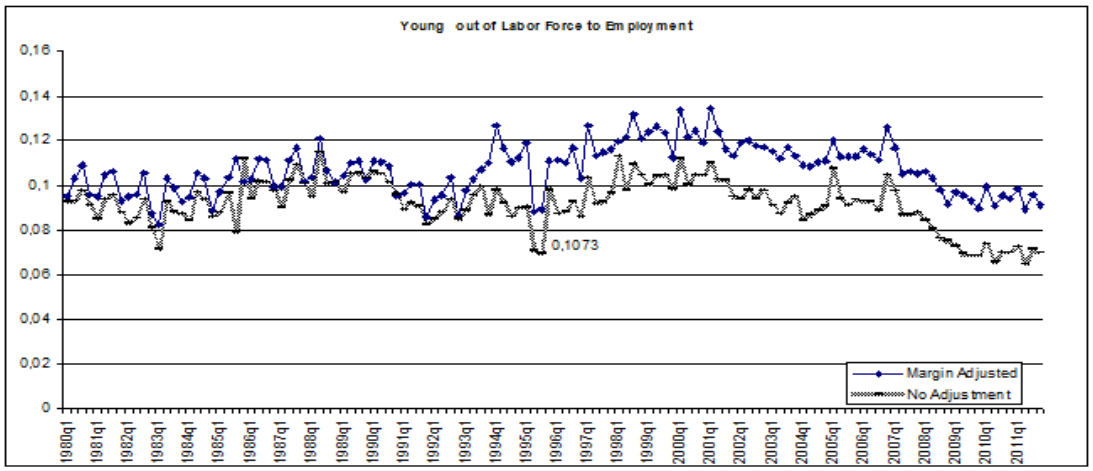

Figure 5.33 Transition probabilities of out of labor force to employment of margin adjusted and unadjusted model of young. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares

Margin adjusted transitions from out of labor force to employment are above the unadjusted transitions for the younger population. As can be seen from the figure 5.33, the margin errors in the transitions from inactivity to employment is higher for the olders.

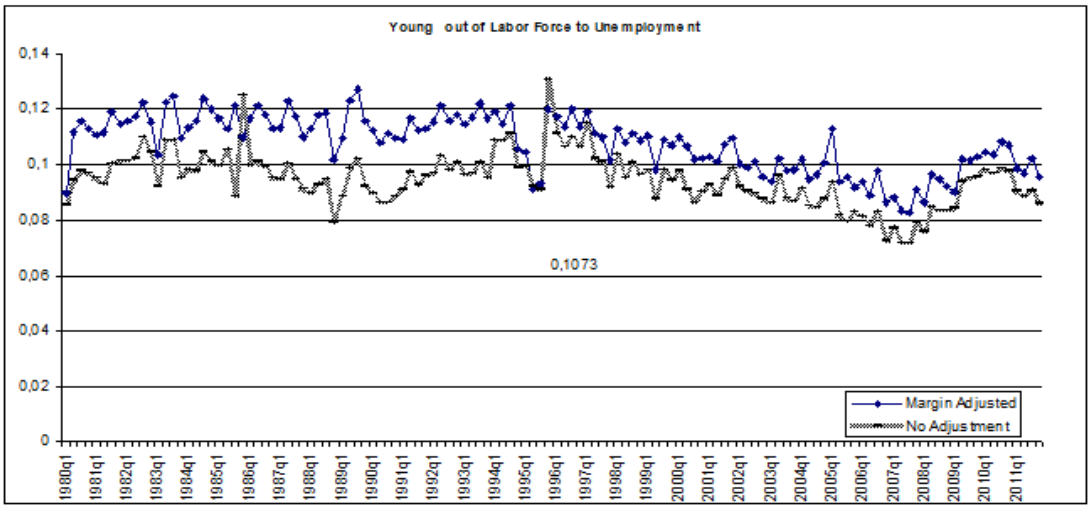

Figure 5.34 Transition probabilities of out of labor force to unemployment of margin adjusted and unadjusted model of young. Probabilities are derived for the period from 1980Q1 to 2011Q4 by seasonally adjusting the transition shares

Margin adjusted out of labor force to unemployment transition probability is over the unadjusted transition probability, which can be seen by Figure 5.34. The errors in his transition for the younger are smaller than that of the olders.

Margin adjustment procedure suggests that the margin errors in calculation of employment to unemployment transitions are higher for males, whites and older aged population than the females, non-whites and the younger population. All gropus margin erorrs increase or decrease the adjusted transition probabilities. Margin errors in unemployment to employment transitions are higher for the males, whites, and the older group. Margin errors in transitions from out of labor force to unemployment are higher for the males, the whites, and the older population.

CHAPTER 6

Further Thoughts

6.1 Introduction

Our analysis up to this point provides five inter-related insights: (1) Shimer's analysis suggests that unemployment fluctuations are affected mostly from the fluctuations in the transitions from unemployment to employment rather than the fluctuations in the transitions from employment to unemployment. (2) Calculations carried out using different methods (i.e., Baker's method) suggest that Shimer's conclusions might be overstated. This casts doubt on the validity of his results. (3) The explanatory power of the cyclical fluctuations in the exit rate from unemployment exhibits stark differences across demographic sub-groups (based on gender, race, and age-groups). The validity of Shimer's results holds on average for all of these groups, but the strength of his conclusions varies. (4) Incorporating transitions in an out of self-employment over the business cycle as a fourth state (besides employment, unemployment, and out of labor force) does not change Shimer's main conclusions. But this analysis provides new insights about the cyclical properties of entrepreneurship. (5) Correcting for the margin error using the Abowd-Zellner method affects the levels of the transition probabilities, but does not affect the cyclical properties of them significantly. Shimer's results hold (even in a reinforced manner) after correcting for missing transitions.

But Shimer's conclusions have a counterintuitive flavor: they say that unemployment fluctuations are determined mostly by how workers transition from

unemployment to employment rather than employment to unemployment. This means that hiring and job finding behaviors dominate exits, quits, and layoff. However, we see mass layoffs during crises and only little separations during booms. Moreover, individuals tend to reduce their reservations wages during recessions, which mitigates the cyclical nature of unemployment to employment transitions. In sum, the five conclusions we have reached above suggests that maybe the mechanics of Shimer's method are generating part of his results.

After taking a deeper look at his statistical model, we observe that he focuses on transition "rates." This has three implications. First, a transition rate is roughly obtained by dividing the number of people transitioning into the total number of people in the relevant state. For example, transition rate from unemployment to employment equals the ratio of those choosing to switch to employment from unemployment to the total number of unemployed individuals before the transition. Second, not only the numerator, but also the denominator fluctuates. And, third, the extent of the fluctuations in rates depends on how large is the relevant state (i.e., the denominator).

This third point deserves further explanations. Suppose that we see 1000 more workers quitting unemployment and getting employed. At the same time, 1000 more workers are quitting their jobs and becoming unemployed. In this case, the change in the number of unemployed will be zero (the rate of unemployment will change in an atomistic amount). However, the change in the exit rate from unemployment will be much bigger than the change in the entry into unemployment. The reason is the relative magnitudes of the denominators.

6.2 Analysis of Transition Numbers

To address these concerns, we perform a preliminary descriptive analysis in two step. First, we report descriptive statistics on the "number" of workers transitioning across labor market states rather than "rates." Figure 6.2 and Figure 6.3 presents these numbers for the employment-to-unemployment and unemployment-to-employment transitions, respectively. A preliminary eyeball test suggests that the cyclical properties of these two figures are mostly indistinguishable (the former is

even more cyclical – contrary to Shimer's conclusions). Moreover, Figure 1 suggests that the number of unemployed (i.e., the denominator for the exit rate from uemployment) fluctuates a lot over the business cycle but the number of employed is relatively stable.

To carry out analysis over numbers, we perform a simple regression of the number of unemployed on the number of people transitioning across states. This is very similar to Shimer's regressions except that we focus on numbers rather than rates. We admit that there might be missing variables and other problems with these regressions; however, our purpose is to simply understand the correlations when the regressions are estimated with numbers than rates. Table 6.1 presents the regression results. Surprisingly, the regression results indicate that the transitions from employment to unemployment have a very large explanatory power, while transitions from unemployment to employment have none.

We conclude that there are returns to developing alternative estimation methods based on numbers rather than rates. The reason is that rates have scale problems. The same number of workers entering and exiting the relevant states might imply very different results if one conduct statistical analysis based on rates than numbers. As a result, we conjecture that Shimer's results will potentially change in a formal model dealing with numbers instead of rates. We leave this interesting task for future research.

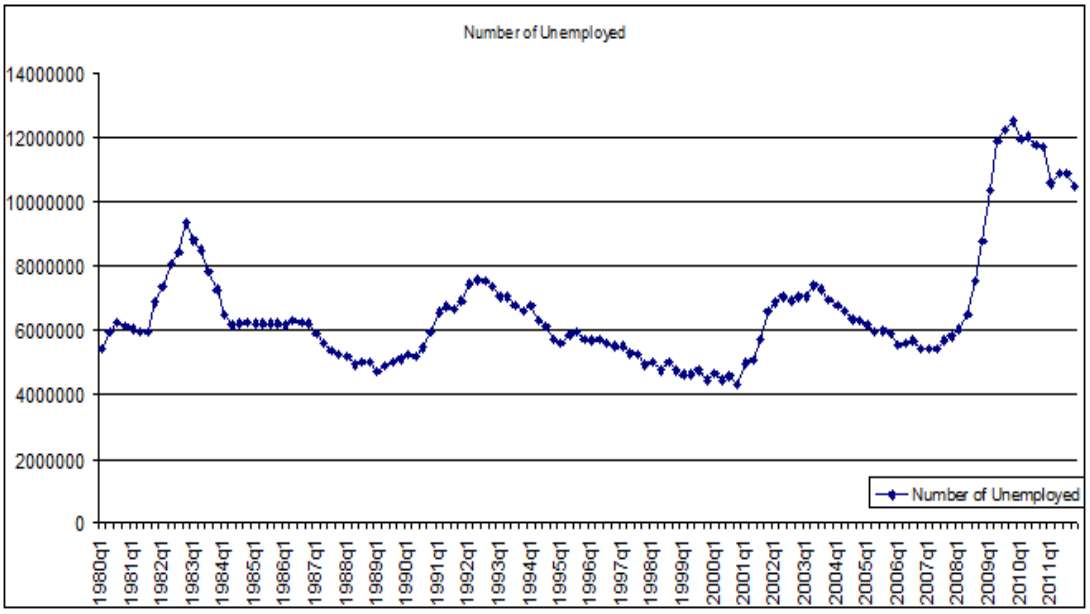

Figure 6.1 The number of unemployed series from the first quarter of 1980 to last quarter of 2011 from published series of BLS. The series are seasonally adjusted by using ratio to moving average method.

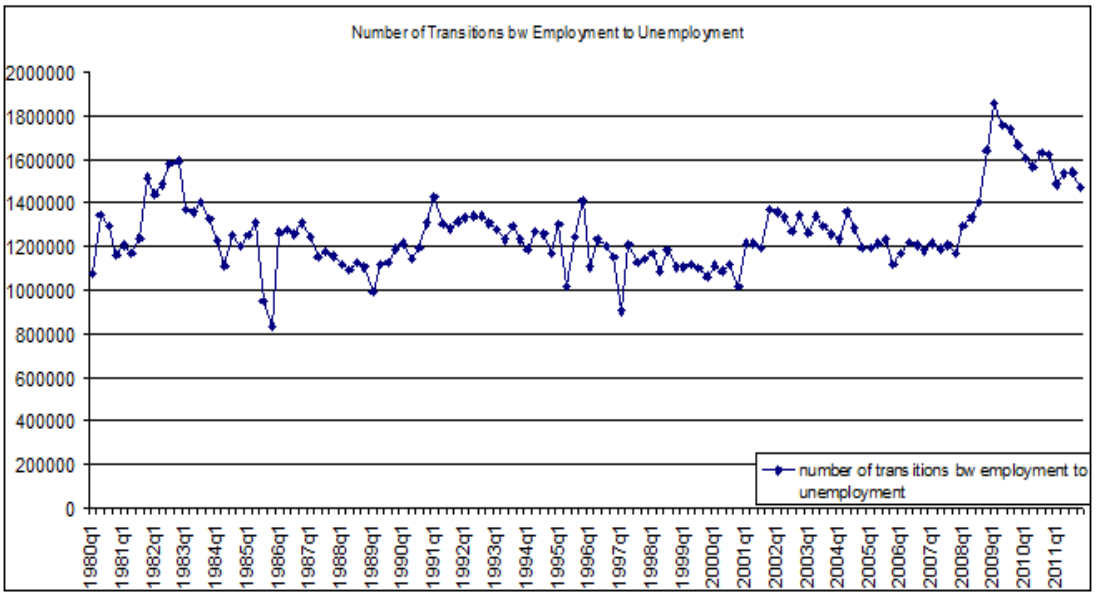

Figure 6.2 The number of transitions from employment to unemployment from the first quarter of 1980 to last quarter of 2011. The series are seasonally adjusted by using ratio to moving average method.

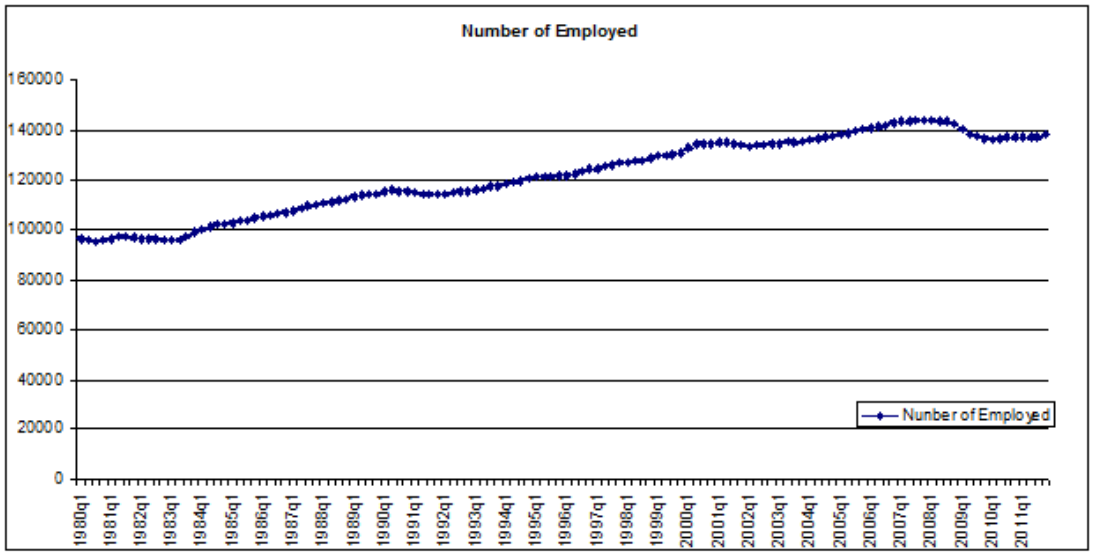

Figure 6.3 The number of employed series from the first quarter of 1980 to last quarter of 2011 from published series of BLS. The series are seasonally adjusted by using ratio to moving average method.

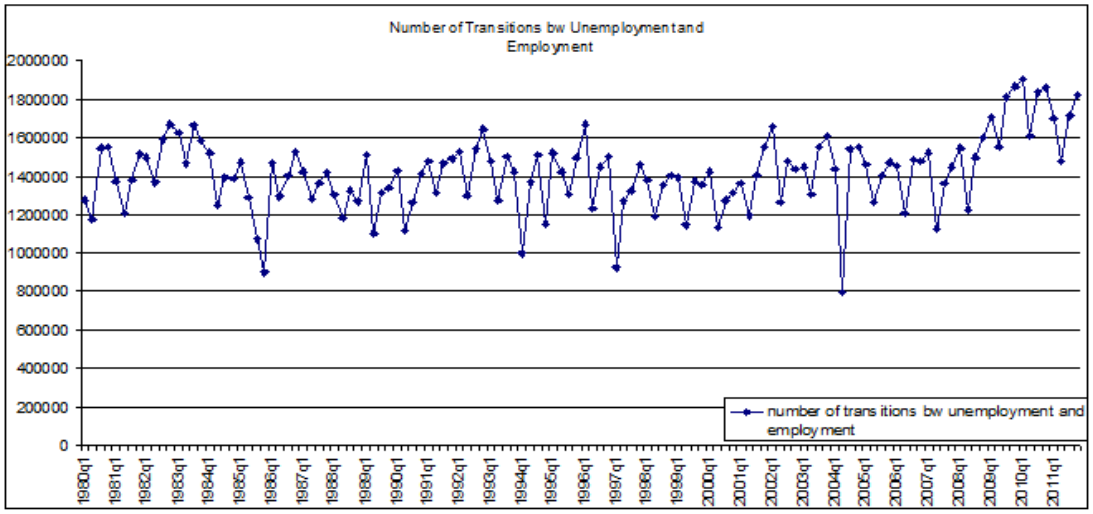

Figure 6.4 The number of transitions from unemployment to employment from the first quarter of 1980 to last quarter of 2011. The series are seasonally adjusted by using ratio to moving average method.

Table 6.1 Estimation Results

Regression on the number of unemployed	**Total**
Variables	Explanatory power
EU	0.958* (0.220)
EI	0.162 (0.177)
UE	-0.04 (0.184)
UI	-0.153* (0.078)
IE	-1.269* (0.2316)
IU	0.164* (0.078)
EE	-0.008 (0.0134)
UU	1.255* (0.184)
II	-0.0201* (0.005)

Notes: The results of the regression of the number of transitions on the number of unemployed. The stars shows that the parameter is significant. The variables with no star denotes that the parameter is insignificant.

CHAPTER 7

CONCLUSION

This thesis investigates the sources of unemployment fluctuations using the U.S. micro data. There is an emerging consensus in the literature that movements in job finding probability explain a larger fraction of unemployment fluctuations, whereas movements in the employment exit probability can explain a relatively smaller fraction. This is inconsistent with the workhorse macro-labor model: the celebrated Mortensen-Pissarides framework. It is quite surprising that the Mortensen-Pissarides model is consistent with a lot of stylized facts and is used to explain a wide array of labor market phenomena, while it falls short of explaining the most basic fact: the magnitude and sources of unemployment fluctuations. This result is clearly documented in two well-cited papers by Robert Shimer [see Shimer (2005, 2012)].

There are several attempts in the literature trying to show that Shimer's result can be altered when several assumptions he made are relaxed. Although some of these attempts have found audience, there is still ample room for progress in this literature. Our main purpose is to provide a broad reanalysis of the major research questions in this literature through extending the existing models and improving upon the widely used empirical methods.

A basic analysis is to check the correlation between the duration of unemployment the rate of unemployment over the business cycle. Baker (1992) performs this analysis for the 1980–1989 period and concludes that the sign of the

correlation is positive and large. This suggests that mean duration of unemployment goes up during recessions, which points out the fact that finding a job becomes much more difficult during downturns. This conclusion has motivated Shimer's research and Shimer links his conclusions to Baker's findings.

We start our study by extending Baker's analysis to the 1996–2012 period, which is an extremely important time period for the U.S. economic history. Interestingly, we find that the magnitude of the correlation between aggregate unemployment duration and the rate of unemployment is much smaller for the most recent period. This casts doubt on the validity of Shimer's results.

Then we ask "what drives the gap between this basic finding and Shimer's findings." Our agenda consists of three extensions: (1) carrying out Shimer's analysis for sub-groups in the worker population to check if his results hold for everyone, (2) incorporating self-employment, a neglected but important labor market state, as an additional worker status into the analysis to check if transitions from and into self-employment drive Shimer's results, and (3) performing a detailed error-correction analysis to check if well-documented errors in CPS transitions affect Shimer's conclusions or not.

In this dissertation, we execute these tasks and conclude that they do not affect Shimer's main conclusions significantly. But, these exercises have provided interesting insights regarding (i) the differences across sub-groups in terms of their responses to unemployment fluctuations and (ii) the role and importance of self-employment for workers over the business cycle. Both sets of insights are new and are based on novel approaches and analyses.

Correcting for the measurement errors is an important and burdensome empirical task. The literature documents that these errors might be systematic and non-randomly distributed in the worker population. If that is the case, there are good reasons to believe that correcting for Shimer's analysis for these measurement errors has a potential to alter Shimer's results. In Section 5, we correct for the missing-transitions (i.e., margin) error using the Abowd-Zellner method and we conclude that the correction exercise significantly affects the levels of the transition probabilities,

but it has only negligible impacts on the cyclical properties of these probabilities. This suggests that errors in the data might be non-random, but this non-randomness does not appear in a cyclical way.

Finally, in Section 6, we question the mechanics of the statistical model developed in Shimer (2012). We observe that Shimer focuses on rates of transitions rather than number of transitioning workers. We show that this might be generating his results. In particular, we argue that the cyclicality in the exit rate from unemployment is admittedly larger than the cyclicality in the job separation rate. But this might be due to the fact the transitions from unemployment to employment come from a much smaller (and also significantly countercyclical) pool of individuals: the unemployed. However, the transitions from employment to unemployment are drawn from a much larger (and much more stable) pool: the pool of employed. We argue that this issue might be the key in understanding the results reported by Shimer. We leave the interesting task of developing a statistical model based on numbers, estimating it, and comparing the outcomes with those of Shimer's study to future research.

REFERENCES

Abowd, John M., and Arnold Zellner. "Estimating gross labor-force flows."Journal of Business & Economic Statistics 3.3 (1985): 254-283.

Baker, Michael. "Unemployment duration: compositional effects and cyclical variability." The American Economic Review 82.1 (1992): 313-321.

Blanchard, Olivier Jean and Peter Diamond. "The cyclical behavior of the gross flows of US workers." Brookings Papers on Economic Activity 1990.2 (1990): 85-155.

Blanchflower, David G. "Self-employment in OECD countries." Labour economics 7.5 (2000): 471-505.

Bruce, Donald, and Herbert J. Schuetze. "The labor market consequences of experience in self-employment." Labour Economics 11.5 (2004): 575-598.

Caballero, Ricardo J, and Mohamad L. Hammour. "The Cleansing Effect of Recessions." American Economic Review 84.5 (1994): 1350-1368.

Carrasco, Raquel. "Transitions to and From Self-employment in Spain: An Empirical Analysis." Oxford Bulletin of Economics and Statistics 61.3 (1999): 315-341.

Chua, Tin Chiu, and Wayne A. Fuller. "A model for multinomial response error applied to labor flows." Journal of the American Statistical Association 82.397 (1987): 46-51.

Darby, Michael R., John C. Haltiwanger, and Mark W. Plant. "Unemployment-rate dynamics and persistent unemployment under rational expectations". No. w1558. National Bureau of Economic Research, 1985.

Darby, Michael, John Haltiwanger, and Mark W. Plant. "The Ins and Outs of Unemployment: The Ins Win". working paper series no. 1997. National Bureau of Economic Research, Inc, 1986.

Davidson, Paul. "Is the current financial distress caused by the subprime mortgage crisis a Minsky moment? Or is it the result of attempting to securitize illiquid noncommercial mortgage loans?." Journal of Post Keynesian Economics 30.4 (2008): 669-676.

Davis, Steven J., and John Haltiwanger. "Gross job creation and destruction: Microeconomic evidence and macroeconomic implications." NBER Macroeconomics Annual 1990, Volume 5. MIT Press, (1990). 123-186.

Davis, Steven J., and John Haltiwanger. "Gross job creation, gross job destruction, and employment reallocation." The Quarterly Journal of Economics 107.3 (1992): 819-863.

Davis, Steven J., and John Haltiwanger. "Measuring gross worker and job flows." Labor Statistics Measurement Issues. University of Chicago Press, (1998). 77-122.

Davis, Steven J., John Haltiwanger, and Scott Schuh. "Small business and job creation: Dissecting the myth and reassessing the facts." Small business economics 8.4 (1996): 297-315.

Dunn, Thomas, and Douglas Holtz-Eakin. "Financial Capital, Human Capital, and the Transition to Self-Employment: Evidence from Intergenerational Links."Journal of Labor Economics 18.2 (2000): 282-305.

Elsby, Michael WL, Ryan Michaels, and Gary Solon. "The ins and outs of cyclical unemployment." American Economic Journal: Macroeconomics 1.1 (2009): 84-110.

Hobijn, Bart, and Ayşegül Şahin. "Job-finding and separation rates in the OECD." Economics Letters 104.3 (2009): 107-111.

Elsby, Michael W., Bart Hobijn, and Aysegul Sahin. The labor market in the Great Recession. working paper series no. 15979. National Bureau of Economic Research, 2010.

Elsby, Michael WL, and Bart Hobijn. "The Labor Market in the Great Recession: An Update." The Quarterly Journal of Economics 128.1 (2013): 249-85.

Evans, David S., and Linda S. Leighton. "The determinants of changes in US self-employment, 1968–1987." Small Business Economics 1.2 (1989): 111-119.

Fairlie, Robert W. "The absence of the African-American owned business: An analysis of the dynamics of self-employment." Journal of Labor Economics17.1 (1999): 80-108.

Feng, Shuaizhang. "Misclassification Errors and the Underestimation of the US Unemployment Rate." The American Economic Review 103.2 (2013): 1054-1070.

Frazis, Harley J., et al. "Estimating gross flows consistent with stocks in the CPS." Monthly Lab. Rev. 128 (2005): 3.

Fujita, Shigeru, and Garey Ramey. "The Cyclicity of Seperation and Job Finding Rates." International Economic Review 50.2 (2009): 415-430.

Fujita, Shigeru, and Garey Ramey. "Exogenous versus Endogenous Separation." American Economic Journal: Macroeconomics 4.4 (2012): 68-93.

Gertler, Mark, and Antonella Trigari. "Unemployment Fluctuations with Staggered Nash Wage Bargaining." Journal of Political Economy 117.1 (2009): 38-86.

Hagedorn, Marcus, and Iourii Manovskii. The cyclical behavior of equilibrium unemployment and vacancies revisited. working paper series no. 853. European Central Bank, 2008.

Hall, Robert E. "Employment fluctuations with equilibrium wage stickiness."American Economic Review 95.1 (2005): 50-65.

Hall, Robert E., and Paul R. Milgrom. "The Limited Influence of Unemployment on the Wage Bargain." American Economic Review 98.4 (2008): 1653-74.

Hipple, S. "Self-employment in the United States." Monthly Labor Review 133.9 (2010): 17-32.

Hughes, Karen D. "Pushed or Pulled? Women's Entry into Self-Employment and Small Business Ownership." Gender, Work & Organization 10.4 (2003): 433-454.

Katz, Lawrence. "Long-term unemployment in the Great Recession." Testimony for the Joint Economic Committee, US Congress, April. Vol. 29. 2010.

Kennan, John. "Private information, wage bargaining and employment fluctuations." The Review of Economic Studies 77.2 (2010): 633-664.

Kotz, David M. "Contradictions of economic growth in the neoliberal era: accumulation and crisis in the contemporary US economy." Review of Radical Political Economics 40.2 (2008): 174-188.

Kotz, David M. "The financial and economic crisis of 2008: A systemic crisis of neoliberal capitalism." Review of Radical Political Economics 41.3 (2009): 305-317.

Mortensen, Dale T., and Christopher A. Pissarides. "Job creation and job destruction in the theory of unemployment." The review of economic studies 61.3 (1994): 397-415.

Pissarides, Christopher A. Equilibrium unemployment theory. MIT press, 2000.

Pissarides, Christopher A.. "The Unemployment Volatility Puzzle: Is Wage Stickiness The Answer?." Econometrica 77.5 (2009): 1339-1369.

Poterba, James M., and Lawrence H. Summers. "Reporting errors and labor market dynamics." Econometrica 54.6 (1986): 1319-1338.

Rissman, Ellen. Self-employment as an alternative to unemployment. working paper series no. 34. Federal Reserve Bank of Chicago, 2003.

Robinson, Edvin L., and Marta Duff. "A Proposed Estimation Procedure for CPS Gross Flows." working paper of U.S. Bureau of Labor Statistics, U.S. Census Bureau

Şahin, Ayşegül, Joseph Song, and Bart Hobijn. "The unemployment gender gap during the 2007 recession." Current Issues in Economics and Finance 16.2 (2010): 1-7.

Shimer, Robert. "The cyclical behavior of equilibrium unemployment and vacancies." American economic review 95.1 (2005): 25-49.

Shimer, Robert. "Reassessing the ins and outs of unemployment." Review of Economic Dynamics 15.2 (2012): 127-148.

Sider, Hal. "Unemployment duration and incidence: 1968-82." The American Economic Review 75.3 (1985): 461-472.

Spence, Michael, and Sandile Hlatshwayo. "The evolving structure of the American economy and the employment challenge." Comparative Economic Studies 54.4 (2012): 703-738.

Taylor, Mark P. "Survival of the fittest? An analysis of self-employment duration in Britain." The Economic Journal 109.454 (1999): 140-155.

Tansel, Aysıt, and H. Mehmet Tasci. Determinants of unemployment duration for men and women in Turkey. IZA, 2004.

Tasci, H. Mehmet, and Aysit Tansel. "Unemployment and transitions in the Turkish labor market: Evidence from individual level data." Available at SSRN 756385 (2005).

Thurik, A. Roy, et al. "Does self-employment reduce unemployment?." Journal of Business Venturing 23.6 (2008): 673-686.

Tumen, Semih. "Measuring earnings inequality: An economic analysis of the Bonferroni index." Review of Income and Wealth 57.4 (2011): 727-744.

U.S. Bureau of Labor Statistics, U.S. Census Bureau."Technical Paper 63: Current Population Survey--Design and Methodology" (2002),.

U.S. Bureau of Labor Statistics, U.S. Census Bureau “Technical Paper 66: Current Population Survey--Design and Methodology” (2006).

Verleger, Philip K., et al. "The US petroleum crisis of 1979." Brookings Papers on Economic Activity 1979.2 (1979): 463-476.

Zissimopoulos, Julie M., and Lynn A. Karoly. "Transitions to self-employment at older ages: The role of wealth, health, health insurance and other factors."Labour Economics 14.2 (2007): 269-295.

APPENDICES

APPENDIX A

TURKISH SUMMARY

Bu tezde Amerika Birleşik Devletleri'nin CPS veri setini kullanarak, işsizlik süresi, işsizliğe giriş oranı ve işsizlikten çıkış oranı gibi faktörlerin ekonomik aktivite ile olan ilişkisi incelenmiştir. Kullandığımız veri seti aylık bir data seti olup 1980 senesinin Ocak ayından 2012 senesinin Şubat ayına kadar olan dönemi kapsamaktadır. Data setimiz, her ay, aşağı yukarı 60 bin hane halkını içermektedir. Data setimizde yer alan kişiler 4 ay ardarda takip edilmiş, daha sonra 8 ay boyunca very setinin dışında kalıp, sonraki 4 ay tekrar ardarda takip edilen ve rotasyon grupları olarak adlandırılan kişilerden oluşmaktadır. Bu kişiler aylık olarak takip edilerek hem işsizlik süreleri hem de iş gücü piyasasındaki, istihdam, işsizlik, aktif iş gücü dışında olma, ve kendi hesabına çalışma gibi durumlar arası geçişleri incelenmiştir. Kişileri, aylık olarak takip edebilmek için, yapay bir kimlik numarası oluşturulmuştur. Çünkü veri setimizde kişiler için ayrı bir numaralandırma değil her hane halkı için ayrı bir numaralandırma yapılmıştır. Yaş, cinsiyet, hane halkı reisine yakınlık, ve bireysel telefon numaraları kullanılarak kişilerin birbirinden ayrılması sağlanmış ve data setimizin panel boyutu kullanıma hazır hale getirilmiştir.

Literatürde iş arama terorilerinin beklediği sonuç kriz dönemlerinde iş sahibi olan insanların işsiz kalmasıyla işsizlik oranının artması ve işsizlik süresinin birey düzeyinde sabit kalmasıdır. İşsizlik oranındaki artış iş sahibi olan insanların işten çıkışı sonucu gerçekleşecektir. Mevcut işsizlerin iş bulma sürelerindeki uzama sürelerinin ise ekonomik aktivite ile güçlü bir ilişkisi olmadığından değişmemesi beklenmektedir. Darby, Michael ve Plant (1986) tarafından yapılan çalışmada heterojenlik hipotezi açıklanmıştır. Buna gore eğer ortalama işsizlik süresinde bir artış gözlemlendiyse bundan işsiz kalan kişilerin zaten işsizlik süresi daha uzun olan

dezavantajlı kişilerden oluşması ve bu kişilerin ortalama beklenen işsizlik sürelerini yükseltmeleridir. Buna gore bir very seti eğer işsizlik süresinde bir artış ortaya koyuyorsa bu bireysel düzyde işsizlik sürelerinin artışından değil işsizlik havuzundaki kompozisyonun değişmesinden kaynaklanmaktadır.

Öte yandan, Shimer (2012) tarafından yapılan çalışmada işsizlik oranının artmasındaki temel sebebin işşsizlik süresindeki değişim olduğunu iddia ederek iş arama teorilerinin tersine bir bulgu ile literatürü sarsmıştır. Literatürde daha önce yapılmış ve yine Amerika Birleşik Devletleri üzerinden Shimer'ın bulgusuna paralel bulgular taşıyan Sider'ın 1985 ve Baker'ın 1992 yıllarında yaptıkları çalışmalar da Shimer'in çalışmasıyla birlikte daha fazla önem kazanmıştır. Literatür içersinde Shimer'in çalışmasının yarattığı büyük yankı Mortensen ve Pissarides'in temel iş arama modelinde bazı modifikasyonlara gidilmesine sebep olmuştur. Konu üzerindeki tartışmalar devam etmektedir ve konu üzerinde bir fikir birliği sağlanamamıştır. Bunun etkisiyle araştırmaya değer bulduğumuz bu konuda öncelikle işsizlik süresi ve işsizlik oranı arasındaki ilişkiyi incelemeye karar verdik.

Baker (1982) tarafından yapılan çalışmayı ve Sider (1985) tarafından yapılan çalışmaları izleyerek dinamik bir model kullandık. Ortalama işsizlik süresinin hesaplanması için tamamlanmamış olan işsizlik sürelerinden tamamlanmış işsizlik sürelerini çıkarmamızı sağlayan bir metod kullandık. Beklenen işsizlik sürelerini sadece bütün veri setimiz için değil, bazı alt gruplar için de hesapladık. Alt gruplardan oluşturduğumuz kohortları zaman içersinde takip edebildiğimiz için, işsiz olan kişilerin gelecek dönemde de işsiz kalmasının olasılığını hesapladık. Bu olasılığı temel denklemimize yerleştirerek tamamlanmamış işsizlik süresinden beklenen tamamlanmış işsizlik sürelerini elde edebildik. Daha sonra işsizlik süresi ve ekonomik aktivite ile olan ilişkiyi tespit etmek için basit bir regresyon modeli kullandık. Bazı mevsim değişkenleri, kukla değişkenler ve trend değişkeni de ekleyerek yaptığımız regresyon analizi sonucunda işsizlik süresi ve ekonomik aktivite arasındaki ilişkinin 1996'dan günümüze kadar olan süreç içersinde azaldığını gözledik. 1980 ve 1989 yılları arasında işsizlik oranı ve işsilik süresi arasındaki güçlü döngüsel ilişkinin son yıllara doğru düşmesi Shimer'in bulguları ile

ilgili bazı şüpheleri de beraberinde getirdiğinden Shimer'ın kendi yöntemini kullanarak bu ilişkiyi tekrar inceledik.

Markov modelini kullanarak kişiler çalışan, işsiz ve aktif iş gücünün dışında olmak üzere 3'e ayrı duruma göre ayrılmıştır. Bu şekilde kişileri aylara göre takip edebildiğimiz için kişilerin bu 3 durum arasındaki geçişleri de tespit edilebilmiştir.. Bu şekilde her bir durum'a geçiş oranları hesaplanmıştır. Bu işlem elde mevcut olan her ay için ayrı aırı yapılımıştır. Bir yıllı 4 çeyreğe bölerek oluşturduğumuz durumlar arası geçiş oranları mevsimsellikten arındırılmış bir hale getirilmiştir. Mevsimsellikten arındırma için kullanılan yöntem ise hareketli ortalamalar yöntemidir.

Oluşturduğumuz modelde nümerik çözüm metodu kullanarak iş gücü piyasaasındaki durumlar arası geçiş oranlarından giriş geçiş hızlarını hesapladık. Bu olasılıklar: iş sahibi bir kişinin iş bulma olasılığı, iş sahibi kişinin aktif iş gücünün dışına çıkma olasılığı, işsiz bir kişinin iş bulma olasılığı, işsiz kişinin aktif iş gücünün dışına çıkma olsılığı, aktif iş gücü dışındaki kişinin iş sahibi olma olsılığı ve aktif iş gücü dışında olan bir kişinin işsizlik durumuna geçmesi yani iş aramaya başlaması olasılıklarıdır. Bu olasılıkları kullanarak yapay işsizlik oranı hesapladık. Bu oranı hesaplarken sırayla sadece bir olasılığı zaman içersinde değişebilir kılıp diğerlerini sabit tutarak 6 ayrı şekilde yapay işsizlik oranı hesapladık. Elimizde bulunan ve her bir geçiş olasılığı için ayrı ayrı hesapladığımız yapay işsizlik oranlarının gerçekleşen işsizlik oranı ile olan ilişkisini inceledik. Yaptığımız varyans ayrıştırma analizi ile birlikte işsizlik oranındaki dalgalanmaların her bir olasılık tarafından ne oranda açıklandığını ortaya koyduk. Bulguların tüm very seti için yaptığımız tahminlerde genellikle Shimer'i doğrulayan nitelikte olması tahminlerimizde karşılaştığımız dikkat çekici sonuçlardandır. Bunu gördükten sonra analizimizi tekrar alt gruplar için yaptık. Kadın-erkek, üniversite mezunları – üniversite mezunu olmayanlar,genç-yaşlı, ve beyaz ve beyaz olmayan nüfus olmak üzere verimizi gruplara ayırdık.

Yukarıda değindiğimiz gibi verimizi hiçbir gruba ayırmadan tüm örneklemimizi kullanarak yaptığımız tahminlerde genellikle Shimer (2012) tarafından yapılan çalışmayı destekleyecek türden bulgulara ulaştık. İş sahibiyken

işsizlik durumuna geçiş olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 20'sinden sorumluyken; işsizken iş sahibi olma olasılığındaki döngüsel dalgalanmalar işsizlik oranındaki döngüsel dalgalanmaların yaklaşık yüzde 50'sinden sorumludur. Bu durum Shimer (2012) tarafından ulaşılan, işsizlik havuzuna girişlerin bu havuzdan çıkışlara göre ekonomik aktivite ile daha döngüsel bir ilişki taşıdığı şeklindeki sonuç ile paraleldir. Bu sonuçlarımıza göre, iş sahibiyken aktif iş gücü dışına geçiş olasılığındaki dalgalanmalar ile işsizlik oranındaki dalgalanmalar arasında bir ilişki olmadığı tespit edilmiştir. Diğer yandan işsizlikten aktif iş gücü dışına geçiş olasılığındaki döngüsel dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 15'inden sorumludur. Aktif işgücü dışındayken istihdam edilme olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 8'ini açıklamaktadır. Aktif iş gücü dışındayken işsizlik durumuna geçiş olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 12'sini açıklamaktadır.

İş sahibiyken işsiz kalma olasılığı 1980 ve 2011 arasındaki krizlerde erkekler için kadınlara göre daha fazla artmıştır. Bu durum literatürde krizlerden genellikle etkilenen sektörün imalat sanayi sektörü olması ve bu sektörün erkeklerin daha yoğun çalıştığı bir sektör olmasıyla açıklanmıştır. İşsiz kişilerin iş bulma olasılığı ise erkekler için kadınlardan daha yüksek olmasına rağmen tezimizin kapsadığı periyot içersinde genellikle küçük bir fark olarak kalmıştır. Ayrıca son yıllara yaklaştıkça bu fark iyice küçülmekte ve işsizken iş bulma olasılıklarındaki farklılık kadın ve erkekler için neredeyse ortadan kalkmaktadır. İşsizken aktif iş gücü dışarısına çıkma olasılığı ise beklendiği gibi kadınlar için daha yüksektir, ancak zaman içersinde bu fark giderek azalmış ve özellikle de 2007 krizinden sonra neredeyse kapanmıştır. Bu durum kadınların aktif iş gücü içerisinde kalma eğilimlerinin zamanla arttığını ortaya koyan göstergelerden biridir. İş sahibiyken işsiz kalma olasılığı ise kadınlarda erkeklere göre daha yüksektir. Bu fark zaman içersinde azalmış fakat kapanmamıştır. Aktif iş gücü dışındayken istihdam edilme olasılığı kadınlarda erkeklere göre daha düşüktür. Aktif iş gücü dışında olan kadınların iş aramaya başlaması olasılığı da erkeklere göre daha düşüktür.

Varyans ayrıştırma methodu kullanarak yaptığımız analiz sonucunda, erkekler için, istihdam edilmişken işsiz kalma olasılığındaki dalgalanmaların işsizlik

oranındaki dalgalanmanın % 26'sını açıkladığı tespit edilmiştir. Aynı şekilde, erkekler için işsizken istihdam edilme olasılığındaki dalgalanmaların ise işsizlik oranındaki dalgalanmaların yüzde 46'sını açıkladığı ortaya konmuştur. İstihdam edilen bir kişinin aktif iş gücü dışına çıkmasının işsizlik oranındaki dalgalanmalarla ilişkisiz olduğu tespit edilmiştir. İşsizken aktif iş gücü dışasına çıkma olasılığındaki dalgalanmalar ise işsizlik oranındaki dalgalanmaların yaklaşık yüzde 11'ini açıklamaktadır. Aktif iş gücü dışarısında olan bir kişinin iş bulma olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 7'sini açıklarken; aktif iş gücü dışında olan birinin işsiz olma yani iş aramaya başlama olasılığı ise işsizlik oranındaki dalgalanmaların yüzde 9'unu açıklamaktadır.

Kadınlarda ise durum önemli ölçüde farklılık göstermektedir. İş sahibiyken işsiz kalma olasılığı kadınlar için işsizlik oranındaki dalgalanmaların yüzde 11'ini açıklamaktadır. Erkeklerde bu oranın yüzde 26 olduğunu göze aldığımızda, bu durum, yukarıda da değindiğimiz gibi, krizlerde etkilenen sektörlerin genellikle erkeklerin daha yoğun olarak çalıştığı sektörler olmasıyla açıklanabilir. Bunun sonucunda daha fazla erkek işsiz kalmış, erkeklerin bu geçiş olasılığı kriz anında daha çok yükselmiş ve bu sebeple bu oran yüksek çıkmış olabilir. Yine de Shimer (2012) tarafından yapılan çalışmadaki sonuçların her bir grup için aynı olmadığını ortaya koyması yönüyle bu sonuç büyük önem taşımaktadır. İstihdam edilmiş bir kadının aktif iş gücü dışarısına çıkma olasılığındaki dalgalanmalar ise işsizlik oranı ile döngüsel bir ilişki içersinde değildir. İşsiz bir kadının iş bulma olasılığındaki dalgalanmaları işsizlik oranındaki dalgalanmaların yaklaşık yarısını açıklamaktadır. İşsizken aktif iş gücü dışına çıkma olasılığı ise kadınlarda işsizlik oranındaki dalgalanmaların yüzde 15'ini açıklamaktadır. Aktif işgücü dışında olan bir kadının istihdam edilme olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 13'ünü açıklamaktadır. Aktif işgücü dışında olan bir kadının işsiz olma olasığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 9'unu açıklamaktadır.

Etnik gruplara göre yaptığımız tahminlerde ise datamızı beyazlar ve beyaz olmayanlar olmak üzere 2'ye ayırdık. Böylece toplumdaki azınlığın ve çoğunluğun çevrimsel dalgalanmalar içersinde iş gücü piyasasındaki durumlarındaki değişimi

takip ettik. İstihdam edilmişken işsiz kalma olasılığı kapsam alanındaki periyot içersinde beyaz olmayan kişiler için beyaz olanlardan daha yüksektir. Fakat zaman içerisinde özellikle de son yıllara doğru bu olasılık bu iki grup için birbirlerine yaklaşmıştır. Beyaz olan kişilerin işsizken iş bulma olasılıkları beyaz olmayan kişilerin üzerindedir. Son yıllara doğru bu iki grup için işsizken iş bulma olasılıklarındaki farklılık, özellikle de 2007 krizinden sonra, azalmaya başlamıştır. Beyaz olmayan kişilerin istihdam edilmişken aktif iş gücü dışına çıkma olsılığı beyaz olmayan kişilerinkine göre daha fazladır. Beyaz olmayan kişilerin işsizken aktif iş gücü dışına çıkma olasılığı ise beyaz olan kişilerin üzerindedir. Zaman içersinde özellikle de 2007 krizinden sonra işsizken aktif iş gücü dışına çıkma olasılığı bu iki grup için kapanmaya başlamıştır. Bu durum cesareti kırılmış işçi davranışının zamanla azınlık olmayan gruplarda da arttığını göstermektedir. Beyazlar ve beyaz olmayanlar için, aktif iş gücü dışındayken istihdam edilme olasılığı 1990'ların ortasına kadar benzer bir düzeyde dalgalanmalar göstermiştir. 1990'ların ortasından sonra ise beyaz olmayan kişilerin aktif iş gücü dışındayken istihdam edilme olasılıkları beyaz olanların üzerine çıkmıştır. 2007 krizinden sonra ise bu fark tekrar kapanmıştır. Beyaz olmayan kişilerin aktif iş gücü dışındayken işsiz kalma olasılığı ise beyaz olanların daha yukarısındadır. Beyazların istihdam edilmiş durumdayken işsiz kalma olasılıkları işsizlik oranındaki dalgalanmaların yüzde 21'ini açıklamaktadır. İstihdam edilmişken aktif iş gücü dışına çıkma olasılığı ise işsizlik oranı ile döngüsel bir ilişki içersinde değildir. İşsizken istihdam edilme olasılığı beyazların işsizlik oranındaki dalgalanmalarının yüzde 48'ini açıklamaktadır. İşsizken aktif iş gücü dışına çıkma olasılığı beyazların işsizlik oranındaki dalgalanmaların yaklaşık yüzde 13'ünü açıklamaktadır. Aktif iş gücü dışındayken istihdam edilme olsılığı ise beyazların işsizlik oranındaki dalgalanmalarının yüzde 7'sini açıklamaktadır. Beyazların aktif iş gücü dışındayken işsiz olma olsılığındaki dalgalanmalar bu kişilerin işsizlik oranındaki dalgalanmaların yüzde 11'ini açıklamaktadır.

Beyaz olmayanların istihdam edilmişken işsiz kalma olasılıklarındaki dalgalanmlar bu grubun işsizlik oranındaki dalgalanmaların yüzde 16'sını açıklamaktadır. İstihdamdayken aktif iş gücü dışına çıkma olasılığı bu grubun

işsizlik oranı ile de çevrimsel bir ilişki içersinde değildir. İşsizken iş bulma olasılığındaki dalgalanmalar bu grubun işsizlik oranındaki dalgalanmaların yüzde 43'ünü açıklamaktadır. Beyaz olmayanların işsizken aktif iş gücü dışına çıkma olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 16'sını açıklamaktadır. Beyaz olmayanların aktif iş gücü dışındayken istihdam edilme olasılığındaki dalgalanmalar bu grubun işsizlik oranındaki dalgalanmaların yüzde 15'ini açıklamaktadır. Beyaz olmayanların aktif iş gücü dışındayken işsizlik durumuna geçiş olasılıklarındaki dalgalanmalar bu grubun işsizlik oranındaki dalgalanmaların yüzde 14'ünü açıklamaktadır.

Bu analizimiz göstermektedir ki sadece işsizlik durumuna geçişleri ve işsizlik durumundan çıkışları incelemek krizlerin etkileri açısından iki grup arasındaki farklılıkları görmek açısından yeterli olmayacaktır. Beyaz olmayanlar ve beyaz olanların istihdam edilme durumundan işsizlik durumlarına geçiş olasılıkları benzer değişimler göstermiştir. Aktif işgücü dışına ve aktif işgüü dışından gerçekleşen geçişlere baktığımız da ise yine bu iki grubun beyazlar daha avantajlı olmak üzere son yıllarda özellikle de 2007 krizinden sonra birbirlerine yaklaştıklarını görmekteyiz. Bu yaklaşma azınlık gruplarının daha iyi bir konuma gelmesiyle değil, çoğunluk gruplarının daha önceki ve daha iyi olarak nitelendirilebilecek durumlarını kaybetmesiyle ilgilidir. Literatürde iddia edildiğinin aksine 3 durumlu markov modelimizin verdiği sonuçlar 2007 kriziyle beraber beyaz olanların iş gücü piyasasındaki beyaz olmayan kişilere gore sahip oldukları göreli avantajlarını zaman içerrsinde kaybederek, daha kötü bir duruma gelerek en az beyaz olmayanlar kadar son krizden kötü etkilendiklerini ortaya koymaktadır.

Yaşlı olan nüfusun istihdam edilmişken işsizlik durumuna geçiş olasılığı periyodumuzda gençlerden daha düşüktür. Bu olasılık gençler ve yaşlılar için de benzer dalgalanmalar göstermiştir. Gençlerin işsizken iş bulma olasılıkları yaşlardan daha yukarıdadır. Fakat zaman içersinde bu fark azalmaya başlamış ve de 2007 krizinden sonra kapanmıştır.

Yaşlıların istihdam edilmişken işsiz kalma olasılıklarındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 22'sini açıklamaktadır. Yaşlıların istihdam

edilmişken işsizlik durumuna geçiş olasılıklarındaki dalgalanmaların ise işsizlik oranının gösterdiği dalgalanmalar arasında bir ilişki bulunmadığı tespit edilmiştir. Yaşlıların işsizken iş sahibi olma olasılığındaki döngüsel dalgalanmar ise işsizlik oranındaki döngüsel dalgalanmaların yüzde 43'ünü açıklamaktadır. İşsizken aktif işgücü dışına çıkma olasılığındaki dalgalanmalar yaşlıların işsizlik oranındaki dalgalanmaların yüzde 18'ini açıklamaktadır. Aktif iş gücü dışındayken istihdam edilme olasılığındaki döngüsel dalgalanmalar işsizlik oranındaki döngüsel dalgalanmaların yüzde 6'sından sorumludur. Diğer yandan, aktif iş gücü dışından işsizlik durumuna geçiş olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 15'inden sorumludur.

Gençlerin istihdam edilmişken işsiz kalma olasılıklarındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 19'unu açıklamaktadır. Bu grubun istihdam edilmişken aktif iş gücü dışına geçiş olasılığının bu grubun işsizlik oranı ile bir ilişkisi yoktur. Gençlerin işsizken istihdam edilme olasılıklarındaki döngüsel dalgalanmalar bu grubun işsizlik oranındaki döngüsel dalgalanmaların yüzde 48'ini açıklamaktadır. İşsizken aktif iş gücü dışına geçiş olasılığı işsizlik oranındaki dalgalanmaların yüzde 13'ünü açıklamaktadır. Aktif iş gücü dışındayken istihdam edilme olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 14'ünü açıklamaktadır. Aktif iş gücü dışından işsizlik durumuna geçiş olasılığındaki döngüsel dalgalanmalar ise işsizlik oranındaki döngüsel dalgalanmaların yüzde 11'inden sorumludur.

Gençlerin 2007 krizinden en kötü etkilendikleri nokta işsizken iş arama faaliyetlerindeki başarılarının bu krizden sonra azalması ve 35 yaş üstü nüfusa doğru gitgide yaklaşmasıdır. Bu durum gençlerin yüzde 48 olan ve bu olasıktaki dalgalanmaların işsizlik oranı ile ilişkisini gösteren parametre ile ortadadır.

Üniversite mezunu olanların istihdam edilmişken işsiz kalma olasılıkları kapsadığımız periyot içerisinde üniversite mezunu olmayanların altındadır. Bu iki grubun işsizken iş sahibi olma olasılıkları son dönemde birbirine büyük ölçüde yaklaşmıştır. Hatta 2007 krizinden sonra neredeyse aynı hale gelmiştir. Bu durum

üniversite mezunu olan grubun iş bulma konusunda üniversite mezunu olamayan grup kadar zorluklarla karşılaşmaya başladığını ortaya koymaktadır.

Bulgularımız kadınların, beyaz olmayanların, ve gençlerin işsizken iş sahibi olma olasılıklarının işsizlik oranı ile daha güçlü bir ilişki içerisinde olduklarını ortaya koymaktadır. Diğer yandan bu gruplar için iş sahibi kişilerin işsiz kalma olasılıklarının işsizlik oranıyla diğer gruplara göre daha zayıf bir ilişki içersinde olduğu ortaya çıkmıştır. Bu durum genellikle krizin gruplar üzerindeki heterojen etkisine bağlıdır. Örneğin erkeklerde işini kaybetme kadınlardan daha sık görünmüştür. Literatürde yukarda da değindimiz gibi bu durum genellikle imalat sanayinin 2007 krizi ile birlikte etkilendiğini bu sektöründe genellikle erkeklerin çalıştığı bir sektör olmasına bağlanmıştır. Daha avantajlı grupların daha fazla işlerini kaybetmesi durumu ise bulgularımızdaki heterojenliğin heterojenlik hipotezinin beklediği türden olmadığını ortaya koymuşlardır. Yukarıda da değindiğimiz gibi, Darby, Haltiwanger ve Plant (1986) tarafından yapılan çalışmada heterojenlik hipotezinin kriz dönemlerinde işsizlik süresi diğer gruplara göre daha yüksek olan daha fazla bir hızda işsizlik havuzuna katılmalarını öngördüğü gösterilmiştir. Bu şekilde ortalama işsizlik oranındaki artışlar birey düzeyinde bir işsizlik süresi artışına değil; işsizlik süresi zaten yüksek olan grupların işsiz kalmalarına bağlanmıştır. Bunun aksine, bizim bulgularımız genellikle işsizlik süresi daha düşük olan grupların işsiz kaldığını ortaya koymaktadır. Bu durum işsizlik süresi ve işsizlik oranı arasındaki döngüsel ilişkinin tahmin edilenden de daha güçlü olabileceğini ortaya koymaktadır. Grup analizimizde elde ettiğimiz bir diğer bulgu işsizken iş sahibi olma olasılıklarının üniversite mezunu olan ve olmayan gruplar için, yaşlılar ve gençler için, beyazlar ve beyaz olmayanlar için birbirlerine yaklaşmalarıdır. Bu durum zaman içersinde iş bulma konusunda daha avantajlı olan; işsizlik süresi daha az olan üniversite mezunları, gençler, erkekler ve beyazların iş bulma açısından sahip olduğu göreli avantajı zaman içerisinde yitirdiğine dair bir göstergedir.

Çalışmanın bir sonraki aşamasında iş gücü piyasasındaki daha önce tanımladığımız 3 duruma ek olarak kendi hesabına çalışan kişilerin durumlarını dinamik olarak incelemeye karar verdik. Bu durum girişim davranışının ekonomik aktivite ile olan ilişkisini görmemize yardımcı olmuştur. Çalışmanın bu bölümünde

bir işyeri açmak bir kişinin ücret kazandığı bir işini kaybettikten sonra başvurduğu bir seçenek mi yoksa ücretli işini isteyerek ve bilerek bırakarak girdiği bir durum mu olduğu sorularına cevap aranmıştır. Amerika Birleşik Devletleri örneğinde ekonomik aktivite ile girişim davranışının arasında güçlü, pozitif bir döngüsel ilişki olduğu ortaya konmuştur. İşsizlerin girişimci olma olasılığı da büyüme dönemlerinde kriz dönemlerine göre daha fazladır. Yani Amerika Birleşik Devletleri örneğinde kendi hesabına çalışma durumu durgunluk dönemlerinde kolayca başlatılabilecek bir süreç değildir. Aksine genişleme dönemlerinde kullanılan bir seçenektir. Diğer taraftan kendi hesabına çalışanların kriz dönemlerinde işsiz kalma olasılıklarının önemli miktarda arttığı tespit edilmiştir. Kendi heabına çalışan kişilerin işlerini kaybetme olasılığının açıkladığı işsizlik oranındaki dalgalanmanın miktarı toplam işini kaybedenlerin yaklaşık yarısıdır. Bu durum kriz dönemlerinde en büyük zararlardan birini kendi hesabına çalışan kişilerin gördüğünü ortaya koymaktadır.

Kendi hesabına çalışan kişilerin dinamik analizini yine alt gruplar için de gerçekleştirilmiştir. Bulgularımız kendi hesabına çalışma durumunun en çok görüldüğü grubun 35 yaş üstü grup olduğunu tekrar ortaya koymaktadır. Erkeklerde kadınlardan, yaşlılarda gençlerden, beyazlarda siyahlardan daha fazla görülmektedir. Diğer taraftan, kendi hesabına çalışıtığı işini kriz dönemlerinde en çok kaybeden gruplar ise daha zaten daha dezavantajlı görülen gruplardır. Bu durum gelir eşitsizliğini daha da arttıran bir durum ortaya koymaktadır. Bir politika önerisi olarak bu gruplara desteğin daha da arttırılması gündeme getirilebilir.

Kendi hesabına çalışma durumunu da hesaba katarak oluşturduğumuz 4 durumlu Markov modeli sonuçları eklenen bu durumun iş gücü piyasasındaki geçişler içerisinde önemli bir rol oynadığını göstermektedir. İş sahibiyken işsiz kalma olasılığındaki dalgalanmarlar 4 durumlu Markov modelinde işsizlik oranındaki dalgalanmaların yüzde 12'sinden sorumludur. Kendi hesabına çalışan kişilerin ise işsiz kalma olasılıklarının açıkladığı işsizlik oranındaki dalgalanma oranı ise yüzde 10'dur. 4 durumlu Markov modelimizde iş sahibiyken aktif iş gücü dışına geçme olasılığının işsizlik oranı ile bir ilişki içersinde olmadığı tespit edilmiştir. İşsizken iş sahibi olma olasılığı işsizlik oranındaki dalgalanmaların yüzde 46'sını açıklamaktadır. 4 durumlu modelimizde, aktif iş gücü dışındayken istihdam edilme

olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmların yüzde 7'sinden sorumludur. Aktif iş gücü dışındayken işsiz kalma olasılığındaki dalgalanmalar ise işsizlik oranındaki dalgalanmaların yüzde 10'unu açıklamaktadır. İş sahibiyken kendi hesabına çalışma durumuna geçiş olasığındaki dalgalanmalar ile işsizlik oranı arasında bir ilişki olmadığı tespit edilmiştir. İşsizken kendi hesabına çalışan kişi durumuna geçiş olasılığı ise işsizlik oranındaki dalgalanmaların yüzde 1'ini açıklamaktadır. Bu durum Amerika Birleşik Devletleri'nde kendi hesabına çalışma durumuna girşin ekonomik aktivite ile arasında zayıf ve pozitif bir ilişki olduğuna dair bir göstergedir. Kendi hesabuına çalışma durumundan işsizlik durumuna geçişlerin ekonomik aktivite ile olan negatif ilişkisini ve bu duruma geçişlerin ekonomik aktivite ile olan zayıf pozitif ilişkisini bir arada düşündüğümüzde, kendi hesabına çalışma durumunun başlatılması ve sürdürülmesi en zor durum olduğu ortaya çıkmaktadır.

Aktif iş gücü dışından kendi hesabına çalışma durumuna geçiş olasılığındaki dalgalanmalar ise işsizlik oranındaki dalgalanmaların yüzde 2'sini açıklamaktadır. Bu oran işsizlik durumundan kendi hesabına çalışma durumuna doğru geçişlerin aktif iş gücü dışından gerçekleşen geçişlerden daha az olduğunu göstermektedir. Bu da Amerika Birleşik Devletleri'nde, yukarda da bahsettiğimiz gibi, kendi hesabına çalışma durumunun ücretli bir işe alternatif olarak görülmediğini ve işsizlikten korunmak için değil, daha çok kendi başına baştan planlanarak başlatılan bir süreç olduğunu ortaya koyar.

Kendi hesabına çalışan kişilerin ücretli bir işe geçmesi olasılığı işsizlik oranındaki çevrimsel dalgalanmaların yüzde 2'sinden sorumludur. Kendi hesabına çalışan kişilerin aktif iş gücü dışına çıkma olasılıklarındaki çevrimsel dalgalanmalar ile işsizlik oranı arasında herhangi bir ilişki olmadığı tespit edilmiştir.

4 durumlu modelimizde erkekler için istihdam edilmişken işsiz kalma olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 17'sinden sorumludur. Bu oran kadınlar için yüzde 7'dir. Erkekler için, istihdam edilmişken aktif iş gücü dışına geçiş olasılığı ile işsizlik oranı arasında bir ilişki bulunmadığı tespit edilmiştir. Bu durum 4 durumlu modelde kadınlar için de aynıdır. İşsizken

istihdam edilme olasılığındaki dalgalanmalar 4 durumlu markov modelimizde işsizlik oranındaki dalgalanmaların yüzde 44'ünü açıklamaktadır. Bu oran kadınlar için yüzde 49'dur. Erkekler için, işsizken aktif iş gücü dışına çıkış olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 10'unu oluşturmaktadır. Diğer yandan kadınlar için bu olasılıktaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 15'ini oluşturmaktadır. Erkekler için aktif işgücü dışarısındayken istihdam edilme olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 5'inden sorumludur. Diğer yandan kadınlar için bu olasılıktaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 9'unu oluşturmaktadır. Aktif iş gücü dışındayken işsizlik durumuna geçiş olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 7'sini açıklarken kadınlarda bu oran yüzde 16'dır. Ücretli bir işte istihdam edilmişken kendi hesabına çalışmaya başlama olasılığının 4 durumlu modelde erkekler için işsizlik oranı ile bir ilişki içersinde olmadığı tespit edilmiştir. Benzer durum kadınlar için de sözkonusudur. İşsizken kendi hesabına çalışmaya geçiş olasığılındaki dalgalanmalar 4 durumlu modelde erkekler için işsizlik oranındaki dalgalanmaların yüzde 2'sini açıklamaktadır. Kadınlar da ise bu olasılıktaki dalgalanmalar ve işsizlik oranı arasında pozitif veya negatif döngüsel bir ilişki olmadığı tespit edilmiştir. Aktif iş gücü dışıdayken kendi hesabına çalışma durumuna geçiş olasılığının işsizlik oranıyla bir ilişki içersinde olmadığı tespit edilmiştir. Bu durum kadınlar için de aynıdır. Kendi hesabına çalışma durumundan aktif iş gücü dışına geçiş olasılığı erkekler için de kadınlar için de işsizlik oranı bir ilişki içersinde değildir. Kendi hesabına çalışma durumundan ücretli bir işte ishdam edilme durumuna geçiş olasılığındaki dalgalanmalar erkekler için işsizlik oranındaki dalgalanmaların yüzde 1'ini açıklamaktadır. Bu oran kadınlar için yüzde 4'tür. Erkekler için kendi hesabına çalışırken işsizlik durumuna geçiş olasılığındaki dalgalanmalar ise işsizlik oranındaki dalgalanmaların yüzde 10'unu açıklamaktadır. Bu oran kadınlar için ise daha düşük, yüzde 7'dir.

Bu oranlar bize kadınların kendi hesabına çalışma durumunun kadınlarda erkeklerden daha az görüldüğünü göstermektedir. Kadınlarda görülen kendi shesabına çalışma durumu ile ekonomik aktivite arasındaki yüksek ilişki dikkat

çekmesi gereken bir diğer noktadır. Özellikle duraklama dönemlerinde kadınlar kendi hesabına çalışa durumundan diğer bir duruma geçmeden direk olarak ücretli bir işe geçmektedirler.

4 durumlu modelimizde beyazların iş sahibiyken işsiz kalma olasılığındaki değişim işsizlik oranının zaman içersindeki değişimlerinin yüzde 11'ini açıklamaktadır. Beyaz olmayan kesim için bu oran yüzde 9'dur. Irklara göre ayırdığımız 2 grup için de istihdam edilenlerin aktif iş gücü dışına geçiş olasılıklarının bu iki grubun işsizlik oranlarındaki değişim ile negatif veya pozitif bir ilişki içerisinde olmadığı tespit edilmiştir. Beyaz olanların işsizken iş bulma olasılığının açıkladığı işsizlik oranındaki değişim oranı yüzde 48 iken siyahlar için bu oran yüzde 5 daha düşüktür. İşsizlik durumundan aktif iş gücü dışına geçiş olsılığının işsizlik oranı ile olan ilişkisi benzer düzeydedir. Bu oranlar beyazlar ve beyaz olmayanlar için sırasıyla yüzde 12 ve yüzde 14'tür. Aktif iş gücü dışındayken istihdam eldilme olasılıklarının işsizlik oranı ile ilişkisi beyaz olanlar için yüzde 5'tir. Beyaz olmayanlar için ise bu oran yüzde 13'tür. Bu, beyaz olmayanların iş arama gibi bazı formel metodları kullanmadan istihdam edildiklerine dair bir göstergedir. Diğer yandan aktif iş gücü dışındaki kişilerin işsizlik durumuna geçiş olasılığının beyazlarda yüzde 19 ve beyaz olmayanlarda yüzde 11'dir. Bu durum azınlık gruplarında iş aramanın sonuç vereceğine dair cesareti kaybetme eğiliminin daha yüksek olduğunu göstermektedir. Ücretli bir işte istihdam edilmişken kendi hesabına çalışma durumuna geçiş olasılığının iki grup için de işsizlik oranı ile bir ilişkisi mevcut değildir. Beyazlar için işsizken kendi hesabına iş bulma olasılığındaki dalgalanmalar işsizlik oranıyla ilişkili değildir. Diğer yandan işsizken kendi hesabına bir iş kurma eğilimi beyaz olmayan kesim için daha yüksektir. Bu durum beyaz olmayanların kendi hesabına bir iş kurmayı işsizlik karşısında korunmak için bir dayanak noktası olarak gördüklerini göstermektedir. Aktif iş gücü dışından kendi hesabına iş kurma durumuna geçiş durumu beyazlar için işsizlik oranı ile herhangi bir ilişki içerisinde değildir. Diğer yandan beyaz olmayan kişilerde bu olasılık zayıf da olsa ekonomik aktivite ile pozitif bir ilişki içersindedir. Genişleme dönemlerinde aktif iş gücü dışından kendi hesabına çalışma durumuna bir geçiş olmaktadır. Beyazlar için tüm diğer durumlardan, yani işsizlik, ücretli istihdam ve aktif iş gücü

dışından kendi hesabına iş bulma durumuna geçiş olasılıklarının işsizlik oranı ile herhangi bir ilişki içersinde olmamasının birkaç sebebi olabilir. Bunlardan birincisi bu grubun kendi hesabına iş kurma deneyimini ücretli istihdam kanalıyla sahip oldukları varlıklar kanalıyla değil daha çok miras gibi ebeveynden devr aldıkları faktörler sebebiyle seçmeleri olabilir. Bir diğer sebep, kendi hesabına iş kurma davranışının beyazlar arasında işsizlik karşısında bulunan bir çare olarak görülmemesidir. Bir diğer sebep ise, beyazlar arasında kendi hesabına iş kurma durumunun genellikle ücretli istihdamdan ve dolayısıyla ücretli bir iş aramadan önce denenen bir durum olmasından kaynaklanıyor olabilir. Bu 3 sebebin birbirleriyle ilişki içersinde olduğu da unutulmamalıdır. Kendi hesabına çalışma durumundayken ücretli bir iş sahibi olma durumuna geçiş olasılığındaki döngüsel dalgalanmaların işsizlik oranında yarattığı değişim miktarı beyaz olanlar için ve beyaz olmayanlar için sırasıyla yüzde 2 ve yüzde 1'dir. Diğer yandan kendi hesabına çalışan kişilerin işlerini kaybedip iş aramaya başlama durumları ise beyaz olmayanlarda daha sık görülmektedir. Bu durum çevrimsel dalgalanmalar içersinde azınlıktan olan ve kendi hesabına çalışan kişilerin diğerlerine göre daha hassas bir mali yapıya sahip olduklarını ortaya koymaktadır. Bu durum girişim davranışının toplumun her kesimi arasında eşit bir şekilde başarıya ulaşmadığına dair bir gösterge olabilir. Azınlık gruplarına yönelik daha fazla mali destek gibi politikalar bu durumu eşitlemek açısından düşünülebilecek politika önerilerindendir.

4 durumlu modelimizde yaşlıların istihdam edilmişken işsiz kalma olasılıklarındaki döngüsel dalgalanmalar işsizlik oranındaki döngüsel dalgalanmaların yüzde 14'ünü açıklamaktadır. Bu oran gençlerde yüzde 11'dir. İstihdam edilmişken aktif iş gücü dışına geçiş olasılığı hem yaşlılar hem de gençler için işsizlik oranıyla ilişkisizdir. 4 durumlu modelimiz yaşlıların işsizken istihdam edilme olasılıklarının döngüselliğini azaltmıştır. 3 durumlu modelimizde işsizken iş bulma olasılığındaki döngüsel dalgalanmalar işsizlik oranındaki döngüsel dalgalanmaların yüzde 43 ünü açıklarken bu oran 4 durumlu modelimizde işsizken ücretli bir istihdama geçme durumu için yüzde 40'tır. İşsizken iş gücü dışına geçiş olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yaşlılar için yüzde 14'ünü gençler için ise yüzde 11'ini açıklamaktadır. Yaşlıların aktif iş gücü

dışındayken istihdam edilme olasılığındaki dalgalanmaların açıkladığı işsizlik oranındaki değişim oranı yüzde 15 iken bu oran gençlerde yüzde 11'dir. Bu durum aktif iş gücü dışındayken istihdam edilme durumunun yaşlılarda daha çok görüldüğüne dair bir göstergedir. Yaşlılar formel bir şekilde iş aramak yerine gözlemleyemediğimiz informel bazı arama metodları kullanarak işe yerleşiyor olabilirler. Aktif iş gücü dışından işsizliğe geçiş olasılığındaki döngüsel dalgalanmalar işsizlik oranındaki dalgalanmaların yaşlılar için yüzde 11'ini gençler için ise yüzde 8'ini açıklamaktadır. Ücretli bir işte istihdam edilmişken kendi hesabına çalışmaya başlama olasılığının işsizlik oranıyla pozitif veya negatif herhangi bir ilişkisi yoktur. Öte yandan işsizken kendi hesabına çalışmaya başlama durumunun yaşlılarda daha çok gözlemlenen bir durum olduğu, bu olasılığın yaşlıların işsizlik oranındaki dalgalanmalarının yüzde 3'ünü açıklamasıyla ortaya konmuştur. Gençlerin işsizlik oranı ile işsizken kendi hesabına çalışmaya başlama olasılığı arasında bir ilişki yoktur. Bu durumun sebeplerinden biri yaşlıların daha önceki iş deneyimlerinden sahip oldukları varlık birikimi onların kendi hesabına çalışma durumuna geçmek için gereken finansal yükümlülüklerini daha rahat karşılamalarını sağlaması olabilir. Aktif iş gücü dışarısındayken kendi hesabına çalışmaya başlama durumu iki yaş grubu için de işsizlik oranıyla pozitif veya negatif herhangi bir ilişki taşımamaktadır. Gençlerin diğer durumlardan kendi hesabına çalışmaya geçiş olasılığının işsizlik oranı ile bir ilişkisi olmaması, gençlerin eğer kendi hesabına çalışmayı deneyecekse bunu aileden miras olarak aldığı bazı faktörlerin etkisiyle yapacağını gösteriyor olabilir. Yani eğer genç bir kişi kendi hesabına çalışmaya başlayacaksa, bunun için, kısa süreli bir iş deneyimine ve ücretli bir iş aramaya ihtiyacı yoktur. Kendi hesabına çalışma durumundan ücretli bir işe geçme olasılığının açıkladığı işsizlik oranındaki değişim yaşlılar için yüzde 3 gençler içinse yüzde 2'dir. Kendi hesabına çalışma durumundan işsizlik durumuna geçiş olasılığının açıkladığı işsizlik oranındaki dalgalanma oranı yaşlılar için yüzde 10'ken gençler için yüzde 14'tür. Bu durum kendi hesabına çalışan gençlerin çevrimsel dalgalanmalar içersinde daha hassas olduklarını gösteriyor olabilir. Yaşlıların varlık birikimlerinin daha güçlü olması kendi hesabına çalışılan işin süresini ve başarısını artırıyor olabilir.

Kullandığımız veri setinin yapısından kaynaklanan marjin hataları yukarıdaki analizimizde göze alınmamıştır. Bu hatalar veri setimizde mevcut aydan önümüzdeki aya eşleşmeyen ve bir önceki ay mevcut olup mevcut ay ile eşleşmeyen kişilerin sebep olduğu hatalardır. Kişilerin iş gücü piyasasındaki durumlara göre yaptığımız eşleştirmede eğer bu kişiler rasgele dağılmıyorsa tahmin sonuçlarının yanlı çıkmasına sebep olacaktır. Markov modeli ile tahmin ettiğimiz 6 olasılık yukarıda da değindiğimiz gibi, şunlardır: İş sahibi bir kişinin iş bulma olasılığı, iş sahibi kişinin aktif iş gücünün dışına çıkma olasılığı, işsiz bir kişinin iş bulma olasılığı, işsiz kişinin aktif iş gücünün dışına çıkma olsılığı, aktif iş gücü dışındaki birinin iş sahibi olma olsılığı ve aktif iş gücü dışında olan bir kişinin iş aramaya başlaması olasılıkları. Tüm bu olasılıklar very setinden kaynaklanan marjin hataları hesaba katılarak yeniden hesaplanmıştır. Abowd ve Zellner (1985) tarafından yapılan çalışmayı takip ederek, Lineer olmayan bir tahmin metodu kullanarak birbirini takip eden iki ay arasında eşleşmeyen kişilerin ne oranda diğer geçişler arasında dağıldığı hesaplanmıştır. Bu tahmin 2 ayrı dönem için gerçekleştirilmiştir. 1996 yılından itibaren birbirini takip eden aylarda gözlem kaybı olan kişilerin dağılımlarında bir değişiklik olduğu tespit edilmiştir. Abowd ve Zellner (1985) tarafından yapılan çalışmaya getirilen en büyük eleştirilerden biri olan modeled tahmin edilen tahsis parametrelerinin sabit olması sorunu bu şekilde çözülmüştür. Fujita ve Ramey (2005) tarafından yapılan çalışmada da Abowd ve Zellner (2005) tarafından yapılan çalışma takip edilmiştir. Bu çalışmada da Fujita ve Ramey'i kayıp olan gözlemlerin hangi oranda iş gücü piyasasındaki istihdam durumları arasında dağıldığını hesaplarken tahsis parametreleri 3 ayrı dönem için hesaplanmıştır. Böylece zaman içersinde parametrelerde oluşabilecek değişiklikler hesaba katılmıştır.

Bulgularımız marjin hatalarının rasgele dağılmadığını ve hesapladığımız olasılıkların marjin hatalarını göze aldığımız durumda değiştiğini ortaya koymaktadır. Bulduğumuz sonuçlar 1980'li yılların ilk yarısında iş sahibiyken işsiz kalma olasılığının marjin hatalarına göre düzeltilmiş olan modelimizde, marjin hatalarına göre düzeltilmemiş olan modelimizden daha düşük olduğunu göstermiştir. Öte yandan 1980'li yılların ikinci yarısından itibaren bu olasılık marjin hatalarına göre düzeltilmemiş olan modelimizin daha üzerine çıkmıştır. 90'lı yılların ilk

yarısında ve 2000'li yılların sonunda marjin hataları düzeltilmiş olan ve marjin hataları düzeltilmemiş olan modelimizin olasılıklarının birbirlerine yaklaştığı gözlenmiştir. 1980'li yılların başında marjin hataları düzeltilmiş olan modelimizin diğer modelimize göre daha düşük olasılık sonuçları vermesi bu dönemde gözlem kaybı yaşadığımız kişilerin büyük kısmının istihdam edilmişken işsizlik durumuna değil diğer durumlara geçiş yaptığını göstermektedir. Diğer yıllarda, marjin hataları düzeltilmiş olan modelin istihdam edilmişken işsiz kalma olasılığının daha yüksek olması, bir önceki ay istihdam edilip mavcut ayda kayıp olan kişilerin önemli bir kısmının aslında işsizlik durumuna geçiş yaptığını, mevcut ayda kayıp olup bir sonraki ayda ise işsiz olan kişilerin ise önemli bir kısımının aslında istihdam edilmişken işsiz olan kişiler olduğunu göstermektedir. İstihdam edilmişken aktif iş gücü dışına geçiş olasılığı marjin hataları düzeltilmiş olan modelde daha yüksektir. Bu durum mevcut ayda aktif iş gücü dışında olup bir önceki ay kayıp olan ve bir önceki ay istihdam edilmiş olup mevcut ayda kayıp olan kişilerin önemli bir kısmını istihdam durumundan aktif iş gücü dışına geçiş yaptıklarını ortaya koymaktadır.

Marjin hatalarına göre düzeltilmiş olan modelimizde işsizken istihdam durumuna geçiş olasılığı 1990'lı yılların ortalarına kadar Marjin hatalarına göre düzeltilmemiş olan modelimizden daha yukarıdadır. 1990'lı yılların ortalarından itibaren marjin hatalarına göre düzeltilmiş olan modelimizin işsizken iş bulma olasılığı Marjin hatalarına göre düzeltilmemiş olan modelimizin altına düşmüştür. Bu durum marjin hatalarını göze almadığımız modelin 1990'lı yılların başına kadar bu olasılığı olması gerekenden fazla tahmin ettiğini ve 1990'lı yılların ikinci yarısından sonra ise olması gerekenden daha düşük tahmin ettiğini ortaya koymaktadır. İşsizken aktif iş gücü dışına geçme olasılığı marjin hatalarına göre düzeltilmiş olan modelimizde 1990'lı yılların ortasına kadar marjin hatalarına göre düzeltilmemiş olan modelimize göre daha düşüktür. 1990'lı yılların ortasından sonra ise bu olasılık iki model arasında birbirine yaklaşmıştır. Bu durum 1990'lı yılların ortasına kadar kayıp olan datanın büyük kısmının işsizken aktif iş gücü dışına çıkan kişilere değil diğerlerine ait olduğunu gösterir. 1990'lı yılların ortasından sonra ise bu olasılık için önemli bir hata gözlemlenmemiştir.

Bu tezde marjin hatalalarına göre düzeltilmiş olan olasılıkların varyans ayrıştırma metoduna göre işsizlik oranıyla ilişkisi de tespit edilmiştir. Buna göre, iş sahibiyken işini kaybetme olasılığı marjin hatalarına göre düzeltilmiş olan modelde işszilik oranındaki dalgalanmaların yüzde 19'unu açıklamaktadır. İstihdam edilmişken aktif iş gücü dışına geçiş olasılığı ise marjin hatalarına göre düzeltilmiş olan modelde de diğer modelde olduğu gibi işsizlik ornıyla pozitif veya negatif hehangi bir ilişki içersinde değildir. İşsizlikten istihdam edilme olasılığındaki dalgalanmalar işsizlik oranındaki döngüsel dalgalanmaların yüzde 51'ini oluşturmaktadır. İşsizken aktif iş gücü dışına geçiş olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 17'sini oluşturmaktadır. Aktif iş gücü dışındayken istihdam edilme durumuna geçiş olasılığındaki dalgalanmalar marjin hatalarına göre düzeltilmiş olan modelimizde işsizlik oranındaki dalgalanmaların yüzde 6'sını açıklamaktadır. Aktif iş gücü dışındayken işsizlik durumuna geçiş olasılığındaki dalgalanmalar işsizlik oranındaki dalgalanmaların yüzde 10'unu oluşturmaktadır.

Bu analiz işsizlik havuzundan çıkışların işsizlik oranı ile olan pozitif döngüsel ilişkisini daha yüksek olduğunu göstermiştir. Diğer yandan iş sahibi olan kişilerin işlerini kaybetme olasılığının ise işsizlik oranı ile olan negatif döngüsel ilişkisi ise az da olsa düşmüştür. Yani marjin hatalarının düzeltilmesi de Shimer'in (2012) analizini daha da güçlendirmektedir. Başlangıçta bulduğumuz işsizlik süresinin işsizlik oranıyla olan döngüsel ilişkisinin zamanla azalması bulgusunun diğer tüm bulgularımızla çelişmesi bizi Shimer'in kullandığı matematiksel ve istatistiksel modelleri sorgulamaya itmiştir. Geçiş olasılıklarını hesaplarken kullandığımız oranlarda hareketin başladığı durum hep paydada yer almıştır. Bu durum Markov modelinin bir gereğidir. Mesela iş sahibiyken işini kaybetmiş kişilerin oranı bu kişilerin sayısını bir önceki dönemki iş sahibi olan kişilerin sayısına bölerek elde edilmiştir. Aynı şekilde işsiz kişilerin iş bulma oranı hesaplanırkende işsiz kişilerin sayısı payda da yer almıştır. Bu durum olasılığın düzeyinin belirlenmesi konusunda bir sıkıntı yaratmayacaktır. Fakat aylık düzeydeki dalgalanmalarda bir ölçek farkı yaratabilecektir. Ölçek etkisinden dolayı daha küçük bir düzeyde olan işini kaybetme olasılığı daha az bir düzeyde dalgalanabilir. İş bulan kişilerin sayısının ise işsiz

sayısına bölümüyle elde ettiğimiz oran ise paydadaki ölçek daha küçük olduğu için daha döngüsel bir yapı taşıyor olabilir. Yani, Shimer'ın (2012) bulguları ölçek farklılıklarından dolayı bir yanlılık taşıyor olabilir. Bu şüpheler bizi yeni bir analiz yapmaya yönlendirmiştir. Bu sefer geçiş oranlarını hesaplamak yerine durumlar arasındaki geçen kişi sayılarının işsiz sayısıyla ilişkisi incelenmiştir. Basit bir regresyon modeli kullanarak yaptığımız tahminler işsiz sayısındaki dalgalanmanın genellikle işsiz havuzuna katılan kişilerle paralel olarak dalgalandıklarını ortaya koymaktadır. İşsiz sayısı ve işsizlik oranı arasındaki nedatif ilişki ise anlamsız çıkmıştır. Bu durum Shimer'ın (2012) analizinde bir ölçek etkisi olduğunu tamamen ortaya koymaktadır.

APPENDIX B

CURRICULUM VITAE

PERSONAL INFORMATION

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EDUCATION

Degree	Institution	Year of Graduation
MA	METU, Economics	2005
BA	Hacettepe, Economics	2002
High School	Kanuni Lisesi, Ankara	1998

WORK EXPERIENCE

Year	Place	Enrollment
2005-Present	METU	Research Assistant

FOREIGN LANGUAGES

Advanced English.

CONFERENCES

"Reassessing the Heterogeneity Hypothesis in Unemployment Dynamics" Turkish Economic Association". ICE-TEA, 2012, in İZMİR with Hakan Ercan and Semih Tumen.

AWARDS AND HONORS

Turkish Economic Associiation Award for being ranked first in economics department. 2001 – 2003

APPENDIX C

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	☐
Sosyal Bilimler Enstitüsü	x
Uygulamalı Matematik Enstitüsü	☐
Enformatik Enstitüsü	☐
Deniz Bilimleri Enstitüsü	☐

YAZARIN

Soyadı : Ulucan
Adı : Hakan
Bölümü : İktisat

TEZİN ADI (İngilizce) : "Essays on Unemployment Dynamics"

TEZİN TÜRÜ : Yüksek Lisans ☐ Doktora x

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. x
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz. ☐

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: