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LABOUR SUPPLY EFFECTS OF AN EARLY RETIREMENT PROGRAMME*

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Abstract

In 1988, an early retirement program (AFP) was introduced in Norway for the 66-years-old. Since then, AFP has gradually been extended and by now it covers workers aged 62-66. In this paper we employ a multinominal logit model to study the transition between states in the labour market. The model is estimated on a large panel data set covering the period 1988-2 to 1999-4. The estimated model tracks the development quite well, as also outside sample predictions do. The model is used to assess the future labour market impact of abolishing AFP. We find that by abolishing AFP may increase the labour force participation among older men (55-67) in 2005 from 72 percent in the baseline projection to 83 percent. For females the corresponding increase is from 62 to 67 percent.

JEL Classification: D10, H55, J26.

Keywords: Early retirement, large panel data sets, econometric models.

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1. Introduction

The long-term decline observed in male labour force participation in industrialized countries, is the result of interaction among several sets of factors. On the part of the individual participants in the labour market, increases in the earnings rate will both have an income effect inducing demand for more leisure and earlier retirement, and a substitution effect inducing reduced demand for leisure and later retirement. On the part of the companies, implicit wage contracts may entail a need for mandatory retirement to ensure that older persons leave when their productivity has declined sufficiently for the life-cycle wage stream to be at the "right" level, Lazear (1986).

Institutional factors determine not only when pension will be available and at what level, but also the availability of other exit routes from the labour market. Most important in Norway is disability benefit, which 34 per cent of the population aged 60-66 were receiving in 1997 (NOU, 1998: 19, p 138).

Standard micro based analyses typically model the choice of timing of transition from employment to retirement, see Lumsdaine and Mitchell (1999) for many references. These choice models usually include a precise description of the economic attributes of the options, that is potential pension and earnings in continued employment, see for instance Hernæs, Sollie and Strøm (2000). However, to the extent that early retirement schemes are substitutes for disability pensions, an assessment of the net impact on the labour force of an early retirement scheme needs to take into account also transitions into other states.

In Norway, an **e**arly **r**etirement **p**rogramme (hereafter called AFP) came into effect in 1989 (see Hernæs and Strøm, 2000). AFP has been assessed by Bratberg et al (2000). They have estimated transition models for a 2,5-year period from employment into disability, unemployment and early retirement, separately for those who were eligible for early retirement and the non-eligible. In a simulation on the model, they applied the non-AFP coefficients to the AFP-sample. The result was that 50 percentage points of the transition into AFP was replaced by an increase of 17 percentage points into employment, 14 percentage points into disability, 4 percentage points into unemployment and 15 percentage points into other states. The crucial assumption in that study is the applicability of the model that was estimated for the non-eligible, on the group of eligible. However, in another, rather detailed study of transitions among older workers in the Norwegian labour market, Haugen and Røed (2001) did not find any indication of the early retirement program, AFP, being a substitute for disability.

In Norway the standard retirement age is 67 years. However, in 1988 an early retirement program was introduced for the 66-year-old workers, effective from January 1., 1989. The introduction of this program was the outcome of the wage settlement between the employers and employees association in 1988. To avoid high wage increases the employers association said yes to the trade-unions claim for a reduction in the retirement age. Since then AFP has been gradually extended, and by now it covers workers aged 62-66. To be eligible the worker has to fulfil two requirements. One is related to his or her working history. The other is related to the firm in which he or she works. The firm has to be part of the central tariff agreements. The introduction of AFP comes close to being a natural experiment. In the first place, the workers did not anticipate it. The eligibility rules require a long-term commitment to the firm, and thus, there are good reasons for assuming that the individuals have not adjusted the job-affiliations in the period considered here. Finally, the firms have strong disincentives to recruit workers close to the early retirement age. Thus, we would expect that the strongest, and perhaps sole, effect of AFP would be on the propensity to retire early. How strong this effect has been is the main purpose with our study.

In order to study changes in the whole labour force, we include in this paper a sample from the whole population and model the flows between three states in the labour market:

State 1: Employed,
State 2: Unemployed
State 3: Out of the labour force.

The latter group consists mainly of disabled and pensioners.

The models are estimated on a quarterly basis over the period 1988-2 to 1999-4. They include a large number of individual characteristics and labour market variables. The long observation period allows us to estimate flows between all three states and to estimate the effects both of seasonal variation and of labour market tightness on transitions.

The price we pay for the use of long time-series and large number of explanatory variables is crude states and missing variables. Neither earnings nor potential pensions are observed, but part of their effects are picked up by education, since they are both positively correlated with the level of education (Hernæs, Sollie and Strøm, 2000). Public pension is strongly re-distributive so that variation is much less in pension than in earnings. Therefore education may have a stronger impact on earnings than on pensions.

The negative effect of education on transition from employment to out of the labour force, support this hypothesis.

A multinomial logit model is applied to give the transition probabilities. These probabilities are assumed to depend on observed characteristics of the individuals and of the labour market. Seasonal effects as well as a time-trend are also included. The coefficients entering the transition probabilities depend on the initial state as well as on the destination-state. The models are estimated separately for males and females.

Among the variables we have included a dummy which capture AFP-eligibility only in terms of age, since other requirements for eligibility, mainly related to labour market history, are not included in the available data set. The estimated coefficients for (age) eligibility will therefore depend on the share that fulfils also the other requirements for eligibility and on the share of these who take out AFP. To the extent that education does not capture all aspects of earnings and pensions, the coefficient for eligibility will also depend on the composition with regard to current earnings and potential pension. In the observation period, the estimated coefficients related to the age eligibility will thus capture the net impact of the availability of the AFP on labour force participation. If AFP has been made available for the "healthiest" part of the population, this has been taken into account.

Simulations with the estimated models follow the observed transitions quite accurately, and out of sample predictions, excluding part of the observation period from the estimations and using it for comparison with predictions, are also quite accurate. The out-of sample predictions are not shown here, but they are available in Brinch (2000). The models and the data permit medium term projections of the labour force.

The introduction of an early retirement programme (AFP) proved to have a large impact, not only on the retirement pattern, but also on the magnitude of the whole labour force. In a simulation of an immediate abolishment of the AFP, labour force participation in 2005 will be 2.5 percentage points higher than in a baseline projection. The baseline projection gives an increase of 3.5 percentage points in labour force participation from 1999 to 2005.

2. Data

The data set used in the analysis is constructed from the panels of Norwegian labour force surveys (Statistics Norway, 1998) for the period 1988-II – 1999-IV. This data set is a rotating sample, increasing in size from 12 000 to 20 000 over the observation period. The labour force surveys contain information on demographic characteristics including attainment and place of residence, and labour market activity. There is, however, no information on earnings or pensions, neither potential nor received.

The change in the panel structure over the period causes the numbers of persons in the flows from quarter to quarter to change. This is reflected in the varying precision of various estimates. There is also a potential problem from the change in response rates due to change in sampling procedure. However, most of the estimates are very precise. Details of the construction of the data set can be found in Brinch (2000).

Altogether the sample contains 481 371 observations. These observations are distributed across gender and initial states as described in Table 1.

Table 1. Number of observations across gender and initial states.

Initial states	**Men**	**Women**	**Total**
Employment	176 803	152 237	329 040
Unemployment	8 130	6 706	14 836
Out of labour force	54 942	82 553	137 495
Total	239 875	241 496	481 371

3. Econometric Model

3.1 A multinomial logit model

The probability of transition from one quarter (t) to the next (t+1) is assumed to follow from a multinomial logit model.

Let $[Y_j(t+1) \mid Y_i(t)]$ denote the event that an individual transit from state *i* in period t to state *j* in period t+1, i,j= 1,2,3.

1) State 1 is employment,
2) State 2 is unemployment
3) State 3 is out of labor force.

The probability of transiting from state *i* in period t to state *j* in period t+1, is given by

$$(1) \qquad \Pr\left[Y_j(t+1) \mid Y_i(t)\right] = \frac{\exp(\alpha_{ij}^* + x(t)\beta_{ij}^*)}{\sum_{k=1}^{3}\exp(\alpha_{ik}^* + x(t)\beta_{ik}^*)} = \frac{\exp(\alpha_{ij}^* - \alpha_{i3}^*) + x(t)(\beta_{ij}^* - \beta_{i3}^*))}{1 + \sum_{k=1}^{2}\exp(\alpha_{ik}^* - \alpha_{i3}^*) + x(t)(\beta_{ik}^* - \beta_{i3}^*))}$$

By letting $\alpha_{ij} = \alpha_{ij}^* - \alpha_{i3}^*; \beta_{ij} = \beta_{ij}^* - \beta_{i3}^*$, we get

$$(2) \qquad \Pr\left[Y_j(t+1) \mid Y_i(t)\right] \equiv \varphi_{ij}(t+1) = \frac{\exp(\alpha_{ij} + x(t+1)\beta_{ij})}{1 + \sum_{k=1}^{2}\exp(\alpha_{ik} + x(t+1)\beta_{ik})}; \text{ for i, j} = 1,2,3$$

We note that

1) all coefficients are normalised against the destination state j=3, which is out of the labour force,
2) coefficients vary across originating as well destination states,
3) x(t) is the vector of explanatory variables described in Table 2 below.

From the definitions of the α-s and the β-s, we have

$$(3) \qquad \varphi_{i3}(t+1) = \frac{1}{1 + \sum_{k=1}^{2}\exp(\alpha_{ik} + x(t+1)\beta_{ik})}$$

From (2) we get the following marginal effects from differentiating with respect to variable no s, x_s:

$$(4) \qquad \frac{\partial \ln(\varphi_{i1}/\varphi_{i3})}{\partial x_s} = \beta_{i1,s}$$

$$\frac{\partial \ln(\varphi_{i2}/\varphi_{i3})}{\partial x_s} = \beta_{i2,s}$$

and consequently

$$\frac{\partial \ln(\varphi_{i1}/\varphi_{i2})}{\partial x_s} = \beta_{i1,s} - \beta_{i2,s}.$$

3.2 Explanatory Variables

The variables in the x- vectors are given in Table 2 and the summary statistics in Table 3.

Table 2. Explanatory variables

Variable	**Definition**
Age	Age at the end of the year
Age2	$0.1Age^2$
Age3	$0.01Age^3$
Edu	Highest completed education in years
N-Edu	=1, if no education information, =0 otherwise
Edu2	$0.1Edu^2$
Edu3	$0.01Edu^3$
A-Edu	0.1Age*Edu
A-Edu2	$0.1Age*Edu^2$
OLF-Agg	Share of population out of labor force, this quarter
Unem-Agg	Share of population unemployed, this quarter
Dem1	Dummy for age group, 16-19
Dem2	Dummy for age group, 20-24
Dem3	Dummy for age group, 25-39
Dem4	Dummy for age group, 40-54
Dem5	Dummy for age group, 55-67
Dem6	Dummy for age group, 68-74
OLF-Agg-Dem_i, i=1,2,,,6	Share of population in age group i, OLF, gender-specific,
Unem-Agg-Dem_i, i=1,2,,,6	Share of population in age group i, unemployed, gender specific
Q-12	Dummy for transition from 1. quarter to 2.quarter
Q-23	Dummy for transition from 2. quarter to 3.quarter
Q-34	Dummy for transition from 3. quarter to 4.quarter
AQ-12	Q-12*Age
AQ-23	Q-23*Age
AQ-34	Q-34*Age
A-62,,,A-69	Dummies, if the person has turned 62, etc
APF-62,,,APF-66	Dummies for age **and** if AFP is available at that age
Tightness	Natural logarithm of the aggregate flow from unemployment to employment
Quit	Natural logarithm of the aggregate flow from employment to unemployment
Time	The year, two last numbers

Table 3. Summary statistics for the total samples, N=481 371

Variable	Mean	Std Dev	Minimum	Maximum
Age	41.85	16.1	16	74
Age2	20.10	14.3	2.6	54.8
Age3	10.68	10.6	0.4	40.5
N-Edu	0.01	0.1	0	1
Edu	11.22	2.5	0	15
Edu2	13.21	5.5	0	22.5
Edu3	16.13	9.9	0	33.8
A-Edu	4.64	1.9	0	11.1
A-Edu2	0.54	0.29	0	1.65
OLF-Agg	0.30	0.02	0.26	0.32
Unem-Agg	0.033	0.006	0.019	0.043
Dem1	0.074	0.261	0	1
Dem2	0.095	0.293	0	1
Dem3	0.311	0.463	0	1
Dem4	0.275	0.446	0	1
Dem5	0.163	0.370	0	1
Dem6	0.081	0.272	0	1
OLF-Agg-Dem1	0.043	0.152	0	0.714
OLF-Agg-Dem2	0.0271	0.085	0	0.408
OLF-Agg-Dem3	0.044	0.074	0	0.232
OLF-Agg-Dem4	0.0367	0.066	0	0.217
OLF-Agg-Dem5	0.071	0.164	0	0.555
OLF-Agg-Dem6	0.076	0.255	0	0.979
Unem-Agg-Dem1	0.005	0.019	0	0.117
Unem-Agg-Dem2	0.007	0.021	0	0.111
Unem-Agg-Dem3	0.013	0.021	0	0.076
Unem-Agg-Dem4	0.006	0.011	0	0.041
Unem-Agg-Dem5	0.002	0.005	0	0.030
Unem-Agg-Dem6	0.000	0.001	0	0.010
Q-12	0.244	0.430	0	1
Q-23	0.259	0.438	0	1
Q-34	0.251	0.433	0	1
AQ-12	10.26	19.74	0	74
AQ-23	10.88	20.15	0	74
AQ-34	10.51	19.86	0	74
A-62	0.012	0.110	0	1
A-63	0.012	0.111	0	1
A-64	0.013	0.111	0	1
A-65	0.013	0.113	0	1
A-66	0.013	0.112	0	1
A-67	0.013	0.111	0	1
A-68	0.013	0.113	0	1
A-69	0.013	0.114	0	1
AFP-62	0.001	0.035	0	1
AFP-63	0.002	0.043	0	1
AFP-64	0.007	0.084	0	1
AFP-65	0.017	0.108	0	1
AFP-66	0.012	0.111	0	1
Tightness	-1.005	0.226	-2.079	-0.223
Quit	-4.414	0.445	-6.235	-2970
Time	93.98	3.04	88	99

4. Estimation results

The main idea with this type of model is to have an empirical model that can track the development over time in the transition structure. That is the reason why so many explanatory variables have been included. With this type of model the coefficients are complicated to interpret, all the more so in this case because of all the interaction terms. The estimates of coefficients for all transitions are given in Appendix 1.

However, to give an example of the interpretation of the estimated transition probabilities, we will focus on the effects of AFP. Thus, we will illustrate the effect of AFP on the transition probabilities by focusing on the marginal effect of AFP-64. AFP-64 is a dummy for the age 64 **and** if AFP was available for the individual when he turned 64. Furthermore we will solely focus on the transition from State 1: Employment, to the three possible states:

State 1: Employment,
State 2: Unemployment,
State 3: Out of the labour force.

Because early retirement belongs to State 3: Out of labour force, we will expect that $\beta_{11,k}$ and $\beta_{12,k}$ both are negative. (The subscript k here denotes the variable AFP-64.) If this is so, the marginal effect of the availability of AFP at the age of 64 on the transition from employment to out of labour force is positive. From Tables 1 and 2 in Appendix 1, we observe that this is the case both for men and women, with the exception that for women the estimates indicate a transition from employment to unemployment. However, as also seen from these two tables, $\beta_{12,k}$ is not significantly different from zero, neither for men nor women.

Of course, and as alluded to above, it is complicated and also of little interest to interpret each and every coefficients. Therefore, the results are presented here in the form of graphs, see Figures 1-6 below. The graphs show that we track the actual developments of the flow rates quite well over the period 1988-II - 1999-IV.

[Figures: 1-6 in here]

5. Simulating the impact of the early retirement program, AFP

The impact of the early retirement programme (AFP) is studied in two steps. In the first step, we predict counterfactual transition rates for the age groups that are affected. In the second step, these rates are used to simulate the effect on the labour force of abolishing AFP. The basis for this simulation is a baseline projection up to year 2005, and the assessment can be interpreted as abolishing AFP, effective from year 2000.

5.1 The effect on transition rates of the AFP

Counterfactual transition rates are calculated by setting the AFP-eligibility dummies equal to zero. The graphs in Figure 7-15 below show the estimated and the counterfactual rates for males and females and for single age groups 62-66, except for women aged 66, where there were too few observations. It should be remembered that the estimated transition rates are quite close to the observed, even for narrow age groups. Also, most of the estimates of the age effects are rather precise.

The transition rates from employment to out of the labour force are declining over time, probably driven by the upswing in the labour market from 1993 and throughout the observation period. Hence, an assessment of the impact of the AFP, which does not take this trend into account, as we do, will underestimate the impact of AFP.

Figures 7-15 show that the effect of the AFP eligibility dummy is generally stronger for males than for females. This is reasonable, since the estimated coefficients are applied to the whole age group, whereas in reality eligibility requires also a certain work history, as described by Hernæs, Sollie and Strøm (2000). Hence, the coefficients give the product of the share of the age group who is eligible, and the share of those eligible that actually take out AFP. Because of the labour market requirements, the former component, the share of eligible, is smaller among females than among males. The latter component, the take-up rate, is dependent on a number of factors, among them the potential pension level, see Hernæs, Sollie and Strøm (2000). Potential pension is dependent on previous earnings, and this probably also tend to give lower take-up and a smaller coefficient among females.

Eligibility for 62 years old males is estimated to increase the outflow rate from employment to out the labour force (OLF) by 10 percentage points, and for 62 years old females by 4 percentage points. For 63 years old, the effect is similarly estimated at about 6 percentages points for males and 2.5 percentage points for females, which is similar to the level also for older persons. One interpretation of the stronger effect among 62 years old is that among older persons, potential retirees have to a greater extent already taken disability before AFP became available.

Because of the gradual introduction of the AFP programme, the estimation of the (other) age coefficients needs a few comments. Let us look at estimation of the age 64-outflow dummy. This is estimated on the basis of observations from three periods. The first period is from before 1 October 1993, when the eligibility was at age 65 (or even higher). The second period is between 1 October 1993 and 1 October 1997 when eligibility was at age 64 and the third period is after October 1997 when eligibility was at age 63 (or even lower). For the first period, the age 64 dummy has the interpretation as the outflow, mainly due to disability, of 64 years old who are not eligible for AFP. For the second period there is an AFP dummy that will capture the change in outflow due to introduction of AFP eligibility for 64 years old, and the age dummy can retain its interpretation. For the last period, eligibility occurred at age 63, and consequently the age-64-eligibility dummy will have to capture outflow of 64 years old that became eligible at age 63, but did not then take out AFP.

The outflow rate of 64 years old who qualified for AFP at 63 without then taking AFP, consists both of those who take AFP at 64 and outflow for other reasons (mainly disability). The first component may make outflow higher than among 64 years old not AFP eligible. The second component may make outflow lower, if AFP substitutes for disability. In the present analysis we assume that these effects cancel out.

[Figures 7-15 in here]

5.2 Baseline simulation of the labour force 1999-2005

As a starting point for assessing what would happen to the labour force if the AFP were abolished, we used the estimated flow coefficients to make a baseline projection. This projection starts with the last observed sample, and predicts changes from quarter to quarter with the predicted transition probabilities. The projection is made in terms of expected states, so that we sum over the individual state probabilities each quarter.

The labour market state variables Tightness and Quit used in the projections are based on observed values over the last two quarters. These values appear to reflect an extremely tight labour market and are therefore somewhat moderated in the projections. The aggregate transition rate from unemployment to employment (Tightness) is decreased by 20 per cent and the aggregate transition rate from employment to unemployment (Quit) is increased by 20 per cent. In the retirement assessment setting, this mainly serves as controlling for other factors than the AFP.

We also take account of mortality. Mortality rates by age and gender are given in Brinch (2000). We add a new cohort at the lower age bracket (16) with the same

characteristics as the last observed 16 years old cohort; and we increase educational attainment at the medium level where it matters most, based on a regression in the sample, see Brinch (2000) for further details. The labour force projections start with the last quarter of 1999 and are conducted quarter by quarter throughout 2005.

5.3 Abolishing the AFP

The effect of abolishing the AFP is assessed by setting all the AFP eligibility dummy variables equal to zero. All other coefficients are held constant, and we investigate deviation from the baseline projection described above.

The baseline projection gives an increase in employment from 70.9 per cent of the total population in the last quarter of 1999 to 74.5 per cent in the last quarter of 2005. The simulation of abolishing the AFP increases employment in the last quarter of 2005 by an additional 2.6 percentage points. Looking only at older persons, labour force participation in 2005 for 55-67 years old males will be 72 per cent in the baseline projection and 83 per cent without AFP. For females, the corresponding figures are 62 per cent in the baseline projection and 67 per cent without AFP.

The simulation gives a smaller effect for females of abolishing the AFP because the AFP coefficient, which is the product of eligibility and take-up, see discussion above, is lower for females than for males.

Due to data limitations, we do not project cohort changes in labour market history or accrued pension rights. The former will increase eligibility among females. In our projections, the AFP coefficient for females should therefore be increased. The latter increase both potential earnings and potential pension, with uncertain net effect. It seems likely that the net result is that our AFP coefficient for females underestimates the effect of the AFP.

6. Conclusions

The labour force results do not fully translate into the sum of hours worked, since average hours worked is lower among older persons. Moreover, it should also be remembered the reservations we made above with regards to the estimated coefficients used in the simulations and the underestimation of the impact on female labour force participation. The results, however, indicate that an abolishment of the early retirement programme would have a large macroeconomic impact, increasing the work force and the contributions to pension systems, and reducing payments from the AFP- system.

In this paper, we have investigated the net impact on the labour force of the early retirement programme. We have neither taken into account information on pension rights,

nor the implications of the household structure. In further research, we intend to integrate the two approaches.

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Appendix 1

Tables 1-6 below give the estimates of the transition probabilities:

Tables 1 and 2 give the estimates of the probabilities of transiting from employment (state 1) in period t, to employment (state 1), unemployment (state 2) and out of labor force (state 3) in period t+1, for men and women, respectively. For each variables there are two estimates. The first line attached to each variable gives the estimate of β_{11} and the second line gives the estimate of β_{12}.

Tables 3 and 4 give the estimates of the probabilities of transiting from unemployment (state 2) in period t to employment (state 1), unemployment (state 2) and out of labor force (state 3) in period t+1, for men and women, respectively. For each variables there are two estimates. The first line attached to each variable gives the estimate of β_{21} and the second line gives the estimate of β_{22}.

Tables 5 and 6 give the estimates of the probabilities of transiting from out of labor force (state 3) in period t to employment (state 1), unemployment (state 2) and out of labor force (state 3) in period t+1, for men and women, respectively. For each variables there are two estimates. The first line attached to each variable gives the estimate of β_{31} and the second line gives the estimate of β_{32}.

Table 1. Transition from employment, men, N= 176 803

Variable	Estimate	t-value
Intercept	-44.87	-8.2
	-92.60	-4.5
Age	0.81	13.5
	0.73	5.6
Age2	-1.61	-9.8
	-1.64	-4.9
Age3	0.95	7.0
	1.11	3.8
N-Edu	32.66	7.5
	43.77	4.4
Edu	8.33	7.2
	11.78	4.5
Edu2	-6.87	-6.9
	-10.02	-4.4
Edu3	1.80	6.4
	2.73	4.3
A-Edu	-0.33	-2.0
	-0.07	-0.1
A-Edu2	3.69	5.0
	0.96	0.4
OLF-Agg	-11.04	-3.8
	-2.33	-0.5
Unem-Agg	-12.44	-2.1
	-14.08	-1.3
Dem1	10.07	3.5
	42.05	2.4
Dem2	9.16	3.2
	43.02	2.5
Dem3	10.14	3.5
	43.24	2.5
Dem4	8.60	3.0
	41.84	2.4
Dem5	8.65	3.0
	40.91	2.4
OLF-Agg-Dem1	0.55	0.8
	0.75	0.5
OLF-Agg-Dem2	2.28	2.0
	0.19	0.1
OLF-Agg-Dem3	-3.42	-0.8
	-5.25	-0.8
OLF-Agg-Dem4	21.73	3.1
	12.54	1.3
OLF-Agg-Dem5	4.30	1.8
	6.41	1.3
OLF-Agg-Dem6	9.10	3.0
	43.6	2.3
Unem-Agg-Dem1	-2.71	1.2
	7.95	1.7
Unem-Agg-Dem2	4.77	1.9
	3.69	0.8
Unem-Agg-Dem3	12.74	2.9
	10.05	1.5

Unem-Agg-Dem4	3.98	0.6
	15.03	1.4
Unem-Agg-Dem5	8.23	1.0
	-15.25	-0.7
Unem-Agg-Dem6	-3.34	0.1
	266.30	2.0
Q-12	-0.28	-2.2
	-0.37	-1.6
Q-23	-0.99	-8.8
	-0.83	-4.1
Q-34	-1.57	-13.6
	-1.47	-6.8
AQ-12	0.01	4.5
	0.01	2.0
AQ-23	0.02	7.8
	0.01	1.8
AQ-34	0.03	11.1
	0.02	4.1
A-62	-0.56	-3.8
	-0.57	-1.7
A-63	-0.72	-4.6
	-1.17	-2.8
A-64	-0.60	-2.9
	-0.89	-1.7
A-65	-0.96	-2.9
	-0.74	-0.8
A-66	-0.65	-0.9
	0.28	0.2
A-67	-2.01	-9.0
	-3.90	-3.6
A-68	0.20	1.1
	1.63	2.2
A-69	-0.04	-0.2
	-0.04	0.0
AFP-62	-1.44	-5.7
	0.00	0.0
AFP-63	-0.91	-3.6
	..	
AFP-64	-0.72	-3.5
	-1.21	-1.6
AFP-65	-0.18	-0.6
	-0.88	-1.0
AFP-66	-0.67	-0.9
	-3.26	-2.3
Tightness	0.02	0.2
	-0.01	0.0
Quit	-0.19	-4.5
	0.77	10.2
Time	-0.03	-2.7
	0.01	0.1

Table 2. Transition from employment, women, N= 152 237

Variable	Estimate	t-value
Intercept	-41.47	-5.3
	-15.27	-1.7
Age	0.60	9.5
	0.43	2.9
Age2	-1.24	-7.4
	-1.01	-2.5
Age3	0.82	5.7
	0.75	2.1
N-Edu	24.96	5.7
	6.93	0.8
Edu	6.65	5.8
	2.08	0.9
Edu2	-5.59	-5.6
	-1.85	-0.9
Edu3	1.50	5.4
	0.50	0.9
A-Edu	-0.52	-3.1
	-0.31	-0.7
A-Edu2	4.31	5.5
	1.37	0.7
OLF-Agg	-6.69	-3.3
	-7.14	-1.7
Unem-Agg	-5.05	-0.9
	-6.54	-0.5
Dem1	11.55	2.5
	0.00	0.0
Dem2	10.57	1.6
	4.80	6.5
Dem3	11.19	1.7
	0.00	0.0
Dem4	12.82	2.0
	0.00	0.0
Dem5	11.74	1.8
	3.30	1.4
OLF-Agg-Dem1	0.03	0.0
	-0.20	-0.2
OLF-Agg-Dem2	2.91	3.3
	1.71	1.0
OLF-Agg-Dem3	0.18	0.1
	-5.34	-1.8
OLF-Agg-Dem4	-7.83	-3.1
	-8.98	-2.3
OLF-Agg-Dem5	0.08	0.0
	2.48	0.5
OLF-Agg-Dem6	8.93	1.3
	2.11	1.2
Unem-Agg-Dem1	-1.22	0.6
	-4.83	1.2
Unem-Agg-Dem2	-1.02	-0.3
	-1.40	-0.2
Unem-Agg-Dem3	12.14	2.6
	10.41	1.1

Unem-Agg-Dem4	28.11	2.8
	41.10	2.2
Unem-Agg-Dem5	-10.49	-0.6
	19.47	0.4
Unem-Agg-Dem6	53.9	0.6
	0.00	0.0
Q-12	-0.04	-1.1
	0.65	2.5
Q-23	-0.71	-7.0
	0.31	1.4
Q-34	-1.18	-10.9
	-0.37	-1.4
AQ-12	0.01	1.4
	-0.01	-1.2
	0.01	4.1
AQ-23	-0.01	-1.5
AQ-34	0.02	8.6
	0.01	0.6
A-62	-0.51	-3.3
	-1.09	-1.9
A-63	-0.59	-3.5
	-1.07	-1.8
A-64	-0.92	-4.5
	-1.41	-1.7
A-65	-1.25	-3.7
	-0.93	-0.8
A-66	0.00	0.0
	-2.51	0.0
A-67	-2.29	-9.6
	-2.51	-2.8
A-68	0.85	3.7
	0.00	0.0
A-69	0.62	2.8
	1.22	0.8
AFP-62	-0.78	-2.5
	0.58	0.5
AFP-63	-0.52	-1.7
	1.50	1.8
AFP-64	-0.54	-2.7
	0.35	0.4
AFP-65	-0.27	-0.8
	-0.70	-0.6
AFP-66	-8.27	-38.6
	1.15	0.0
Tightness	-0.05	-0.8
	-0.09	-0.6
Quit	-0.09	-2,4
	0.90	10.8
Time	0.01	1.3
	0.03	2.2

Table 3. Transition from unemployment, men, N= 8 130

Variable	Estimate	t-value
Intercept	-47.49	-2.1
	-57.00	-2.5
Age	0.88	5.4
	0.76	4.6
Age2	-2.11	-4.7
	-1.89	-4.2
Age3	1.74	4.5
	1.51	3.9
N-Edu	30.63	2.3
	33.15	2.5
Edu	8.08	2.3
	8.90	2.5
Edu2	-6.26	-2.1
	-7.58	-2.5
Edu3	1.57	1.8
	2.03	2.4
A-Edu	-1.65	-3.0
	-0.84	-1.7
A-Edu2	7.31	3.0
	6.69	3.0
OLF-Agg	-14.52	-2.2
	1.70	0.3
Unem-Agg	1.95	0.1
	-2.12	-0.1
Dem1	17.49	1.0
	16.40	0.9
Dem2	18.01	1.0
	16.30	0.9
Dem3	18.02	1.0
	16.63	0.9
Dem4	17.11	1.0
	14.87	0.8
Dem5	15.57	0.9
	13.84	0.7
OLF-Agg-Dem1	2.79	1.7
	-0.59	-0.4
OLF-Agg-Dem2	5.63	2.2
	-0.29	-0.1
OLF-Agg-Dem3	14.64	1.8
	-2.32	-0.3
OLF-Agg-Dem4	20.90	1.7
	18.80	1.6
OLF-Agg-Dem5	6.09	0.8
	6.02	0.9
OLF-Agg-Dem6	16.15	0.9
	13.50	0.7
Unem-Agg-Dem1	-1.68	-0.4
	-2.61	-0.5
Unem-Agg-Dem2	-1.04	-0.2
	2.87	0.5
Unem-Agg-Dem3	0.30	0.0
	1.63	0.2

Unem-Agg-Dem4	23.21	1.7
	3.22	0.2
Unem-Agg-Dem5	68.96	2.4
	16.78	0.6
Unem-Agg-Dem6	-201.10	-0.8
	-110.20	-0.5
Q-12	-0.94	-3.2
	-0.69	-2.4
Q-23	-0.85	-3.2
	-0.97	-3.7
Q-34	-0.51	-1.8
	-0.56	-2.0
AQ-12	0.02	2.8
	0.02	2.0
	0-02	2.2
AQ-23	0.02	2.7
AQ-34	0.00	0.1
	0.01	1.4
A-62	-0.64	-1.3
	-0.95	-2.0
A-63	-1.93	-3.1
	-0.77	-1.6
A-64	-2.30	-2.6
	-1.58	-2.2
A-65	-9.32	-14.2
	-1.62	-1.0
A-66	-3.48	-4.3
	-1.92	-2.9
A-67	-5.23	-4.2
	-4.16	-4.2
A-68	3.29	2.4
	2.48	1.8
A-69	1.98	1.9
	-0.05	0.0
AFP-62	0.54	0.4
	-7.52	0.0
AFP-63	-7.00	-0.0
	-1.14	-0.9
AFP-64	-0.21	-0.2
	-0.24	-0.3
AFP-65	6.73	0.0
	-0.31	-0.2
AFP-66	0.00	0.0
	0.00	0.0
Tightness	1.66	9.9
	-0.23	-1.5
Quit	0.03	0.4
	-0.05	-0.6
Time	-0.08	-3.1
	-0.01	-0.6

Table 4. Transition from unemployment, women, N= 6 706

Variable	Estimate	t-value
Intercept	-5.50	-0.4
	-43.04	-3.4
Age	0.14	1.0
	0.50	3.7
Age2	-0.22	-0.6
	-1.22	-3.5
Age3	0.06	0.2
	0.86	3.0
N-Edu	16.43	1.3
	23.07	1.9
Edu	4.00	1.2
	6.05	1.9
Edu2	-2.97	-1.1
	-5.07	-1.8
Edu3	0.77	1.0
	1.38	1.8
A-Edu	0.12	0.2
	0.14	0.3
A-Edu2	-2.28	-0.9
	-0.02	-0.0
OLF-Agg	3.44	0.7
	3.11	0.6
Unem-Agg	-22.33	-1.6
	6.29	0.4
Dem1	-13.11	-0.0
	-14.24	-0.0
Dem2	13.06	0.0
	14.11	0.0
Dem3	-10.93	-0.0
	12.64	0.0
Dem4	-12.75	-0.0
	12.90	0.0
Dem5	-16.09	-0.0
	13.20	0.0
OLF-Agg-Dem1	2.09	1.9
	-1.72	-1.5
OLF-Agg-Dem2	1.23	0.7
	-2.38	-1.4
OLF-Agg-Dem3	-8.21	-2.7
	-0.30	-0.1
OLF-Agg-Dem4	6.59	1.6
	7.82	1.8
OLF-Agg-Dem5	7.34	4.3
	0.31	0.2
OLF-Agg-Dem6	-9.38	-0.0
	14.32	0.0
Unem-Agg-Dem1	5.03	1.3
	-2.49	-0.6
Unem-Agg-Dem2	14.34	2.1
	-3.99	-0.6
Unem-Agg-Dem3	19.95	1.9
	9.94	0.9

Unem-Agg-Dem4	-5.79	-0.3
	-41.66	-1.9
Unem-Agg-Dem5	44.18	0.7
	22.36	0.4
Unem-Agg-Dem6	-1728.40	-2.0
	-1932.90	1.6
Q-12	-0.24	-0.8
	0.25	0.8
Q-23	-0.36	-1.2
	-0.75	-2.6
Q-34	-0.14	-0.5
	-0.61	-2.1
AQ-12	0.01	1.0
	-0.01	-0.9
	0.01	1.0
AQ-23	0.01	1.7
AQ-34	0.01	1.3
	0.01	1.3
A-62	-0.63	-0.9
	0.32	0.7
A-63	-0.43	-0.7
	-0.43	-0.9
A-64	0.55	0.8
	0.87	1.0
A-65	-6.75	-0.0
	-7.10	-0.0
A-66	-6.84	-0.0
	-6.98	-0.0
A-67	1.39	1.4
	-8.23	-0.0
A-68	-6.24	-0.0
	-5.63	-0.0
A-69	-0.61	-0.5
	-6.81	-0.0
AFP-62	1.30	0.8
	-7.46	-0.0
AFP-63	1.04	0.7
	1.51	1.2
AFP-64	1.38	1.3
	1.54	1.2
AFP-65	4.84	4.3
	6.13	0.0
AFP-66	-5.06	-0.0
	6.71	0.0
Tightness	1.29	7.6
	-0.05	-0.3
Quit	-0.08	-0.9
	-0.02	-0.2
Time	-0.02	-1.2
	-0.01	-0.6

Table 5. Transition from out of labor force, men, N= 54 942

Variable	Estimate	t-value
Intercept	-1.78	-0.2
	-42.13	-2.7
Age	0.42	6.7
	0.25	2.7
Age2	-1.14	-7.0
	-0.72	-3.0
Age3	0.86	6.3
	0.46	2.4
N-Edu	12.38	1.6
	50.03	4.6
Edu	2.85	1.4
	13.28	4.7
Edu2	-2.13	-1.2
	-11.49	-4.7
Edu3	0.54	1.1
	3.20	4.7
A-Edu	0.65	3.5
	0.55	1.9
A-Edu2	-2.57	-3.1
	0.13	0.1
OLF-Agg	13.47	4.3
	7.67	1.6
Unem-Agg	-2.96	-0.5
	-19.22	-2.0
Dem1	-21.97	-6.7
	-15.84	-1.4
Dem2	-23.20	-7.2
	-16.25	-1.4
Dem3	-24.13	-7.5
	-15.78	-1.4
Dem4	-24.02	-7.4
	-16.02	-1.4
Dem5	-21.30	-6.5
	-15.43	-1.8
OLF-Agg-Dem1	-4.46	-6.0
	-0.42	-0.4
OLF-Agg-Dem2	-4.35	-3.5
	0.78	0.4
OLF-Agg-Dem3	-12.41	-2.6
	-6.33	-1.0
OLF-Agg-Dem4	-14.13	-1.8
	-3.80	-0.4
OLF-Agg-Dem5	-10.39	-3.7
	-2.46	-0.5
OLF-Agg-Dem6	-29.88	-8.6
	-20.93	-1.7
Unem-Agg-Dem1	-2.51	-1.2
	-1.03	-0.3
Unem-Agg-Dem2	-8.59	-3.2
	-0.44	-0.1
Unem-Agg-Dem3	-1.24	-0.3
	12.12	2.1

Unem-Agg-Dem4	1.16	0.1
	18.92	1.8
Unem-Agg-Dem5	-12.12	-1.1
	20.05	1.0
Unem-Agg-Dem6	-147.50	-3.4
	90.93	0.6
Q-12	0.71	5.8
	0.98	4.7
Q-23	2.20	19.8
	1.41	7.5
Q-34	0.18	1.4
	0.19	1.0
AQ-12	-0.01	-3.6
	-0.02	-3.5
	-0.04	-13.2
AQ-23	-0.03	-5.3
AQ-34	-0.00	-0.2
	-0.00	-0.6
A-62	-0.23	-1.2
	-0.28	-0.9
A-63	-0.26	-1.3
	-0.61	-1.7
A-64	-0.56	-2.1
	-0.82	-1.6
A-65	-0.43	-0.9
	-8.87	-0.0
A-66	-0.18	-0.3
	-6.77	-0.0
A-67	-0.99	-4.0
	-2.48	-4.0
A-68	0.66	3.1
	0.14	0.2
A-69	0.37	1.9
	-0.96	0.9
AFP-62	-1.04	-1.4
	-7.95	-0.0
AFP-63	-0.16	-0.4
	-0.54	-0.5
AFP-64	-0.30	-0.9
	-0.24	-0.4
AFP-65	- 0.13	-0.3
	8.27	0.0
AFP-66	-0.54	-0.7
	5.76	0.0
Tightness	-0.01	-0.0
	-0.02	-0.2
Quit	-0.02	-0.4
	-0.13	-2.1
Time	0.03	2.6
	0.01	0.1

Table 6. Transition from out of labor force, women, N= 82 553

Variable	Estimate	t-value
Intercept	15.58	1.8
	-10.96	-0.4
Age	0.05	0.7
	-0.13	-0.1
Age2	-0.16	-1.0
	0.02	0.1
Age3	0.06	0.4
	-0.20	0.9
N-Edu	19.36	3.2
	56.80	6.4
Edu	4.58	2.9
	14.74	6.3
Edu2	-3.59	-2.6
	-12.47	-6.2
Edu3	0.97	2.6
	3.43	6.1
A-Edu	0.66	3.9
	0.27	1.0
A-Edu2	-3.71	-4.6
	0.42	0.3
OLF-Agg	-4.18	-2.0
	-5.83	-1.8
Unem-Agg	3.20	0.5
	11.96	1.2
Dem1	-33.48	-5.3
	-46.65	-2.0
Dem2	-35.51	-5.6
	-49.13	-2.1
Dem3	-36.04	-5.7
	-48.14	-2.1
Dem4	-35.98	-5.7
	-48.34	-2.1
Dem5	-38.38	-6.0
	-45.59	-1.9
OLF-Agg-Dem1	-2.08	-3.2
	-1.29	-1.3
OLF-Agg-Dem2	-0.05	-0.0
	4.20	2.7
OLF-Agg-Dem3	1.33	0.7
	-0.78	-0.3
OLF-Agg-Dem4	3.77	1.3
	3.40	0.8
OLF-Agg-Dem5	5.21	2.8
	-4.41	-1.3
OLF-Agg-Dem6	-38.27	-5.8
	-50.44	-2.1
Unem-Agg-Dem1	-4.60	-2.3
	-7.56	-2.5
Unem-Agg-Dem2	4.73	1.4
	-1.02	-0.2
Unem-Agg-Dem3	8.54	1.7
	9.65	1.3

Unem-Agg-Dem4	-2.65	-0.3
	-8.73	-0.5
Unem-Agg-Dem5	30.00	1.5
	28.33	0.7
Unem-Agg-Dem6	196.20	2.1
	134.90	0.4
Q-12	0.43	3.8
	0.57	3.1
Q-23	1.49	13.8
	0.78	4.4
Q-34	0.28	2.4
	-0.35	-1.9
AQ-12	-0.01	-1.7
	-0.02	-2.7
	-0.03	-9.4
AQ-23	-0.02	-3.5
AQ-34	-0.00	-0.4
	0.01	1.1
A-62	-0.31	-1.5
	0.07	0.2
A-63	-0.22	-1.0
	0.02	0.0
A-64	-0.24	-0.9
	0.57	1.1
A-65	-0.05	-0.1
	0.39	0.4
A-66	0.20	0.3
	-5.91	-0.0
A-67	-0.31	-1.1
	-1.84	-1.7
A-68	0.34	1.3
	-1.30	-1.2
A-69	0.35	1.5
	-0.41	-0.5
AFP-62	0.02	0.0
	0.40	0.5
AFP-63	-0.11	-0.2
	-0.69	-0.6
AFP-64	0.36	1.2
	-0.70	-1.1
AFP-65	-0.08	-0.2
	-0.63	-0.6
AFP-66	-0.23	-0.3
	5.04	0.0
Tightness	0.06	0.8
	0.04	0.4
Quit	-0.01	-0.4
	-0.01	-0.0
Time	-0.02	-2.5
	0.01	0.7

Figure 1 - Quarterly transition rates from employment, men

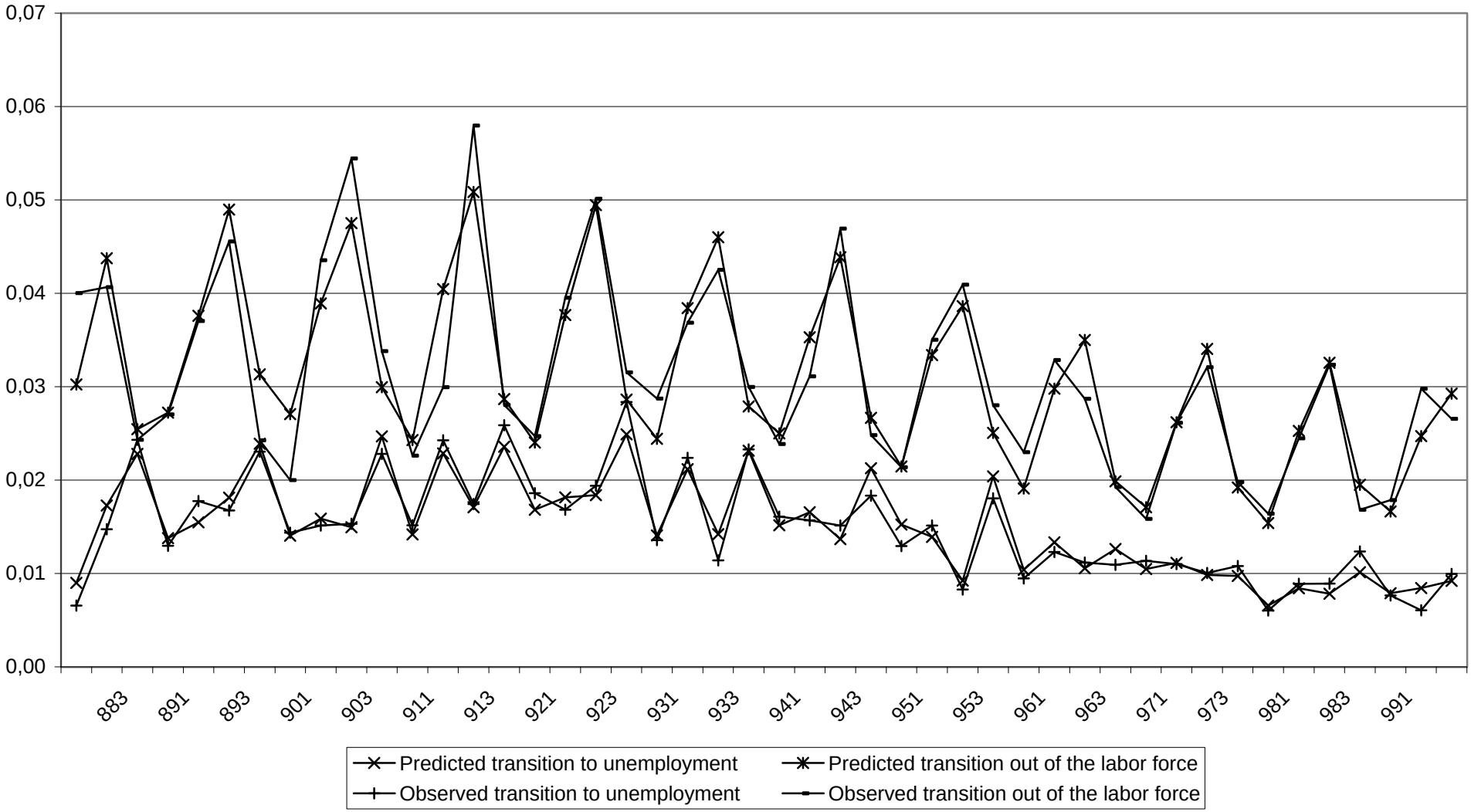

Figure 2 - Quarterly transition rates from employment, women

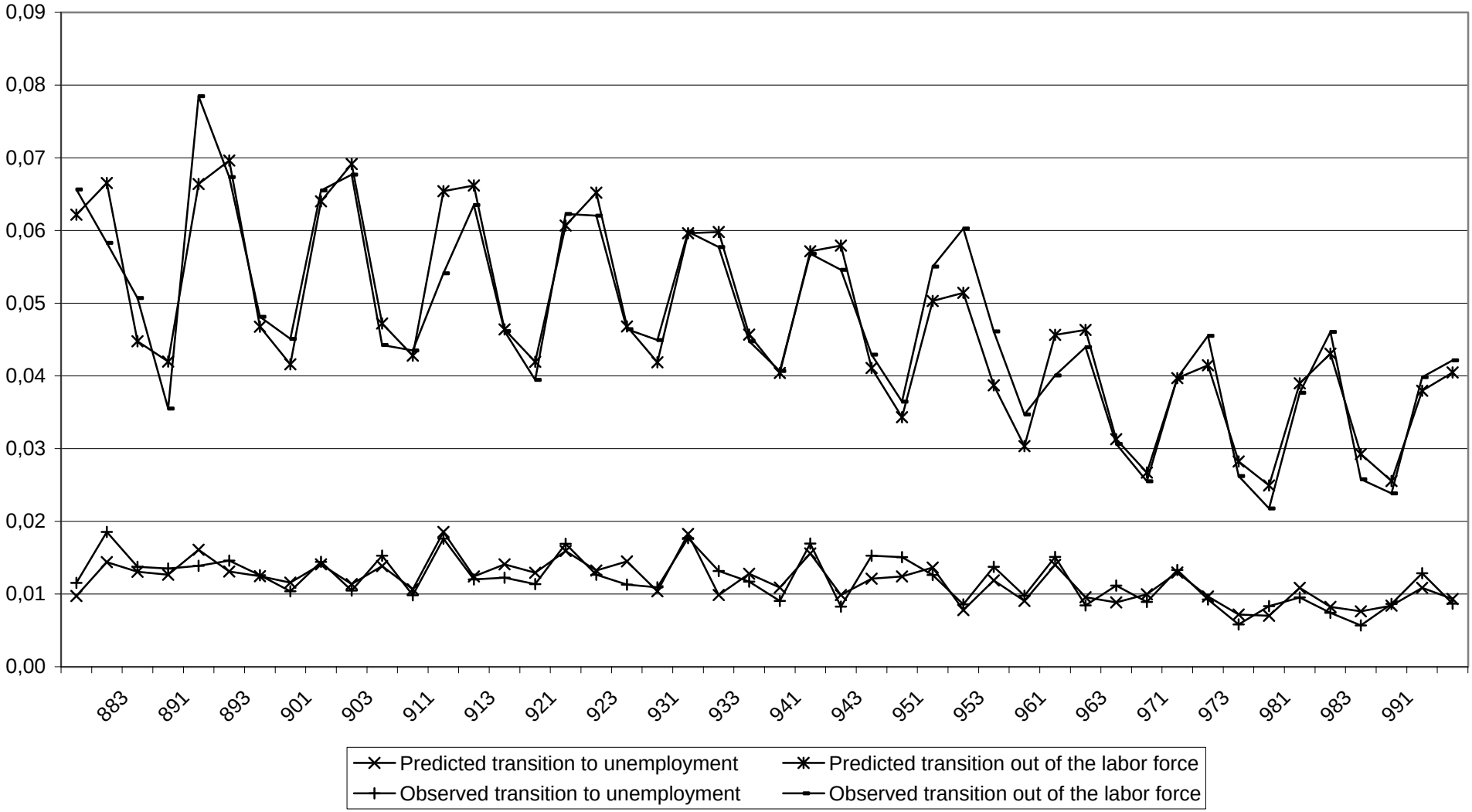

Figure 3 - Quarterly transition rates from unemployment, men

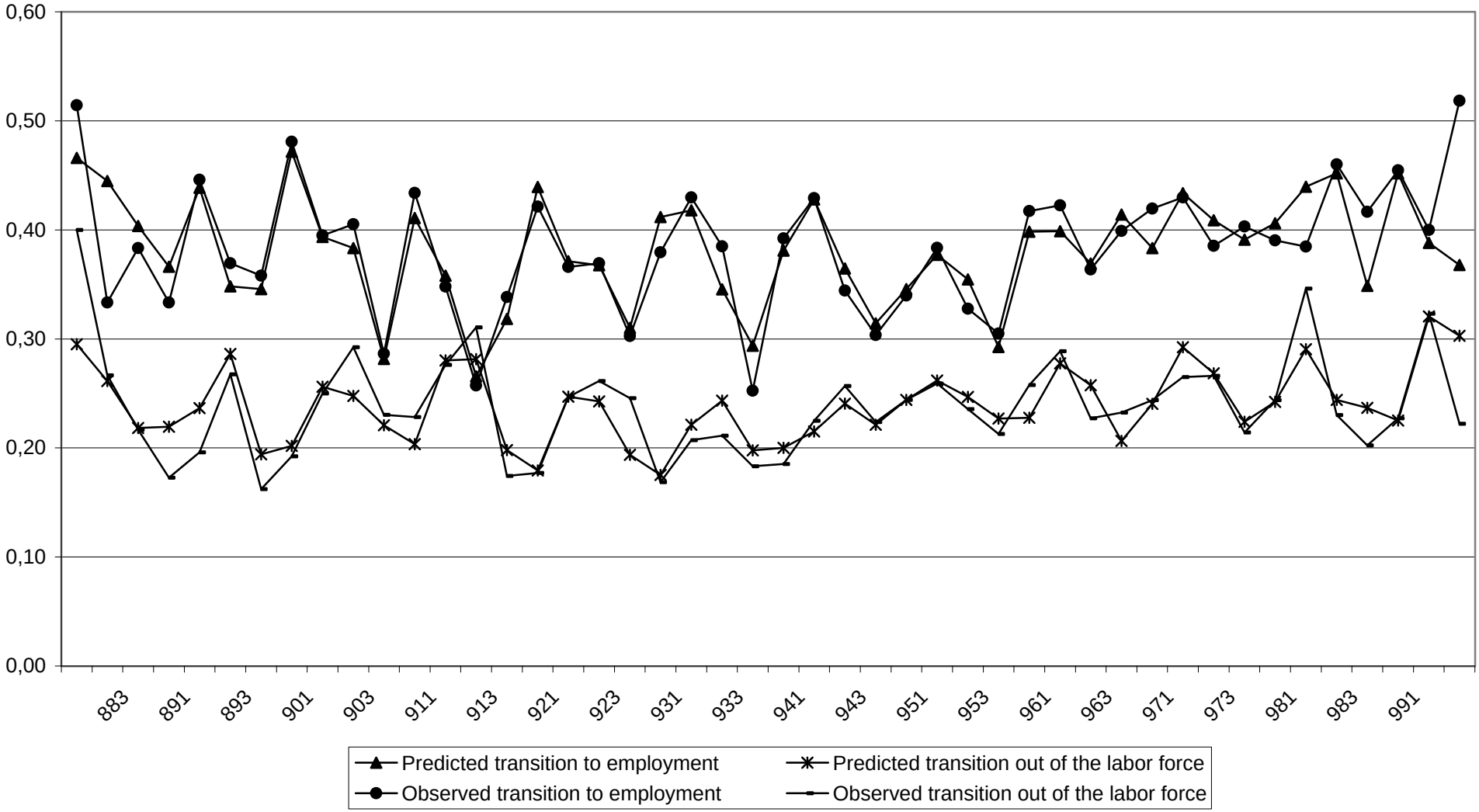

Figure 4 - Quarterly transition rates from unemployment, women

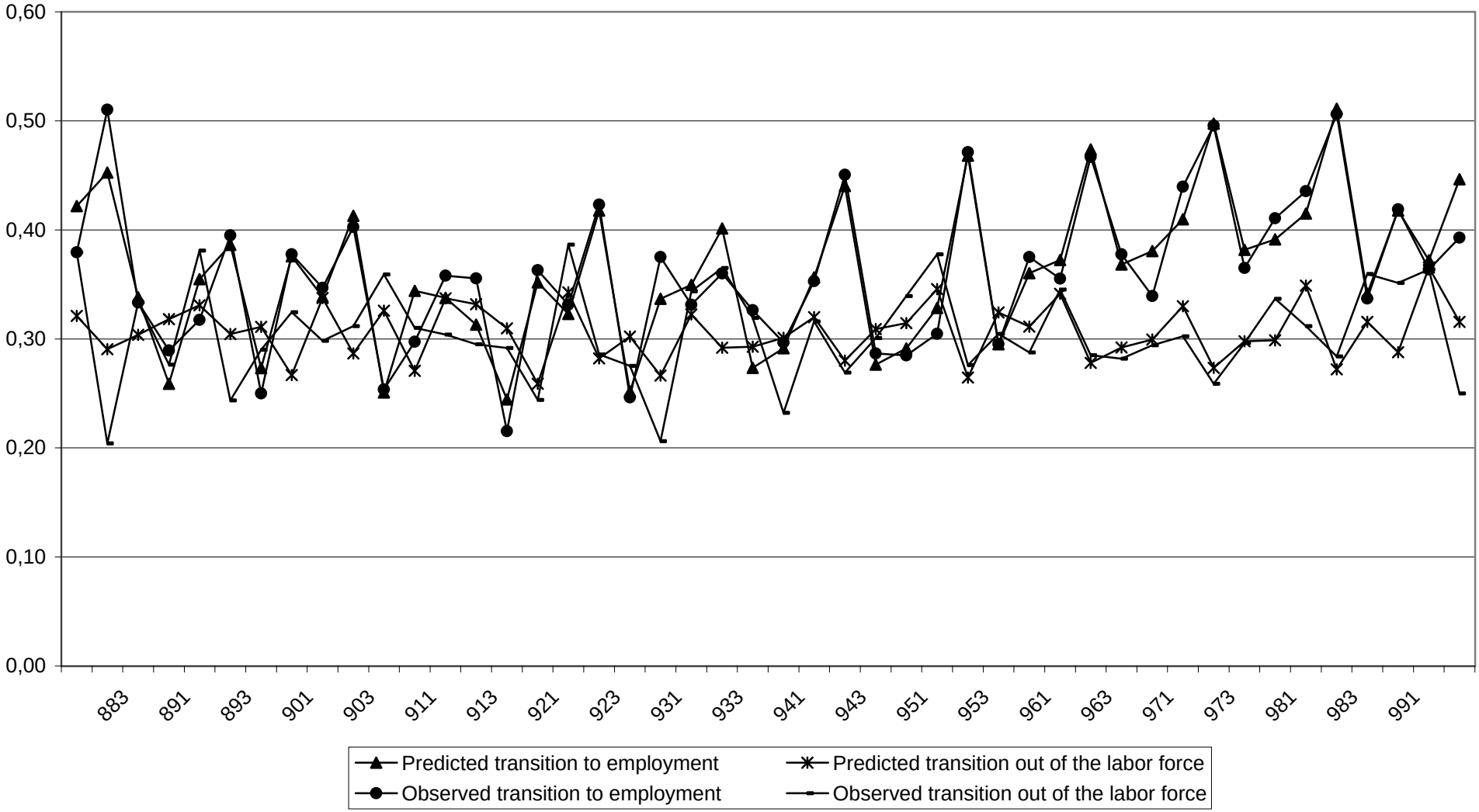

Figure 5 - Quartely transition rates from out of the labor force, men

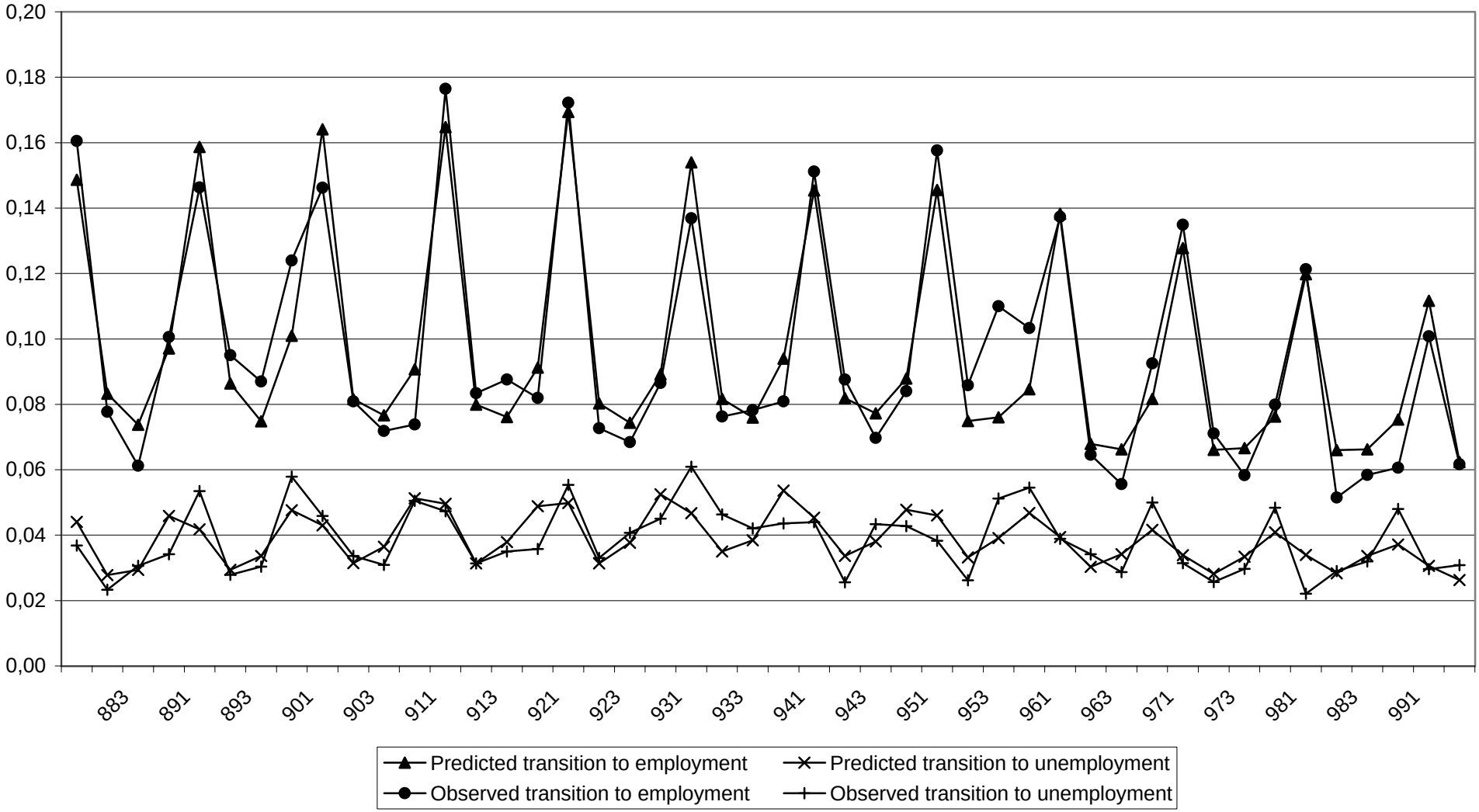

Figure 6 - Quartely transition rates from out of the labor force, women

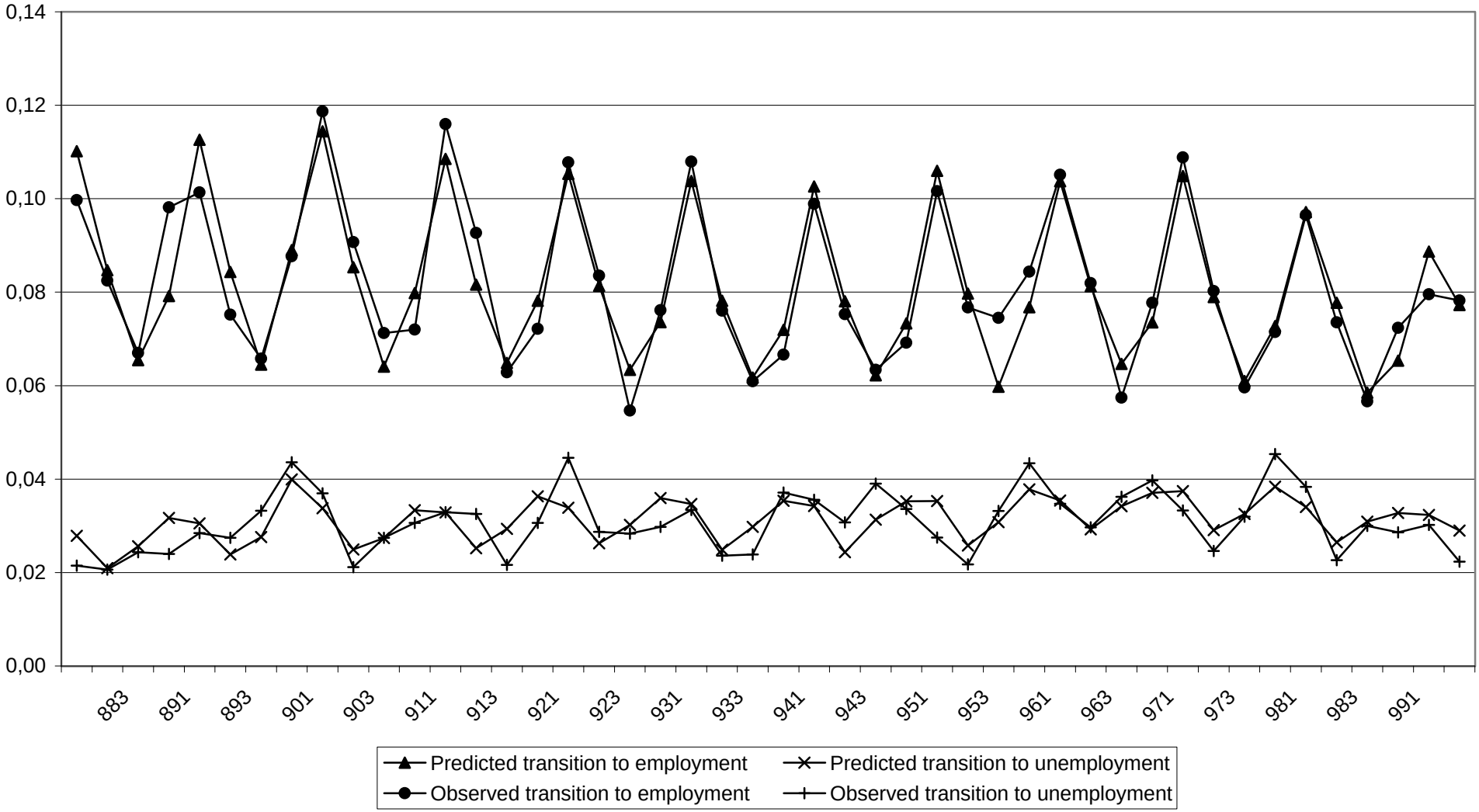

Figure 7 - Predicted and counterfactually predicted transition rates from employment out of the labor force, men, 62 years

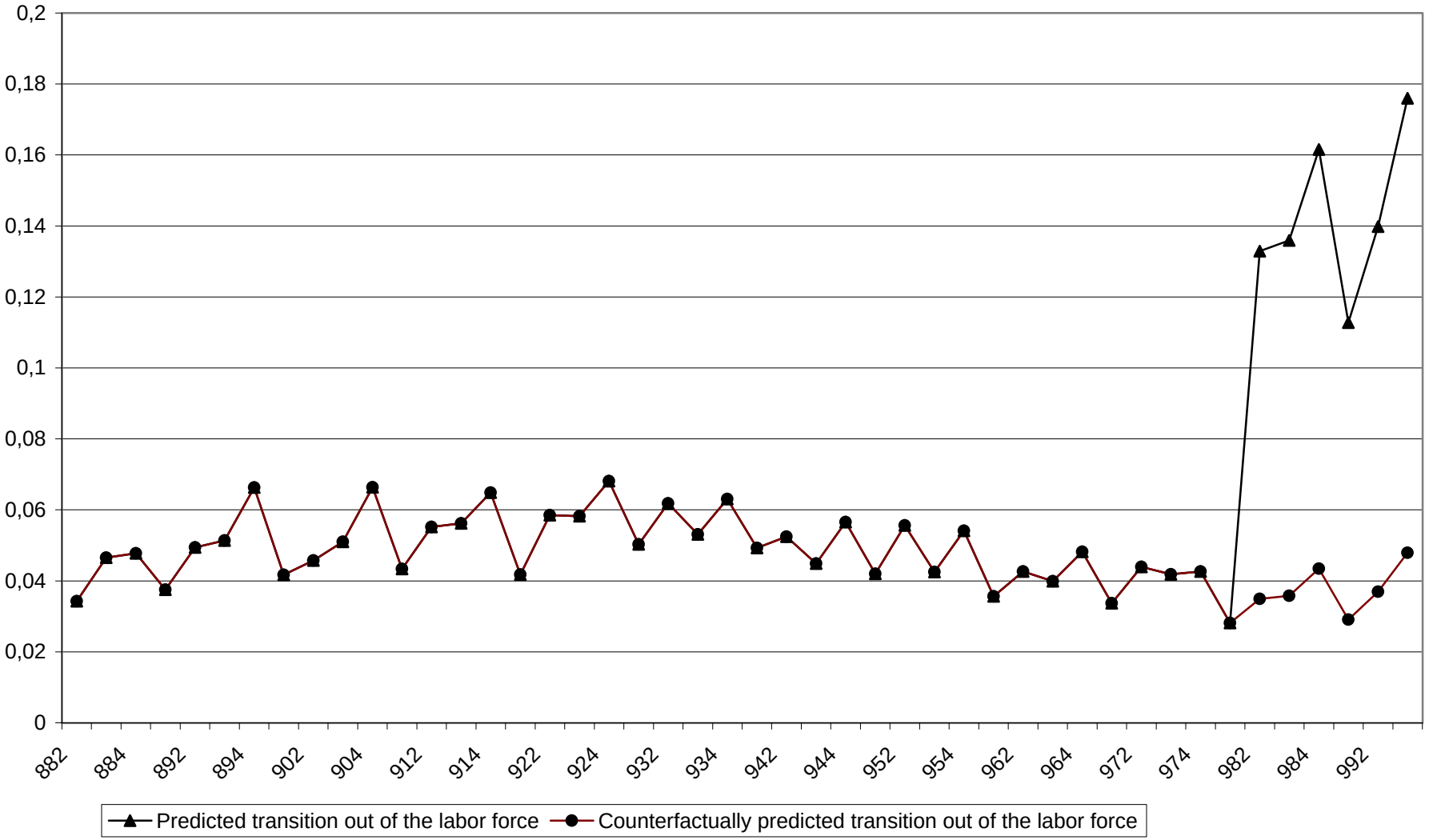

Figure 8 - Predicted and counterfactually predicted transition rates from employment out of the labor force, men, 63 years

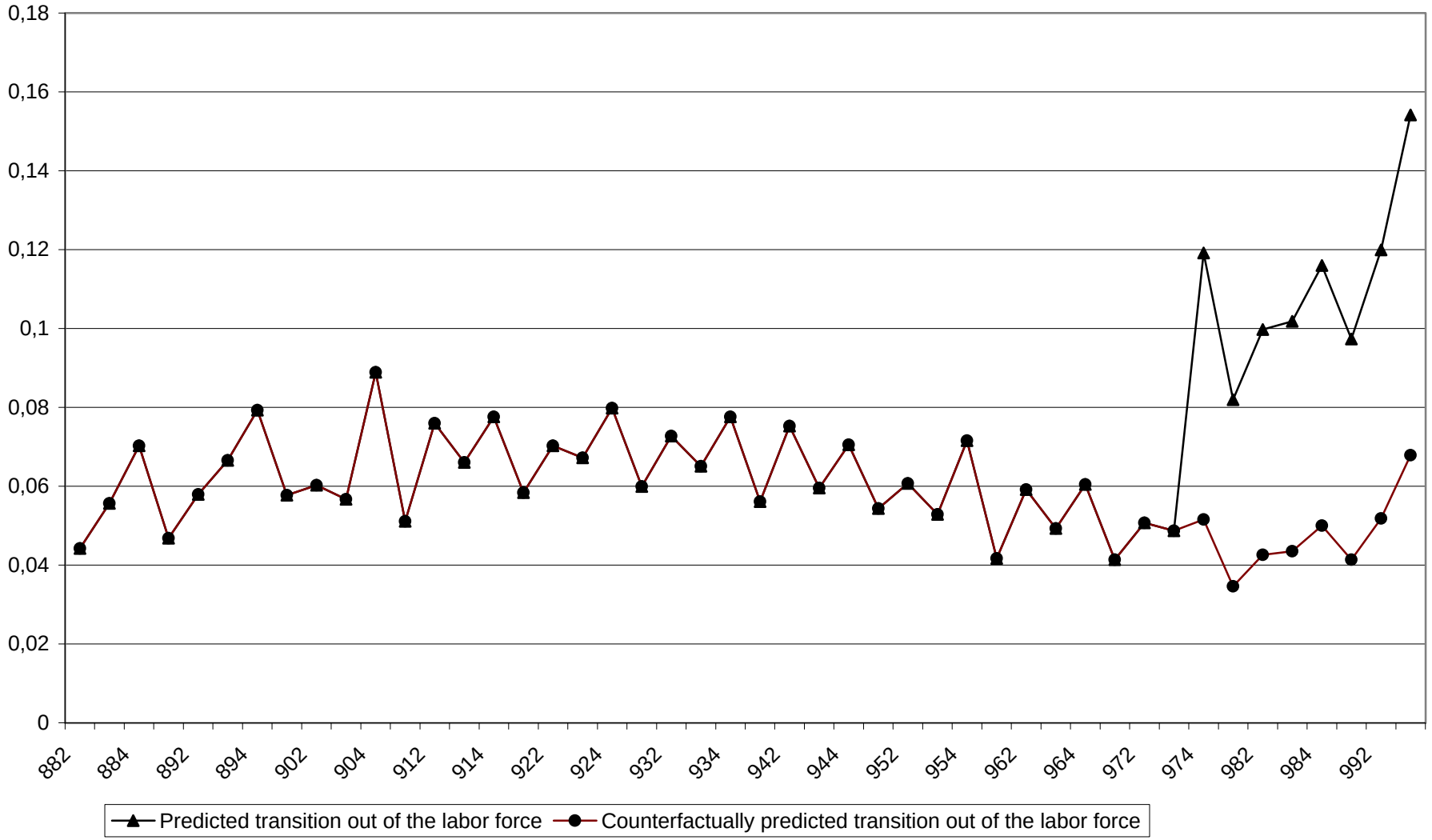

Figure 9 - Predicted and counterfactually predicted transition rates from employment out of the labor force, men, 64 years

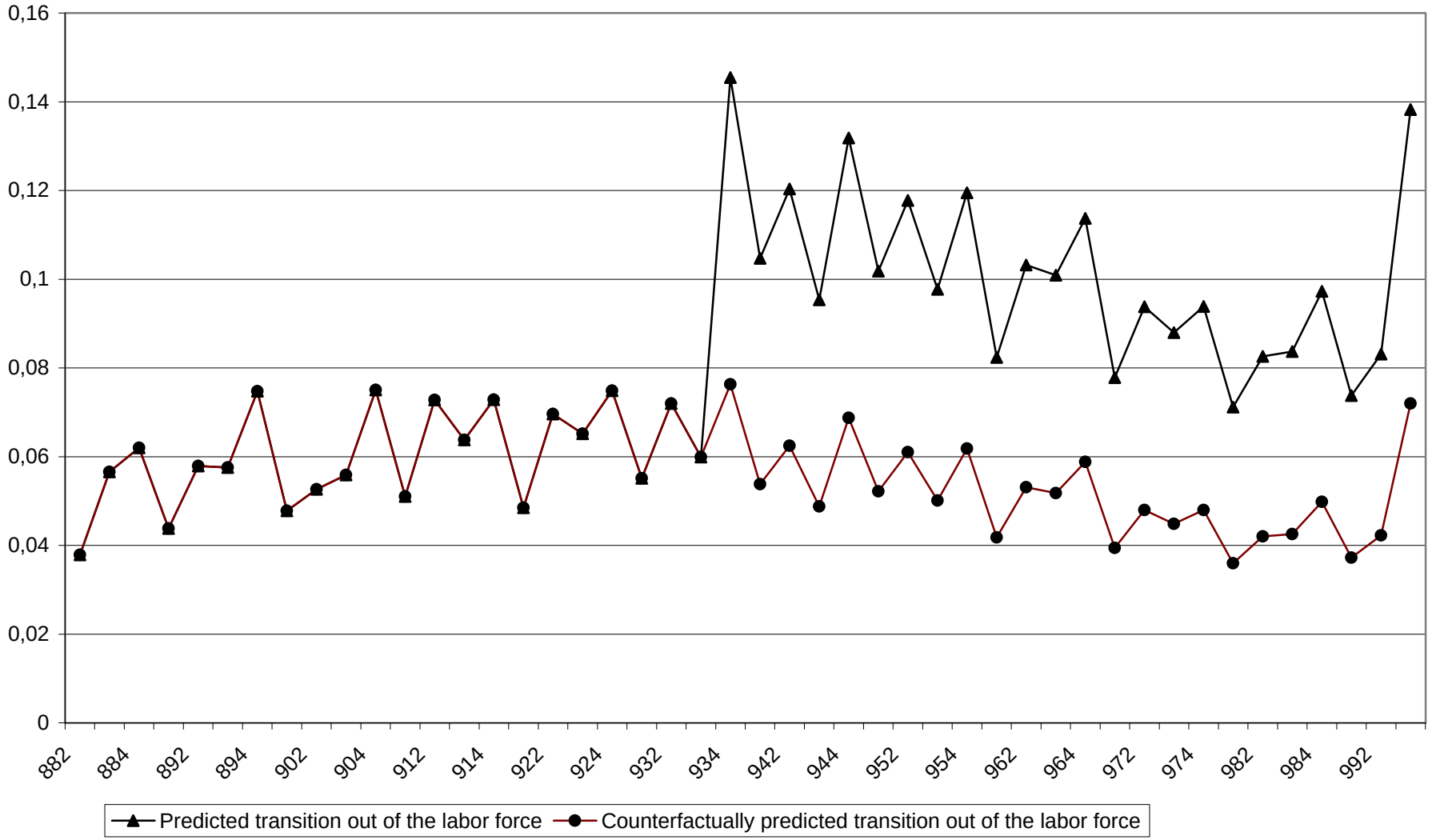

Figure 10 - Predicted and counterfactually predicted transition rates from employment out of the labor force, men, 65 years

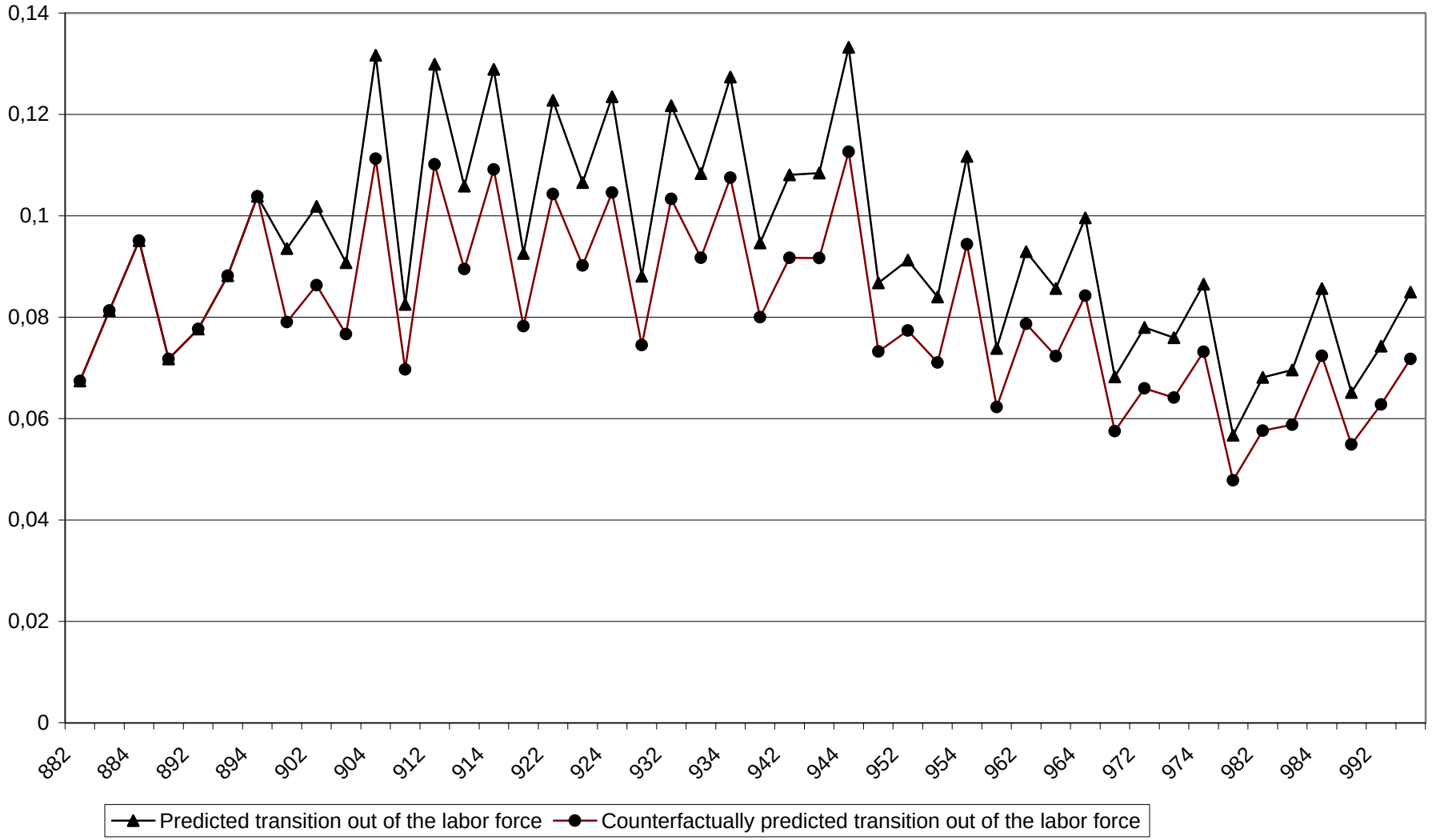

Figure 11 - Predicted and counterfactually predicted transition rates from employment out of the labor force, men, 66 years

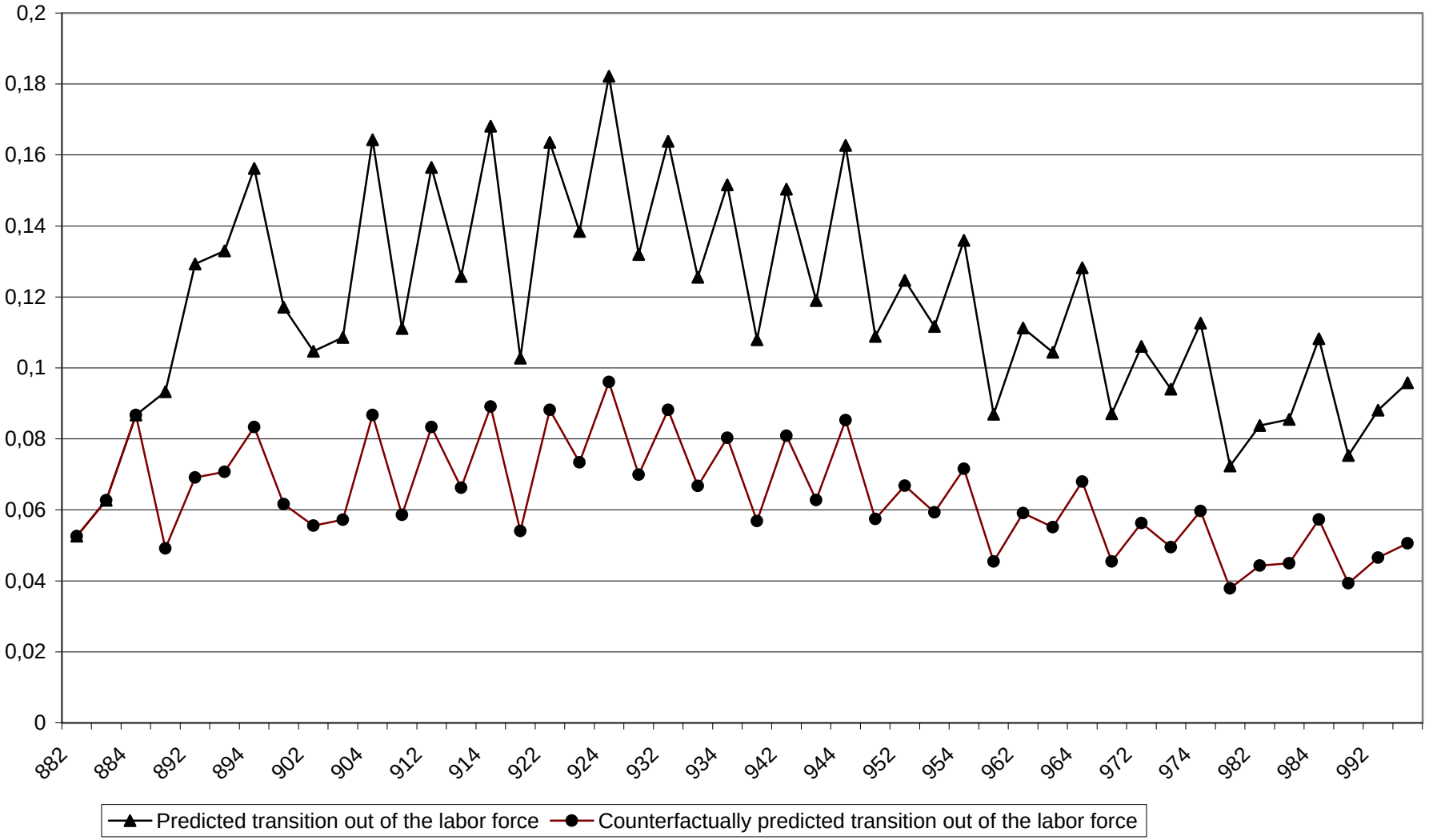

Figure 12 - Predicted and counterfactually predicted transition rates from employment out of the labor force, women, 62 years

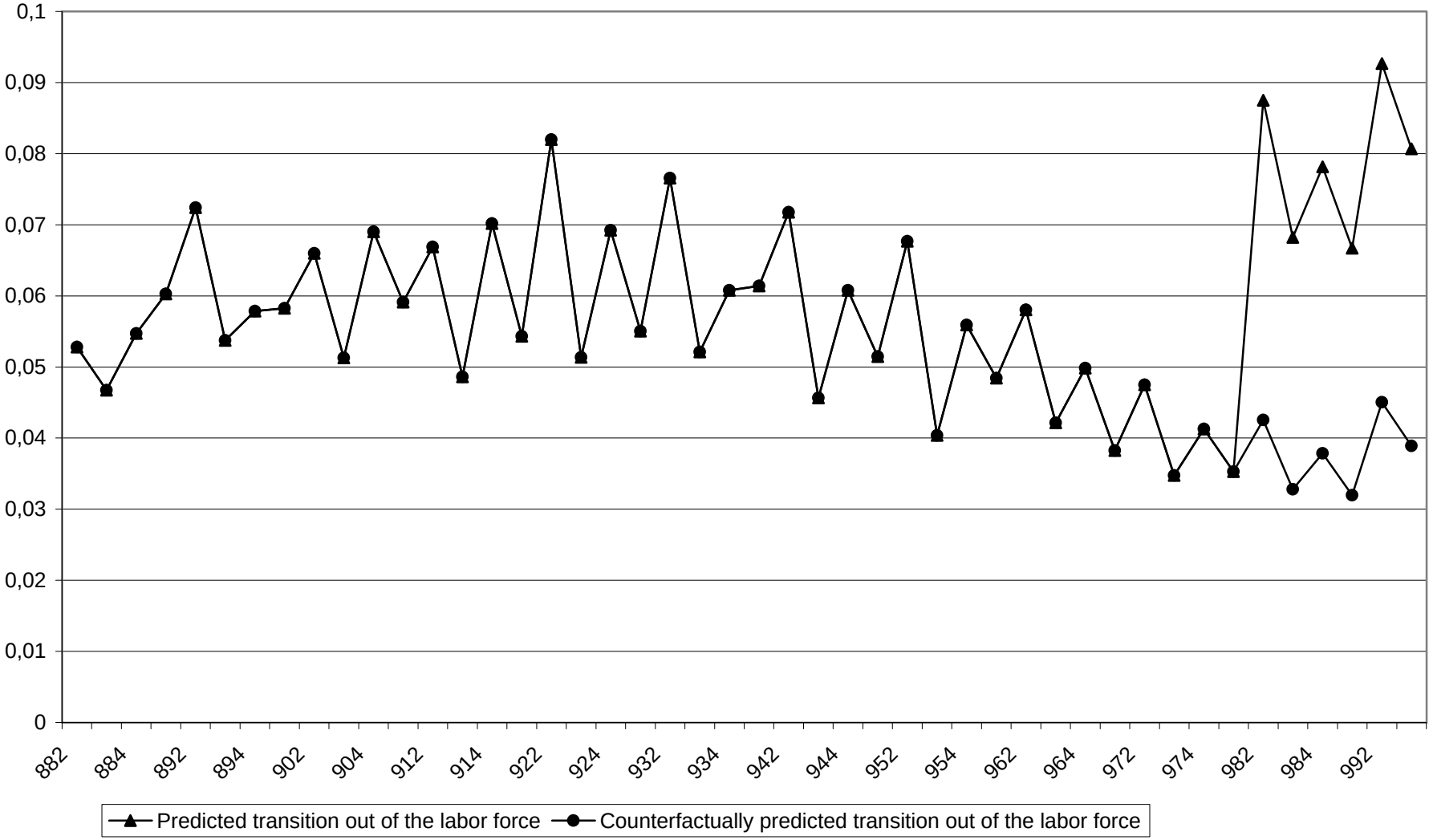

Figure 13 - Predicted and counterfactually predicted transition rates from employment out of the labor force, women, 63 years

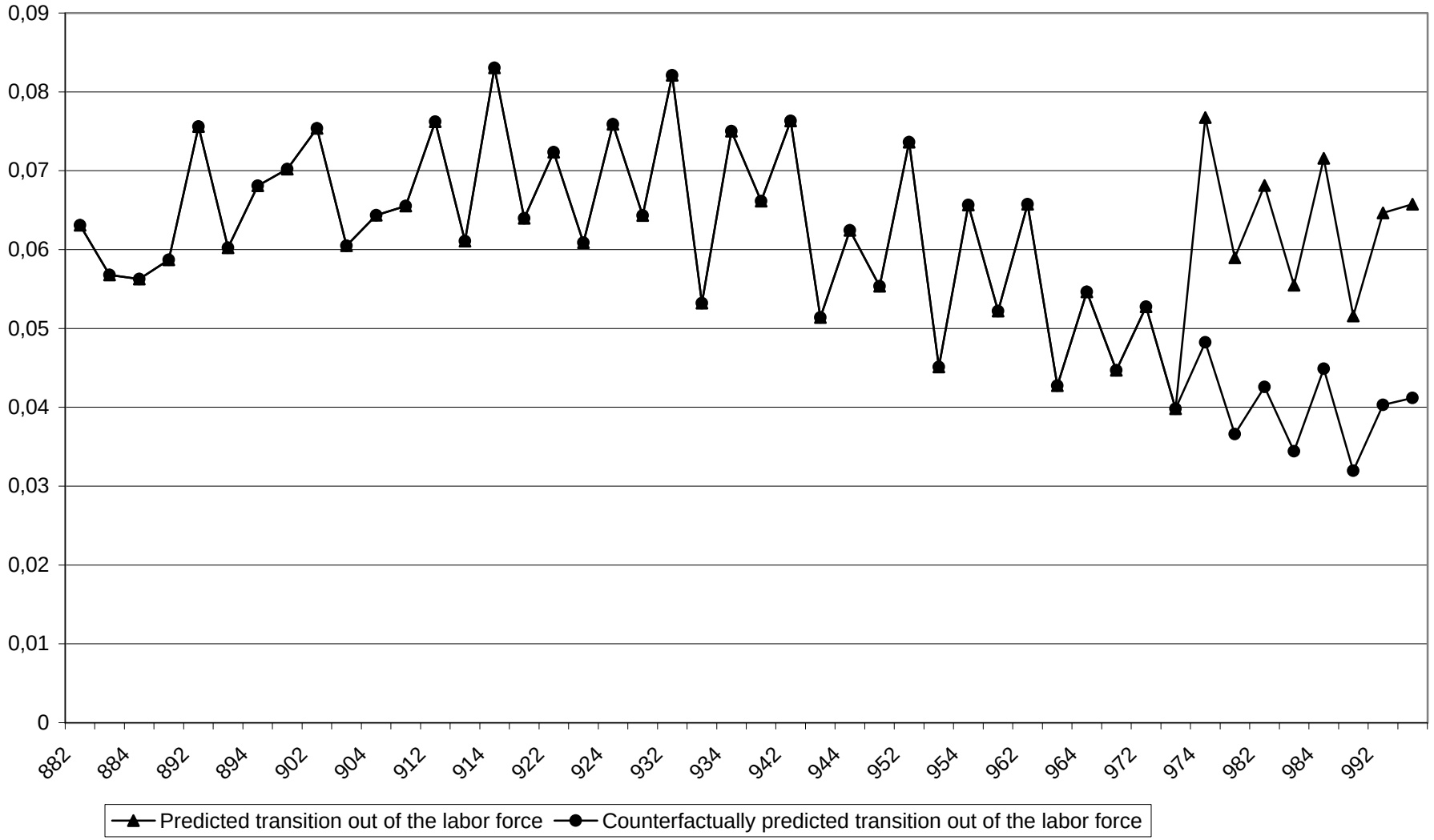

Figure 14 - Predicted and counterfactually predicted transition rates from employment out of the labor force, women, 64 years

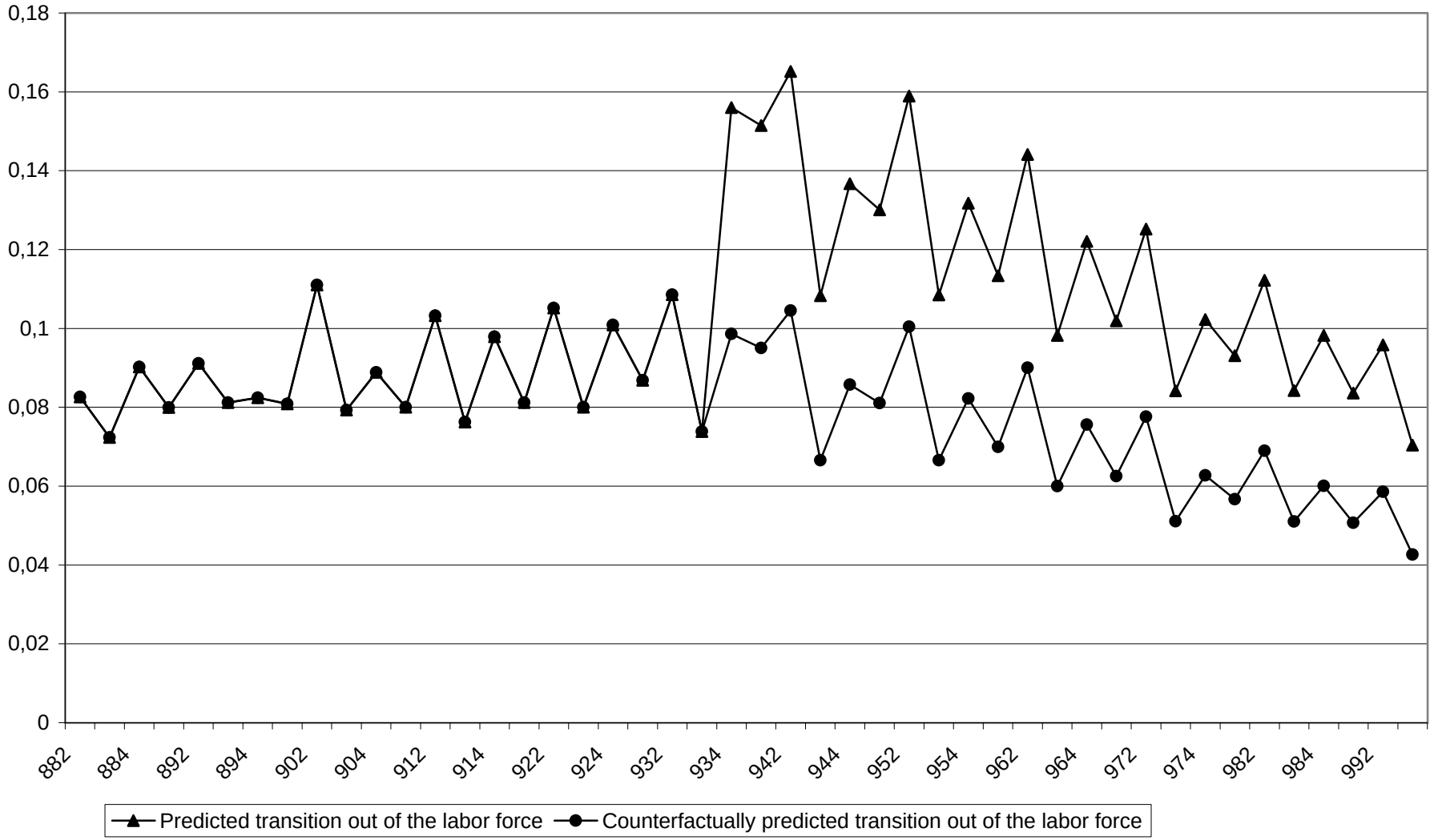

Figure 15 - Predicted and counterfactually predicted transition rates from employment out of the labor force, women, 65 years