On the relevance of the ILO standards for the sake of international comparisons in the field of labour force and economic activity

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Paper Presented in the IAOS meeting 2006, Canada

January 2007

1. Abstract

We explore in this paper if the variation in the institutional setup[1] among developed and developing labour markets has substantial impact on the relevance of international comparisons based on the ILO standard definition and classification. We investigate if the ILO unemployment definition provides a suitable measure for labour reserve in the developed and developing labour markets using semi Markov transitional matrix techniques. We also use the techniques developed by Flinn and Heckman (1983) and Riddell (1999) to formally test for pooling categories.

The results show that unemployment could not serve as an indicator for reserve in both developed and developing countries. The analysis show also that while the ILO dichotomization definition of unemployment aggregates heterogeneous categories of non-working individuals in one group, some of sub categories have transitional behavior closer to unemployed rather than the rest of out of labour. This heterogeneity is much less in the more developed labour markets compared with developed markets which questions the relevance of ILO standards for international comparisons.

2. Introduction and Literature review

The unemployment rate is the most widely used indicator of the well-being of a labour market and an important measure of the state of an economy in general. While the unemployment rate is in theory straightforward, classifying working age persons as either employed, unemployed, or out of the labour force is difficult in practice. To facilitate comparisons of unemployment rates over time and across countries, the International Labour Organization (ILO) has since 1954 set forth guidelines for categorizing individuals into these labour market states. These have now been adopted, at least in some form, by most developed and a large number of developing countries, which has allowed the ILO to compile a sizeable number of roughly comparable labour market statistical series across countries and over time.

[1] Institutional setup includes the mechanisms for arrangement and coordination that governs the flow of persons into labour markets. This includes legislative, legal and institutional arrangement such as labour law, tax-benefit system, labour unions, employment offices, etc.

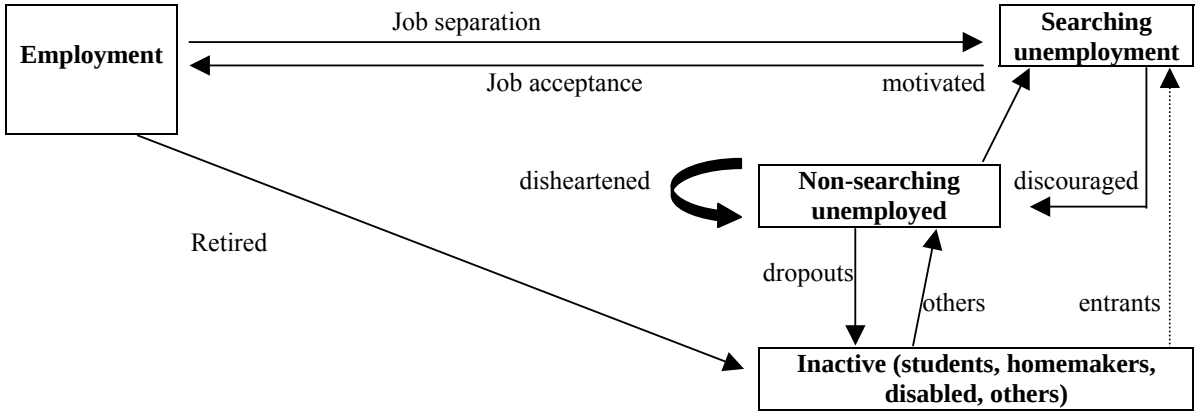
According to these, a person is unemployed if the person is (a) not working, (b) currently available for work and (c) seeking work. Practical implementation of these guidelines is, however, generally difficult. While employed persons are relatively easily classified in most countries, the issue of classifying non-employed persons as either unemployed or out of the labour force, especially according to criteria (c) is not uncontroversial; see, for instance, OECD (1987, 1995). For instance, the requirement of a job search is attractive because it requires active demonstration of attachment to the labour force, but it also classifies a large number of non-searchers as out of the labour force. Some economists argue that availability and willingness to work are sufficient to distinguish workers in the labour force from the non-attached. Moreover, while the requirement of active job search may be more meaningful in industrialized countries where the bulk of the population engages in paid employment and where there are clear channels for the exchange of labour market information. This may not be the case in many developing countries where search may be more costly and job search behavior is less meaningful, especially in largely rural sectors. Furthermore, searching for a job is meaningless for Palestinian workers who used to work in Israel and are on temporary layoff due to closure as they do not know when and how the closure will be lifted, and if they will be able to resume their previous job.

On the other hand, and within the Palestinian context, key concepts of job search theory such as availability, willingness to join the labour market, retirement, discouragement, and job search intensity are still vague concepts that are not really measuring the level and degree of intention to belong to the labour market (labour market attachment). The main reasons for less clear concepts are due to the fact that these concepts are actually not simple but are really the outcome of interaction of personal, household (family) and community determinants (pressure factors) that motivate labour force attachment. Furthermore, it is claimed that the transition from non-employed states into employment does not have strong association with job search intensity, which raise serious questions of the relevance classification of individuals by labour force attachment, particularly in the less developed markets like Palestine.

Job search theory is the departure theoretical framework came out as a consequence of information imperfection and uncertainty that affects labour force behaviour. It found success of a decision-maker who acquires information to make rational action under uncertainty. It also

proved both suitable and unifying choices-theoretic basis for macroeconomics. The classic income-leisure choice model is a good tool for formulating the decision to seek employment, and its extension to the analysis of other topics like investment in education, training, retirement, labour force participation of married women and other related issues enriched the collection of hypotheses concerning household behaviour *(Bradley 1991, Ashenfelter and Layard, 1986)*. But job search itself is a complex concept, it is an outcome of the interaction of personal, household and community determinants, therefore, it could be argued whether search theory can explain all dynamics of the pool of unemployed persons. An analytical framework for the transition of individuals consider the labour force attachment, where it is assumed to indicate the degree of membership of an individual in the labour market *(Dinkelman and Pirouz 2002).* The flows and consequent states which are of interest in this research project are those labeled 'motivated', 'discouraged', 'drop-outs', 'entrants' and 'disheartened', which describe different experiences of unemployment.

Labour market flows and states



Entrants' include re-entering house-workers and education leavers. 'Drop-outs' are those who choose to remove themselves from the labour force entirely. 'Motivated' individuals move from non-searching to searching unemployment. 'Disheartened workers' are theoretically distinguished from 'discouraged' workers in that the latter choose to stop searching after a period of unsuccessful search, whereas the former have never moved out of passive unemployment because of the perception that search activities will fail. They have never been encouraged to search. Whether an individual chooses to search for a job or not, and how to go about this search are decisions which can be modeled using a marginal benefit/cost analysis. This is the process

described by search theory. To the extent that the relevant costs and benefits depend on the environment in which search takes place, the decision to search will be endogenous. This means that capabilities possessed by an unemployed individual, as well as labour market conditions facing an individual, will influence the decision to search or to stop searching. In an environment of mass unemployment, it may be a rational strategy to not search, if the chances of locating a job offer are low and if the costs involved in searching are high. For this reason, a discouraged or disheartened non-searching worker may be willing to work, but does not consider a search a worthwhile investment strategy.

This approach suggests that searchers are more closely attached to the labour market than non-searchers, and attachment may be described by the type and quality of labour market information about job opportunities available to jobless individuals. Especially in an environment of mass unemployment, better information about potential job and wage offers could imply a stronger attachment to the labour market, as it increases the probability of the jobless individual locating a suitable job match. Even within groups of searchers, there may be different degrees of search intensity, which will give rise to different types of labour market information. Jones and Riddell (1999) argued that considering search intensities with reference to search methods is one way to think about degrees of labour force attachment. But still, job search theory might serve in explaining the behaviour of unemployed and why some people are unemployed *(Bradley 1991).*

2. Methods

This paper ivestigates the labour market history of different population categories in regard to labour force attachment in the concerned labour markets utilizing Markov transition matrix techniques and event history analysis. Assume an individual with characteristics (x,z) where (x) represents the surrounding environment and (z) is the labour history, enters state (i) at time (t), and let $Q_{ij}(t,x,z)$ denote the probability that the individual will enter the state (i) and then move to state (j) in no later than time period (t), and assume that P_{i_j} is the probability of moving from (i) to (j), then: $Q_{ij}(t,x,z)=P_{i_j}(T\leq t)=P_{ij}F_{ij}(t,x,z)$, where $\sum P_{ij}=1$. Now assume a distribution function $G_{ij}(t,z)=F_{ij}(t,y,x,z)$ for all x, z, and t. This assumption implies that the individual's labour market history to date plays no direct role in determining the probability laws affecting the flows. The

only aspect that plays a role, by assumption, are the fixed characteristics of the individual, which implies that individual's labour market history can be described by a relatively simple stochastic process, in particular P_{ij} and $G_{ij}(.;z)$ describe the probability laws determining the flows of an individual between the states, and therefore the individual's labour market history can be described by a semi-Markov process, of which a special case is the Markov process if P_{ij} and $G_{ij}(t;z)$ describe the probability laws determining the flows of an individual between the states, and given $G_{ij}(t;z)$ is an exponential distribution function. *(Burdett and Taylor, 1994).*

The empirical framework presented here is accumulating on the econometric methods initiated by *(Flinn and Heckman, 1982, 1983)* to empirical analysis of individual labour market histories which introduced more flexible assumptions compared with the pervious work in this direction, the model allowed for structural economic interpretation, time varying explanatory variables, unobserved heterogeneity components were permitted to correlated across spells, and a flexible model duration that permits tests among competing specifications within a unified framework. The remarkable discussion made by *(Flinn and Heckman, 1983)* whether or not the categories "unemployed" and "out of labour force" are behaviourally distinct labour force states, is a relevant particularly in the study of labour market dynamics of youth in the developed countries, where a range of non-market options are available to many youth and practices of many state compensation which effectively limits the eligibility of unemployment *(Ellwood, 1979),* and the high labour mobility and higher unemployment rates among youth in the less developed countries.

Population in the working age are classified into four main categories, namely: EM: employed persons, UN: unemployed, NA: purely not active population, which include all persons outside labour force for traditional reasons, this comprises persons not working, not seeking job and do not want to work for family care, study or retirement, permanent illness, disability etc. The fourth category is the marginally attached (MA), which involves the persons classified in the gray are between unemployment and not attached, this comprise the following four sub-categories DS: discourages persons, WN: want to work not seeking job, DO: do not want to work for other reasons rather than those mentioned in the purely not attached category, and DW: do not want job, not seeking because they are waiting response for application submitted. We

employ the methodology used by *(Riddell and Jones 1999, 2000, 2002)* to test the marginally attached as one category and then test each sub-category to explore the differences in the transitional behaviour across standard definitions in the concerned labour markets.

Flinn and Heckman 1983 assumed that individuals exit employment at a rate governed by a density function $f_e(t_e)$. The probability that a person terminating employment will be classified either unemployed (UN), marginally attached (MA) or not marginally attached (NA), with probabilities P_{UN}, P_{MA}, P_{NA} respectively. The density function of non-employment states is governed by $f_n(t_n)$. The associated hazard h_n is given by: $hn = \frac{f_n(t_n)}{S_n(t_n)} = \frac{f_n(t_n)}{1 - F_n(t_n)}$, $F_n(t_n)$ is the cumulative distribution function of t_n, and $S_n(t)$ is the survival function. By assuming no dependence (constant hazard) in either labour market states, then using Cox model which assume an exponential distribution for time duration of exit, we get:

$f_{em}(t_{em}) = (a_{em})e^{(-a_{em}t_{em})}$, and $f_{un}(t_{un}) = (a_{un})e^{(-a_{un}t_{un})}$.

Now, suppose that a person is in state (em) at time (t) with probability $P_{em}(t)$, the conditional probability of exit from the state in time interval $(t + \Delta t)$ is the hazard $(a_{em}\Delta t)$. Thus the probability of exit from the employment state to the unemployment state is $(a_{em}\Delta t)$, and the probability of exit from the unemployment state to the employment state is $(a_{un}\Delta t)$. The conditional probability of remaining in the unemployment state is then $1- (a_{un}\Delta t)$. As $\Delta t \to 0$, the hazard decreases to vanish; while the probability of remaining in the same state increases to 1. Assuming that a_e and a_u are bounded positive numbers, the unconditional probability that a person is employed at time $(t + \Delta t)$ is given by:

$P_{em}(t+\Delta t) = (1 - a_{em}\Delta t)P_{em}(t) + (a_{un}\Delta t)P_{un}(t)$, thus $\frac{P_{em}(t+\Delta t) - P_{em}(t)}{\Delta t} = -a_{em}P_{em}(t) + a_{un}P_{un}(t)$, taking the limit as $\Delta t \to 0$, we get: $\frac{d}{dt}P_{em}(t) = -a_{em}P_{em}(t) + a_{un}P_{un}(t)$, and $\frac{d}{dt}P_{un}(t) = a_{em}P_{em}(t) - a_{un}P_{un}(t)$,

This system of equations generates a continuous time Markov process. Given the probability of being in each initial state, these equations can be solved to produce:

$$P_{em}(t)=\frac{a_{un}}{a_{un}+a_{em}}\left(P_{em}(0)-\frac{a_{un}}{a_{em}+a_{un}}\right)\exp\{-(a_{em}+a_{un})t\},\ P_{un}(t)=\frac{a_{em}}{a_{un}+a_{em}}\left(P_{un}(0)-\frac{a_{em}}{a_{em}+a_{un}}\right)\exp\{-(a_{em}+a_{un})t\}$$

as $t\to\infty$, these probabilities converge to continuous irrespective of initial condition, and if the process starts in equilibrium, then it converges immediately. Consequently, the density of time spent going from outside labour force (ol) employed (em) which is denoted by (t_{olem}) is: $P_{olem}(t)=b_{olem}\exp\{-(b_{olem}+b_{olun})t_{olem}\}$, and the density of time spent going from unemployed (un) to employed is: $P_{unem}(t)=b_{unem}\exp\{-(b_{unem}+b_{unol})t_{unem}\}$.

Individuals may change between reported non-employment states for any reason, but all what is needed to get (ol or un) equivalent for characterizing transitions from non-employment to employment is $b_{olem} = b_{unem}$. This condition is also a necessary condition in a Markov model to aggregate out of labour and unemployment into a single state. *Flinn and Heckman, 1983* indicated that it is tempting to extend this type of reasoning to consider transition from employment to the other two non-employment states. Thus it could be argued that if (un) and (ol) are equivalent, the rate of transition b_{emun} should equal to b_{emol}. This argument is correct only if probability of exiting from employment to unemployment (η) equals the probability of exiting from employment to out of labour force ($1 - \eta$), so $\eta = 1 - \eta = 0.5$.

$f_n(t_n)$ is the density of employment length durations with associated hazard rate $b_{em}(t_{em})$, the hazard rate for transition from (em) to (un) is $b_{emun} = \eta b_{en}$, while the corresponding hazard rate for (em) to (ol) transition is $b_{emol} = (1-\eta)b_{em}$. But unless $\eta = 1 - \eta = 0.5$, $b_{emun} \neq b_{emol}$ *(Flinn and Heckman, 1983).*

This approach was later extended by amongst others, *Jones and Riddell (1999),* and applied by *Strobl and Byrne (2002)* utilizing a Markov transition model with four states; employed (EM), unemployed (UN), marginally attached (MA) and out of labour force (NA). With this Markov model labour market dynamics are given by 4x4 transition matrix P where each element P_{ij}

represents the probability of a person to be in state i moving (or remaining in) state j by the following period of time.

$$P = \begin{pmatrix} P_{EMEM} & P_{EMUN} & P_{EMMA} & P_{EMNA} \\ P_{UNEM} & P_{UNUN} & P_{UNMA} & P_{UNNA} \\ P_{MAEM} & P_{MAUN} & P_{MAMA} & P_{MANA} \\ P_{NAEM} & P_{NAUN} & P_{NAMA} & P_{NANA} \end{pmatrix}$$

As Riddell's (1999) note, a necessary and sufficient condition for individuals in (MA) and (UN) to be behaviourally equivalent states is that the probability of transiting from (MA) to (EM) equals that of transiting from (UN) to (EM), and the probability of moving from (MA) to (NA) is identical to that of moving from (UN) to (MA):

$$P_{UNEM} = P_{MAEM} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$P_{UNNA} = P_{MANA} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

If these conditions jointly hold, then individuals that searched within the reference time period according to the definition of labour force survey, and those who did not search exhibit the same transition behaviour. It also be the case that among the non-searching non-employed the marginally attached are not behaviourally distinct from those deemed to be out of labour force. For this to be true, the following must hold

$$P_{MAEM} = P_{NAEM} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$P_{MAUN} = P_{NAUN} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

This method was used to test the transitional behaviour of marginally attached and the behaviour of each of the sub-categories of the marginally attached by imposing certain restrictions on the content of the marginally attached cells in the transition matrix. We examine the suitability of the standard ILO dichotomization classification according to the official definition of unemployment, with special attention paid for persons who lie in the gray area between unemployed and out of the labour market which are known as marginally attached persons. A natural approach to determine whether marginally attached should be considered unemployed or out of the labour force is to compare the transition probabilities (the probability of transiting from one state to other state) to those of these other two labour market states. The

basis of the test initiated by Flinn and Heckman is controlling for heterogeneity if the hazard rates for exit to employment from these states is the same. In simple three-state Markov model, this test is equivalent to testing the proportion that the two states can be aggregated into a single state. In other words, we would like to test if the transitional behaviour of those searching job is not different from those not searching. If this is the case, then searching criteria could not be the best factor for classifying individuals in regard to labour market attachment.

To motivate the test, we consider the transition matrices that could be generated from the overlapped (rotated) sampling scheme in the successive rounds (waves) of labour force survey statistics in Palestine and UK as two models for developing and developed labour markets by studying the characteristics of the transition matrices, and then conduct a test of equivalence of certain categories to examine if the proposed distinction of marginally attached makes any difference from the standard ILO classification. The empirical framework presented here is accumulating on the econometric methods initiated by (Ellwood, 1979, Flinn and Heckman 1982 and 1983, Jones and Riddell 1999 and 2002 and Strobl and Byrne 2002). Standards T-test is employed to test the unconditional transition behaviour, and a series of multinomial logit model is employed to test conditional transition using the likelihood ratio test.

3. Results

3-1 Overview of the concerned labour markets

The Palestinian labour market is a market functioning under occupation and political conflict. It is totally tied to Israel, domestic employment is affected with employment in Israel. There are certain unpredictable constraints on labour mobility, and high unemployment rate is negatively associated with employment in Israel. In addition, rising wages are concurrent with falling unemployment, and there is a persistent wage gap between domestic and Israeli jobs (Shabaneh, 2002). The Palestinian labour market is considered less developed[2] and less organized, formal and informal sectors are not well defined. Taxation system is not functioning routinely and the newly Palestinian labour law is sill not in practice yet. But while the Palestinian labour market is

[2] Human development is a process of enlarging people's choices at all levels of development. The Human Development Index (HDI) is a summary measure for the average achievements in a country in three basic dimensions of human development. A long and healthy life, knowledge, and decent standard of living.

a market under occupation, it should be noticed that it does not represent a special case, but a Middle Eastern developing market. In comparison with the Jordanian labour market, statistics show that Palestine and Jordan enjoy almost the same characteristics compared with the UK.

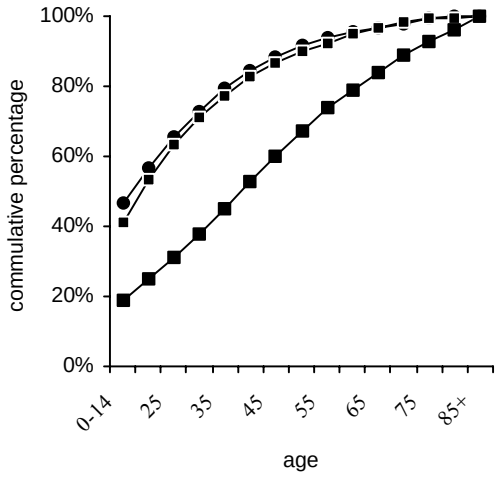
The main development indicators assume that Palestine and Jordan belong to the medium level of human development, life expectancy ratio and literacy rate are very close, and labour force participation in both Jordan and Palestine is much less than the developed countries particularly for females.

Main Human development indicators

Indicator	JOR 2003	PAL 2003	UK 2003
HDI	0.75	0.73	0.93
HDI rank	90	102	13
Life expectancy ratio	70.9	72.3	78.1
Literacy rate	90.0	90.2	100
% of population 15-64 years	55.7	50.3	60.9
LF participation rate	37.9	43.1	78.4
Female LFPR	11.0	14.5	73.1

The cumulative distribution of the population by age for Palestine, Jordan and UK classifies these countries into two categories in regard of population characteristics. The first category includes Palestine and Jordan, while the second category includes UK. Young population, high population growth and higher total fertility rate characterize the first category. The second category assumes lower population growth, lower

Figure: Cumulative distribution of population by age in the concerned countries



total fertility rate and facing elderly problems. UK has an ageing population. The percentage of people under age 16 fell from 25 per cent in mid-1971 to 19 per cent in mid-2004. Over the same period, the percentage of the population aged 65 and over increased from 13 per cent to 16 per cent. The Palestinian population is young and growing at a very rapid rate due to national increase and the gap between crude birth rate and crude death rate (Khawaja 1994).

Percentage distribution of population 16-64 years by labour force attachment

Indicator	JOR 2003		PAL 2003		UK 2003	
	Male	Female	Male	Female	Male	Female

Regular wage employee in private sector	23.5	3.6	15.8	2.1	51.6	41.9
Irregular wage employee in private sector	-	-	1.2	0.1	2.6	2.6
Employer in private	3.5	0.1	1.9	0.1	3.0	1.0
On own account in private sector	5.1	0.2	16.2	1.5	9.3	3.5
Other sector	0.3	0.1	2.0	1.2	1.6	2.1
Government employee & training program	21.8	4.5	10.6	2.6	11.0	18.4
Unpaid family worker in private sector	0.4	0.2	3.7	4.6	0.1	0.3
ILO unemployed	9.0	2.3	17.8	2.0	4.6	3.2
Inactive – discouraged	0.0	1.2	1.2	0.2	0.1	0.1
Inactive-want	0.0	0.4	0.5	0.0	0.6	0.8
Inactive-don't want -student	18.3	18.7	16.9	17.5	4.2	4.4
Inactive-don't want -family care	0.2	67.4	0.3	64.6	1.0	12.6
Inactive-don't want -old, ill, retired	12.1	1.0	3.6	1.8	9.2	7.3
Inactive-don't want -other	5.6	0.2	8.0	1.5	1.1	1.8
Inactive- not seeking wait response job app.	0.2	0.1	0.3	0.2	0.0	0.0
Total	**100**	**100**	**100**	**100**	**100**	**100**

More people are classified out of labour due to other reasons rather than the standard ILO classification reasons, and more people are classified out of labour due to study compared with developed countries. Furthermore, the demographic characteristics of labour force attachment categories, are very similar in both Jordan and Palestine compared with UK and Poland. In particular those classified as unpaid family members and discouraged persons are much younger in both Palestine and Jordan compared with the UK, and it does not seem that retirement is well defined as the organizational setup of labour markets does not assume clear delineation of retirement in the less developed countries compared with the developed countries.

Unlike Palestine and Poland, the Treasury decides economic policy in the UK, but the Cabinet has overall responsibility for it. Privately run businesses produce almost 70% cent of the total value of all the UK's goods and services. The private sector also employs more than two-thirds of the workforce.

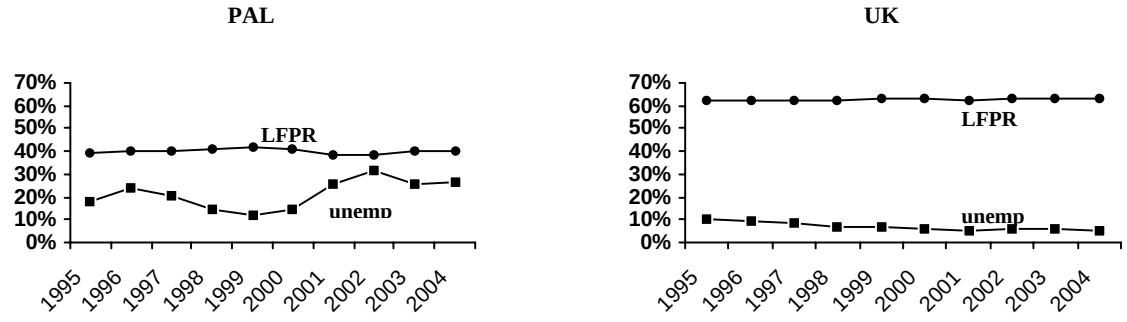
Median age in completed years by sex and country for selected labour force states

Indicator	**JOR (2003)**		**PAL (2003)**		**UK 2003**		**POL 2002**	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Employed	30	28	40	39	40	39	40	42
Unemployed	23	24	31	30	31	30	32	33

Unpaid family worker in private sector	22	34	41	41	41	41	27	41
Inactive - discouraged	22	26	57	49	57	49	58	52
Inactive-want	25	25	38	37	38	37	38	32
Inactive-don't want -student	17	17	18	18	18	18	18	18
Inactive-don't want -family care	42	36	44	36	44	36	46	48
Inactive-don't want -old, ill, retired	63	65	56	51	56	51	56	57
Inactive-don't want -other	26	19	39	47	39	47	52	51

Self-employment has been rising since 2001, with particularly large increases in 2003. There have been also changes to the tax system in recent years targeted at supporting small businesses. The work permits system is the main mechanism for managing labour immigration to the UK. In recent years it has expanded considerably with several new schemes introduced. Over the period 1995 to 2002, total applications in the main work permit increased of over 300%.

Figure 1: Labour force participation and unemployment rate in Palestine and UK; 1995-2004



There is continuing stability in the labour market; the trend in the working age employment rate is close to flat. Numbers of job vacancies continue to increase year on year and redundancies are less than a year ago. The downward trend in the unemployment rate continues, although the downward trend in the claimant count may have started to slow. Unemployment rates decreased between spring 1993 and spring 2003. Over the same period people in long-term unemployment as a proportion of all unemployed people declined, while the unemployed short-term increased *(ONS: 2004, several articles).*

Finally, it should be mentioned that the gap in the institutional setup among the three countries is a major difference that might affect the personal attitudes towards labour market decisions,

and affect the working environment of theoretical framework used in the analysis of labour market such as the job search theory and the ILO labour force framework. In the UK there is an effective labour law, redundancy schemes, disability allowances, job seek allowance, and other benefits. In particular, there are two forms of unemployment benefit: job seekers allowance (income-based) and job seekers allowance (contribution-based) within the framework of the national insurance which is the system of payroll taxes, and related social benefits operating since late 1940s. Contribution-based benefit covers all persons who can prove that they are available for work and are actively seeking employment. If not, and they have a low or no income they receive income-based benefit, but they still have to prove that they are available for and actively seeking work. Palestine enjoys no single benefit paid by the state, and in Poland, unemployed persons can receive means-tested unemployment insurance for 12 months under certain conditions. *(OECD 2003)*.

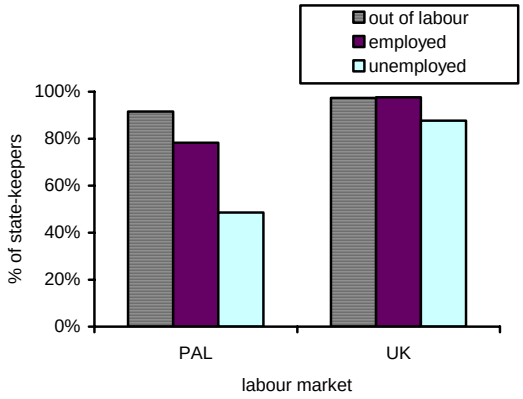
3-2 transitional behaviour

The transitional probabilities are viewed from three different angles to conclude regarding the relevance of the ILO standard definition for international comparisons. We start by an overview of transitional probabilities, then discussing the testing of unconditional transition probabilities, and end by testing the equivalence across the standard ILO classification**.** The aim of examining the unconditional probabilities is to test if they vary by development level (organizational setup) and main labour force determinants. T-test is conducted to examine the difference of mean transition probability of the marginally attached and its sub-categories by selected determinants (characteristics), including but not limited to age groups and sex. The Palestinian labour market seems to have the higher turnover and mobility rate, it is quite clear that state-keeping rate in Palestine is much lower than UK. The most dynamic and less stationary states are unemployment, but there is substantial difference between the concerned labour markets. Actually the quarterly unemployment state-keeping rate in Palestine is 48.6% against 52.6% in the UK. Using the standard ILO classification, it is worth-noting that fluctuation in the state-keeping rate at the short run among quarterly waves in Palestine is much higher than UK. The standard deviation of the average state-keeping rate for unemployed persons in Palestine is 8.0 against 2.4 in the UK. At the category level, while the highest

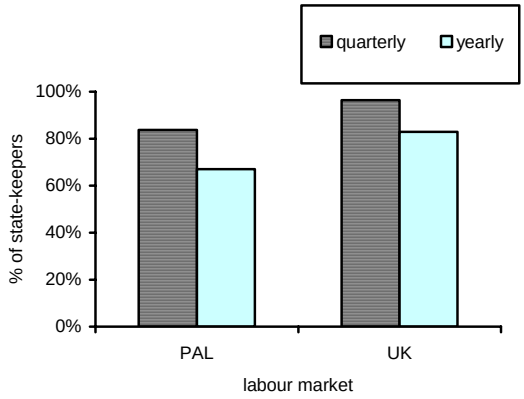
standard deviation was for unemployment in both Palestine and the UK, the lowest standard deviation is for those out of labour in Palestine and for employed persons in the UK .

Percentage of quarterly and yearly state-keepers by country

Quarterly ILO LF classification



Short-medium term level



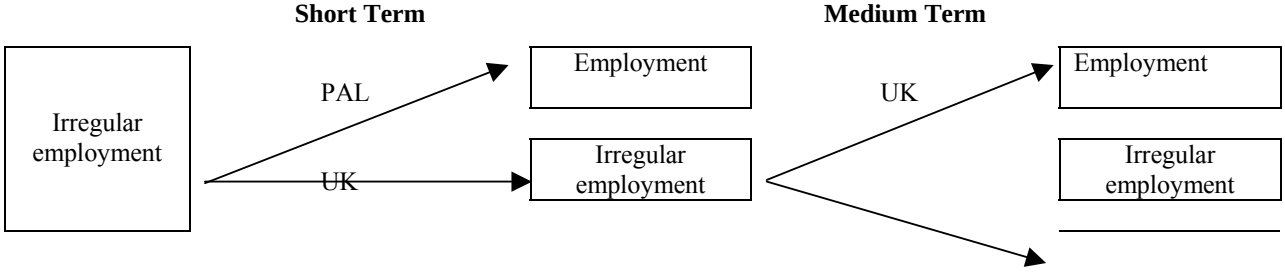
At the medium term level (yearly panel), UK is more stable than Palestine, which witnesses a less stable situation. Medium term average state-keeping rate is lower than short term rate. This rate is in Palestine (80% of the quarterly rate) is lower than UK (88%). The more stable categories are those out of labour for traditional reasons in addition to those working in the public sector. It is noted that there is substantial difference between developed and developing labour markets related to the organizational setup of the market. For example, regular employees in the private sector in Palestine have less ability to keep there state compared with their British counterparts, while Palestinian students are more probable to remain in their states compared with the British counterparts. In addition, irregular employees in the private sector have much lower state-keeping rate in Palestine compared with UK.

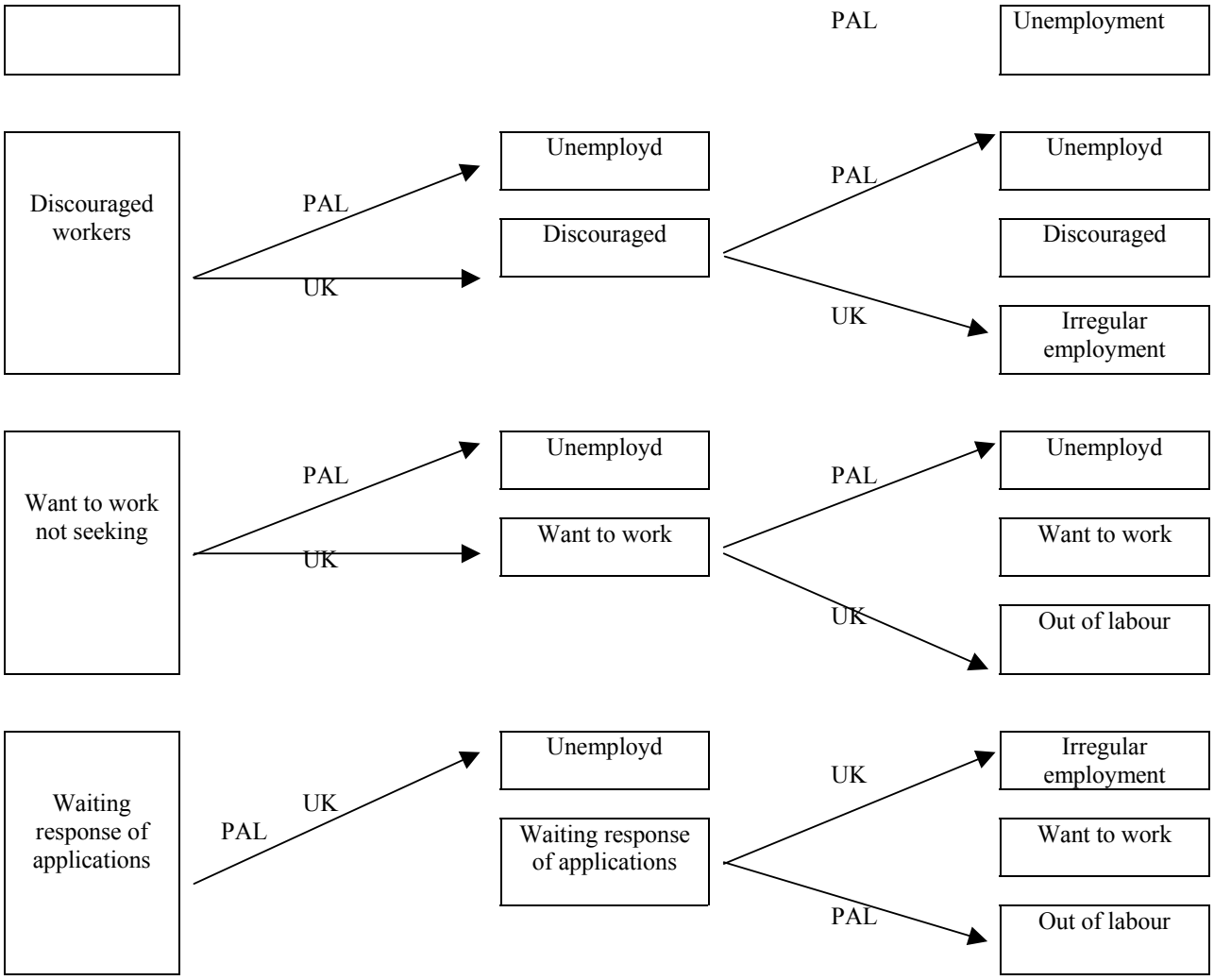
It is worth-noting that at the sub-category level, those classified in the gray area between unemployment and out of labour for traditional reasons (home-making, study and retirement or illness) are the most dynamic groups, this comprise discourages persons, those who want job but not seeking, those who do not want job because they are waiting response of submitted applications and those do not want to work and not seeking job for other reasons. This applies as well for the vulnerable employed categories namely unpaid family members and irregular employees in the private sector. The level of stability of those groups is negatively correlated with the level of development of labour market, where people have higher state-keeping rate

compared with Palestine and UK. The unconditional transition rate supports the claim of asymmetry of the behaviour of different categories of the labour force at the short and medium term. Regular employees in the private sector maintain their position in the labour market at the short and medium run in both UK, while the main destination state of the Palestinians counterparts is the same at the short run, but unemployment at the medium term. Persons classified in the well established states usually keep their positions at the short and medium term, this applies to both markets for own account workers, those employed in other sectors, public sectors employees in addition to those out of labour for traditional reasons namely retirement or sickness, home making and students, with an exception for British students, who have also a better opportunity to move into work at the medium term compared with their Palestinian counterparts. As for the vulnerable workers particularly the unpaid family member, they have a different transition behaviour, while they keep their main destination in the same classification at the short and medium term levels in UK, they keep their state at the short run in Palestine and go out of labour at the medium term level.

The major behavioral difference between developed and less developed markets at the short and medium term are observed in two groups; vulnerable workers, particularly irregular employees in the private sector, in addition to those in the gray area between unemployment and out of labour, namely discouraged, wanting not seeking and waiting response of applications. For the first group, at the short run, they move to regular employment or stay in their state in Palestine while stay in the same state in the UK, but at the medium term, they move in the UK to regular employment or stay as irregular employees, while moving basically to unemployment in Palestine. As for the second category, we find discouraged persons and those wanting job but not seeking move to unemployment at both short and medium term in Palestine, and stay in the same category in the UK at the short run and move to out of labour at the medium term.

Main destination state of selected origin states at the short and medium term level by country





Finally, those classified as out of labour for other reasons, they keep their state at the short run in both countries, but at the medium run they move to unemployment in Palestine and to out of labour in UK.

It clear that EM and NA are the most stationary states, while individuals who were classified as either UN or MA were relatively less unlikely to remain so, particularly in the case of individuals originating in MA. This latter effect is more pronounced for Palestine compared with UK. It is clear also that P(UN→EM) > P(MA→EM) > P(NA→EM), in addition, P(UN→UN) > P(MA→UN) > P(NA→UN) and P(NA→NA) > P(MA→NA) > P(UN→NA), which assumes according to (*Riddell and Jones 2002)* that MA is an intermediate state between UN and NA in terms of labour force attachment. This applies to both Palestine and UK, with

slightly changes in the magnitude of the transitional probabilities, but this is not obvious when it comes to the sub-categories of the marginally attached persons, namely discouraged persons, those wanting not seeking job and those not seeking waiting response of submitted applications.

At the short term level, significant difference is observed in the mean transition for all categories in all countries despite the fact that the magnitude of T-statistic of equality of the transitional probability of marginally attached and unemployment to the other states is smaller in Palestine compared with UK, while the value of the T-statistics of equality of the mean transitional probability of marginally attached and out of labour to the other states is smaller in UK compared with Palestine. This applies to the main subpopulations by age and gender, with an exception that Palestinian males classified as marginally attached are closer to unemployed, while females are closer to out of labour in terms of transitional behaviour.

The unconditional transition indicates that discourages Palestinians, persons wanting not seeking job and those waiting for response of submitted applications are closer to unemployed, while those out of labour for other reasons have a distinct transitional behaviour from all other categories. This situation is different in the UK, where all categories have distinct transitional behaviour except discouraged persons who have transition probability closer to out of labour, this applies also for sub-populations by age and gender.

At the medium term level, T-statistics for the equality of transition probability assume that discouraged persons and those waiting for response of submitted applications are closer to unemployed in Palestine and closer to out of labour in the UK. Persons wanting job but not seeking are also closer to unemployed in Palestine, while assume stand alone behaviour in the UK, and those out of labour for other reasons assume stand alone behaviour in Palestine against more closer behaviour to those out of labour in the UK. This applies to all subpopulation by age and gender with an exception of slightly different behaviour in the UK.

To draw more general conclusion regarding behaviour equivalency and difference between the states, we condition on observations. As in Jones and Riddell, (2002), we fit a multinomial model of the determinants of the transition probabilities from (MA) and test whether we can

pool the individuals originating from (MA) with those from (UN) or with those from (NA) for all labour markets in consideration. This is conducted in three steps, first fit a model for the transition probability as a response variable (y), second, fit a restricted multinomial logit models using the same covariates used in step one for individuals either remaining in their origin state, which is either (MA) or (UN), transiting to (EM), or transiting to (NA) by pooling individuals originating from (MA) and (UN), and fitting another model using the same explanatory variables of individuals either remaining in their origin state, which is either (MA) or (NA), transiting to (EM), or transiting to (UN) by pooling individuals originating from (MA) and (NA), which means fitting three models for transition probabilities using the same explanatory variables as follows:

$\log it(P(y_1) = \alpha_1 + \beta_1 X + \varepsilon_1$

$\log it(P(y_2) = \alpha_2 + \beta_2 X + \varepsilon_2$

$\log it(P(y_3) = \alpha_3 + \beta_3 X + \varepsilon_3$, where,

$$P(y_1) = \begin{pmatrix} P_{EE} & P_{EU} & P_{EM} & P_{EN} \\ P_{UE} & P_{UU} & P_{UM} & P_{UN} \\ P_{ME} & P_{MU} & P_{MM} & P_{MN} \\ P_{NE} & P_{NU} & P_{NM} & P_{NN} \end{pmatrix}$$, EM, UN, MA, NA (Unrestricted model in the dependent)

$$P(y_2) = \begin{pmatrix} P_{EE} & P_{EU} & P_{EM} & P_{EN} \\ P_{UE} & P_{UU} & P_{UM} & P_{UE} \\ P_{ME} & P_{MU} & P_{MM} & P_{ME} \\ P_{NE} & P_{NU} & P_{NM} & P_{NN} \end{pmatrix}$$, PMN=PME and PUN=PUE (restricted UN and MA)

$$P(y_2) = \begin{pmatrix} P_{EE} & P_{EU} & P_{EM} & P_{EN} \\ P_{UE} & P_{UU} & P_{UM} & P_{UE} \\ P_{ME} & P_{MU} & P_{MM} & P_{ME} \\ P_{NE} & P_{NU} & P_{NM} & P_{NN} \end{pmatrix}$$, PME=PMU and PNE=PNU (restricted MA and NA)

Subsequently we fit unrestricted model, which includes a dummy variable for those originating in (M) and with covariates with this dummy variable. The unrestricted model thus allows for different intercept and different impacts of the covariates on the transitions for two origin states in question. To determine the equivalence of the two origin states using this approach we employ a likelihood ratio test of the restricted versus the unrestricted model.

Consequently the deviance G^2 could be calculated for the models as:

$$G_1^2 = -2\ln\left(\frac{L_{reduced}}{L_{f_{ull}}}\right)_{(y_1)}, G_2^2 = -2\ln\left(\frac{L_{reduced}}{L_{f_{ull}}}\right)_{(y_2)}, G_3^2 = -2\ln\left(\frac{L_{reduced}}{L_{f_{ull}}}\right)_{(y_3)}$$

Then the statistics $\chi_i^2 = G_1^2 - G_i^2, i = 1,2$ is asymptotically distributed $\chi^2_{(m)}$ and could be used to test equivalence of transition behaviour between (MA) and (NA), and the equivalent transition behaviour between (MA) and (UN), and to avoid the problem of using the multinomial logit model test resulting from the strong assumption that there is independence between the possible outcomes, we test the restrictions separately using binary logit model (Riddell, 2002).

Then we extend this test to cover a more detailed classification of labour force attachment by changing the definition of the marginally attached group to be one of the following groups:

1. Vulnerable employed (VE): unpaid family members, irregular employees.
2. Marginally attached (MA): out of labour for discouragement, waiting response of submitted application, want to work but not seeking
3. Semi marginally attached (SA): out of labour for other reason
4. Not attached (NA): out of labour for illness/study/housework

Which means that transition matrix is a 4X4 matrix and we test each time if one of the four mentioned categories could be pooled with one of the original ILO classification categories.

We used a test to examine the equivalence among the above-mentioned labour force states, namely Riddell-Jones test. The test is based on the likelihood ratio test. It is conducted through imposing sufficient condition related to transition to other states. The results reveal that

According to Heckman and Riddell in a 4X4 matrix including the state EM, UN, MA, NA, the states UN and MA are equivalent if and only if the above-mentioned equations (1) and (2) hold.

The results indicate clear variation of the transitional behaviour of counterpart categories in developed and developing countries. Riddell-Jones likelihood ratio test indicated that there is equivalence in the behaviour of marginally attached persons with unemployed persons in Palestine, while possibility of pooling marginally attached, semi attached and not attached in the UK. In addition, while vulnerable employment could be pooled with employed persons in the UK at the short run, the hypothesis was rejected in Palestine. At the medium term vulnerable employment intends to converge with unemployment transitional behaviour in the UK and Palestine. The semi attached could be pooled with marginally attached in the UK, but has separate transitional behaviour in both Palestine.

4. Concluding remarks

In this paper, we examined the transition into employment from non-working categories in a comparative analysis approach to explore the Palestinian labour statistics within international context. The analysis showed that the standard ILO definitions of unemployment could not serve as an indicator of labour reserve in Palestine. While the ILO dichotomization definition of unemployment aggregates heterogeneous categories of non-working individuals in one group, some of sub categories have transitional behavior closer to unemployed rather than the rest of out of labour. This heterogeneity is much less in the more developed labour markets. There is heterogeneity among both working and non working categories in their transitional behaviour. The gap between workers and vulnerable workers in the less developed countries is grater than the corresponding gap in the developed countries. There is also heterogeneity among developed and developing countries in the behaviour of the counterpart categories, the gap in the difference increases among those in the gray area between unemployed and out of labour. Therefore, comparisons based on ILO classification for the purpose of international comparisons between developed and developing countries are not fully relevant.

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Table 1: Percentage of quarterly panel LF state-keepers by ILO broad category and wave

Period	Palestine				United Kingdom			
	E	U	O	T	E	U	O	T
Q1-Q2-2000	88.7	32.1	91.1	87.4	97.4	55.8	90.3	94.2
Q2-Q3-2000	85.3	33.8	90.1	86.2	97.4	55.1	88.5	93.8
Q3-Q4-2000	60.5	46.9	91.6	77.8	96.8	50.6	89.3	93.5
Q4-00-Q1-01	76.7	46.8	91.9	82.6	97.2	54.5	91.1	94.1
Q1-Q2-2001	82.1	42.4	89.5	82.8	97.1	53.6	90.8	94.0
Q2-Q3-2001	80.0	46.1	92.7	84.9	97.5	55.1	88.4	94.1
Q3-Q4-2001	80.5	51.1	90.9	84.1	97.0	49.8	88.8	93.5
Q4-01-Q1-02	79.7	57.1	92.8	85.5	97.0	52.8	91.2	94.2
Q1-Q2-2002	70.8	57.8	93.6	83.4	97.3	54.6	90.5	94.3
Q2-Q3-2002	71.7	58.2	90.8	82.2	97.4	52.8	88.3	93.8
Q3-Q4-2002	78.4	46.7	90.7	81.9	97.0	47.6	88.4	93.3
Q4-02-Q1-03	76.3	55.8	92.4	84.3	97.2	52.3	91.2	94.3
Q1-Q2-2003	82.1	46.8	90.0	83.0	97.3	50.9	90.5	94.2
Q2-Q3-2003	80.5	53.0	91.4	84.6	97.4	53.8	88.6	94.0
Q3-Q4-2003	80.5	54.0	92.7	85.3	97.0	49.6	89.0	93.5
Mean	**78.3**	**48.6**	**91.5**	**83.7**	**97.2**	**52.6**	**89.7**	**93.9**
Std. Deviation	**6.7**	**8.0**	**1.2**	**2.3**	**0.2**	**2.4**	**1.2**	**0.3**

State-keeper is the individual who do not change his/her labour force state over two quarterly successive waves.

Table 2: Average percentage of yearly panel state-keepers over two parallel waves of successive years of LFS by LF attachment category

Category	Palestine* 2001-2003		United Kingdom** 2001-2003	
	Mean	SD	Mean	SD
Regular wage employee in private sector	44.2	9.8	88.7	3.7
Irregular wage employee in private sector	18.7	12.1	41.8	13.4
Employer in private	35.8	7.6	69.4	27.7
On own account in private sector	50.3	5.1	72.5	22.2
Other sector employee	62.0	7.4	74.7	9.6
Government employee & training program	81.6	5.0	89.5	3.6
Unpaid family worker in private sector	33.3	6.9	34.2	16.5
ILO unemployed	39.3	6.3	37.4	8.8
Inactive – discouraged	6.1	4.6	27.5	7.7
Inactive-want	0.0	0.0	14.7	8.7
Inactive-don't want –student	82.2	4.3	56.0	15.0
Inactive-don't want -family care	88.1	2.1	75.0	5.7
Inactive-don't want -old, ill, retired	70.6	4.7	89.7	5.3
Inactive-don't want –other	35.2	8.8	28.6	17.6
Inactive- not seeking wait response job app.	1.2	2.2	1.8	4.3
Total	**67.0**	**1.1**	**82.3**	**3.5**

State-keeper is the individual who do not change his/her labour force state over two yearly parallel waves: second quarter

* Calculations are based on the data of six waves during 2001-2003

** Calculations are based on the data of five waves during 2001-2003

Table 3 Average quarterly transition rate from non-working categories to labour force attachment categories

	Employed (EM)	Unemployed (UN)	Marginally attached (MA)	Not attached (NA)	Out of labour (MA+NA)
PAL					
Non-employed states					
Unemployed (UN)	35.2	42.0	5.2	17.6	22.8
Marginally attached (MA)	15.7	17.4	49.1	17.8	66.9
Not attached (NA)	4.2	1.2	2.3	92.2	94.5
Marginally attached					
Want (WN)	33.9	39.9	16.0	10.1	26.1
Discouraged (DS)	29.2	32.6	15.6	22.7	38.3
Do not want waiting (DW)	35.1	25.6	16.0	23.4	39.4
Do not want other reasons (DO)	15.8	11.4	3.0	69.8	72.8
UK					
Non-employed states					
Unemployed (UN)	29.6	52.6	2.9	14.9	17.8
Marginally attached (MA)	13.4	9.5	52.1	25.0	77.0
Not attached (NA)	5.3	3.6	2.5	88.6	91.1
Marginally attached					
Want (WN)	15.5	15.1	35.0	34.3	69.3
Discouraged (DS)	5.3	12.3	50.4	31.9	82.3
Do not want waiting (DW)	18.5	27.6	23.8	30.3	54.1
Do not want other reasons (DO)	13.2	6.1	4.1	76.7	80.8

M: Marginally attached is composed of inactive did not seek but want to work, inactive discouraged, inactive don't want for other reasons and inactive not seeking waiting response of job application.

Table 4 T-Test statistic of equality of means of quarterly transition rate by country

Transition type	PAL		UK	
	T-statistic	P-value	T-statistic	P-value
PUE=PME	9.47	0.000	44.26	0.000
PUN=PMN	-12.36	0.000	-24.50	0.000
PME=PNE	12.46	0.000	14.71	0.000
PMU=PNU	15.85	0.000	16.42	0.000

Table 6 T-Test statistic of equality of means of quarterly transition rate by country and selected variables

Transition type	Male		Female		Young (16-34)		Old (45-64)	
	T-statistic	P-value	T-statistic	P-value	T-statistic	P-value	T-statistic	P-value
PAL								
PUE=PME	7.92	0.000	4.24	0.001	9.50	0.000	7.50	0.000
PUN=PMN	-8.87	0.000	-2.60	0.021	-8.96	0.000	-7.07	0.000
PME=PNE	9.17	0.000	0.55	0.592	10.22	0.000	12.99	0.000
PMU=PNU	11.18	0.000	1.57	0.139	13.71	0.000	8.02	0.000
UK								
PUE=PME	28.59	0.000	24.22	0.000	16.91	0.000	23.55	0.000
PUN=PMN	-6.33	0.000	18.94	0.000	-18.42	0.000	-21.71	0.000
PME=PNE	16.32	0.000	11.38	0.000	13.82	0.000	17.96	0.000
PMU=PNU	16.75	0.000	13.43	0.000	13.53	0.000	13.33	0.000

Table 7 T-Test statistic of equality of means of quarterly transition rate by labour force attachment category and country

Transition type	PAL			UK		
	T-statistic	df	P-value	T-statistic	df	P-value
Discouraged persons						
PUNEM=PDSEM	3.23	14	0.01	25.87	14	0.00
PUNNA=PDSMNA	-2.70	14	0.02	-9.60	14	0.00
PDSEM=PNAEM	10.24	14	0.00	-0.35	14	0.73
PDSUN=PNAUN	13.45	14	0.00	7.40	14	0.00
Want job not seeking						
PUNEM=PWNEM	-1.07	14	0.30	19.99	14	0.00
PUNNA=PWNMNA	3.68	14	0.00	-23.21	14	0.00
PWNEM=PNAEM	4.49	14	0.00	10.59	14	0.00
PWNUN=PNAUN	4.74	14	0.00	19.76	14	0.00
Do not want job for other reasons						
PUNEM=PDOEM	10.14	14	0.00	41.53	14	0.00
PUNNA=PDOMNA	-12.30	14	0.00	-5.99	14	0.00
PDOEM=PNAEM	10.06	14	0.00	11.62	14	0.00
PDOUN=PNAUN	9.88	14	0.00	6.92	14	0.00
Do not want job waiting response						
PUNEM=PWTEM	0.74	14	0.47	4.3	14	0.00
PUNNA=PWTMNA	-3.39	14	0.00	-3.43	14	0.00
PWTEM=PNAEM	6.96	14	0.00	4.56	14	0.00
PWTUN=PNAUN	8.31	14	0.00	5.80	14	0.00

Table 8 T-Test statistic of equality of means of quarterly transition rate by labour force attachment category and selected background characteristics

Transition type	Male		Female		Young (16-34)		Old (45-64)	
	T-statistic	P-value	T-statistic	P-value	T-statistic	P-value	T-statistic	P-value
PAL								
Discouraged persons/ do not want job waiting response/want job not seeking								
PUNEM=PDSEM	1.85	0.08	1.61	0.13	2.57	0.02	-0.12	0.91
PUNNA=PDSMNA	-0.60	0.56	-1.41	0.18	-3.46	0.00	-2.57	0.02
PDSEM=PNAEM	10.09	0.00	4.08	0.00	12.49	0.00	5.69	0.00
PDSUN=PNAUN	14.10	0.00	5.70	0.00	17.71	0.00	7.26	0.00
Do not want job for other reasons								
PUNEM=PWNEM	9.04	0.00	7.02	0.00	10.65	0.00	7.78	0.00
PUNNA=PWNMNA	-10.29	0.00	-3.95	0.00	-8.06	0.00	-6.22	0.00
PWNEM=PNAEM	7.44	0.00	1.77	0.10	8.30	0.00	5.19	0.00
PWNUN=PNAUN	9.56	0.00	2.60	0.02	10.46	0.00	8.96	0.00
UK								
Discouraged persons/ do not want job waiting response/want job not seeking								
PUNEM=PDSEM	26.25	0.00	17.61	0.00	24.65	0.00	18.93	0.00
PUNNA=PDSMNA	-15.38	0.00	-16.55	0.00	-4.86	0.00	-17.27	0.00
PDSEM=PNAEM	8.99	0.00	11.94	0.00	13.23	0.00	21.69	0.00
PDSUN=PNAUN	15.59	0.00	17.78	0.00	12.82	0.00	13.71	0.00
Do not want job for other reasons								
PUNEM=PWNEM	14.07	0.00	29.43	0.00	7.74	0.00	25.03	0.00
PUNNA=PWNMNA	-12.64	0.00	-9.48	0.00	-12.58	0.00	-20.00	0.00
PWNEM=PNAEM	5.67	0.00	9.00	0.00	11.73	0.00	14.23	0.00
PWNUN=PNAUN	7.04	0.00	2.35	0.03	8.75	0.00	7.44	0.00

Table 9 T-Test statistic of equality of means of yearly transition rate by labour force attachment category and country

Transition type	PAL			UK		
	T-statistic	df	P-value	T-statistic	df	P-value
Discouraged persons/ do not want job waiting response						
PUNEM=PDSEM	-0.03	11	0.98	9.03	5	0.00
PUNNA=PDSMNA	-2.86	11	0.02	2.75	5	0.04
PDSEM=PNAEM	5.69	11	0.00	-0.56	5	0.60
PDSUN=PNAUN	8.88	11	0.00	0.46	5	0.66
Want job not seeking						
PUNEM=PWNEM	-0.30	6	0.77	7.87	5	0.00
PUNNA=PWNMNA	5.58	6	0.00	-5.95	5	0.00
PWNEM=PNAEM	3.10	6	0.02	4.33	5	0.01
PWNUN=PNAUN	3.67	6	0.01	5.62	5	0.00
Do not want job for other reasons						
PUNEM=PDOEM	5.80	7	0.00	7.17	5	0.00
PUNNA=PDOMNA	-8.28	7	0.00	-7.01	5	0.00
PDOEM=PNAEM	13.70	7	0.00	4.28	5	0.01
PDOUN=PNAUN	6.79	7	0.00	1.01	5	0.36

Table 10 T-Test statistic of equality of means of yearly transition rate by labour force attachment category and selected background characteristics

Transition type	Male		Female		Young (16-34)		Old (45-64)	
	T-statistic	P-value	T-statistic	P-value	T-statistic	P-value	T-statistic	P-value
PAL								
Discouraged persons/ do not want job waiting response/want job not seeking								
PUNEM=PDSEM	1.85	0.08	1.61	0.13	2.57	0.02	-0.12	0.91
PUNNA=PDSMNA	-0.60	0.56	-1.41	0.18	-3.45	0.00	-2.57	0.02
PDSEM=PNAEM	10.09	0.00	4.08	0.00	12.49	0.00	5.69	0.00
PDSUN=PNAUN	14.10	0.00	5.70	0.00	17.71	0.00	7.26	0.00
Do not want job for other reasons								
PUNEM=PWNEM	9.04	0.00	7.02	0.00	10.64	0.00	7.78	0.00
PUNNA=PWNMNA	-10.29	0.00	-3.95	0.00	-8.06	0.00	-6.22	0.00
PWNEM=PNAEM	7.44	0.00	1.77	0.10	8.93	0.00	5.19	0.00
PWNUN=PNAUN	9.56	0.00	2.60	0.02	10.46	0.00	8.96	0.00
UK								
Discouraged persons/ do not want job waiting response/want job not seeking								
PUNEM=PDSEM	6.01	0.00	7.65	0.00	1.55	0.18	6.25	0.00
PUNNA=PDSMNA	-6.94	0.00	-4.07	0.01	-2.83	0.04	-6.96	0.00
PDSEM=PNAEM	1.07	0.33	3.94	0.01	1.78	0.13	2.75	0.04
PDSUN=PNAUN	4.66	0.01	9.35	0.00	2.68	0.04	6.75	0.00
Do not want job for other reasons								
PUNEM=PWNEM	3.79	0.01	8.39	0.00	1.96	0.11	6.41	0.00
PUNNA=PWNMNA	-5.29	0.00	-4.03	0.01	-2.84	0.04	-7.56	0.00
PWNEM=PNAEM	3.95	0.01	2.78	0.04	3.01	0.03	9.50	0.00
PWNUN=PNAUN	1.57	0.18	-0.54	0.61	5.13	0.00	1.58	0.18

Table 11 Riddell-Jones likelihood ratio test for pooling origin states of yearly and quarterly transitional behaviour (LL)

Test	Palestine		UK	
	quarterly q23-2003	yearly q2/02-03	quarterly q23-2003	yearly q2/02-03
EM=VE				
Sample size	10752	6456	46536	9127
$-LL_{un\text{-}pooled}$	11058	8268	43843	9231
$-LL_{Pooled}$	10744	7899	43487	9133
LRT	628	738	712	196
P-value	<0.001	<0.001	<0.001	<0.001
VE=UN				
$-LL_{un\text{-}pooled}$	11058	8268	43843	9231
$-LL_{Pooled}$	10736	8019	43265	9051
LRT	644	498	1156	360
P-value	<0.001	<0.001	<0.001	<0.001
UN= MA				
$-LL_{un\text{-}pooled}$	10096	7732	40391	8211
$-LL_{Pooled}$	9925	7604	40032	8156
LRT	342	256	718	110
P-value	<0.001	<0.001	<0.001	
MA=SA				
$-LL_{un\text{-}pooled}$	8870	6668	34539	7053
$-LL_{Pooled}$	8738	6566	34245	7012
LRT	264	204	588	82
P-value	<0.001	<0.001	<0.001	<0.001
MA=NA				
$-LL_{un\text{-}pooled}$	10096	7732	40391	8211
$-LL_{Pooled}$	9918	7661	40096	8166
LRT	356	142	590	90
P-value	<0.001	<0.001	<0.001	<0.001
SA=NA				
$-LL_{un\text{-}pooled}$	11167	8656	41249	8502
$-LL_{Pooled}$	10942	8538	40914	8441
LRT	450	236	670	122
P-value	<0.001	<0.001	<0.001	<0.001

Table 12 Riddell-Jones likelihood ratio test for pooling origin states of yearly and quarterly transitional behaviour (χ^2)

Test	Palestine		UK	
	quarterly q23-2003	yearly q2/02-03	quarterly q23-2003	yearly q2/02-03
EM=VE				
Sample size	10752	6456	46536	9127
χ^2	11425	4872	9337	2176
χ^2	11262	4679	9311	2136
LRT	163	193	26	40
P-value	<0.001	<0.001	0.054	0.0008
VE=UN				
χ^2	11425	4872	9337	2176
χ^2	11270	4726	9305	2159
LRT	155	146	32	17
P-value	<0.001	<0.001	0.010	0.3856
UN= MA				
χ^2	10880	4738	8846	2105
χ^2	10857	4727	8785	2081
LRT	23	11	61	24
P-value	0.2888	0.6108	<0.001	0.0895
MA=SA				
χ^2	11202	6201	8082	2019
χ^2	11167	6148	8058	1991
LRT	35	53	24	28
P-value	0.0201	<0.001	0.0895	0.0316
MA=NA				
χ^2	10880	4738	8846	2105
χ^2	10811	4685	8768	2086
LRT	69	53	78	19
P-value	<0.001	<0.001	<0.001	0.2687
SA=NA				
χ^2	12597	5926	9067	2212
χ^2	12545	5803	8995	2151
LRT	52	123	72	61
P-value	0.0001	<0.001	<0.001	<0.001

DF for Riddell-Jones likelihood ratio test for pooling origin states of yearly and quarterly transitional behaviour

Model	Palestine		UK	
	quarterly q23-2003	yearly q2/02-03	quarterly q23-2003	yearly q2/02-03
Sample size	10752	6456	46536	9127
unrestricted	150	105	120	120
restricted	130	92	104	104
DF	20	13	16	16