The use of regression models in labour market flow statistics

Session 2

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Hannah Kiiver & Frank Espelage

Eurostat

Hannah.kiiver@ec.europa.eu

Frank.espelage@ec.europa.eu

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# Introduction to Labour Force Survey (LFS) based flow statistics

- Quarterly survey, sample overlap

- Match data, re-calculate weights to fit marginal distribution of ILO status (unemployment, employment, inactivity) in both quarters

- Flows for ILO- status, 15-74 age group, by sex

- High demand for additional breakdowns:
  - Age, education, duration of unemployment
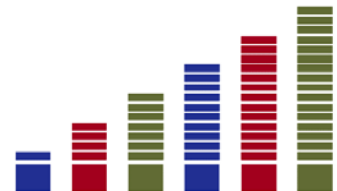
Transitions in labour market status in 26 EU MS, Q1-Q2 2015

(in % of initial status; population aged 15-74)

|	Employment Q2 2015	Unemployment Q2 2015	Inactivity Q2 2015
Employment Q1 2015	97.1%	1.3%	1.6%
Unemployment Q1 2015	18.6%	64.6%	16.8%
Inactivity Q1 2015	3.0%	3.7%	93.3%
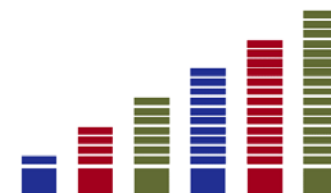
Share of confidential data points of flows data, by breakdown, 2015Q1-Q2

Breakdown variable	Total # of breakdowns	% confidential data points		
			26 MS – change	
		26 MS - total	of ILO status	EE/LU/MT - total
Age groups	3	12	17	50/41/56
Age groups, sex	6	21	30	71/61/57
Education, sex	6	25	36	67/69/59
Duration of unemployment, sex (sample restricted to flows from unemployment in initial period)	8	26	36	91/95/90
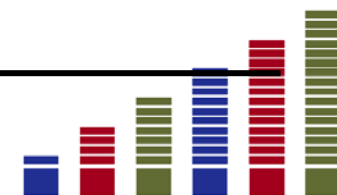
# How to meet demand for data?

- (Very) long run: improve sample size, provide matched micro-data with longitudinal weights
  - For small countries, this may not be a solution

- Short run: use simple regressions to extract information
  - Again, limits for small countries

- Issues
  - Modelling in general
  - How to determine method, regression specification?
  - Use of weights in regression
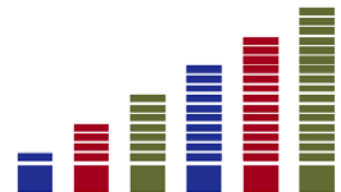
Approach for flow statistics I

- Modelling is already used, also in survey data; use of regression analysis on final data unusual, but not different.
  - → replace descriptive statistics, no causality

- Keep goal in mind: simple model, use variables of interest for breakdowns, present results similarly to current tables.
  - → logit, interaction terms, present predicted probabilities

- Use of weights determined by available technical information and regressors.
  - → results similar with and without use of weights
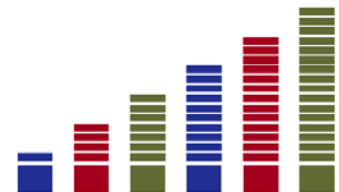
Approach for flow statistics II

Dependent variable =1 if individual moved from unemployment to employment

Explanatory variables	Definition	(1)	(2)	(3)	(4)	(5)*
sex	0= female 1=male	x	x	x	x	x
age	continuous	x	x	x	x	x
age*age				x		
duration of unemployment	0= less 3 mths 1= 3 to 11 mths 2= 12-23 mths 3= 24+ mths	x	x	x	x	x
educational attainment	0= ISCED0_2 1=ISCED3_4 2=ISCED5_8	x	x	x	x	x
sex*duration			x			
education*duration					x	
age*duration					x	
age*age*duration					x	
year	0=2014 1=2015					x
year*duration						x
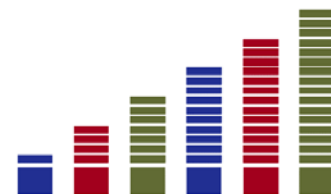
# Example: flow unemployment to employment, Spain 2014Q2-Q3

```
Logistic regression                          Number of obs   =      14602
                                             Wald chi2(14)   =     527.81
                                             Prob > chi2     =     0.0000
Log pseudolikelihood = -1760.0138            Pseudo R2       =     0.0722
```

flow_UE	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
sex						
male	.3056156	.0595245	5.13	0.000	.1889498	.4222814
education						
ISCED 3-4	.1022014	.0748458	1.37	0.172	-.0444937	.2488964
ISCED 5+	.3620214	.0716501	5.05	0.000	.2215898	.5024529
age	.1010368	.0322819	3.13	0.002	.0377654	.1643082
c.age#c.age	-.0013497	.0004243	-3.18	0.001	-.0021814	-.0005181
duration						
3-11 mths	-.4597966	.7365629	-0.62	0.532	-1.903433	.9838402
12-23 mths	-.9064614	.9605456	-0.94	0.345	-2.789096	.9761734
24 mths +	-.9308355	1.041637	-0.89	0.372	-2.972406	1.110735
duration#c.age						
3-11 mths	.0105112	.0412544	0.25	0.799	-.070346	.0913683
12-23 mths	.0089656	.0535842	0.17	0.867	-.0960574	.1139887
24 mths +	-.0258149	.0551312	-0.47	0.640	-.1338701	.0822403
duration#c.age#c.age						
3-11 mths	-.0001735	.0005427	-0.32	0.749	-.0012371	.0008902
12-23 mths	-.0003622	.0007027	-0.52	0.606	-.0017394	.0010151
24 mths +	.0002222	.0006895	0.32	0.747	-.0011292	.0015735
_cons	-2.876687	.5788542	-4.97	0.000	-4.01122	-1.742153
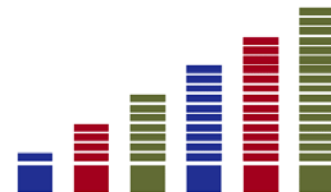
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                           Delta-method
              Margin      Std. Err.      z      P>|z|    [95% Conf. Interval]

_at#duration
     1#<3 mths   .2843314    .016668    17.06    0.000    .2516628    .3170001
   1#3-11 mths   .2268469   .0115369    19.66    0.000     .204235    .2494589
  1#12-23 mths   .1387329   .0130725    10.61    0.000    .1131114    .1643545
  1#24 mths +    .0868739   .0100641     8.63    0.000    .0671486    .1065992
     2#<3 mths   .3121298   .0156889    19.89    0.000    .2813801    .3428795
   2#3-11 mths   .2519284   .0108762    23.16    0.000    .2306114    .2732454
  2#12-23 mths    .148425   .0119908    12.38    0.000    .1249234    .1719265
  2#24 mths +    .0922378   .0073803    12.50    0.000    .0777728    .1067029
     3#<3 mths   .3264617   .0172123    18.97    0.000    .2927262    .3601971
   3#3-11 mths   .2638343    .011879    22.21    0.000     .240552    .2871167
  3#12-23 mths   .1476279   .0126235    11.69    0.000    .1228864    .1723695
  3#24 mths +    .0930459   .0075154    12.38    0.000     .078316    .1077758
     4#<3 mths    .326251   .0175553    18.58    0.000    .2918433    .3606587
   4#3-11 mths    .261248   .0119884    21.79    0.000    .2377513    .2847448
  4#12-23 mths   .1364823   .0119174    11.45    0.000    .1131245    .1598401
  4#24 mths +    .0891894   .0078385    11.38    0.000    .0738263    .1045526
     5#<3 mths   .3115127   .0166884    18.67    0.000     .278804    .3442214
   5#3-11 mths   .2444494    .011241    21.75    0.000    .2224175    .2664812
  5#12-23 mths   .1169576   .0099502    11.75    0.000    .0974555    .1364598
  5#24 mths +     .081185   .0071025    11.43    0.000    .0672644    .0951057
     6#<3 mths   .2833567   .0179065    15.82    0.000    .2482607    .3184528
   6#3-11 mths   .2153376   .0119688    17.99    0.000    .1918791    .2387961
  6#12-23 mths   .0924827   .0091089    10.15    0.000    .0746295    .1103359
  6#24 mths +    .0700849   .0061073    11.48    0.000    .0581149     .082055
     7#<3 mths   .2442115   .0239493    10.20    0.000    .1972717    .2911513
   7#3-11 mths   .1774888   .0154999    11.45    0.000    .1471095    .2078681
  7#12-23 mths   .0671462   .0103013     6.52    0.000     .046956    .0873364
  7#24 mths +     .057285   .0064988     8.81    0.000    .0445476    .0700224
     8#<3 mths   .1980107   .0322513     6.14    0.000    .1347993    .2612221
   8#3-11 mths   .1358893   .0195454     6.95    0.000     .097581    .1741975
  8#12-23 mths   .0445842   .0112087     3.98    0.000    .0226157    .0665528
  8#24 mths +    .0442588   .0080988     5.46    0.000    .0283855    .0601322
     9#<3 mths   .1499213   .0386101     3.88    0.000    .0742469    .2255957
   9#3-11 mths   .0959995   .0214939     4.47    0.000    .0538724    .1381267
  9#12-23 mths   .0270156   .0104263     2.59    0.010    .0065803    .0474508
  9#24 mths +    .0322779   .0093854     3.44    0.001    .0138828     .050673


Variables that uniquely identify margins: age duration
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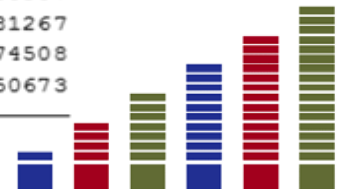
Predicted probability for transition from unemployment to employment, Q2-Q3 2014, Spain
Marginal effects of duration evaluated at 5-year age intervals covering ages 25 to 65