

**AGRICULTURAL TRANSFORMATION AND
LABOR MOBILITY DURING THE ARIP
PERIOD IN TURKEY: EVIDENCE FROM
MICRO-DATA, 2000-2002**

by

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Abstract

This thesis analyses the transition dynamics in and out of agricultural and non-agricultural employment in the Turkish labor market during ARIP period. A multinomial logit model is used to determine the factors that affect these processes. Before launching our investigation of the flows, we dealt with the attrition/substitution problem. We reviewed the methodology developed by Tunali, Ekinici and Yavuzoglu (2011) and adopt it for the problem we have. Empirical findings confirm that there is a systematic relationship between attrition behavior and labor market outcomes in the HLFS. For aged 15 and over, non-participant and unemployed in both periods are severely overrepresented in the balanced panel. In addition, employed individuals in agriculture are underrepresented in the balanced panel. We calculate weights (reflation/deflation factors) for an individual. We then use these weights in MNL regression as probability weights. The MNL results enlighten the challenges of making successful transition to non-agriculture that faced by the workers who left the agriculture. Age and educational attainment are crucial for making a successful transition between agriculture and non-agriculture. Elder generations and less educated people are more likely to continue with farming. Better educated individuals are more likely to flow into non-agricultural employment.

Keywords: Agriculture, non-agriculture, ARIP, multinomial logit, agricultural transformation, transitions, Rescaled AN model, attrition/substitution, Turkey, HLFS

Özet

Bu tez Tarım Reformu Uygulama Projesi (ARIP) dönemindeki Türk işgücü piyasasının tarım ve tarım dışı istihdam dinamiklerini incelemektedir. Bu süreci etkileyen faktörleri belirlemek için multinomial logit modelinden yararlandık. Akımları soruşturmadan önce kayıpranma/ikame sorunu ile uğraşmak zorundayız. Tunalı, Ekinci ve Yavuzoglu (2011) tarafından geliştirilen modeli elimizdeki probleme uyguladık. Ampirik bulgularımız HİA'de kayıpranma davranışı ve işgücü piyasası sonuçları arasında sistematik bir ilişki olduğunu doğrulamaktadır. 15 yaş ve üzeri olanlar için, her iki dönemde de istihdam dışında olanlar ve işsiz olanlar dengeli panelde ciddi bir şekilde fazlasıyla temsil edilmektedirler. Buna ek olarak, tarımda çalışan bireyler dengeli panelde yeterince temsil edilmemektedirler. Kişilere özel olarak hesapladığımız ağırlıkları MNL regresyonunda olasılık ağırlığı olarak kullandık. MNL sonuçlarımız tarımda çözülen işgücünün tarımdışı istihdama giriş zorluklarına ışık tutmaktadır. Yaş ve eğitim düzeyi, tarım ve tarım dışı arasında başarılı bir geçiş yapmak için çok önemlidir. Yaşlı kuşakların veya daha az eğitilmiş insanların çiftçilik ile devam etme ihtimali diğer insanlara nazaran daha fazla olduğu görülmektedir. İyi eğitilmiş bireyler, tarım dışı istihdam geçiş yapma ihtimali daha fazladır.

Anahtar Sözcükler: Tarım, tarım dışı, ARIP, multinomial logit, tarımsal dönüşüm, geçişler, Rescaled AN model, kayıpranma/ikame, Türkiye, HİA

To my wife, PÇKM.

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1 Introduction

Economic development goes hand in hand with structural transformation. Countries in the early stages of development rely heavily on agriculture. Over time the share of agriculture in the Gross Domestic Product (GDP) and in employment goes down. While development is often attributed to the rise of the manufacturing sector, a large and growing service sector characterize the late stages (Tunali and Ilkkaracan, 2010). The process of transition of the economy from an agrarian economy to a diversified and productive economy dominated by manufacturing and services is known as agricultural transformation. All said, there is consensus that the significance of agriculture, as a share of total output and labor force, diminishes with the development process. This synopsis is also true in Turkey's case. Agriculture contributed more than 40 percent of total national income in 1950 but by 2000 the share was down to 13.4 percent. During this period, employment share of agriculture went down from 85 percent to 36 percent in 2000 (Tunali and Ilkkaracan, 2010).

In “Principles of Political Economy and Taxation”, Ricardo (1821) underscored the implications of diminishing returns in agriculture. He thought that this feature of agricultural technology set the upper limit to the growth of the non-agricultural sector and thereby to aggregate capital formation. Thus Ricardo recognized that the speed and nature of the structural transformation is itself dependent on agricultural progress. This line of thinking was elaborated by Lewis:

“... [I]f the capitalist sector produces no food, its expansion increases the demand for food, raises the price of food in terms of capitalist products, and so reduces profits. This is one of the senses in which industrialization is dependent upon agricultural improvement; it is not profitable to produce a growing volume of manufactures unless agricultural production is growing simultaneously. This is also why industrial and agrarian revolutions always go together and why economies, in which agriculture is stagnant, do not show industrial development”. (Lewis, 1954: 433)

Lewis posited that the elasticity of food production in response to population growth would be very low in densely populated countries where there is little uncultivated land. He then derived the implication that the marginal product to labor in densely populated countries was likely to be zero or close to zero. He went on to classify a large part of the employment in agriculture as “surplus labor”. Moreover, he argued that with rural-to-urban migration this surplus labor could serve the needs of higher productivity occupations in urban areas.

Tunalı and Ilkcaracan (2010) point out that, especially after the urban economy begins to use skilled labor, the absorption of the agricultural labor surplus into urban non-agricultural employment is prevented by the low levels of educational attainment of the rural population. As a result of the unsuccessful absorption process, a huge reserve army of uneducated or unskilled workers accumulate. This is manifested in the form of high unemployment or low participation rates, possibly both. Governments who see the threat turned to agricultural supports. According to estimates by OECD, agricultural supports which accounted for 3.5% of the GDP in Turkey in 1988 reached their maximum of 6.7% during 1997. Existence of generous subsidies has been a longstanding concern, because size of the rural vote created a political economy problem. The Agricultural Reform Implementation Project (ARIP) was initiated to address this, after the Turkish economy’s poor performance in the 1990s exposed radical stabilization and reform needs (Çakmak, 2004).

ARIP had two phases. In the first phase, the project removed the three major forms of state involvement in agriculture: product price supports, subsidized credit, and input price subsidies. Instead of these, direct income support was given to land owners. The expected consequence of the first phase is a decline in agricultural employment. This decline is expected to raise average productivity in the agricultural sector. In the second phase of the project, surplus labor could be transferred to non-agricultural employment without any reduction in agricultural output. Therefore, the aggregate output of the economy could increase even if there were no technological change. Tunalı and Ilkcaracan (2010) provide ample evidence that the implementation of ARIP accelerated the pace of

agricultural transformation. In their labor market analysis, they detected considerable non-agricultural employment growth in rural areas but argued that the majority of those who left agriculture failed to find non-agricultural employment.

The main aim of this thesis is to formally study the inter-sectoral flows of labor at a time when the agricultural transformation was enhanced. Towards that end we rely on the short panel component of the Household Labor Force Survey (HLFS). This component of the data is rarely used, because the rotating sample frame ushers in attrition and substitution, whereby the representativeness of the sample becomes suspect. To ensure that the panel dimension can be utilized, we use the methodology developed by Tunali, Ekinçi and Yavuzoglu (2011). After making the necessary adjustments, we use the micro data to associate the flows between labor market states (non-participant, employed in agriculture, employed in non-agriculture and unemployment) with observables: male/female, age, education, and location. A multinomial logit model is used to determine the factors that affect the dynamics; in particular the labor flows from, and to the agricultural and non-agricultural sectors. Our results show that there are significant upward/downward biases in the transitions as a consequence of attrition and substitution. For instance, non-participants are overrepresented in the balanced panel, except when they work in agriculture in one of the periods. Also, transitions between agriculture and non-agriculture are underrepresented in the balanced panel. Microeconomic evidence underscores that older generations and less educated individuals are more likely to stay in the agricultural sector. In addition, better educated are less likely to leave the non-agricultural sector. These findings support the arguments in Tunali and Ilkcaracan (2010) who point at the skill mismatch between labor released from agriculture and labor needs of non-agricultural sectors.

The thesis is structured as follows. First, we describe Household Labor Force Survey (HLFS), and give a broad account of employment patterns and inter-sectoral labor adjustments in Turkey (Section 2). We then introduce the methodology for handling attrition/substitution and set the stage for multinomial logit estimation (Section 3). In section 4, first we have a descriptive analysis on weights (reflation/deflation factors) (Step

1). We then present the forward and backward transition probabilities between labor market states. To capture patterns in transitions, we use multinomial logit models estimated on both quarterly and annual data (Step 2). Also, we provide a rich set of empirical results. The final section contains some concluding remarks (Section 5).

2 HLFS and Employment in Turkey

The data used in this paper are quarterly rounds of the Turkish Household Labor Force Survey (HLFS) collected during 2000 – 2002 by the State Institute of Statistics of Turkey (called Turkish Statistical Institute or TURKSTAT since 2005). HLFS is representative of the civilian non-institutional population. Each round of the survey includes about 70,000 individuals from 18 – 20,000 households. Notably the survey has a rotating sample frame which requires four visits to the same address over a period of 18 months. All household members residing at this address are interviewed in two consecutive quarters, allowed to rest for the next two, and then interviewed again in two consecutive quarters (TURKSTAT, 2001b). This yields a short panel with two quarterly and two annual components. This feature of the HLFS allows tracking the changes of the labor market status of individuals between successive quarters and years. For instance, we can detect whether an individual who is employed in agriculture remains there over time, and if not, his/her subsequent labor market status.

TURKSTAT uses International Labour Organization’s (ILO) internationally standardized definitions to classify the labor market status of each individual as employed, unemployed, and non-participant. Engagement in an economic activity for at least one hour in the reference period is sufficient for an individual aged 15 or over to be categorized as employed. Individuals with a job who did not engage in an economic activity even for one hour during the reference period for various reasons are considered as employed providing they have guarantee of return to work within a period of 3 months, or if they receive at least 50% of their wage or salary from their employer during their time off. Intermittent workers, who did not work in the reference week even for one hour, are not considered as employed. The unemployed are all persons 15 years old and over who did not engage in an economic activity during the reference period, used at least one channel for seeking a job during the last three months, and are available to start work within two weeks. Persons who are neither unemployed nor employed are classified as not in the labor force (TURKSTAT, 2001a). In our empirical work, we further classify the employed according to their sector of activity, as agricultural and non-agricultural employment.

Figure 1: Employment by Sectors

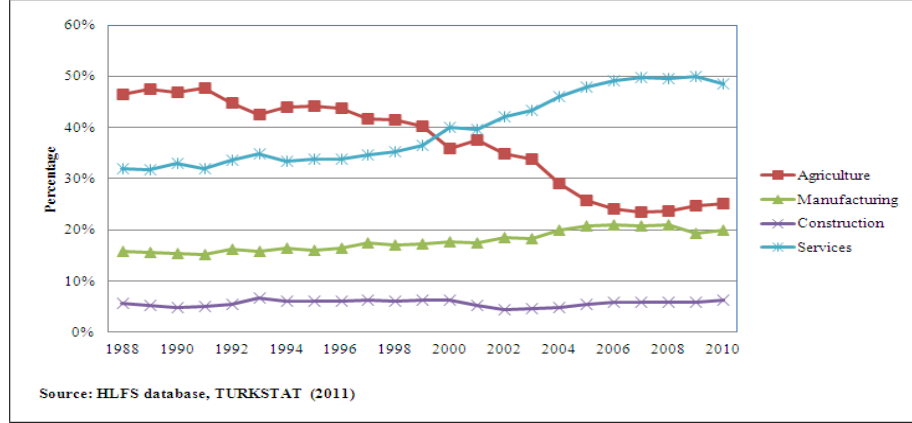


Figure 1 shows the employment allocation between the four main sectors between 1988 and 2010. The prominent features of the Figure 1 are the drop in the share of employment in Agriculture¹, and a steady increase in the share of employment in Services². Construction has a small share, between 5-8%, over time. Employment in Manufacturing³ shows a slight increase from about 17% to 20% of total employment, and displays fluctuations around its trend. The period we will examine at length (2000 – 2002), includes another important event besides ARIP. Turkey experienced two economic shocks in November 2000 and again in February 2001 and slid into a severe recession. Labor market consequences are reviewed in detail in Tunali et al. (2004) and World Bank (2006). One consequence that can be detected in Figure 1 is the slight increase in the share of employment in Agriculture in 2001.

¹Whenever agriculture is used here, it means agriculture, forestry, hunting and fishing

²Whenever services used here, it means “Wholesale and retail trade, hotels and restaurants”, “Transportation, communication and storage”, “Financial intermediation ,real estate, rental and business services”, “Community services, social and personal activities”.

³Whenever manufacturing used here, it means “Manufacturing”, “Electricity, gas and water supply”, and “Mining and quarrying”

Table 1: Share of different sectors in total employment

	2000		2001		2002	
<i>Employment</i>						
Agriculture	7,458	(34,9%)	8,089	(37,6%)	7,769	(36,0%)
Manufacturing	3,954	(18,5%)	3,774	(17,5%)	3,810	(17,7%)
Construction	9,58	(4,5%)	1,110	(5,2%)	1,364	(6,3%)
Services	8,984	(42,1%)	8,551	(39,7%)	8,638	(40,0%)
Total	21.354	(100%)	21.524	(100%)	21.580	(100%)

Source: HLFS database, TURKSTAT (2011)

Table 1 reports the actual magnitudes during the period of interest. The agricultural share in total employment increased 2.8 percentage points between 2000 and 2001, but declined by 1.1 percentage points in the next year. The other sectors followed the opposite pattern. There are drops of about 1.4 and 1 percentage points respectively in the shares of employment in Manufacturing and Services between 2000 and 2002. Next, we breakdown the sectoral aggregates in Table 1 to capture compositional patterns. Table 2 displays the gender distribution of employment between 2000 and 2002. Male workers have a higher share in Manufacturing, Construction and Services. Nearly all workers in the Construction are males (98%). This can be attributed to the fact that it is a muscle-intensive sector. The largest share of females is in Agriculture. As discussed at length in Tunali and Ilkcaracan (2010), high incidence of female employment in Agriculture is attributable to the domination of small scale family farms in Turkey, where women play an important role in the form of unpaid family workers.

Table 2: Gender structure in different sectors

	2000		2001		2002	
<i>Agriculture</i>						
Male	3,784	(50.7%)	4,309	(53.3%)	4,261	(54.8%)
Female	3,674	(49.3%)	3,780	(46.7%)	3,508	(45.2%)
Total	7,458	(100%)	8,089	(100%)	7,769	(100%)
<i>Manufacturing</i>						
Male	3,137	(79.3%)	3,071	(81.4%)	3,080	(80.8%)
Female	817	(20.7%)	703	(18.6%)	730	(19.2%)
Total	3,954	(100%)	3,774	(100%)	3,810	(100%)
<i>Construction</i>						
Male	935	(97.6%)	1,089	(98.1%)	1,331	(97.6%)
Female	23	(2.4%)	21	(1.9%)	33	(2.4%)
Total	958	(100%)	1,110	(100%)	1,364	(100%)
<i>Services</i>						
Male	7,377	(82.1%)	7,086	(82.9%)	7,108	(82.3%)
Female	1,607	(17.9%)	1,465	(17.1%)	1,529	(17.7%)
Total	8,984	(100%)	8,551	(100%)	8,637	(100%)

Source: HLFS database, TURKSTAT (2011)

Figures 2-4 show the age distribution of employment in 2000 – 2002. Employment in the construction and service sectors have similar age distributions. About 80% of all employees are between 25 and 55 years old. The distribution for agricultural sector stands out as being different from the rest. While the others display distinct modes at ages 25-34, in Agriculture the distribution is almost flat between ages 15-44. Furthermore, about 40% of all employees are at least 45 years old. Notably despite the increase in the share of agricultural employment observed in 2001, we detect a consistent drop in the share of agricultural employment for young workers (ages 15-34). The actual magnitudes are reported in Tables A1-A3 in Appendix A.

Figures 5-7 show the sectoral education levels for the years 2000 – 2002. Education levels are classified as 5 years of primary education or less (Pri5), 8 years of primary education (Pri8), high school education, and higher education (University). The agricultural sector contains the highest share of the least educated groups: 90% of workers have at most 5 years of primary education. By contrast, about 40% of the employees in the service sector have this minimal amount of education, and the ratio displays a declining tendency. Examination of the magnitudes reported in Tables A4-6 in Appendix A reveal that the share of the least educated decrease over time, in all sectors. The figures confirm that to be able to be employed in agricultural sector, workers do not need to have higher education level. In other sectors, employment mix includes much higher share of workers with better education. This implies that workers with low education who leave agriculture will be competing for hard to find jobs in other sectors.

Note that the patterns we studied are based on stocks. However, to understand the significance of the absorption problem underscored in Tunali and Ilkkaracan (2010), we need inter-sectoral flows of labor. We will use the short panel component of the HLFS to study these flows. However, before launching our investigation of the flows, we have to deal with the attrition/substitution problem identified in the introduction. In next section, we will review the methodology developed by Tunali et al. (2011) and adapt it for the problem we have.

Figure 2: Sectoral age distribution, 2000

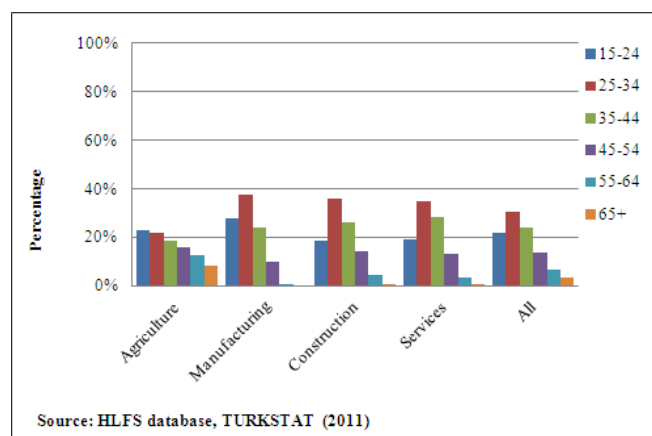


Figure 3: Sectoral age distribution, 2001

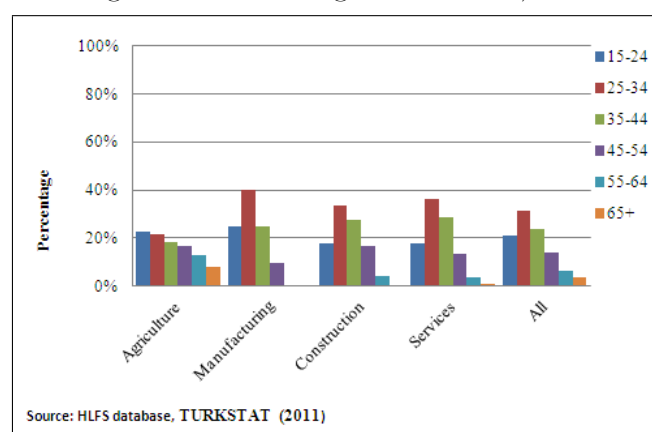


Figure 4: Sectoral age distribution, 2002

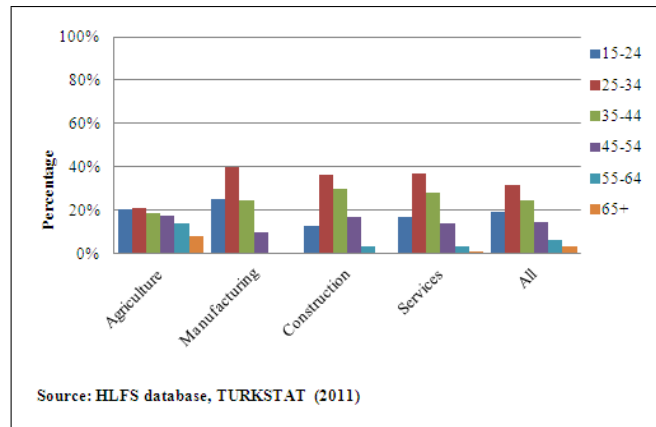


Figure 5: Sectoral education distribution, 2000

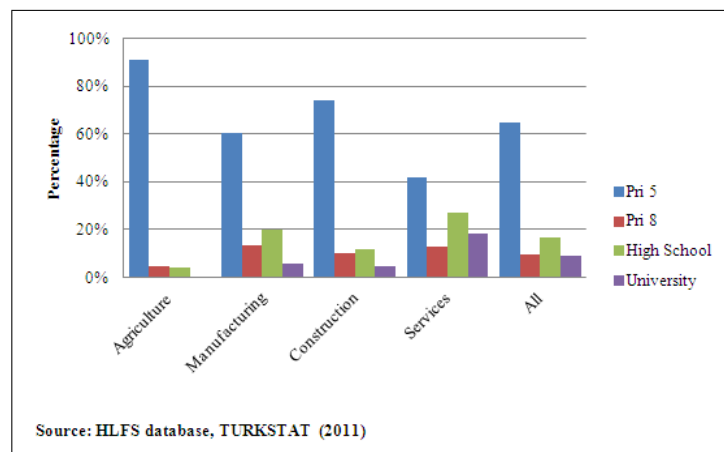


Figure 6: Sectoral education distribution, 2001

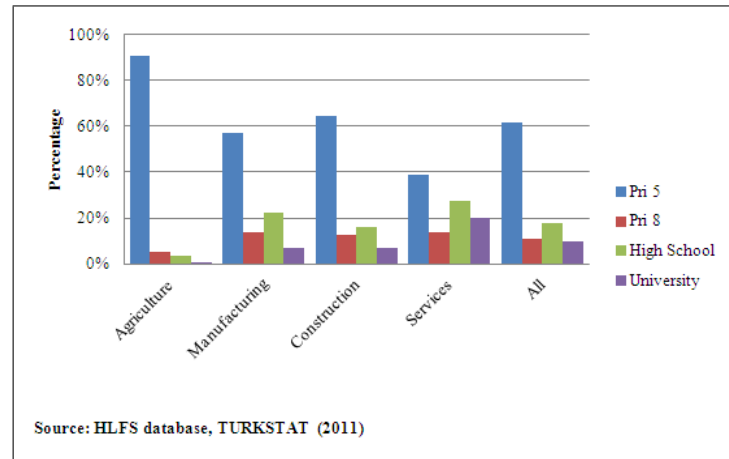
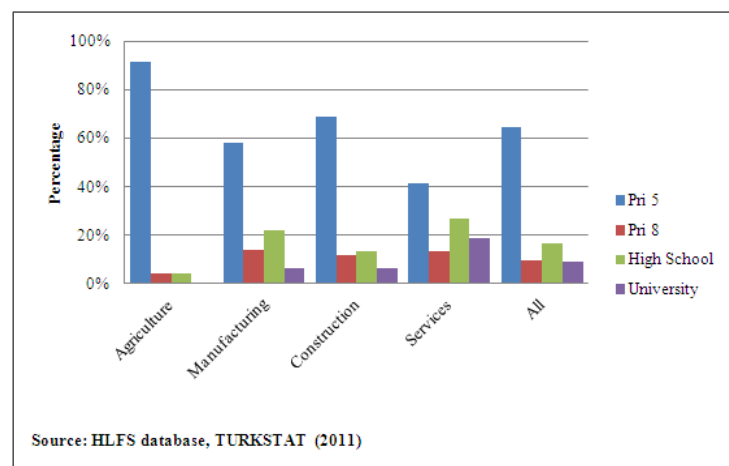


Figure 7: Sectoral education distribution, 2002



3 Methodology:

Our ultimate objective is to study the determinants of transitions from, to, and between agricultural and non-agricultural employment. Before this undertaking, we need to consider the consequences of attrition, or non-response that frequently arises in data collection efforts designed to study transitions. In Step 1, we introduce a model that overcomes the attrition problem. In Step 2, we will clarify how we applied the findings obtained in Step 1.

3.1 Step 1: RAN Model

The main problem of the HLFS and similar surveys that include a panel dimension is the attrition phenomenon. In Turkey, attrition (response followed by non-response) emerges because of frequent movements of the respondents. The address based rotating sample frame also introduces non-response followed by response, termed substitution by Tunali et al. (2011). As a consequence of attrition and substitution, the representativeness of the sample may change over time. Furthermore, attrition/substitution behavior may be a function of the labor market state occupied by the respondent. If that is the case, dynamic analyses may be biased. Tunali et al. (2011) address this problem and offer a methodology suitable for data sets such as the HLFS. Let

y_{it} = the labor market status of individual i in period t , $t = 1, 2$;

x_i = the observed characteristics of individual in the first period

$D_i = 1$ if individual i responds in both periods, $= 0$ otherwise.

Where possible, we will omit the individual subscript to make the notation simpler. The objects of interest for us are the forward transition probabilities, obtained from $f(y_2|y_1, x)$, the conditional probability of labor market status in period 2 given the observed characteristics and labor market status in period 1. This conditional probability is derived from

$$f(y_2|y_1, x) = \frac{f(y_1, y_2|x)}{f(y_1|x)}. \quad (1)$$

In the conventional panel setting, the joint probability in the numerator in (1) cannot be identified, because y_2 is only observed for the subsample who responds in both periods. When a rotating sample frame is used, the identification of the term in the denominator is also problematic, because some individuals show up in a later round (substitution). As stated in Hirano et al. (2001) and derived in Tunalı and Ekinçi (2007), $f(y_1, y_2|x)$ may be expressed as:

$$f(y_1, y_2|x) = \frac{f(y_1, y_2|x, D = 1)P(D = 1)}{P(D = 1|y_1, y_2, x)}. \quad (2)$$

This equation forcefully demonstrates how attrition complicates the analysis. While the terms in the numerator are (typically) non-parametrically identified, the term in the denominator is not. A frequently used assumption is to set $P(D = 1|y_1, y_2, x) = P(D = 1|x)$, which amounts to ignoring the retention selectivity induced by attrition. However, Tunalı (2009a, 2009b) documented that attrition observed in HLFS 2000 – 2002 data is not independent from the employment status in the first period, even after controlling for a very long list of observed characteristics. That is, $P(D = 1|y_1, x) \neq P(D = 1|x)$. Therefore the joint probabilities that are calculated by equation (2) from the balanced panel, $f(y_1, y_2|x, D = 1)$, have to be biased.

For a conventional panel data setting supplemented by a refreshment sample, Hirano et al. (2001) propose an additive model for the retention probability in the denominator. Identification is achieved by exploiting the information in the marginal distributions. Note that the joint probabilities need to satisfy two restrictions:

$$\begin{aligned}\sum_{y_2} f(y_1, y_2|x) &= f_1(y_1|x), \\ \sum_{y_1} f(y_1, y_2|x) &= f_2(y_2|x).\end{aligned}\tag{3}$$

Hirano et al. use the first period marginal to identify $f_1(y_1|x)$ and an independent refreshment sample drawn in the second period to identify $f_2(y_2|x)$. For practical reasons discussed in Tunalı, Ekinçi and Yavuzoglu (2011), AN model cannot be used with the HLFS. Tunalı et al. offer modifications suitable for a rotating sample frame. Interestingly, in the presence of substitution, $P(D = 1)$ is no longer non-parametrically identified. They treat $P(D = 1)$ in (2) as a nuisance parameter and absorb it in the specification of $P(D = 1|y_1, y_2, x)$. The resulting Rescaled Additively Non-ignorable (RAN) model can be expressed as:

$$f(y_1, y_2|x) = f(y_1, y_2|x, D = 1)w(y_1, y_2|x)\tag{4}$$

where $w(\cdot)$ yields the inflation/deflation factor that will be applied to the probability taken from the balanced panel.

The marginal probabilities defined in (3) are obtained from official statistics which are issued by TURKSTAT and maintained on their website. We apply the RAN model for the case where the labor market status takes one of four values (0 = non-participant, 1 = employed in agriculture, 2 = employed in non-agriculture, 3 = unemployed). In this case (3) yields seven independent equations, so we can estimate up to 7 parameters. We express $w(y_1, y_2|x)$ as function of a linear index in (y_1, y_2) and use indicators for distinct labor market states.

As a reference category, we take the individuals who are not in the labor force in both periods ($y_1 = 0, y_2 = 0$). The other distinct categories $y_t = 1, 2, 3; t = 1, 2$, have their

own parameters. Hence, we have 7 parameters to be estimated. With non-participation in both periods as the reference, for period $t(= 1, 2)$, the indicators for distinct labor market states are defined as:

$$\begin{aligned} z_{1t} &= \begin{cases} 0 & , \text{employed in agriculture } y_t = 1 \\ 1 & , \text{otherwise} \end{cases} ; \\ z_{2t} &= \begin{cases} 0 & , \text{employed in non-agriculture } y_t = 2 \\ 1 & , \text{otherwise} \end{cases} ; \\ z_{3t} &= \begin{cases} 0 & , \text{unemployed } y_t = 3 \\ 1 & , \text{otherwise} \end{cases} . \end{aligned}$$

Let $\underline{z}' = (1 \ z'_1 \ z'_2) = [1 \ z_{11} \ z_{21} \ z_{31} \ z_{12} \ z_{22} \ z_{32}]$ and $\underline{\theta}' = [\theta_0 \ \theta_1 \ \theta_2 \ \theta_3 \ \theta_4 \ \theta_5 \ \theta_6]$, so that $w(y_1, y_2|x) = w(\underline{\theta}'\underline{z}|x)$. The system of interest is:

$$\begin{aligned} \sum_{y_2} f(y_1, y_2|x, D=1)w(\underline{\theta}'\underline{z}|x) &= f_1(y_1|x), \\ \sum_{y_1} f(y_1, y_2|x, D=1)w(\underline{\theta}'\underline{z}|x) &= f_2(y_2|x). \end{aligned} \tag{5}$$

MATLAB's predefined function *fsolve*(.), is used to find the solution. After we get the parameter estimates $\hat{\underline{\theta}}$, we compute the adjusted joint probabilities (Weighted Panel) as a product of the unadjusted joint probabilities (Balanced Panel) and the estimated reflation/deflation factor $w(\cdot)$:

$$f(y_1, y_2|x) = f(y_1, y_2|x, D=1)w(\hat{\underline{\theta}}'\underline{z}|x). \tag{6}$$

To assess the sensitivity of the results to parametric assumptions, we allow $w(\cdot)$ to take three different forms (concave, convex and linear). The reported results are from the

linear form, because choice of the functional form hardly makes a difference. Hence, $w(\cdot)$ simplifies as:

$$w(\underline{\theta}'\underline{z}|x, y_1, y_2) = \underline{\theta}'\underline{z}. \quad (7)$$

To illustrate the practical use of (6), we attach two examples based on the linear form (see Tables 3 and 4). Here x takes on a unique value, because we consider the entire working age population (age 15 or older).

Table 3: Annual, 2001-Q1 to 2002-Q1, 15+All

	$y_2 = 0$ (NP)	$y_2 = 1$ (AG)	$y_2 = 2$ (NAG)	$y_2 = 3$ (UNE)	
$y_1 = 0$ (NP)	0,50015 $\times 0,90545$	0,03045 $\times 1,67964$	0,02073 $\times 0,84712$	0,01202 $\times 0,66702$	$f_1(0)$ 0,52957
$y_1 = 1$ (AG)	0,01345 $\times 1,04875$	0,07036 $\times 1,82294$	0,00323 $\times 0,99042$	0,00163 $\times 0,81032$	$f_1(1)$ 0,14687
$y_1 = 2$ (NAG)	0,01684 $\times 1,02050$	0,00335 $\times 1,79469$	0,25822 $\times 0,96217$	0,01533 $\times 0,78207$	$f_1(2)$ 0,28363
$y_1 = 3$ (UNE)	0,01135 $\times 0,80133$	0,00364 $\times 1,57552$	0,01658 $\times 0,74299$	0,02270 $\times 0,56290$	$f_1(3)$ 0,03993
	$f_2(0)$ 0,49323	$f_2(1)$ 0,19114	$f_2(2)$ 0,28153	$f_2(3)$ 0,03410	1.00000

Table 4: Quarterly, 2001-Q1 to 2001-Q2, 15+All

	$y_2 = 0$ (NP)	$y_2 = 1$ (AG)	$y_2 = 2$ (NAG)	$y_2 = 3$ (UNE)	
$y_1 = 0$ (NP)	0,49192 $\times 0,92380$	0,01988 $\times 1,33275$	0,03249 $\times 1,00548$	0,017533 $\times 0,91092$	$f_1(0)$ 0,52957
$y_1 = 1$ (AG)	0,02899 $\times 1,36161$	0,05481 $\times 1,77056$	0,00515 $\times 1,44329$	0,002163 $\times 1,34873$	$f_1(1)$ 0,14687
$y_1 = 2$ (NAG)	0,03925 $\times 0,88127$	0,00359 $\times 1,29022$	0,23165 $\times 0,96295$	0,024573 $\times 0,86839$	$f_1(2)$ 0,28363
$y_1 = 3$ (UNE)	0,01519 $\times 0,79768$	0,00157 $\times 1,20663$	0,01491 $\times 0,87935$	0,016336 $\times 0,78480$	$f_1(3)$ 0,03993
	$f_2(0)$ 0,54062	$f_2(1)$ 0,13005	$f_2(2)$ 0,27628	$f_2(3)$ 0,05305	1.00000

Terms written in bold are directly available in the data. Joint probabilities come from the balanced panel component of the micro data. The marginal probabilities written in bold are obtained from TURKSTAT's website. The reflation/deflation factors (given after the multiplication sign) are estimated using MATLAB. Adjusted joint probabilities satisfy the adding up restrictions. Details of our estimation and testing methodology are the subject of Section 3.3.

Observe that in Table 3 the rows and columns for AG have weights considerably bigger than 1. This means that agricultural employment is underrepresented in the annual balanced panel. This is attributable to the fact that agricultural employment is a temporary state for many people. In addition, from Table 4, we can observe that agricultural employment in the second period of the quarterly balanced panel is underrepresented. Also, note that non-participants and unemployed in both periods are overrepresented. In sum, there is more circulation in and out of employment than what gets captured in the balanced panel. These findings underscore the importance of the adjustment. We will return to this point in Section 4.

The unbiased transition rates of individuals from one labor market state to another labor market state can be extracted from weighted panel data. Individuals are observed in one of the four labor market labor states in each period. Based on these four labor market states, sixteen transition probabilities between states can be calculated. Using the weighted joint probabilities calculated as in Tables 3-4, one can compute a forward transition matrix and a backward transition matrix. Let j denote the labor market state in the first period and j' the labor market state in the second period. The forward transition matrix $P_{j'|j}^F$, is the conditional probability of being in state j' in the second period, given that the individual occupied state j in the first period. Similarly, the backward transition matrix $P_{j|j'}^B$, is the conditional probability of being in labor market state j in the first period given that individual is in labor market state j' in the second period. We will use the forward transition probabilities to study flows out of a given labor market state, $j = 0, 1, 2, 3$. Likewise, we will use the backward transition probabilities to examine flows into a labor market state, $j' = 0, 1, 2, 3$. These transition matrices are calculated as:

$$\text{Forward Transition Matrix} = \begin{bmatrix} P_{0|0}^F & P_{1|0}^F & P_{2|0}^F & P_{3|0}^F \\ P_{0|1}^F & P_{1|1}^F & P_{2|1}^F & P_{3|1}^F \\ P_{0|2}^F & P_{1|2}^F & P_{2|2}^F & P_{3|2}^F \\ P_{0|3}^F & P_{1|3}^F & P_{2|3}^F & P_{3|3}^F \end{bmatrix}_{4 \times 4}$$

	$y_2 = 0$	$y_2 = 1$	$y_2 = 2$	$y_2 = 3$	Row sum
$y_1 = 0$	$\frac{f(y_1=0, y_2=0 x)}{f_1(0)}$	$\frac{f(y_1=0, y_2=1 x)}{f_1(0)}$	$\frac{f(y_1=0, y_2=2 x)}{f_1(0)}$	$\frac{f(y_1=0, y_2=3 x)}{f_1(0)}$	1.0000
$y_1 = 1$	$\frac{f(y_1=1, y_2=0 x)}{f_1(1)}$	$\frac{f(y_1=1, y_2=1 x)}{f_1(1)}$	$\frac{f(y_1=1, y_2=2 x)}{f_1(1)}$	$\frac{f(y_1=1, y_2=3 x)}{f_1(1)}$	1.0000
$y_1 = 2$	$\frac{f(y_1=2, y_2=0 x)}{f_1(2)}$	$\frac{f(y_1=2, y_2=1 x)}{f_1(2)}$	$\frac{f(y_1=2, y_2=2 x)}{f_1(2)}$	$\frac{f(y_1=2, y_2=3 x)}{f_1(2)}$	1.0000
$y_1 = 3$	$\frac{f(y_1=3, y_2=0 x)}{f_1(3)}$	$\frac{f(y_1=3, y_2=1 x)}{f_1(3)}$	$\frac{f(y_1=3, y_2=2 x)}{f_1(3)}$	$\frac{f(y_1=3, y_2=3 x)}{f_1(3)}$	1.0000

$$\text{Backward Transition Matrix} = \begin{bmatrix} P_{0|0}^B & P_{0|1}^B & P_{0|2}^B & P_{0|3}^B \\ P_{1|0}^B & P_{1|1}^B & P_{1|2}^B & P_{1|3}^B \\ P_{2|0}^B & P_{2|1}^B & P_{2|2}^B & P_{2|3}^B \\ P_{3|0}^B & P_{3|1}^B & P_{3|2}^B & P_{3|3}^B \end{bmatrix}_{4 \times 4}$$

	$y_2 = 0$	$y_2 = 1$	$y_2 = 2$	$y_2 = 3$
$y_1 = 0$	$\frac{f(y_1=0, y_2=0 x)}{f_2(0)}$	$\frac{f(y_1=0, y_2=1 x)}{f_2(1)}$	$\frac{f(y_1=0, y_2=2 x)}{f_2(2)}$	$\frac{f(y_1=0, y_2=3 x)}{f_2(3)}$
$y_1 = 1$	$\frac{f(y_1=1, y_2=0 x)}{f_2(0)}$	$\frac{f(y_1=1, y_2=1 x)}{f_2(1)}$	$\frac{f(y_1=1, y_2=2 x)}{f_2(2)}$	$\frac{f(y_1=1, y_2=3 x)}{f_2(3)}$
$y_1 = 2$	$\frac{f(y_1=2, y_2=0 x)}{f_2(0)}$	$\frac{f(y_1=2, y_2=1 x)}{f_2(1)}$	$\frac{f(y_1=2, y_2=2 x)}{f_2(2)}$	$\frac{f(y_1=2, y_2=3 x)}{f_2(3)}$
$y_1 = 3$	$\frac{f(y_1=3, y_2=0 x)}{f_2(0)}$	$\frac{f(y_1=3, y_2=1 x)}{f_2(1)}$	$\frac{f(y_1=3, y_2=2 x)}{f_2(2)}$	$\frac{f(y_1=3, y_2=3 x)}{f_2(3)}$
Column Sum	1.0000	1.0000	1.0000	1.0000

The joint probabilities and the transition matrices are reported in Appendices B and C. We break down the full data set (working population, defined as age 15 and above.) into four partitions according sex and location (urban-male, urban-female, rural-male and rural female). Small cell sizes impose practical limits on finer stratification.

3.2 Step 2: Multinomial Logit Model

In the first step, we calculated the weights (reflation/deflation factors) for an individual characterized by the vector x . We use these weights in MNL regression as probability weights. We utilize the Stata command [pweight = weight] in obtaining the MNL estimates. We use micro data from quarterly rounds of the HLFS for three years 2000, 2001, and 2002. Conditional on being present in the first period and re-interviewed in the second period, we form quarterly and annual samples using STATA. Then, using MATLAB, we append the weight for each individual in that sample. At the end, we have eleven quarterly and eight annual samples. For each sample, the information for each individual in the sample consists of the following:

- Labor market status: (0 = Non-participant, 1 = Employed in Agriculture, 2 = Employed in Non-Agriculture, 3 = Unemployed).
- Regressors: sex and location interactions (urban-male/rural-male/urban-female/rural-female), age-groups (15-24, 25-34, 35-44, 45-54, 55-64 and 65+), education (illiterate, literate without a diploma, primary5, primary8, middle school, general highschool (highgen), vocational highschool (highvoc), vocational higher education (univoc), 4-year or higher university graduate (univ4plus)), marital status (single/divorced/married/widow) and period dummies (Q1/ Q2/ Q3/ Q4/ year2000/ year2001/ year2002).

Underlined categories denote the reference groups. We assume that the probability of choosing labor market state j is given by

$$\Pr(Y_i = j) = \frac{e^{\beta_j x_j}}{\sum_{k=0}^3 e^{\beta_k x_j}} \quad j = 0, 1, 2, 3. \quad (8)$$

The model in (8) is a multinomial logit model (Nerlove and Press, 1973). The estimated equations yield a set of probabilities for the four choices for a decision maker with

characteristics x_i . Note that at most three of the four set of parameters can be identified (Greene, 2003). In our case we have to estimate a set of parameters conditional on origin state (for forward transitions) and each destination state (for backward transitions). An appropriate normalization for our case is $\beta_{j'} = 0$ where j' denotes the conditioning state. This normalization enables us to compare each outcome with the base group of individuals who stay in same sector between period t and period $t + 1$. Therefore the transition probabilities conditional on occupying state j' are:

$$\Pr(Y_i = j | \underline{x}_i) = \frac{e^{\beta_j \underline{x}_j}}{1 + \sum_{k=1}^3 e^{\beta_k \underline{x}_j}}, \quad j \neq j';$$

$$\Pr(Y_i = j' | \underline{x}_i) = \frac{1}{1 + \sum_{k=1}^3 e^{\beta_k \underline{x}_j}}.$$
(9)

3.3 Estimation and Inference in RAN model:

In Section 3.1, we chose $\hat{\underline{\theta}} = [\hat{\theta}_0 \hat{\theta}_1 \hat{\theta}_2 \hat{\theta}_3 \hat{\theta}_4 \hat{\theta}_5 \hat{\theta}_6]'$ so that row and column restrictions (3) are met. In order to obtain the standard error for $\hat{\underline{\theta}}$, we propose a Bootstrap method. Each of the random components $f(y_1, y_2 | x)$, $f_1(y_1 | x)$, and $f_2(y_2 | x)$ are bootstrapped. From each distribution, we draw three independent bootstrap samples that have the same sample size as in the raw data. Using these three independent bootstrap samples, we use MATLAB to calculate a new $\hat{\underline{\theta}}$. We repeat this process one hundred times. At the end of these replications, we report bootstrap means, standard errors and estimated variance-covariance matrix for $\hat{\underline{\theta}}$. We use these statistics to test the statistical significance of the RAN model.

We wish to test the whether the attrition process is random against the alternative that it is influenced by labor market states occupied by respondents who have the same $\underline{x}$. Under the null $\underline{\theta}' = [1 \ 0 \ \cdots \ 0]_{1 \times 7}$. The null hypothesis involves seven restrictions (so $\#r = 7$) and can be expressed as:

$$H_0 : R\hat{\underline{\theta}} = \underline{r}$$

$$\text{where } R = \begin{bmatrix} 1 & 0 & \cdots & 0 & 0 \\ 0 & 1 & \ddots & \ddots & 0 \\ \vdots & \ddots & \ddots & \ddots & \vdots \\ 0 & \ddots & \ddots & 1 & 0 \\ 0 & 0 & \cdots & 0 & 1 \end{bmatrix}_{7 \times 7} \quad \text{and } \underline{r} = \begin{bmatrix} 1 \\ 0 \\ \vdots \\ \vdots \\ 0 \end{bmatrix}_{7 \times 1}.$$

To test the null hypothesis, we compute the Wald statistics as:

$$W = N \times (R\hat{\underline{\theta}} - \underline{r})' (R\hat{V}R')^{-1} (R\hat{\underline{\theta}} - \underline{r}). \quad (10)$$

where $\hat{V}$ is the variance-covariance estimate of $\hat{\underline{\theta}}$ and N is the number of replications. Asymptotically, W has a χ^2 distribution with 7 degrees of freedom under the null hypothesis (Greene, 2003).

To illustrate the procedure, we will perform the test for the period starting with the first quarter of 2001 on the full sample of respondents who are at least 15 years old. For the annual transition from 2001–Q1 to 2002–Q1, we estimate the variance-covariance matrix as:

$$\hat{V} = \begin{bmatrix} 0.000047 & -0.000162 & -0.000111 & -0.000080 & 0.000001 & 0.000009 & -0.000018 \\ -0.000162 & 0.002848 & 0.000418 & 0.000601 & -0.001821 & -0.000212 & -0.000181 \\ -0.000111 & 0.000418 & 0.001429 & 0.000883 & -0.000058 & -0.001203 & -0.000741 \\ -0.000080 & 0.000601 & 0.000883 & 0.001905 & -0.000506 & -0.000836 & -0.000871 \\ 0.000001 & -0.001821 & -0.000058 & -0.000506 & 0.002607 & 0.000015 & 0.000185 \\ 0.000009 & -0.000212 & -0.001203 & -0.000836 & 0.000015 & 0.001283 & 0.000706 \\ -0.000018 & -0.000181 & -0.000741 & -0.000871 & 0.000185 & 0.000706 & 0.001331 \end{bmatrix}_{7 \times 7}$$

The Wald statistic computed using (10) equals to 218101.102 which has a p -value of almost 0. Therefore, we reject the null hypothesis.

Similarly, for the quarterly transition from 2001 – Q1 to 2001 – Q2, we estimate the variance-covariance matrix as:

$$\hat{V} = \begin{bmatrix} 0.000046 & -0.000055 & 0.000020 & 0.000020 & -0.000075 & -0.000121 & -0.000105 \\ -0.000055 & 0.004525 & 0.000459 & 0.000936 & -0.003410 & -0.000418 & -0.000717 \\ 0.000020 & 0.000459 & 0.003860 & 0.002019 & -0.000528 & -0.003792 & -0.002126 \\ 0.000020 & 0.000936 & 0.002019 & 0.002167 & -0.000969 & -0.002062 & -0.001931 \\ -0.000075 & -0.003410 & -0.000528 & -0.000969 & 0.004232 & 0.000490 & 0.000847 \\ -0.000121 & -0.000418 & -0.003792 & -0.002062 & 0.000490 & 0.004039 & 0.002274 \\ -0.000105 & -0.000717 & -0.002126 & -0.001931 & 0.000847 & 0.002274 & 0.002371 \end{bmatrix}_{7 \times 7}$$

According to (10), the Wald statistic is 339427.99 with a p – value of almost 0. Again, we reject the null hypothesis. In both illustrations, as well as all other cases studied, we reach the same conclusion that labor market states in both periods influence the attrition/substitution process.

4 Empirical Results

In this section, we examine the results from the methodology we reviewed in Section 3. First, we discuss the RAN model estimates (Step 1). We then provide MNL results (Step 2). The empirical results are reported in Appendices B-F. The results are presented separately for annual and quarterly transitions.

4.1 Step 1: RAN Model Estimates

We begin by discussing the patterns in the reflation/deflation factors obtained from the RAN model. The associated tables are in Appendix B. We then examine the annual and quarterly forward and backward transition probabilities between quarters of 2000, 2001, and 2002. The annual (quarterly) probabilities are presented in tables collected in Appendix C (D). Moreover, the adjusted joint probabilities are presented.

4.1.1 Descriptive Analysis on Weights (Reflation/Deflation Factors)

Following Tunali et al. (2011), to arrive at the joint probability $f(y_1, y_2|x)$, we applied weights to the probability taken from the balanced panel. The weights help us to examine whether there is an attrition/substitution problem, and if so, what the direction of bias is. In other words, the weights inform us whether a particular cell is underrepresented or overrepresented in the balanced panel.

First, we formed tables of weights following the format of the transition probabilities in Appendices C-D. We classified each cell according to their bias direction and magnitude. We classified biases as severe when they are more than 10 percent and mild otherwise. Blue and green cells indicate that these cells are underrepresented in the balanced panel (i.e. there is a downward bias.), whereas yellow and orange cells indicate that these cells are overrepresented in the balanced panel (i.e. there is an upward bias.). We report the results of our classifications in tabular form in Appendix B at annual and quarterly frequencies for different x .

Starting with the full sample, in the case of annual transitions we see that the cells in the rows and columns for AG are typically colored blue which indicates a severe downward bias in the balanced panel (BP). This is attributable to the fact that agricultural employment is a temporary state for many people. Non-participants and unemployed in both periods are severely overrepresented in the BP, meaning that there is more circulation in and out of employment than what gets captured in the BP. The case is similar for the workers who are employed in non-agriculture in both periods, but the upward bias is mild. Conditional on being unemployed in the first period and not employed in agriculture in the second period, almost all of the cells are colored with orange. This result suggests that unemployed individuals in the first period are severely overrepresented in the BP. Moreover, with some mild exceptions, non-participants and workers employed in non-agriculture are also overrepresented in the BP. When the full sample is broken down by gender/location interaction, most of the conclusions remain valid for rural males, except the followings: non-participants are only overrepresented in the first period, conditional on being unemployed in the first period and employed in agriculture in the second period are also overrepresented.

Qualitatively, we reach the same conclusions with the weights of quarterly transitions for the default case. Non-participants are overrepresented in the balanced panel, except when it is paired with AG. Unemployed workers are also overrepresented except when unemployed workers make a transition to AG; these are underrepresented. Transitions between AG and NAG are underrepresented in the BP. The likelihood of remaining employed in AG is underrepresented and the likelihood of remaining in NAG is overrepresented in the BP. Most of the conclusions remain valid for rural males, except for the following: non-participants are only overrepresented in the first period, unemployed workers are overrepresented in both periods.

4.1.2 Estimate of Transitions

In this section, we highlight the patterns and magnitudes of the annual and quarterly forward and backward transition probabilities. The full set of estimates for the full sample

obtained from the RAN model are presented in Appendices C and D. Moreover, separate sets of estimates are obtained for interactions of residential area and sex (i.e. urban male / urban female / rural male / rural female). The latter serve as weights in our MNL estimation. Theoretically the adjustment can be done conditional on other x 's but we did not pursue this further because of small cell sizes. Each of the annual forward (backward) transition tables collected in Appendix C contains eight transition matrices we were able to estimate for the period 2000–2002. Each of the quarterly forward (backward) transition tables collected in Appendix D contains eleven transition matrices we were able to estimate for the period 2000 – 2002. To study the determinants of transitions, we will turn to regression methods in Section 4.2. Here, we focus on a few of the tables and put the magnitudes into perspective.

Transitions from/to Agriculture: We begin our examination by studying the annual transition probabilities between the first quarters of 2000 and 2001 in Appendix C. Conditional on being employed in agriculture (AG) in 2000 – Q1, one year later 75% of rural male workers remain employed in AG, 17% of them become non-participants and 5.4% of them move to non-agriculture (NAG). Only 2.3% of rural male workers become unemployed. This picture is quite different for females. About 60% of rural female workers remain in AG, and the remainder leave the labor force. It is extremely difficult for rural females to transit from AG to NAG. The case is similar for urban females. Conditional on being employed in agriculture (AG) in 2000 – Q1, only 1.6% of urban female workers were able to move to NAG, while 21.5% of them remain in AG, and 75.4% of them leave the labor force. In addition to these, 1.2% of urban female workers become unemployed in the next year. Urban male workers have the highest chance to move from AG to NAG which is 27.8%. From 2000 – Q1 to 2001 – Q1, 48.8% of urban males remain in AG, 19.8% become NP, and only 3.5% start to search for a new job.

Patterns of transition are similar in other periods. Not surprisingly, the likelihood of a successful AG-NAG transition is higher for individuals residing in urban areas. The highest annual transition rate from AG to NAG for urban males is 32.2% (2001 – Q2 to

2002 – Q2), whereas the lowest value is 13.8% (2000 – Q4 to 2001 – Q4). The range of transition rates of rural male workers are 12% (2000 – Q2 to 2002 – Q2) and 4% (2000 – Q2 to 2001 – Q2), respectively. The highest AG to NAG transition rate for urban females is 3.6% (2001 – Q2 to 2002 – Q2), which is lower than the lowest transition rate of rural male workers.

Corroborating patterns emerge from backward transitions. Conditional on being employed in AG in 2001 – Q1, 73.8% of the rural male workers were employed in AG in the previous year. Rural female workers were either employed in AG (57.9%) or were a non-participant (41.6%) in the previous period. Moreover, 52.4% of urban male workers employed in AG occupied that state in the previous year. This rate is the lowest for urban females (20.4%). In the case of urban females, non-participation is the dominant initial state: 71.5% of urban female workers employed in AG were out of the labor force in the previous year. Additionally, conditional on a successful transition from NAG to AG, urban male workers have the highest share, which is 18.8%.

Transitions from/to Non-Agriculture:

Again, we begin our examination by looking at the annual transition probabilities between the first quarters of 2000 and 2001. Conditional on being employed in NAG in 2000 – Q1, 86.6% of urban male workers remain employed in NAG, 8% of them become non-participants and 4.8% of them are employed. Only 0.4% of urban male workers move to AG in the next year. It is extremely rare for urban males to transit from NAG to AG. The case is similar for urban females. Conditional on being employed in non-agriculture (NAG) in 2000 – Q1, only 0.2% of urban female workers have the chance to move to AG, while 67.9% remain in NAG, and 28.9% leave the labor force. About 71.6% of rural female workers remain in NAG, and about 24.7% leave the labor force. The likelihood of a successful transition from NAG to AG is lower for rural female workers. From 2000 – Q1 to 2001 – Q1, only 1.2% move from NAG to AG. In addition, 2.3% of urban female workers become unemployed in the next year. From 2000 – Q1 to 2001 – Q1, rural male workers have the highest chance to move from NAG to AG which is 8.6%. During this period, 77% of urban males remain in NAG, 8.4%

become NP, and 5.9% start searching for a new job.

For individuals residing in rural areas, the likelihood of a successful NAG-AG transition is higher. The highest transition rate from NAG to AG for rural males is 12.3% (2000 – Q2 to 2001 – Q2), whereas the lowest transition rate is 4.7% (2001 – Q1 to 2002 – Q1). These transition rates for rural female workers are 14.4% (2000 – Q3 to 2001 – Q3) and 1.2% (2000 – Q1 to 2001 – Q1), respectively. On the contrary, the highest transition rate from NAG to AG for individuals residing in urban areas is 0.7% (of urban males, 2000 – Q2 to 2001 – Q2), which is lower than the lowest transition rate for individuals residing in rural areas.

Turning to backward transitions, conditional on being employed in NAG in 2001 – Q1, 78% of rural male workers were employed in NAG in the previous year. Rural female NAG workers were mostly either employed in NAG (79.6%) or were non-participants (16.3%) in the previous period. Only 3.9% were unemployed in the previous year. Moreover, 85.6% of urban male workers employed in NAG were in the same state in the previous year. This rate is the lowest for urban females which is 74.5%. For urban females, non-participants have the largest share in the agricultural employment in 2001 – Q1 after non-agricultural employment. 20.4% of urban female workers employed in NAG were out of the labor force in the previous year. In addition, conditional on a successful transition from AG to NAG, rural male workers have the highest share, which is 8.2%.

4.2 Step 2: Multinomial Logit Estimates

This section is devoted to the examination of the determinants of transition rates using micro data. We first use pooled data from 11 quarterly transitions, then use pooled data from 8 annual transitions over the period 2000 – 2002. We begin by comparing the unweighted and weighted results to examine whether weighting makes a difference. We then discuss in turn the multinomial logit (MNL) results on labor flows from agriculture and non-agriculture (Annual). Quarterly MNL results are also reported in Appendix F.

4.2.1 Comparisons of weighted and unweighted MNL Estimates

Table E1 in Appendix E shows the weighted and unweighted MNL estimates of annual transitions from AG. Except for the period dummies, almost all of the estimated coefficients and the level of significance of the coefficients are similar to each other. The only difference is the coefficient of “*univoc*” (vocational university graduate), but this is almost surely attributable to the small number of observations for this category.⁴ With the acceleration of exports in 2002, economy starts to recover (Borataş and Akyüz, 2003). Hence, we expect workers who sought refuge in AG in 2001 – Q1 to be more likely to find a job in NAG in the next year compared to workers employed in AG in 2000 – Q1. Similarly, we expect workers employed in AG in 2001 – Q1 to be more likely to search for a new job during the recovery year compared to workers employed in AG in 2000 – Q1. Notably the estimated coefficient for “*year_2001*” is positive and statistically significant for NAG and UNE only in the weighted model.

Table E2 in Appendix E shows the weighted and unweighted MNL estimates of annual transitions from NAG. Again, “*year_2001*” is the main distinction between these two models. During the crisis period, the agricultural sector absorbed a large number of workers displaced from the non-agricultural sector. However, this growth was short-lived. During the recovery period, employment in AG declined (Alisjahbana & Manning, 2007). In our MNL model, we would expect workers employed in NAG in 2001 – Q1 to be less likely to move to AG or become NP in the next year relative to workers employed in NAG in 2000 – Q1. Thus, we expect that the estimated coefficient of “*year_2001*” for NP and AG be negative. The sign of the coefficients are as expected in both models, nevertheless the magnitude and the level of significance are larger in the weighted model.

Table E3 in Appendix E shows the weighted and unweighted MNL estimates of quarterly transitions from AG. There is no noteworthy difference between these two models, except for period dummies. The table reports quarterly transitions, so seasonal factors are expected to affect the transition rate from AG to NAG. Third quarter of the

⁴It is evident that having *univoc* = 1 is a near perfect predictor of being a participant.

year is considered to be the peak agricultural period. Therefore a worker employed in AG in $Q2$ is more likely to remain employed in AG in the next quarter compared with a worker employed in AG in $Q1$. Since AG is our reference, the effect will show elsewhere. Indeed, the estimated coefficients of “ $Q2$ ” are negative and statistically significant in the columns for NP and NAG. The level of significance of “ $Q2$ ” is higher in the weighted model. Moreover, after the agricultural period, seasonal workers are expected to move out of agriculture. We see that the estimated coefficient of “ $Q3$ ” is positive and statistically significant for NAG. Note that, we can capture this fact only with the weighted model.

Table E4 in Appendix E shows the weighted and unweighted MNL estimates of quarterly transitions from NAG. Almost all of the estimated coefficients are the same in both models with small distinctions in the level of significance. Conditional on being employed in NAG in the agricultural period, we expect that workers would be less likely to be employed in $Q4$ compared to workers employed in NAG in first quarter. The sign of the coefficient is acceptable for both models, but in the weighted model the coefficient is not statistically significant.

To summarize, although the estimated coefficients of personal characteristics hardly change, to capture the effect of the crisis on annual labor market transitions and the effect of seasonality in the quarterly transitions, the weighted model works better. In the next section, we will discuss the individual determinants of transitions by using the weighted model.

4.2.2 The Determinants of Flows from Agriculture

Annual/quarterly estimates of coefficients on individual characteristics (i.e. other than period effects) are qualitatively the same. Hence, we discuss the annual results. The MNL estimates of annual transitions from the agricultural sector are presented in Table F1. According to Chi-square test of goodness-of-fit of the overall model, the estimated model is statistically significant with an associated $p - value$ of almost 0.

We chose urban males as a reference category in MNL regression. The estimated coefficients of “*urban_female*”, “*rural_female*”, and “*rural_male*” are negative and statistically significant for flows into the non-agricultural sector. Also, the magnitude for rural males is larger than the other two. These results imply that female workers employed in AG are less likely to move from AG to NAG. This ordering of relative magnitudes is the same as what we reported in section 4.1.2 under "Transitions from/to Agriculture" section. The location/gender interactions clearly capture differences in labor market opportunity. In addition to this, “*rural_male*” is negative and statistically significant for all alternative labor market states. The negative coefficients imply that urban males are more likely to leave agriculture and move elsewhere than rural males.

Compared to 15 – 24 years old workers, individuals who are over 45 years of age are more likely to remain in AG in the next period. These results confirm the arguments in Tunali and Ilkcaracan (2010) who state that older generations represented by individuals over 45 years old have become the dominant group in agricultural employment. We would expect that younger people are more likely to move between sectors because they can reap the benefits of sectoral change over a long period. Moreover, above a certain age we expect individuals to leave the labor force. The estimated coefficients for UNE shows that, as age increases, individuals are less likely to become unemployed.

Compared to married individuals, individuals who are single and those who lost their partners are more likely to leave AG and become NP. This is not surprising given the advantage of a larger household in small-scale farming. Marital status doesn’t have statistically significant effect on the likelihood of finding a job in the non-agricultural sector or becoming unemployed.

Turning to the results for education levels, we observe that only the estimated coefficients of “*univ4plus*” and “*univoc*” are statistically significant and positive for transition to NAG. The fact that university graduates are the only group who are able to make successful transitions from AG to NAG underscores the severity of the absorption problem.

We chose “*year_2000*” as a reference category since this year is neither a crisis year, nor a recovery year. The estimated coefficient of “*year_2001*” implies that individuals employed in AG in 2001 – *Q1* are more likely to make a successful transition from AG to NAG than individuals employed in AG in 2000 – *Q1*. This is attributable to the economic crisis. To see the seasonal effects on the transition from AG to NAG, we have to consider the MNL estimates of quarterly transitions from agriculture (Table F3). From this table, we notice that individuals employed in AG in *Q2* are more likely to remain in AG in the agricultural period (quarter 3) compared to individuals employed in AG in *Q1*. In addition to this, individuals who are employed in AG in *Q3* are more likely to make a successful transition from AG to NAG compared to individuals employed in AG in *Q1*.

4.2.3 The Determinants of Flows from Non-Agriculture

In this section, we discuss the MNL estimates of annual transitions from the non-agricultural sector (Table F2 in Appendix F). According to Chi-square test of goodness-of-fit of the overall model, the estimated model is statistically significant with an associated p – *value* close to 0.

We chose urban males as the reference category. The estimated coefficients of “*rural_female*” and “*rural_male*” are positive and statistically significant for transitions to AG. These results imply that individuals who live in rural areas are more likely to make a successful transition from NAG to AG compared to individuals who live in urban areas. Furthermore, all of the estimated coefficients of location-sex interaction dummies are negative and significant for flows into unemployment. The signs and ordering of magnitudes reflect on the chances of finding employment in NAG.

Marital status doesn’t have an effect either on the likelihood of making transition to AG from NAG or on the probability of becoming NP. The only statistically significant coefficients are those for “*single*” and “*divorced*” in the transition to UNE. Compared to married individuals, single and divorced individuals may not have any non-labor income

to draw on, and this is likely to drive them to the labor market. This point is elaborated in the case of females in Tunalı and Başlevent (2006).

Educational attainment emerges as an important factor that affects transitions from NAG to AG. Individuals with higher education are less likely to leave the non-agricultural sector and move to another employment state. This finding corroborates the absorption problem: NAG is extremely selective with respect to education.

The estimated coefficient of “*year_2001*” for transitions to AG is negative and statistically significant. This result implies that workers employed in NAG in 2001 – Q1 are less likely to move to AG or become NP in the next year than workers employed in NAG in 2000 – Q1. This finding provides transition based evidence to support the arguments in Alisjahbana & Manning (2007) that employment in Agriculture declined during the recovery period.

5 Conclusion

This thesis studied mobility between labor market states at a time when agricultural transformation was enhanced. Towards that end we relied on the rarely used short panel component of the HLFS. Due to geographic mobility the representativeness of the sample becomes suspect over time. To ensure that the panel dimension can be utilized, we employed the methodology developed by Tunali et al. (2011). They addressed this representativeness problem and offered a methodology suitable for data sets which suffer from attrition and substitution, such as HLFS. In this model attrition/substitution behavior is considered as a function of labor market states occupied by the respondent. We presented the methodology in two steps. In the first step, we discussed how we obtain the reflation/deflation factors (weights) which adjust for attrition/substitution. In the second step, we included these weights in MNL regression as probability weights using STATA.

RAN model allows a remarkably general semi-parametric framework for testing the null hypothesis that the attrition/substitution process is random against the alternative that it is influenced by labor market states occupied by respondents who have the same set of observed characteristics. In all the cases studied, we rejected the null. We then analyzed the weights to examine the biases due to attrition/substitution. We discovered that occupants of particular states (such as non-participation and unemployment) were overrepresented, while others (especially agricultural employment) were underrepresented in the balanced panel. We estimated both weighted and unweighted MNL regressions. These results were not all that different, except for period effects. In the quarterly transitions from AG and from NAG, we noticed that the seasonality is captured better in the weighted model. Similarly, in the annual transitions the effects of the 2001 crisis and the recovery period in 2002 could be detected more forcefully by the weighted MNL regression.

Based on our MNL results, we concluded that gender and residential area are important factors that affect successful transition from AG to NAG. Urban males are more likely to move from AG to NAG, and they are followed by rural males, urban females,

and rural females. Older generations (individuals 45 years old and older) are less likely to move from AG. University graduates are more likely to flow into NAG compared to less educated individuals. The less educated individuals emerged as a dominant group in agricultural employment. The MNL estimates of annual transition confirm that individuals who live in rural areas are more likely to leave NAG. Rural females are more likely to move from NAG to AG, and they are followed by rural males, urban males, and urban females. Individuals aged between 55 and 64 years are most likely to make a transition from NAG to AG. Younger people are more likely to flow into other sectors to reap the benefits of future income over a long period. Moreover, our results verify that agricultural employment decreases during recovery and workers employed in NAG were less likely to make a transition to AG. Overall, our findings support the conclusion in Tunali and Ilkkaracan (2010) that due to skill mismatch, only a fraction of the surplus labor released from agriculture during the ARIP period could be employed in non-agriculture.

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Appendix A

Table A1: Sectoral age distribution, 2002 (percent)

	15-24	25-34	35-44	45-54	55-64	65+	Total
Agriculture	20.54	21.09	18.92	17.59	13.92	7.94	100.00
Manufacturing	25.26	39.91	24.56	9.78	0.49	0.00	100.00
Construction	12.55	36.19	29.81	17.15	3.66	0.63	100.00
Service	16.73	37.03	28.16	13.78	3.43	0.87	100.00

Source: HLFS database, TURKSTAT (2011)

Table A2: Sectoral age distribution, 2001 (percent)

	15-24	25-34	35-44	45-54	55-64	65+	Total
Agriculture	22.65	21.41	18.12	16.81	12.84	8.16	100.00
Manufacturing	24.88	40.04	24.93	9.66	0.49	0.00	100.00
Construction	17.73	33.30	27.81	16.47	4.14	0.54	100.00
Service	17.68	36.12	28.66	13.23	3.50	0.81	100.00

Source: HLFS database, TURKSTAT (2011)

Table A3: Sectoral age distribution, 2000 (percent)

	15-24	25-34	35-44	45-54	55-64	65+	Total
Agriculture	22.78	21.64	18.40	16.17	12.90	8.11	100.00
Manufacturing	27.64	37.78	24.22	9.74	0.62	0.00	100.00
Construction	18.76	35.76	26.12	14.35	4.56	0.44	100.00
Service	18.99	35.17	28.17	13.06	3.68	0.94	100.00

Source: HLFS database, TURKSTAT (2011)

Table A4: Sectoral education levels, 2002 (percent)

	Pri 5	Pri 8	High School	University	Total
Agriculture	90.79	5.24	3.65	0.32	100.00
Manufacturing	56.88	13.99	22.43	6.70	100.00
Construction	64.58	12.43	15.88	7.11	100.00
Service	38.75	13.75	27.65	19.84	100.00

Source: HLFS database, TURKSTAT (2011)

Table A5: Sectoral education levels, 2001 (percent)

	Pri 5	Pri 8	High School	University	Total
Agriculture	91.32	4.28	4.09	0.31	100.00
Manufacturing	57.89	13.87	21.85	6.39	100.00
Construction	68.71	11.81	13.26	6.22	100.00
Service	41.10	13.17	26.86	18.87	100.00

Source: HLFS database, TURKSTAT (2011)

Table A6: Sectoral education levels, 2000 (percent)

	Pri 5	Pri 8	High School	University	Total
Agriculture	90.94	4.56	4.18	0.32	100.00
Manufacturing	60.62	13.46	20.09	5.82	100.00
Construction	73.90	9.97	11.58	4.55	100.00
Service	41.98	12.83	26.84	18.35	100.00

Source: HLFS database, TURKSTAT (2011)

Appendix B: Weight Analysis

Table B1: Weight Analysis for 15+ Annual Transitions

15+ Annual					(NP) 0	(AG) 1	(NAG) 2	(UNEMP) 3
(NP) 0	Positive	B	>10%	Severe	0	6	0	0
		G	≤10%	Mild	0	2	4	1
	Negative	Y	>10%	Severe	7	0	2	3
		O	≤10%	Mild	1	0	2	4
(AG) 1	Positive	B	>10%	Severe	7	8	8	7
		G	≤10%	Mild	1	0	0	1
	Negative	Y	>10%	Severe	0	0	0	0
		O	≤10%	Mild	0	0	0	0
(NAG) 2	Positive	B	>10%	Severe	0	6	0	0
		G	≤10%	Mild	1	1	2	0
	Negative	Y	>10%	Severe	2	1	6	2
		O	≤10%	Mild	5	0	0	6
(UNEMP) 3	Positive	B	>10%	Severe	0	6	0	0
		G	≤10%	Mild	0	0	0	0
	Negative	Y	>10%	Severe	0	0	0	0
		O	≤10%	Mild	8	2	8	8

Total Number of Colors:

Blue : 48

Green : 13

Yellow : 23

Orange : 44

Table B2: Weight Analysis for Urban Male Annual Transitions

Urban Male Annual					(NP) 0	(AG) 1	(NAG) 2	(UNEMP) 3
(NP) 0	Positive	B	>10%	Severe	0	0	0	0
		G	≤10%	Mild	4	1	2	2
	Negative	Y	>10%	Severe	4	4	5	3
		O	≤10%	Mild	0	3	1	3
(AG) 1	Positive	B	>10%	Severe	2	0	2	0
		G	≤10%	Mild	0	0	0	1
	Negative	Y	>10%	Severe	3	3	2	3
		O	≤10%	Mild	3	5	4	4
(NAG) 2	Positive	B	>10%	Severe	1	0	0	0
		G	≤10%	Mild	6	4	8	2
	Negative	Y	>10%	Severe	1	2	0	4
		O	≤10%	Mild	0	2	0	2
(UNEMP) 3	Positive	B	>10%	Severe	0	0	0	0
		G	≤10%	Mild	0	0	0	0
	Negative	Y	>10%	Severe	3	1	1	1
		O	≤10%	Mild	5	7	7	7

Total Number of Colors:

Blue : 5

Green : 30

Yellow : 40

Orange : 53

Table B3: Weight Analysis for Urban Female Annual Transitions

Urban Female Annual					(NP) 0	(AG) 1	(NAG) 2	(UNEMP) 3
(NP) 0	Positive	B	>10%	Severe	0	1	3	0
		G	≤10%	Mild	0	1	3	3
	Negative	Y	>10%	Severe	8	3	1	1
		O	≤10%	Mild	0	3	1	4
(AG) 1	Positive	B	>10%	Severe	1	0	3	1
		G	≤10%	Mild	1	4	1	0
	Negative	Y	>10%	Severe	3	0	1	2
		O	≤10%	Mild	3	4	3	5
(NAG) 2	Positive	B	>10%	Severe	5	5	8	4
		G	≤10%	Mild	3	2	0	2
	Negative	Y	>10%	Severe	0	1	0	2
		O	≤10%	Mild	0	0	0	0
(UNEMP) 3	Positive	B	>10%	Severe	0	1	0	0
		G	≤10%	Mild	0	0	0	0
	Negative	Y	>10%	Severe	0	0	3	1
		O	≤10%	Mild	8	7	5	7

Total Number of Colors:

Blue : 32

Green : 20

Yellow : 26

Orange : 50

Table B4: Weight Analysis for Rural Male Annual Transitions

Rural Male Annual					(NP) 0	(AG) 1	(NAG) 2	(UNEMP) 3
(NP) 0	Positive	B	>10%	Severe	0	2	4	2
		G	≤10%	Mild	4	1	1	1
	Negative	Y	>10%	Severe	3	4	1	3
		O	≤10%	Mild	1	1	2	2
(AG) 1	Positive	B	>10%	Severe	4	5	4	3
		G	≤10%	Mild	2	2	2	2
	Negative	Y	>10%	Severe	1	1	0	2
		O	≤10%	Mild	1	0	2	1
(NAG) 2	Positive	B	>10%	Severe	1	3	0	0
		G	≤10%	Mild	1	0	1	1
	Negative	Y	>10%	Severe	0	1	2	3
		O	≤10%	Mild	6	4	5	4
(UNEMP) 3	Positive	B	>10%	Severe	0	0	1	0
		G	≤10%	Mild	0	2	2	2
	Negative	Y	>10%	Severe	3	2	1	1
		O	≤10%	Mild	5	4	4	5

Total Number of Colors:

Blue : 29

Green : 24

Yellow : 28

Orange : 47

Table B5: Weight Analysis for Rural Female Annual Transitions

Rural Female Annual					(NP) 0	(AG) 1	(NAG) 2	(UNEMP) 3
(NP) 0	Positive	B	>10%	Severe	0	5	1	0
		G	≤10%	Mild	0	1	5	1
	Negative	Y	>10%	Severe	6	2	0	0
		O	≤10%	Mild	2	0	2	7
(AG) 1	Positive	B	>10%	Severe	0	4	3	0
		G	≤10%	Mild	3	3	1	1
	Negative	Y	>10%	Severe	3	1	2	0
		O	≤10%	Mild	2	0	2	7
(NAG) 2	Positive	B	>10%	Severe	2	4	1	0
		G	≤10%	Mild	1	1	3	1
	Negative	Y	>10%	Severe	2	3	3	2
		O	≤10%	Mild	3	0	1	5
(UNEMP) 3	Positive	B	>10%	Severe	1	4	1	0
		G	≤10%	Mild	0	1	1	0
	Negative	Y	>10%	Severe	2	1	1	1
		O	≤10%	Mild	5	2	5	7

Total Number of Colors:

Blue : 26

Green : 23

Yellow : 29

Orange : 50

Table B6: Weight Analysis for 15+ Quarterly Transitions

15+ Quarterly				(NP) 0	(AG) 1	(NAG) 2	(UNEMP) 3
(NP) 0	Positive	B >10%	Severe	0	9	0	0
		G ≤10%	Mild	0	1	4	0
	Negative	Y >10%	Severe	11	1	3	3
		O ≤10%	Mild	0	0	4	8
(AG) 1	Positive	B >10%	Severe	9	11	9	9
		G ≤10%	Mild	2	0	1	1
	Negative	Y >10%	Severe	0	0	1	0
		O ≤10%	Mild	0	0	0	1
(NAG) 2	Positive	B >10%	Severe	0	10	0	0
		G ≤10%	Mild	4	1	3	0
	Negative	Y >10%	Severe	3	0	8	2
		O ≤10%	Mild	4	0	0	9
(UNEMP) 3	Positive	B >10%	Severe	0	5	0	0
		G ≤10%	Mild	0	3	0	0
	Negative	Y >10%	Severe	0	2	1	0
		O ≤10%	Mild	11	1	10	11

Total Number of Colors:

Blue : 62

Green : 20

Yellow : 35

Orange : 59

Table B7: Weight Analysis for Urban Male Quarterly Transitions

Urban Male Quarterly					(NP) 0	(AG) 1	(NAG) 2	(UNEMP) 3
(NP) 0	Positive	B	>10%	Severe	0	3	1	1
		G	≤10%	Mild	4	1	4	1
	Negative	Y	>10%	Severe	7	4	6	3
		O	≤10%	Mild	0	3	0	6
(AG) 1	Positive	B	>10%	Severe	0	0	1	0
		G	≤10%	Mild	2	0	1	0
	Negative	Y	>10%	Severe	5	4	3	3
		O	≤10%	Mild	4	7	6	8
(NAG) 2	Positive	B	>10%	Severe	1	3	0	0
		G	≤10%	Mild	7	3	11	2
	Negative	Y	>10%	Severe	2	3	0	7
		O	≤10%	Mild	1	2	0	2
(UNEMP) 3	Positive	B	>10%	Severe	0	0	0	0
		G	≤10%	Mild	0	0	0	0
	Negative	Y	>10%	Severe	4	5	1	0
		O	≤10%	Mild	7	6	10	11

Total Number of Colors:

Blue : 10

Green : 36

Yellow : 57

Orange : 73

Table B8: Weight Analysis for Urban Female Quarterly Transitions

Urban Female Quarterly					(NP) 0	(AG) 1	(NAG) 2	(UNEMP) 3
(NP) 0	Positive	B	>10%	Severe	0	1	3	0
		G	≤10%	Mild	1	2	4	2
	Negative	Y	>10%	Severe	10	5	4	2
		O	≤10%	Mild	0	3	0	7
(AG) 1	Positive	B	>10%	Severe	2	2	4	1
		G	≤10%	Mild	3	0	3	2
	Negative	Y	>10%	Severe	4	6	2	0
		O	≤10%	Mild	2	3	2	8
(NAG) 2	Positive	B	>10%	Severe	6	4	11	1
		G	≤10%	Mild	3	2	0	2
	Negative	Y	>10%	Severe	2	3	0	6
		O	≤10%	Mild	0	2	0	2
(UNEMP) 3	Positive	B	>10%	Severe	0	0	1	0
		G	≤10%	Mild	0	0	0	0
	Negative	Y	>10%	Severe	2	2	5	1
		O	≤10%	Mild	9	9	5	10

Total Number of Colors:

Blue : 36

Green : 24

Yellow : 54

Orange : 62

Table B9: Weight Analysis for Rural Male Quarterly Transitions

Rural Male Quarterly					(NP) 0	(AG) 1	(NAG) 2	(UNEMP) 3
(NP) 0	Positive	B	>10%	Severe	0	3	2	3
		G	≤10%	Mild	3	3	4	1
	Negative	Y	>10%	Severe	8	3	1	2
		O	≤10%	Mild	0	2	4	5
(AG) 1	Positive	B	>10%	Severe	3	6	5	4
		G	≤10%	Mild	2	2	3	3
	Negative	Y	>10%	Severe	4	3	0	1
		O	≤10%	Mild	2	0	3	3
(NAG) 2	Positive	B	>10%	Severe	1	3	1	3
		G	≤10%	Mild	2	2	2	0
	Negative	Y	>10%	Severe	5	2	4	1
		O	≤10%	Mild	3	4	4	7
(UNEMP) 3	Positive	B	>10%	Severe	0	2	1	0
		G	≤10%	Mild	1	0	1	1
	Negative	Y	>10%	Severe	1	1	1	1
		O	≤10%	Mild	9	8	8	9

Total Number of Colors:

Blue : 37

Green : 30

Yellow : 38

Orange : 71

Table B10: Weight Analysis for Rural Female Quarterly Transitions

Rural Female Quarterly					(NP) 0	(AG) 1	(NAG) 2	(UNEMP) 3
(NP) 0	Positive	B	>10%	Severe	0	4	3	0
		G	≤10%	Mild	3	3	2	1
	Negative	Y	>10%	Severe	8	3	2	0
		O	≤10%	Mild	0	1	4	10
(AG) 1	Positive	B	>10%	Severe	2	4	5	0
		G	≤10%	Mild	2	5	0	2
	Negative	Y	>10%	Severe	4	2	0	1
		O	≤10%	Mild	3	0	6	8
(NAG) 2	Positive	B	>10%	Severe	4	5	5	0
		G	≤10%	Mild	3	2	0	2
	Negative	Y	>10%	Severe	1	2	2	3
		O	≤10%	Mild	3	2	4	6
(UNEMP) 3	Positive	B	>10%	Severe	0	1	2	0
		G	≤10%	Mild	1	1	2	0
	Negative	Y	>10%	Severe	3	3	0	1
		O	≤10%	Mild	7	6	7	10

Total Number of Colors:

Blue : 35

Green : 29

Yellow : 35

Orange : 77

Appendix C: Joint Probabilities, Forward and Backward Annual Transition Probabilities

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,M and Age 15+

Joint Probabilities

Weighted Panel (L)

Q1 - Q1					Q2 - Q2				Q3 - Q3				Q4 - Q4				
2000-2001		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
	0	0.236420	0.002847	0.049659	0.012892	0.229238	0.004296	0.034062	0.011246	0.220284	0.003209	0.036295	0.014112	0.229031	0.002961	0.039648	0.016650
	1	0.003100	0.007653	0.004355	0.000551	0.003685	0.007619	0.005687	0.000641	0.003758	0.013715	0.004804	0.000960	0.004021	0.009689	0.002341	0.000841
	2	0.049562	0.002743	0.534651	0.030038	0.054680	0.004988	0.550420	0.036770	0.051506	0.004032	0.554203	0.042486	0.053485	0.003722	0.537077	0.047944
	3	0.005036	0.001339	0.035317	0.023837	0.012976	0.001406	0.026260	0.016025	0.009163	0.000804	0.024029	0.016638	0.010207	0.001026	0.023366	0.017992
2001-2002		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
	0	0.241952	0.003450	0.032902	0.015813	0.245062	0.003064	0.035967	0.016486	0.229138	0.003416	0.036227	0.015931	0.242206	0.003464	0.034976	0.016097
	1	0.003378	0.007857	0.002169	0.001178	0.003384	0.010715	0.002991	0.001220	0.004059	0.012168	0.003822	0.001712	0.003042	0.009503	0.003260	0.001592
	2	0.058677	0.002447	0.509378	0.053480	0.041431	0.003690	0.523833	0.047475	0.044042	0.003090	0.525388	0.046812	0.044474	0.003776	0.512009	0.042173
	3	0.014336	0.001167	0.028665	0.023151	0.012185	0.001500	0.029099	0.021899	0.012336	0.001387	0.035409	0.025065	0.011260	0.001759	0.037623	0.032785

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,F and Age 15+

Joint Probabilities

Weighted Panel (L)

		Q1 - Q1				Q2 - Q2				Q3 - Q3				Q4 - Q4			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
2000-2001	0	0.786087	0.006584	0.025497	0.010047	0.762800	0.010947	0.026520	0.013031	0.764232	0.010605	0.027784	0.016848	0.775048	0.009965	0.034035	0.021263
	1	0.006584	0.001884	0.000146	0.000108	0.009356	0.007806	0.000568	0.000083	0.011312	0.009808	0.000399	0.000566	0.005377	0.003859	0.000000	0.000178
	2	0.039666	0.000391	0.093123	0.003939	0.040724	0.000545	0.095655	0.007263	0.034098	0.000168	0.095916	0.005815	0.027262	0.000418	0.097873	0.005963
	3	0.007509	0.000347	0.006111	0.011977	0.014123	0.000080	0.004478	0.006022	0.011595	0.000275	0.004213	0.006365	0.008625	0.000000	0.004051	0.006082
2001-2002	0	0.779133	0.006540	0.035783	0.018389	0.760506	0.009817	0.038458	0.018221	0.751073	0.011324	0.037038	0.021803	0.752808	0.007132	0.033448	0.022924
	1	0.004117	0.004785	0.000209	0.000095	0.009724	0.008560	0.000693	0.000400	0.009025	0.010419	0.000563	0.000850	0.007779	0.005875	0.000478	0.000109
	2	0.027529	0.000346	0.091054	0.005949	0.023942	0.000841	0.096242	0.006196	0.025167	0.000407	0.096501	0.006237	0.028830	0.000320	0.100073	0.006736
	3																

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,M and Age 15+

Joint Probabilities

Weighted Panel (L)

		Q1 - Q1				Q2 - Q2				Q3 - Q3				Q4 - Q4			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
2000-2001	0	0.189157	0.068477	0.019503	0.009364	0.139352	0.039769	0.007738	0.004896	0.126431	0.042189	0.010621	0.007913	0.149289	0.053132	0.017419	0.007529
	1	0.068884	0.296389	0.021401	0.009330	0.043091	0.407625	0.018538	0.005769	0.043051	0.409892	0.035672	0.012825	0.080981	0.294767	0.038577	0.023419
	2	0.022372	0.022986	0.205032	0.015809	0.023394	0.037631	0.230144	0.013539	0.015833	0.026483	0.223836	0.017126	0.023299	0.027954	0.220819	0.024941
	3	0.005821	0.013710	0.013996	0.017769	0.003182	0.015139	0.005316	0.004877	0.003333	0.009204	0.008114	0.007477	0.007956	0.006964	0.010137	0.012820
2001-2002	0	0.196684	0.051742	0.023097	0.014710	0.154505	0.028324	0.020087	0.006103	0.131204	0.032790	0.016642	0.008011	0.173188	0.063512	0.009504	0.015319
	1	0.089404	0.262396	0.035872	0.013891	0.056847	0.368741	0.060994	0.013582	0.059023	0.373427	0.042423	0.012895	0.055137	0.286867	0.029414	0.011400
	2	0.023134	0.012439	0.208532	0.015827	0.013931	0.012482	0.220987	0.014337	0.013132	0.019493	0.234728	0.010890	0.011052	0.018937	0.244694	0.012268
	3	0.012767	0.007513	0.011700	0.020293	0.003110	0.001906	0.013082	0.010984	0.008348	0.003991	0.017969	0.015033	0.012355	0.011261	0.022041	0.023052

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,F and Age 15+

Joint Probabilities

Weighted Panel (L)

		Q1 - Q1				Q2 - Q2				Q3 - Q3				Q4 - Q4			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
2000-2001	0	0.516763	0.128347	0.005622	0.003252	0.454822	0.120725	0.004883	0.002557	0.422762	0.131064	0.007857	0.002146	0.513182	0.110950	0.015666	0.006906
	1	0.119714	0.178679	0.001364	0.000201	0.082425	0.281823	0.001848	0.000627	0.068636	0.321500	0.000860	0.001264	0.101088	0.205588	0.002946	0.001563
	2	0.009475	0.000479	0.027409	0.000896	0.011391	0.004829	0.025071	0.000671	0.006204	0.005343	0.023916	0.001563	0.007048	0.001114	0.027086	0.000198
	3	0.003481	0.000977	0.000000	0.003341	0.005884	0.000907	0.000427	0.001112	0.003644	0.001698	0.000285	0.001257	0.003984	0.001602	0.000000	0.001081
2001-2002	0	0.533113	0.093818	0.015335	0.007168	0.454596	0.081135	0.013399	0.005393	0.393858	0.088284	0.011934	0.007171	0.477362	0.131229	0.009426	0.007284
	1	0.111436	0.191956	0.004502	0.000587	0.106037	0.294515	0.005247	0.002484	0.117457	0.338394	0.001465	0.002289	0.070918	0.244340	0.001145	0.002851
	2	0.007754	0.001627	0.023097	0.001916	0.005104	0.001869	0.023907	0.001348	0.006130	0.000880	0.024409	0.001499	0.006651	0.002366	0.033537	0.003142
	3	0.004629	0.000000	0.000609	0.002453	0.003536	0.000179	0.000834	0.000417	0.003677	0.000464	0.000801	0.001288	0.004119	0.000319	0.002445	0.002865

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,M and Age 15+

Forward Transition

Weighted Panel (L)

		Q1 - Q1				Q2 - Q2				Q3 - Q3				Q4 - Q4			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
2000-2001	0	0.783321	0.009431	0.164533	0.042715	0.822108	0.015406	0.122154	0.040332	0.804247	0.011718	0.132513	0.051522	0.794448	0.010271	0.137528	0.057754
	1	0.197963	0.488742	0.278127	0.035168	0.209014	0.432098	0.322517	0.036371	0.161737	0.590223	0.206732	0.041308	0.238023	0.573614	0.138599	0.049765
	2	0.080328	0.004446	0.866541	0.048685	0.084532	0.007711	0.850913	0.056844	0.078969	0.006182	0.849709	0.065140	0.083280	0.005796	0.836271	0.074653
	3	0.076845	0.020436	0.538958	0.363762	0.228988	0.024818	0.463405	0.282789	0.180970	0.015873	0.474562	0.328595	0.194092	0.019502	0.444292	0.342114
2001-2002	0	0.822636	0.011731	0.111868	0.053765	0.815298	0.010195	0.119659	0.054848	0.804808	0.011997	0.127241	0.055953	0.816213	0.011675	0.117867	0.054245
	1	0.231642	0.538831	0.148727	0.080800	0.184835	0.585203	0.163351	0.066611	0.186515	0.559178	0.175636	0.078671	0.174867	0.546218	0.187396	0.091519
	2	0.094037	0.003921	0.816335	0.085707	0.067211	0.005986	0.849788	0.077016	0.071112	0.004989	0.848315	0.075585	0.073824	0.006268	0.849903	0.070005
	3	0.212956	0.017333	0.425809	0.343903	0.188384	0.023192	0.449870	0.338554	0.166259	0.018688	0.477232	0.337821	0.134971	0.021080	0.450974	0.392975

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,F and Age 15+

Forward Transition

Weighted Panel (L)

		Q1 - Q1				Q2 - Q2				Q3 - Q3				Q4 - Q4			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
2000-2001	0	0.949134	0.007950	0.030785	0.012131	0.937910	0.013459	0.032607	0.016023	0.932594	0.012941	0.033905	0.020560	0.922335	0.011858	0.040503	0.025303
	1	0.754928	0.215979	0.016747	0.012347	0.525220	0.438233	0.031884	0.004663	0.512209	0.444110	0.018059	0.025621	0.571162	0.409908	0.000000	0.018930
	2	0.289279	0.002854	0.679137	0.028730	0.282438	0.003781	0.663408	0.050373	0.250724	0.001238	0.705279	0.042759	0.207287	0.003182	0.744187	0.045343
	3	0.289417	0.013372	0.235542	0.461669	0.571729	0.003241	0.181275	0.243755	0.516534	0.012259	0.187664	0.283543	0.459807	0.000000	0.215954	0.324239
2001-2002	0	0.927711	0.007787	0.042606	0.021896	0.919594	0.011871	0.046503	0.022033	0.914562	0.013789	0.045100	0.026549	0.922206	0.008736	0.040974	0.028083
	1	0.447255	0.519763	0.022684	0.010298	0.501831	0.441728	0.035778	0.020663	0.432730	0.499551	0.026971	0.040749	0.546232	0.412524	0.033556	0.007688
	2	0.220446	0.002767	0.729149	0.047638	0.188194	0.006609	0.756495	0.048702	0.196139	0.003170	0.752084	0.048607	0.212047	0.002353	0.736053	0.049547
	3	0.498485	0.005440	0.203068	0.293007	0.401654	0.015956	0.267935	0.314456	0.447550	0.006755	0.249341	0.296355	0.451439	0.002221	0.234787	0.311553

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,M and Age 15+

Forward Transition

Weighted Panel (L)

		Q1 - Q1				Q2 - Q2				Q3 - Q3				Q4 - Q4			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
2000-2001	0	0.660231	0.239012	0.068072	0.032685	0.726719	0.207394	0.040353	0.025534	0.675546	0.225424	0.056750	0.042280	0.656593	0.233683	0.076610	0.033113
	1	0.173947	0.748449	0.054042	0.023562	0.090713	0.858118	0.039025	0.012144	0.085855	0.817430	0.071140	0.025576	0.184996	0.673379	0.088126	0.053499
	2	0.084042	0.086349	0.770220	0.059388	0.076776	0.123497	0.755293	0.044434	0.055893	0.093487	0.790163	0.060457	0.078444	0.094119	0.743466	0.083971
	3	0.113470	0.267277	0.272856	0.346397	0.111581	0.530923	0.186444	0.171052	0.118502	0.327225	0.288455	0.265818	0.210040	0.183861	0.267637	0.338461
2001-2002	0	0.687145	0.180770	0.080692	0.051393	0.739191	0.135509	0.096100	0.029200	0.695496	0.173818	0.088219	0.042468	0.662227	0.242854	0.036341	0.058578
	1	0.222640	0.653437	0.089331	0.034593	0.113656	0.737240	0.121948	0.027155	0.121007	0.765583	0.086973	0.026436	0.144030	0.749356	0.076835	0.029779
	2	0.088999	0.047855	0.802258	0.060888	0.053224	0.047689	0.844311	0.054776	0.047197	0.070058	0.843607	0.039139	0.038516	0.065993	0.852737	0.042754
	3	0.244237	0.143719	0.223822	0.388222	0.106933	0.065528	0.449850	0.377689	0.184108	0.088033	0.396305	0.331554	0.179818	0.163889	0.320786	0.335507

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,F and Age 15+

Forward Transition

Weighted Panel (L)

		Q1 - Q1				Q2 - Q2				Q3 - Q3				Q4 - Q4			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
2000-2001	0	0.790177	0.196254	0.008596	0.004973	0.780159	0.207080	0.008375	0.004385	0.749805	0.232454	0.013935	0.003806	0.793535	0.171563	0.024224	0.010679
	1	0.399104	0.595679	0.004547	0.000670	0.224762	0.768491	0.005038	0.001710	0.174977	0.819608	0.002193	0.003222	0.324848	0.660662	0.009467	0.005022
	2	0.247659	0.012511	0.716406	0.023424	0.271466	0.115087	0.597464	0.015983	0.167554	0.144300	0.645921	0.042225	0.198838	0.031440	0.764140	0.005582
	3	0.446370	0.125240	0.000000	0.428390	0.706384	0.108916	0.051217	0.133482	0.529326	0.246625	0.041448	0.182602	0.597635	0.240252	0.000000	0.162114
2001-2002	0	0.820889	0.144461	0.023613	0.011037	0.819797	0.146315	0.024163	0.009725	0.785757	0.176128	0.023809	0.014305	0.763411	0.209865	0.015074	0.011649
	1	0.361241	0.622263	0.014593	0.001903	0.259715	0.721349	0.012852	0.006084	0.255560	0.736272	0.003188	0.004981	0.222138	0.765348	0.003585	0.008929
	2	0.225441	0.047307	0.671531	0.055721	0.158370	0.058008	0.741807	0.041815	0.186221	0.026747	0.741501	0.045532	0.145551	0.051784	0.733897	0.068767
	3	0.601867	0.000000	0.079197	0.318936	0.711961	0.035978	0.168034	0.084027	0.590097	0.074522	0.128591	0.206791	0.422532	0.032717	0.250823	0.293927

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,M and Age 15+

Backward Transition

Weighted Panel (L)

		Q1 - Q1				Q2 - Q2				Q3 - Q3				Q4 - Q4			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
2000-2001	0	0.803830	0.195213	0.079584	0.191512	0.762654	0.234628	0.055257	0.173869	0.773709	0.147492	0.058604	0.190199	0.771813	0.170198	0.065813	0.199574
	1	0.010539	0.524827	0.006979	0.008180	0.012261	0.416112	0.009225	0.009914	0.013201	0.630284	0.007757	0.012937	0.013549	0.556912	0.003886	0.010076
	2	0.168510	0.188126	0.856837	0.446214	0.181915	0.272445	0.892918	0.568467	0.180905	0.185289	0.894840	0.572617	0.180240	0.213940	0.891516	0.574688
	3	0.017121	0.091835	0.056600	0.354094	0.043171	0.076815	0.042601	0.247750	0.032185	0.036936	0.038799	0.224247	0.034398	0.058950	0.038785	0.215662
2001-2002	0	0.760035	0.231237	0.057410	0.168906	0.811297	0.161551	0.060766	0.189325	0.791293	0.170278	0.060293	0.177955	0.804718	0.187244	0.059497	0.173744
	1	0.010611	0.526581	0.003784	0.012585	0.011204	0.564842	0.005053	0.014005	0.014016	0.606578	0.006361	0.019123	0.010108	0.513620	0.005546	0.017186
	2	0.184322	0.163983	0.888791	0.571230	0.137159	0.194525	0.885018	0.545190	0.152091	0.154021	0.874414	0.522926	0.147762	0.204086	0.870958	0.455202
	3	0.045032	0.078199	0.050015	0.247279	0.040340	0.079083	0.049162	0.251479	0.042600	0.069123	0.058932	0.279995	0.037411	0.095050	0.063999	0.353867

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,F and Age 15+

Backward Transition

Weighted Panel (L)

		Q1 - Q1				Q2 - Q2				Q3 - Q3				Q4 - Q4			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
2000-2001	0	0.935990	0.715198	0.204177	0.385367	0.922367	0.564899	0.208454	0.493626	0.930586	0.508473	0.216537	0.569307	0.949451	0.699656	0.250335	0.634966
	1	0.007839	0.204606	0.001170	0.004130	0.011313	0.402833	0.004464	0.003146	0.013775	0.470262	0.003108	0.019120	0.006587	0.270963	0.000000	0.005322
	2	0.047230	0.042511	0.745719	0.151103	0.049243	0.028137	0.751883	0.275131	0.041520	0.008070	0.747522	0.196495	0.033396	0.029381	0.719871	0.178087
	3	0.008940	0.037685	0.048935	0.459400	0.017078	0.004131	0.035199	0.228097	0.014119	0.013194	0.032832	0.215078	0.010566	0.000000	0.029794	0.181625
2001-2002	0	0.945808	0.553670	0.270385	0.573370	0.944991	0.499877	0.269945	0.550178	0.940593	0.506676	0.261786	0.578939	0.935707	0.532167	0.235778	0.570217
	1	0.004998	0.405074	0.001578	0.002956	0.012083	0.435863	0.004866	0.012090	0.011303	0.466180	0.003976	0.022568	0.009670	0.438413	0.003369	0.002723
	2	0.033418	0.029250	0.688032	0.185485	0.029750	0.042812	0.675540	0.187081	0.031517	0.018199	0.682082	0.165609	0.035834	0.023870	0.705431	0.167559
	3	0.015777	0.012007	0.040005	0.238189	0.013175	0.021448	0.049648	0.250652	0.016587	0.008944	0.052156	0.232884	0.018790	0.005549	0.055421	0.259501

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,M and Age 15+

Backward Transition

Weighted Panel (L)

		Q1 - Q1				Q2 - Q2				Q3 - Q3				Q4 - Q4			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
2000-2001	0	0.660849	0.170527	0.075030	0.179142	0.666697	0.079512	0.029563	0.168360	0.670194	0.086494	0.038172	0.174521	0.570843	0.138793	0.060703	0.109579
	1	0.240656	0.738089	0.082333	0.178497	0.206157	0.814983	0.070827	0.198361	0.228207	0.840342	0.128206	0.282852	0.309649	0.769993	0.134436	0.340847
	2	0.078160	0.057242	0.788790	0.302437	0.111924	0.075237	0.879298	0.465564	0.083930	0.054294	0.804462	0.377720	0.089088	0.073023	0.769534	0.362993
	3	0.020335	0.034142	0.053846	0.339925	0.015222	0.030268	0.020312	0.167716	0.017669	0.018870	0.029161	0.164908	0.030420	0.018191	0.035327	0.186581
2001-2002	0	0.610842	0.154875	0.082724	0.227287	0.676490	0.068839	0.063737	0.135611	0.619743	0.076310	0.053382	0.171078	0.687985	0.166884	0.031094	0.246930
	1	0.277662	0.785405	0.128481	0.214629	0.248900	0.896193	0.193540	0.301782	0.278797	0.869037	0.136075	0.275357	0.219031	0.753770	0.096233	0.183752
	2	0.071846	0.037233	0.746891	0.244537	0.060994	0.030337	0.701211	0.318553	0.062030	0.045364	0.752907	0.232549	0.043904	0.049758	0.800563	0.197750
	3	0.039650	0.022487	0.041904	0.313547	0.013616	0.004632	0.041512	0.244054	0.039430	0.009289	0.057636	0.321016	0.049080	0.029588	0.072110	0.371568

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,F and Age 15+

Backward Transition

Weighted Panel (L)

		Q1 - Q1				Q2 - Q2				Q3 - Q3				Q4 - Q4			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
2000-2001	0	0.795713	0.416061	0.163446	0.422904	0.820205	0.295689	0.151503	0.514801	0.843422	0.285167	0.238683	0.344458	0.820696	0.347530	0.342814	0.708501
	1	0.184337	0.579220	0.039654	0.026124	0.148642	0.690261	0.057330	0.126259	0.136932	0.699514	0.026131	0.202875	0.161662	0.643963	0.064470	0.160336
	2	0.014590	0.001552	0.796900	0.116528	0.020542	0.011828	0.777928	0.135049	0.012377	0.011625	0.726519	0.250926	0.011271	0.003491	0.592717	0.020299
	3	0.005361	0.003166	0.000000	0.434443	0.010611	0.002222	0.013238	0.223891	0.007269	0.003694	0.008667	0.201742	0.006371	0.005016	0.000000	0.110865
2001-2002	0	0.811520	0.326435	0.352181	0.591197	0.798555	0.214814	0.308818	0.559330	0.755789	0.206259	0.309103	0.585492	0.853880	0.346933	0.202482	0.451251
	1	0.169631	0.667904	0.103385	0.048429	0.186268	0.779763	0.120944	0.257620	0.225392	0.790599	0.037947	0.186923	0.126855	0.645968	0.024586	0.176594
	2	0.011803	0.005661	0.530445	0.158069	0.008966	0.004950	0.551005	0.139769	0.011763	0.002057	0.632198	0.122383	0.011898	0.006256	0.720414	0.194672
	3	0.007046	0.000000	0.013988	0.202305	0.006211	0.000473	0.019234	0.043281	0.007055	0.001085	0.020751	0.105202	0.007367	0.000843	0.052518	0.177484

Appendix D: Joint Probabilities, Forward and Backward Quarterly Transition Probabilities

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,M and Age 15+

Joint Probabilities

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.246433	0.004224	0.038767	0.012395	0.232253	0.005382	0.031931	0.009276	0.238566	0.001307	0.026913	0.007115	0.250749	0.002552	0.022777	0.012211
	1	0.002185	0.010090	0.002698	0.000685	0.002236	0.011808	0.003083	0.000505	0.005381	0.013317	0.003064	0.001476	0.003698	0.010067	0.002476	0.000651
	2	0.022506	0.002593	0.570907	0.020989	0.030876	0.004315	0.590298	0.021369	0.035942	0.002065	0.590912	0.023308	0.031342	0.001347	0.577944	0.031595
	3	0.007718	0.000725	0.034486	0.022600	0.008536	0.001732	0.026916	0.019485	0.008400	0.000203	0.021340	0.020692	0.008328	0.000616	0.020785	0.022861
2001	0	0.259814	0.004313	0.022263	0.007728	0.251613	0.005627	0.028138	0.015202	0.245324	0.002036	0.025084	0.012268	0.263268	0.002535	0.019709	0.011231
	1	0.002697	0.008753	0.002303	0.000830	0.002267	0.011498	0.002509	0.002035	0.005029	0.012089	0.002396	0.002246	0.004123	0.009443	0.002371	0.001461
	2	0.028018	0.003603	0.562357	0.030005	0.023007	0.002867	0.562483	0.028071	0.034201	0.002652	0.545108	0.037370	0.037795	0.001741	0.524619	0.038277
	3	0.010051	0.001641	0.029506	0.026120	0.007824	0.001768	0.026202	0.028889	0.012190	0.000621	0.029843	0.031542	0.013157	0.001201	0.026415	0.042653
2002	0	0.267400	0.004702	0.030220	0.016021	0.254668	0.003231	0.025908	0.018256	0.252817	0.002436	0.022956	0.011365	0.252817	0.002436	0.022956	0.011365
	1	0.001904	0.009697	0.002737	0.000583	0.003076	0.012716	0.002181	0.000995	0.004734	0.011569	0.002163	0.001593	0.004734	0.011569	0.002163	0.001593
	2	0.020674	0.003235	0.523628	0.025578	0.021692	0.002019	0.540886	0.027293	0.029202	0.003097	0.533261	0.035285	0.029202	0.003097	0.533261	0.035285
	3	0.012084	0.001336	0.035305	0.044898	0.010138	0.002094	0.031871	0.042975	0.014229	0.001400	0.029488	0.044403	0.014229	0.001400	0.029488	0.044403

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,F and Age 15+

Joint Probabilities

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.779383	0.011401	0.024784	0.012647	0.774149	0.010257	0.018578	0.010313	0.791475	0.002683	0.016922	0.008390	0.808786	0.004927	0.015110	0.011488
	1	0.003382	0.005089	0.000250	0.000000	0.005437	0.010765	0.001214	0.000397	0.015328	0.006285	0.000376	0.000096	0.005067	0.003893	0.000212	0.000242
	2	0.018487	0.000748	0.114268	0.003617	0.028369	0.000754	0.112880	0.002184	0.022792	0.000114	0.110850	0.002241	0.018919	0.000385	0.107358	0.004855
	3	0.012045	0.000574	0.004885	0.008439	0.011514	0.000309	0.003325	0.009555	0.010717	0.000332	0.003369	0.008031	0.007074	0.000000	0.002197	0.009487
2001	0	0.794448	0.012650	0.020600	0.012147	0.783023	0.010600	0.020545	0.012834	0.774024	0.006773	0.024958	0.015482	0.779140	0.005912	0.018123	0.013137
	1	0.003308	0.005651	0.000177	0.000070	0.009219	0.009441	0.000446	0.000273	0.013881	0.006446	0.000248	0.000282	0.008504	0.005449	0.000113	0.000176
	2	0.017296	0.000283	0.103158	0.004140	0.018607	0.000740	0.103003	0.004870	0.016483	0.000689	0.105769	0.005371	0.021217	0.000204	0.109481	0.005058
	3	0.011951	0.000794	0.003284	0.010042	0.010389	0.000075	0.004318	0.011617	0.011925	0.000334	0.004985	0.012350	0.014916	0.000248	0.004623	0.013700
2002	0	0.772317	0.010590	0.024263	0.016605	0.757285	0.010572	0.018713	0.018206	0.754936	0.005006	0.020247	0.018321				
	1	0.003101	0.008205	0.000506	0.000000	0.008124	0.010887	0.000141	0.000486	0.013211	0.008189	0.000585	0.000365				
	2	0.015936	0.000509	0.112459	0.003436	0.019940	0.000497	0.116486	0.005544	0.020030	0.000119	0.115846	0.005485				
	3	0.013421	0.000334	0.005238	0.013078	0.013161	0.000394	0.006141	0.013423	0.016358	0.000086	0.005183	0.016032				

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,M and Age 15+

Joint Probabilities

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.159675	0.099451	0.024283	0.003092	0.144838	0.036562	0.004489	0.005867	0.151442	0.021051	0.009705	0.004956	0.176596	0.040210	0.006988	0.003575
	1	0.020667	0.339447	0.030441	0.005449	0.028282	0.425987	0.016085	0.004668	0.061965	0.395425	0.036279	0.007770	0.087078	0.326548	0.013264	0.010854
	2	0.007993	0.018447	0.234071	0.005687	0.010873	0.029382	0.258166	0.006287	0.011641	0.018640	0.243753	0.009244	0.019281	0.029221	0.233473	0.015038
	3	0.003421	0.017676	0.015913	0.014285	0.003161	0.009509	0.004538	0.011306	0.002321	0.002627	0.007275	0.015905	0.003278	0.005585	0.006207	0.022806
2001	0	0.170514	0.095036	0.014693	0.005991	0.143435	0.039986	0.014231	0.011367	0.147284	0.022529	0.011352	0.007483	0.200467	0.045100	0.008120	0.007837
	1	0.024200	0.360327	0.012298	0.004737	0.034879	0.430835	0.025348	0.009101	0.093610	0.338876	0.035093	0.020188	0.086622	0.265766	0.018188	0.012242
	2	0.009033	0.022025	0.220726	0.008148	0.008205	0.013449	0.231352	0.008730	0.014000	0.016213	0.229973	0.018058	0.021143	0.012356	0.239013	0.014438
	3	0.005272	0.022775	0.014020	0.010206	0.002130	0.003497	0.007312	0.016143	0.006630	0.005200	0.010533	0.022979	0.013756	0.010867	0.013880	0.030205
2002	0	0.183775	0.102668	0.025147	0.010398	0.167488	0.043768	0.012312	0.004824	0.164158	0.029372	0.006656	0.011522				
	1	0.031352	0.277467	0.020804	0.004466	0.028337	0.357413	0.020555	0.005148	0.066292	0.323855	0.030339	0.009217				
	2	0.008344	0.017780	0.245938	0.007138	0.013062	0.019387	0.266404	0.016297	0.014408	0.022246	0.259614	0.015494				
	3	0.004919	0.013538	0.023262	0.023003	0.002821	0.009134	0.012491	0.020560	0.006875	0.005104	0.009043	0.025807				

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,F and Age 15+

Joint Probabilities

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.513607	0.128869	0.007761	0.003747	0.490495	0.085764	0.003508	0.003219	0.515049	0.043450	0.003571	0.001759	0.545044	0.091639	0.006221	0.003800
	1	0.061750	0.234534	0.002625	0.001049	0.063572	0.300053	0.002200	0.000898	0.123247	0.266483	0.001194	0.001337	0.096234	0.213504	0.001103	0.000343
	2	0.004756	0.002354	0.031148	0.000000	0.004735	0.006089	0.030879	0.000259	0.006039	0.000000	0.030327	0.000660	0.004329	0.003338	0.026857	0.000922
	3	0.002873	0.000965	0.000428	0.003533	0.005029	0.000355	0.000439	0.002508	0.002369	0.001250	0.000355	0.002910	0.003827	0.000000	0.000213	0.002626
2001	0	0.499312	0.143368	0.003795	0.002959	0.439275	0.104535	0.006760	0.003952	0.427369	0.055652	0.011668	0.006557	0.534646	0.077907	0.006146	0.006602
	1	0.047054	0.260068	0.000821	0.000538	0.055816	0.351738	0.000518	0.000212	0.190944	0.262846	0.003545	0.002271	0.108038	0.207909	0.002836	0.000471
	2	0.003989	0.002217	0.027507	0.000682	0.003629	0.003082	0.024794	0.000722	0.003777	0.000000	0.028727	0.000415	0.008597	0.001288	0.033566	0.002247
	3	0.004168	0.002631	0.000105	0.000788	0.002527	0.000250	0.000846	0.001344	0.003211	0.000756	0.001758	0.000506	0.005652	0.000297	0.000994	0.002804
2002	0	0.505287	0.136154	0.011258	0.004234	0.451991	0.105982	0.006297	0.005003	0.441212	0.066246	0.008363	0.005300				
	1	0.049755	0.234849	0.002039	0.000758	0.058473	0.317465	0.000774	0.000987	0.106474	0.310007	0.005707	0.005834				
	2	0.009030	0.004750	0.029436	0.000327	0.006799	0.003049	0.031046	0.002492	0.005029	0.001369	0.031577	0.000635				
	3	0.005201	0.001946	0.000655	0.004322	0.003858	0.001527	0.000492	0.003765	0.006336	0.000633	0.000905	0.004373				

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,M and Age 15+

Forward Transition

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.816494	0.013994	0.128446	0.041066	0.832921	0.019301	0.114511	0.033266	0.870995	0.004771	0.098259	0.025975	0.869780	0.008853	0.079009	0.042358
	1	0.139558	0.644396	0.172269	0.043777	0.126803	0.669722	0.174835	0.028640	0.231583	0.573066	0.131847	0.063504	0.218950	0.595964	0.146563	0.038524
	2	0.036476	0.004203	0.925304	0.034017	0.047732	0.006671	0.912561	0.033035	0.055107	0.003166	0.905991	0.035736	0.048802	0.002098	0.899904	0.049196
	3	0.117787	0.011060	0.526274	0.344879	0.150626	0.030562	0.474973	0.343839	0.165894	0.004004	0.421448	0.408654	0.158365	0.011706	0.395231	0.434699
2001	0	0.883367	0.014663	0.075695	0.026275	0.837093	0.018721	0.093611	0.050575	0.861657	0.007152	0.088104	0.043087	0.887189	0.008544	0.066418	0.037849
	1	0.184959	0.600234	0.157904	0.056903	0.123822	0.628015	0.137037	0.111125	0.231105	0.555540	0.110125	0.103229	0.236972	0.542786	0.136270	0.083971
	2	0.044901	0.005774	0.901238	0.048086	0.037324	0.004652	0.912487	0.045538	0.055223	0.004282	0.880155	0.060340	0.062737	0.002890	0.870836	0.063537
	3	0.149309	0.024370	0.438311	0.388010	0.120960	0.027328	0.405083	0.446629	0.164296	0.008370	0.402212	0.425122	0.157712	0.014402	0.316624	0.511263
2002	0	0.839976	0.014770	0.094929	0.050325	0.843097	0.010697	0.085769	0.060437	0.873066	0.008412	0.079274	0.039248				
	1	0.127627	0.649856	0.183452	0.039064	0.162174	0.670367	0.114987	0.052472	0.236004	0.576735	0.107835	0.079425				
	2	0.036072	0.005644	0.913654	0.044629	0.036649	0.003410	0.913828	0.046112	0.048602	0.005155	0.887518	0.058726				
	3	0.129068	0.014268	0.377098	0.479565	0.116423	0.024050	0.366005	0.493523	0.158944	0.015639	0.329403	0.496015				

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,F and Age 15+

Forward Transition

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.941039	0.013766	0.029925	0.015270	0.951865	0.012612	0.022843	0.012680	0.965838	0.003275	0.020650	0.010238	0.962484	0.005863	0.017982	0.013671
	1	0.387783	0.583519	0.028698	0.000000	0.305229	0.604370	0.068130	0.022272	0.694054	0.284569	0.017028	0.004348	0.538177	0.413557	0.022513	0.025752
	2	0.134824	0.005457	0.833341	0.026378	0.196751	0.005227	0.782874	0.015148	0.167589	0.000840	0.815091	0.016480	0.143850	0.002931	0.816304	0.036915
	3	0.464283	0.022137	0.188291	0.325289	0.466108	0.012496	0.134609	0.386787	0.477392	0.014793	0.150066	0.357748	0.377124	0.000000	0.117119	0.505757
2001	0	0.945945	0.015063	0.024529	0.014463	0.946820	0.012817	0.024843	0.015519	0.942509	0.008247	0.030391	0.018853	0.954463	0.007242	0.022201	0.016094
	1	0.359288	0.613870	0.019272	0.007569	0.475731	0.487205	0.022994	0.014070	0.665518	0.309060	0.011890	0.013532	0.597088	0.382581	0.007945	0.012387
	2	0.138505	0.002264	0.826080	0.033151	0.146256	0.005820	0.809643	0.038281	0.128457	0.005372	0.824312	0.041859	0.156051	0.001497	0.805246	0.037206
	3	0.458401	0.030439	0.125974	0.385186	0.393529	0.002854	0.163556	0.440062	0.402966	0.011273	0.168433	0.417328	0.445432	0.007411	0.138043	0.409114
2002	0	0.937533	0.012856	0.029454	0.020157	0.940988	0.013136	0.023253	0.022623	0.945431	0.006270	0.025355	0.022944				
	1	0.262549	0.694637	0.042814	0.000000	0.413688	0.554386	0.007162	0.024764	0.591090	0.366409	0.026192	0.016309				
	2	0.120420	0.003847	0.849771	0.025961	0.139960	0.003487	0.817639	0.038914	0.141574	0.000843	0.818814	0.038769				
	3	0.418472	0.010416	0.163334	0.407779	0.397385	0.011894	0.185418	0.405302	0.434368	0.002291	0.137631	0.425710				

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,M and Age 15+

Forward Transition

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.557327	0.347122	0.084757	0.010794	0.755328	0.190669	0.023408	0.030595	0.809182	0.112480	0.051856	0.026483	0.776695	0.176847	0.030736	0.015721
	1	0.052189	0.857181	0.076869	0.013761	0.059538	0.896773	0.033861	0.009828	0.123573	0.788580	0.072350	0.015496	0.198925	0.745980	0.030300	0.024795
	2	0.030025	0.069299	0.879311	0.021366	0.035683	0.096427	0.847257	0.020633	0.041095	0.065800	0.860471	0.032634	0.064916	0.098382	0.786072	0.050630
	3	0.066686	0.344599	0.310226	0.278489	0.110865	0.333468	0.159163	0.396504	0.082527	0.093385	0.258642	0.565446	0.086553	0.147452	0.163868	0.602128
2001	0	0.595716	0.332025	0.051331	0.020929	0.686230	0.191305	0.068084	0.054381	0.780732	0.119425	0.060175	0.039669	0.766536	0.172452	0.031047	0.029965
	1	0.060265	0.897312	0.030626	0.011798	0.069735	0.861389	0.050680	0.018197	0.191916	0.694749	0.071947	0.041389	0.226275	0.694236	0.047511	0.031979
	2	0.034751	0.084733	0.849168	0.031347	0.031348	0.051385	0.883911	0.033356	0.050314	0.058268	0.826518	0.064900	0.073682	0.043061	0.832940	0.050316
	3	0.100859	0.435701	0.268201	0.195238	0.073244	0.120241	0.251437	0.555079	0.146223	0.114678	0.232304	0.506795	0.200209	0.158167	0.202013	0.439611
2002	0	0.570752	0.318856	0.078098	0.032293	0.733335	0.191634	0.053907	0.021124	0.775401	0.138737	0.031440	0.054423	0.775401	0.138737	0.031440	0.054423
	1	0.093844	0.830515	0.062272	0.013369	0.068870	0.868662	0.049956	0.012512	0.154273	0.753673	0.070604	0.021449	0.154273	0.753673	0.070604	0.021449
	2	0.029887	0.063681	0.880864	0.025568	0.041448	0.061517	0.845324	0.051711	0.046215	0.071354	0.832733	0.049699	0.046215	0.071354	0.832733	0.049699
	3	0.076008	0.209169	0.359408	0.355415	0.062671	0.202960	0.277537	0.456832	0.146809	0.108992	0.193104	0.551096	0.146809	0.108992	0.193104	0.551096

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,F and Age 15+

Forward Transition

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.785351	0.197052	0.011868	0.005729	0.841349	0.147112	0.006018	0.005522	0.913484	0.077063	0.006333	0.003121	0.842803	0.141702	0.009619	0.005876
	1	0.205861	0.781890	0.008750	0.003499	0.173351	0.818203	0.005998	0.002448	0.314197	0.679352	0.003044	0.003408	0.309252	0.686101	0.003546	0.001102
	2	0.124318	0.061540	0.814142	0.000000	0.112832	0.145109	0.735878	0.006181	0.163100	0.000000	0.819073	0.017827	0.122127	0.094177	0.757685	0.026011
	3	0.368357	0.123760	0.054835	0.453048	0.603685	0.042578	0.052709	0.301027	0.344100	0.181645	0.051543	0.422712	0.574064	0.000000	0.032010	0.393926
2001	0	0.768841	0.220759	0.005844	0.004556	0.792168	0.188514	0.012191	0.007127	0.852614	0.111027	0.023278	0.013081	0.855022	0.124591	0.009829	0.010558
	1	0.152535	0.843059	0.002662	0.001744	0.136708	0.861503	0.001269	0.000520	0.415452	0.571895	0.007713	0.004940	0.338406	0.651234	0.008884	0.001475
	2	0.115979	0.064466	0.799739	0.019816	0.112597	0.095643	0.769351	0.022410	0.114735	0.000000	0.872671	0.012594	0.188118	0.028178	0.734526	0.049178
	3	0.541912	0.342056	0.013618	0.102414	0.508756	0.050315	0.170265	0.270663	0.515404	0.121304	0.282157	0.081136	0.579826	0.030520	0.101962	0.287692
2002	0	0.769162	0.207257	0.017137	0.006445	0.793979	0.186170	0.011061	0.008789	0.846659	0.127122	0.016048	0.010171				
	1	0.173120	0.817147	0.007096	0.002638	0.154813	0.840525	0.002048	0.002614	0.248758	0.724277	0.013334	0.013631				
	2	0.207379	0.109079	0.676022	0.007519	0.156715	0.070282	0.715565	0.057438	0.130242	0.035451	0.817873	0.016435				
	3	0.428985	0.160540	0.053990	0.356484	0.400150	0.158340	0.051062	0.390448	0.517317	0.051678	0.073931	0.357074				

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,M and Age 15+

Backward Transition

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.883772	0.239548	0.059932	0.218723	0.847947	0.231611	0.048956	0.183195	0.827523	0.077369	0.041906	0.135284	0.852545	0.175028	0.036503	0.181399
	1	0.007837	0.572285	0.004170	0.012097	0.008163	0.508159	0.004726	0.009973	0.018667	0.788365	0.004771	0.028060	0.012574	0.690349	0.003968	0.009666
	2	0.080711	0.147064	0.882585	0.370376	0.112727	0.185699	0.905050	0.422023	0.124673	0.122262	0.920096	0.443199	0.106564	0.092406	0.926218	0.469337
	3	0.027680	0.041103	0.053313	0.398805	0.031163	0.074530	0.041268	0.384809	0.029137	0.012004	0.033228	0.393457	0.028317	0.042217	0.033311	0.339598
2001	0	0.864376	0.235552	0.036116	0.119474	0.883748	0.258589	0.045432	0.204888	0.826718	0.117034	0.041638	0.147046	0.826996	0.169919	0.034390	0.119966
	1	0.008973	0.478048	0.003735	0.012828	0.007963	0.528406	0.004051	0.027422	0.016947	0.694840	0.003978	0.026926	0.012951	0.632883	0.004137	0.015605
	2	0.093212	0.196798	0.912282	0.463879	0.080809	0.131773	0.908210	0.378330	0.115255	0.152430	0.904847	0.447942	0.118723	0.116677	0.915384	0.408844
	3	0.033439	0.089603	0.047866	0.403819	0.027480	0.081232	0.042307	0.389361	0.041080	0.035696	0.049537	0.378087	0.041331	0.080521	0.046090	0.455586
2002	0	0.885250	0.247880	0.051057	0.183977	0.879455	0.161067	0.043118	0.203930	0.839973	0.131650	0.039049	0.122672				
	1	0.006305	0.511183	0.004625	0.006694	0.010624	0.633909	0.003630	0.011119	0.015729	0.625295	0.003680	0.017197				
	2	0.068442	0.170518	0.884671	0.293730	0.074912	0.100626	0.900207	0.304883	0.097024	0.167390	0.907110	0.380857				
	3	0.040004	0.070420	0.059647	0.515599	0.035010	0.104398	0.053044	0.480068	0.047274	0.075665	0.050161	0.479274				

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: U,F and Age 15+

Backward Transition

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.958300	0.640059	0.171890	0.511961	0.944696	0.464442	0.136606	0.459392	0.941883	0.285033	0.128669	0.447259	0.963018	0.535205	0.121002	0.440612
	1	0.004158	0.285693	0.001736	0.000000	0.006635	0.487454	0.008923	0.017673	0.018241	0.667560	0.002860	0.005119	0.006033	0.422926	0.001697	0.009299
	2	0.022731	0.042006	0.792495	0.146416	0.034619	0.034127	0.830020	0.097296	0.027123	0.012134	0.842857	0.119484	0.022526	0.041869	0.859709	0.186215
	3	0.014810	0.032242	0.033879	0.341623	0.014051	0.013977	0.024451	0.425639	0.012753	0.035274	0.025614	0.428137	0.008423	0.000000	0.017592	0.363873
2001	0	0.960635	0.652826	0.161925	0.460134	0.953468	0.508231	0.160120	0.433675	0.948196	0.475571	0.183569	0.462354	0.945815	0.500483	0.136945	0.409624
	1	0.003999	0.291632	0.001395	0.002640	0.011225	0.452659	0.003473	0.009213	0.017004	0.452605	0.001824	0.008428	0.010323	0.461274	0.000855	0.005500
	2	0.020914	0.014588	0.810864	0.156815	0.022657	0.035498	0.802757	0.164562	0.020191	0.048400	0.777945	0.160395	0.025755	0.017235	0.827270	0.157722
	3	0.014451	0.040954	0.025816	0.380411	0.012650	0.003612	0.033650	0.392549	0.014609	0.023424	0.036663	0.368823	0.018107	0.021009	0.034929	0.427154
2002	0	0.959667	0.539251	0.170310	0.501374	0.948373	0.473010	0.132266	0.483442	0.938351	0.373576	0.142721	0.455718				
	1	0.003854	0.417814	0.003550	0.000000	0.010174	0.487137	0.000994	0.012914	0.016420	0.611086	0.004126	0.009067				
	2	0.019802	0.025926	0.789371	0.103738	0.024971	0.022227	0.823335	0.147211	0.024896	0.008901	0.816616	0.136435				
	3	0.016677	0.017010	0.036770	0.394888	0.016482	0.017626	0.043404	0.356433	0.020332	0.006437	0.036537	0.398780				

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,M and Age 15+

Backward Transition

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.832702	0.209361	0.079693	0.108448	0.773898	0.072914	0.015845	0.208570	0.666062	0.048090	0.032676	0.130856	0.616966	0.100133	0.026885	0.068383
	1	0.107778	0.714593	0.099901	0.191109	0.151115	0.849528	0.056781	0.165971	0.272529	0.903328	0.122147	0.205153	0.304220	0.813192	0.051028	0.207637
	2	0.041681	0.038834	0.768182	0.199459	0.058096	0.058596	0.911353	0.223512	0.051200	0.042581	0.820682	0.244068	0.067360	0.072767	0.898208	0.287682
	3	0.017839	0.037212	0.052225	0.500984	0.016891	0.018963	0.016021	0.401947	0.010210	0.006001	0.024495	0.419923	0.011453	0.013908	0.023878	0.436297
2001	0	0.815782	0.190011	0.056135	0.205991	0.760328	0.081978	0.051146	0.250692	0.563176	0.058851	0.039560	0.108917	0.622591	0.134995	0.029082	0.121080
	1	0.115779	0.720418	0.046988	0.162901	0.184887	0.883279	0.091101	0.200729	0.357942	0.885215	0.122298	0.293824	0.269022	0.795492	0.065143	0.189150
	2	0.043216	0.044035	0.843314	0.280181	0.043493	0.027573	0.831473	0.192549	0.053531	0.042351	0.801436	0.262822	0.065664	0.036985	0.856062	0.223083
	3	0.025223	0.045535	0.053564	0.350927	0.011291	0.007169	0.026280	0.356029	0.025351	0.013582	0.036706	0.334437	0.042722	0.032528	0.049713	0.466687
2002	0	0.804650	0.249526	0.079793	0.231035	0.791128	0.101856	0.039492	0.103023	0.652113	0.077177	0.021777	0.185714				
	1	0.137275	0.674359	0.066014	0.099241	0.133849	0.831769	0.065931	0.109931	0.263341	0.850960	0.099260	0.148561				
	2	0.036536	0.043212	0.780382	0.158611	0.061700	0.045118	0.854512	0.348001	0.057235	0.058452	0.849378	0.249744				
	3	0.021539	0.032902	0.073811	0.511112	0.013323	0.021258	0.040065	0.439045	0.027310	0.013411	0.029586	0.415981				

Results are for 4x4 transition matrices for Agricultural Employment:

Conditions: R,F and Age 15+

Backward Transition

Weighted Panel (L)

	Q1 - Q2				Q2 - Q3				Q3 - Q4				Q4 - Q1				
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	
2000	0	0.880994	0.351406	0.184959	0.449826	0.869934	0.218641	0.094750	0.467642	0.796422	0.139629	0.100735	0.263945	0.839260	0.297066	0.180862	0.494093
	1	0.105920	0.639541	0.062549	0.125982	0.112750	0.764932	0.059406	0.130405	0.190577	0.856353	0.033685	0.200523	0.148182	0.692112	0.032083	0.044582
	2	0.008158	0.006420	0.742300	0.000000	0.008397	0.015523	0.833985	0.037679	0.009338	0.000000	0.855571	0.099019	0.006666	0.010821	0.780852	0.119886
	3	0.004928	0.002632	0.010192	0.424193	0.008919	0.000904	0.011858	0.364273	0.003663	0.004018	0.010010	0.436513	0.005892	0.000000	0.006204	0.341439
2001	0	0.900435	0.351148	0.117757	0.595832	0.876366	0.227446	0.205361	0.634294	0.683461	0.174319	0.255330	0.672674	0.813853	0.271074	0.141155	0.544513
	1	0.084855	0.636978	0.025480	0.108326	0.111354	0.765304	0.015741	0.034052	0.305363	0.823313	0.077576	0.232934	0.164458	0.723410	0.065140	0.038842
	2	0.007194	0.005431	0.853513	0.137242	0.007239	0.006706	0.753211	0.115915	0.006040	0.000000	0.628624	0.042530	0.013086	0.004480	0.770881	0.185355
	3	0.007516	0.006443	0.003250	0.158599	0.005041	0.000544	0.025687	0.215739	0.005136	0.002367	0.038470	0.051862	0.008603	0.001035	0.022825	0.231290
2002	0	0.887601	0.360482	0.259467	0.439128	0.867343	0.247608	0.163096	0.408532	0.789217	0.175136	0.179641	0.328352				
	1	0.087401	0.621789	0.047003	0.078631	0.112206	0.741701	0.020036	0.080601	0.190456	0.819573	0.122594	0.361434				
	2	0.015862	0.012575	0.678442	0.033958	0.013048	0.007124	0.804117	0.203482	0.008995	0.003619	0.678315	0.039308				
	3	0.009137	0.005153	0.015087	0.448283	0.007403	0.003567	0.012751	0.307384	0.011333	0.001673	0.019450	0.270906				

Appendix E: Comparisons of weighted and unweighted MNL Estimates of Transitions

Table E1: MNL Estimates of Transitions from the agricultural sector (Annual)						
	Non-Participant		Non-Agriculture		Unemployment	
	Adjusted Panel	Balanced Panel	Adjusted Panel	Balanced Panel	Adjusted Panel	Balanced Panel
<u>Residential Area: (Ref. urban_male)</u>						
urban_female	1.419***	1.491***	-2.009***	-1.999***	-1.300***	-1.257***
rural_female	.065	.297***	-3.770***	-3.502***	-3.356***	-2.913***
rural_male	-.778***	-.649***	-1.233***	-1.169***	-1.176***	-1.158***
<u>Age Groups: (Ref. age_15_24)</u>						
age_2534	-.223**	-.231**	.055	.078	-.666***	-.714***
age_3544	-.438***	-.441***	.042	.093	-.842***	-.895***
age_4554	-.391***	-.399***	-.587***	-.595***	-1.572***	-1.610***
age_5564	.174	.155	-1.002***	-.983***	-2.543***	-2.530***
age_65over	1.001***	.992***	-1.756***	-1.637***	-3.832***	-3.595***
<u>Marital Status: (Ref. married)</u>						
single	.361***	.330***	-.193	-.159	.007	-.008
divorced	.310	.316	.517	.431	1.101	1.049
widow	.425***	.414***	-.205	-.125	.054	.019
<u>Education Levels: (Ref. primary5)</u>						
illit	.188***	.189***	-.031	-.098	.580***	.589***
lit	-.164*	-.166*	-.264	-.168	.137	.201
primary8	.595*	.623*	.322	.342	.088	.053
midall	.263**	.267**	.125	.132	-.210	-.197
highgen	-.236	-.252	.221	.202	.261	.338
highvoc	-.175	-.201	.326	.272	-.657	-.529
univoc	-36.301***	-46.228	1.264*	1.414**	1.752**	2.015***
univ4plus	-.139	-.223	1.182***	1.212***	.339	.197
<u>Period Dummies: (Ref. Q1 and year_2000)</u>						
Q2	-.336***	-.381***	-.007	-.021	-.202*	-.184*
Q3	-.262***	-.276***	-.059	-.079*	-.053	-.096
Q4	-.098***	-.110***	-.010	-.030	.090*	.065
year_2001	.051	-.028	.314***	.021	.296**	.080

Table E2: MNL Estimates of Transitions from the non-agricultural sector (Annual)

	Non-Participant		Agriculture		Unemployment	
	Adjusted Panel	Balanced Panel	Adjusted Panel	Balanced Panel	Adjusted Panel	Balanced Panel
<u>Residential Area: (Ref. urban_male)</u>						
urban_female	1.624***	1.687***	-.046	-.033	-.320***	-.255***
rural_female	1.247***	1.263***	2.659***	2.366***	-.678***	-.457**
rural_male	-.253***	-.179**	2.593***	2.517***	-.242***	-.219***
<u>Age Groups: (Ref. age 15_24)</u>						
age_2534	-.768***	-.785***	-.179	-.192	-.131*	-.138*
age_3544	-.714***	-.722***	-.118	-.167	-.409***	-.415***
age_4554	.418***	.431***	.104	.092	-.404***	-.404***
age_5564	1.202***	1.211***	.644**	.616**	-1.057***	-1.046***
age_65over	1.541***	1.559***	.138	.142	-1.617***	-1.625***
<u>Marital Status: (Ref. married)</u>						
single	.008	.054	.109	.124	.703***	.698***
divorced	-.122	-.089	-.316	-.261	.725***	.725***
widow	-.093	-.096	-1.018	-.979	.180	.151
<u>Education Levels: (Ref. primary5)</u>						
illit	.493***	.478***	.794***	.785***	.707***	.722***
lit	.252*	.253**	.664***	.674***	.339**	.326**
primary8	.625*	.615	-.277	-.239	-1.277**	-1.209**
midall	-.065	-.063	-.904***	-.841***	-.327***	-.329***
highgen	-.271***	-.258***	-1.004***	-.982***	-.531***	-.552***
highvoc	-.487***	-.469***	-1.062***	-1.006***	-.607***	-.612***
univoc	-.802***	-.755***	-1.621***	-1.599***	-.771***	-.799***
univ4plus	-.846***	-.814***	-1.695***	-1.689***	-1.389***	-1.419***
<u>Period Dummies: (Ref. Q1 and year 2000)</u>						
Q2	-.071***	-.093***	.204***	.188***	.005	.010
Q3	-.070***	-.085***	.089*	.095*	.005	-.027
Q4	-.045***	-.047***	.060*	.069*	.020	.007
year_2001	-.135***	-.029	-.374***	-.163*	.204***	.136***

Table E3: MNL Estimates of Transitions from the agricultural sector (Quarterly)

	Non-Participant		Non-Agriculture		Unemployment	
	Adjusted Panel	Balanced Panel	Adjusted Panel	Balanced Panel	Adjusted Panel	Balanced Panel
<u>Residential Area: (Ref. urban_male)</u>						
urban_female	1.454***	1.395***	-1.565***	-1.603***	-1.604***	-1.583***
rural_female	.084	.146*	-3.378***	-3.358***	-3.448***	-3.259***
rural_male	-.822***	-.769***	-1.192***	-1.129***	-1.593***	-1.577***
<u>Age Groups: (Ref. age 15_24)</u>						
age_2534	-.305***	-.309***	.286*	.276*	-.141	-.177
age_3544	-.454***	-.451***	.438**	.438**	-.709***	-.731***
age_4554	-.417***	-.414***	-.065	-.072	-1.332***	-1.302***
age_5564	-.001	.004	-.582**	-.598***	-2.139***	-2.227***
age_65over	.732***	.739***	-1.371***	-1.379***	-3.201***	-3.325***
<u>Marital Status: (Ref. married)</u>						
single	.273***	.263***	.243	.208	.496**	.473**
divorced	.259	.245	1.034**	.961*	1.208*	1.145*
widow	.439***	.429***	.324	.335	-.612	-.277
<u>Education Levels: (Ref. primary5)</u>						
illit	.155***	.147***	-.237	-.228	.627***	.590***
lit	.037	.016	-.446*	-.425*	.152	.158
primary8	1.014***	.983***	-.146	-.038	-2.095*	-1.884
midall	.462***	.460***	.155	.162	-.172	-.159
highgen	-.038	-.066	-.048	-.052	.120	.114
highvoc	.097	.089	.437*	.384	.608**	.605**
univ4plus	-.442	-.456	.992**	.869**	.146	.153
univoc	-.328	-.404	.831	.778	1.817***	1.822***
<u>Period Dummies: (Ref. Q1 and year 2000)</u>						
Q2	-.053*	-.039	-.136**	-.102*	.047	-.061
Q3	.299***	.244***	.090**	.047	.294***	.207***
Q4	.243***	.246***	-.032	-.030	.212***	.184***
year_2001	.173***	.116**	-.028	-.216**	.576***	.559***
year_2002	-.056	-.108*	.057	-.210*	.434**	.224

Table E4: MNL Estimates of Transitions from the non-agricultural sector (Quarterly)

	Non-Participant		Agriculture		Unemployment	
	Adjusted Panel	Balanced Panel	Adjusted Panel	Balanced Panel	Adjusted Panel	Balanced Panel
<u>Residential Area: (Ref. urban_male)</u>						
urban_female	1.627***	1.669***	.162	.265	-.300***	-.182**
rural_female	1.357***	1.322***	2.867***	2.721***	-.852***	-.708***
rural_male	-.089	-.100	2.741***	2.667***	-.181**	-.199***
<u>Age Groups: (Ref. age 15_24)</u>						
age_2534	-.736***	-.746***	-.135	-.164	-.198***	-.198***
age_3544	-.808***	-.813***	-.087	-.109	-.487***	-.493***
age_4554	.327***	.334***	-.005	-.023	-.635***	-.636***
age_5564	1.204***	1.209***	.588**	.599***	-.678***	-.686***
age_65over	1.593***	1.603***	.516	.439	-2.463***	-2.373***
<u>Marital Status: (Ref. married)</u>						
single	.114*	.142**	.149	.152	.545***	.551***
divorced	.019	.042	-.586	-.586	.750***	.779***
widow	-.115	-.106	-.625	-.729	.057	.126
<u>Education Levels: (Ref. primary5)</u>						
illit	.385***	.379***	.777***	.779***	.480***	.495***
lit	.184*	.181*	.412*	.451*	.363**	.368**
primary8	1.487***	1.459***	.445	.433	-.374	-.383
midall	-.113*	-.108*	-.639***	-.626***	-.319***	-.323***
highvoc	-.574***	-.549***	-.881***	-.859***	-.632***	-.625***
highgen	-.415***	-.410***	-1.039***	-1.001***	-.652***	-.649***
univoc	-1.214***	-1.166***	-1.269***	-1.274***	-1.127***	-1.135***
univ4plus	-1.150***	-1.124***	-1.602***	-1.517***	-1.446***	-1.444***
<u>Period Dummies: (Ref. Q1 and year_2000)</u>						
Q2	.054*	.065**	.017	-.005	.023	-.039
Q3	.085***	.069***	-.074*	-.044	.086***	.062***
Q4	.080***	.080***	-.047	-.055*	.111***	.084***
year_2001	.037	.056	-.188*	-.019	.428***	.449***
year_2002	-.079	.029	-.112	.148	.437***	.376***

Appendix F: MNL Estimates of Transitions

Table F1: MNL Estimates of Transitions from the agricultural sector (Annual)

	Non-Participant		Non-Agricultural Sector		Unemployment	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
<u>Residential Area: (Ref. urban_male)</u>						
urban_female	1.419***	.106	-2.009***	.225	-1.300***	.262
rural_female	.065	.087	-3.770***	.168	-3.356***	.206
rural_male	-.778***	.086	-1.233***	.093	-1.176***	.146
<u>Age Groups: (Ref. age 15_24)</u>						
age_2534	-.223**	.080	.055	.146	-.666***	.194
age_3544	-.438***	.086	.042	.157	-.842***	.209
age_4554	-.391***	.088	-.587***	.169	-1.572***	.232
age_5564	.174	.091	-1.002***	.187	-2.543***	.308
age_65over	1.001***	.096	-1.756***	.254	-3.832***	.544
<u>Marital Status: (Ref. married)</u>						
single	.361***	.079	-.193	.143	.007	.187
divorced	.310	.284	.517	.496	1.101	.597
widow	.425***	.095	-.205	.406	.054	.614
<u>Education Levels: (Ref. primary5)</u>						
illit	.189***	.050	-.031	.137	.580***	.173
lit	-.164*	.078	-.264	.167	.137	.247
primary8	.595*	.272	.322	.451	.088	.536
midall	.263**	.099	.125	.134	-.210	.216
highgen	-.236	.147	.221	.160	.261	.207
highvoc	-.175	.216	.326	.239	-.657	.441
univoc	-36.301***	.281	1.264*	.516	1.752**	.534
univ4plus	-.139	.520	1.182***	.342	.339	.785
<u>Period Dummies: (Ref. Q1 and year 2000)</u>						
Q2	-.336***	.027	-.007	.051	-.202*	.083
Q3	-.262***	.018	-.059	.034	-.053	.052
Q4	-.098***	.014	-.010	.027	.090*	.038
year_2001	.051	.038	.314***	.070	.296**	.105

Table F2: MNL Estimates of Transitions from the non-agricultural sector (Annual)

	Non-Participant		Agricultural Sector		Unemployment	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
<u>Residential Area: (Ref. urban_male)</u>						
urban_female	1.624***	.043	-.046	.214	-.320***	.059
rural_female	1.247***	.099	2.659***	.184	-.678***	.168
rural_male	-.253***	.057	2.593***	.084	-.242***	.058
<u>Age Groups: (Ref. age 15_24)</u>						
age_2534	-.768***	.057	-.179	.169	-.131*	.064
age_3544	-.714***	.062	-.118	.179	-.410***	.073
age_4554	.418***	.063	.104	.189	-.404***	.082
age_5564	1.202***	.076	.644**	.212	-1.057***	.149
age_65over	1.541***	.106	.138	.317	-1.617***	.331
<u>Marital Status: (Ref. married)</u>						
single	.008	.056	.109	.161	.703***	.060
divorced	-.122	.146	-.316	.535	.725***	.161
widow	-.093	.135	-1.018	.549	.180	.267
<u>Education Levels: (Ref. primary5)</u>						
illit	.493***	.080	.794***	.162	.707***	.104
lit	.252*	.098	.664***	.194	.339**	.126
primary8	.625*	.279	-.277	.758	-1.277**	.475
midall	-.065	.050	-.904***	.139	-.327***	.055
highgen	-.271***	.049	-1.005***	.149	-.531***	.055
highvoc	-.487***	.065	-1.062***	.191	-.607***	.070
univoc	-.802***	.098	-1.621***	.397	-.771***	.121
univ4plus	-.846***	.063	-1.695***	.261	-1.389***	.097
<u>Period Dummies: (Ref. Q1 and year_2000)</u>						
Q2	-.071***	.022	.204***	.056	.005	.025
Q3	-.070***	.015	.090*	.037	.005	.017
Q4	-.045***	.011	.060*	.028	.020	.013
year_2001	-.135***	.031	-.374***	.076	.204***	.036

Table F3: MNL Estimates of Transitions from the agricultural sector (Quarterly)

	Non-Participant		Non-Agricultural Sector		Unemployment	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
<u>Residential Area: (Ref. urban_male)</u>						
urban_female	1.454***	.085	-1.565***	.189	-1.604***	.239
rural_female	.084	.070	-3.378***	.156	-3.448***	.177
rural_male	-.822***	.069	-1.192***	.086	-1.593***	.121
<u>Age Groups: (Ref. age_15_24)</u>						
age_2534	-.305***	.066	.286*	.142	-.141	.159
age_3544	-.454***	.071	.438**	.153	-.710***	.192
age_4554	-.417***	.073	-.065	.159	-1.333***	.211
age_5564	-.001	.076	-.582**	.185	-2.139***	.299
age_65over	.732***	.081	-1.371***	.259	-3.201***	.526
<u>Marital Status: (Ref. married)</u>						
single	.273***	.064	.243	.137	.496**	.157
divorced	.259	.252	1.034**	.378	1.208*	.514
widow	.439***	.084	.324	.330	-.612	.730
<u>Education Levels: (Ref. primary5)</u>						
illit	.155***	.043	-.237	.134	.627***	.158
lit	.037	.067	-.446*	.174	.152	.239
primary8	1.014***	.174	-.146	.445	-2.095*	1.004
midall	.462***	.081	.155	.126	-.172	.196
highgen	-.038	.116	-.048	.163	.120	.198
highvoc	.097	.164	.437*	.211	.608**	.233
univoc	-.328	.630	.831	.459	1.817***	.443
univ4plus	-.442	.425	.992**	.334	.146	.589
<u>Period Dummies: (Ref. Q1 and year_2000)</u>						
Q2	-.053*	.026	-.136**	.046	.047	.077
Q3	.299***	.016	.091**	.029	.294***	.047
Q4	.243***	.013	-.032	.028	.212***	.040
year_2001	.173***	.038	-.028	.077	.576***	.114
year_2002	-.056	.045	.057	.086	.434**	.139

Table F4: MNL Estimates of Transitions from the non-agricultural sector (Quarterly)

	Non-Participant		Agricultural Sector		Unemployment	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
<u>Residential Area: (Ref. urban_male)</u>						
urban_female	1.627***	.042	.163	.172	-.300***	.055
rural_female	1.357***	.092	2.867***	.143	-.852***	.178
rural_male	-.089	.057	2.741***	.079	-.181**	.057
<u>Age Groups: (Ref. age 15_24)</u>						
age_2534	-.736***	.053	-.135	.145	-.198***	.059
age_3544	-.808***	.061	-.087	.155	-.487***	.069
age_4554	.327***	.061	-.005	.167	-.635***	.081
age_5564	1.205***	.072	.588**	.191	-.678***	.124
age_65over	1.593***	.101	.516	.277	-2.463***	.458
<u>Marital Status: (Ref. married)</u>						
single	.114*	.052	.149	.138	.545***	.058
divorced	.019	.128	-.586	.520	.750***	.148
widow	-.115	.135	-.625	.441	.057	.265
<u>Education Levels: (Ref. primary5)</u>						
illit	.385***	.082	.777***	.156	.480***	.109
lit	.184*	.091	.412*	.187	.363**	.115
primary8	1.487***	.173	.445	.433	-.374	.277
midall	-.113*	.049	-.640***	.116	-.319***	.053
highgen	-.415***	.050	-1.038***	.138	-.652***	.055
highvoc	-.574***	.063	-.881***	.156	-.632***	.066
univoc	-1.214***	.110	-1.269***	.301	-1.127***	.135
univ4plus	-1.150***	.069	-1.602***	.219	-1.446***	.094
<u>Period Dummies: (Ref. Q1 and year 2000)</u>						
Q2	.054*	.022	.017	.044	.023	.025
Q3	.085***	.015	-.075*	.030	.086***	.016
Q4	.080***	.012	-.047	.027	.111***	.013
year_2001	.037	.036	-.189*	.081	.428***	.041
year_2002	-.079	.042	-.112	.085	.437***	.048

Appendix G: List of Variables in MNL Regression

- ❖ Interaction of residential area and sex consists of a set of four dummies:
 - “urban_male” is a dummy variable taking value 1 if a man lives in a town of more than 20,000 inhabitants and 0 otherwise (Reference Category)
 - “urban_female” is a dummy variable taking value 1 if a woman lives in a town of more than 20,000 inhabitants and 0 otherwise
 - “rural_male” is a dummy variable taking value 1 if a man lives in a town of less than 20,000 inhabitants and 0 otherwise
 - “rural_female” is a dummy variable taking value 1 if a woman lives in a town of less than 20,000 inhabitants and 0 otherwise
- ❖ Age is a set of six dummies:
 - “age_1524”: Age 15-24 (Reference Category)
 - “age_2534”: Age 25-34
 - “age_3544”: Age 35-44
 - “age_4554”: Age 45-54
 - “age_5564”: Age 55-64
 - “age_65over”: Age 65 and over.
- ❖ Marital status consists of a set of four variable:
 - “Married” is a dummy variable taking value 1 if the survey respondent is married and 0 otherwise (Reference Category)
 - “Single” is a dummy variable taking 1 if the survey respondent is single and 0 otherwise
 - “Divorced” is a dummy variable taking value 1 if the survey respondent is divorced and 0 otherwise
 - “Widow” is a dummy variable taking value 1 if the survey respondent is widow and 0 otherwise
- ❖ Education consists of a set of eight dummies:
 - “illit” : illiterate respondent
 - “lit” : literate with out a diploma
 - “primary5” : graduated from a 5-year primary school (Reference Category)
 - “primary8” : graduated from a 8-year primary school
 - “midall” : graduated from a secondary school
 - “highgen” : graduated from a general high school

- “highvoc” : graduated from a vocational high school
 - “univoc” : graduated from a vocational university (2-year or 3 year)
 - “univ4plus”: graduated from a at least 4-year university
- ❖ Period dummies consist of a set of six variables:
- Q1: is a dummy variable taking value 1 if the survey respondent is interviewed in the first quarter and 0 otherwise (Reference Category)
 - Q2: is a dummy variable taking value 1 if the survey respondent is interviewed in the second quarter and 0 otherwise
 - Q3: is a dummy variable taking value 1 if the survey respondent is interviewed in the third quarter and 0 otherwise
 - Q4: is a dummy variable taking value 1 if the survey respondent is interviewed in the fourth quarter and 0 otherwise
 - year_2000: is a dummy variable taking value 1 if the survey respondent is interviewed in 2000 and 0 otherwise (Reference Category)
 - year_2001: is a dummy variable taking value 1 if the survey respondent is interviewed in 2001 and 0 otherwise
 - year_2002: is a dummy variable taking value 1 if the survey respondent is interviewed in 2002 and 0 otherwise