Matching models of unemployed job searchers:

Does churning help to lower unemployment?

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Introduction

- Central proposition in the literature is that a dynamic labour market improves efficiency via two mechanisms:
  1. Production efficiency: Schumpeterian creation and destruction of jobs to adapt to economic restructuring, innovation, automation and robotisation
  2. Matching efficiency: Hirings and separations are improving the matching of education/skills with the job, career mobility
- Policy frameworks in modern Western countries are directed towards improving labour market flexibility
- Current Dutch policy in the wake of the latest economic crisis is directed to lowering the level of unemployment

Labor market flows

1. Worker inflow: persons moving into employment from non-employment, e.g., (registered) unemployed job finders, school-leavers finding a job, new entrants on the labour market
2. Worker outflow: persons moving from employment to non-employment, e.g., fired, laid-off, workers, workers becoming disabled, workers reaching pension age, going back to school and may need unemployment or social assistance benefits
3. Job creation: new jobs that previously did not exist
4. Job destruction: existing jobs that are being annulled
5. (Job-to-job mobility of employed people between existing jobs: ignored in this paper)

Adjustment processes for more Efficiency

- **Job Reallocation** = the sum of job creations and job destructions
- **Worker Reallocation** = the sum of hirings and seperations
- **Churning** = Worker Reallocation minus Job Reallocation

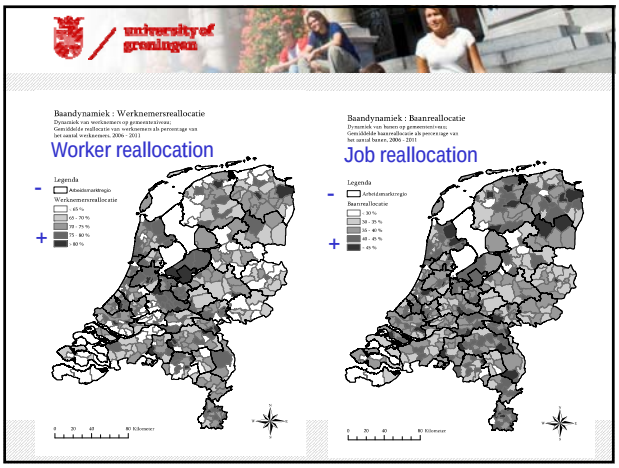
Data

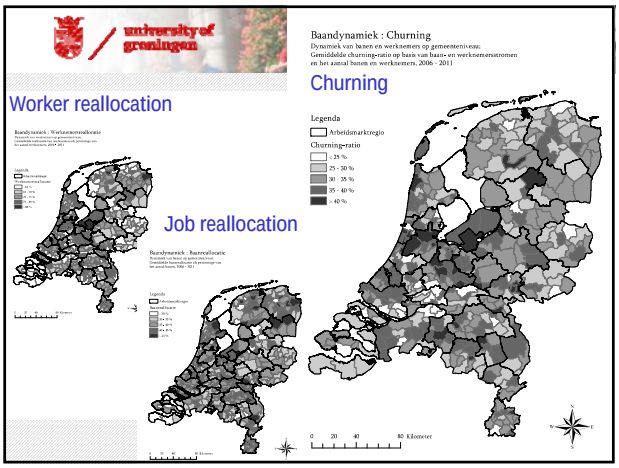
Construction of a dataset on municipality level (N=407) for 2006 - 2011. Source: Statistics Netherlands,

- Job and worker flows are calculated from firm-level microdata and aggregated to municipality level
- In- and outflow data for unemployment insurance ***(UI)*** and sociale assistance ***(SA)*** at municipality level
- Vacancies are based on count data from the Dutch employee insurance agency (UWV) → specifically directed to persons on UI and SA at municipality level
- Specific (matching) stocks (low income, minoritie) and background (urban density) variables at municipality level

Descriptive statistics of the municipalities in the Netherlands for 2007-2011

Variable	Description	Mean (×1000)	Max (× 1000)	Min (× 1)	St. dev (× 1000)
P15-64	Population of working age	27.2	570.8	580	43.7
UI inflow	Unemployment insurance inflow	0.86	25.2	13	1.7
UI outflow	Unemployment insurance outflow	0.85	289.1	13	1.6
SA inflow	Social assistance inflow	0.24	11.2	0	0.7
SA outflow	Social assistance outflow	0.24	10.9	0	0.7
Vacancies		0.1	3.8	0	0.3
Churning		6.6	208.5	34	14.1
Worker reallocation	Worker inflow plus worker outflow (existing firms)	9.4	287.8	46	20.9
Job reallocation	Job creation plus job destruction (existing firms)	2.8	79.6	12	5.9
Low income recipients	Households with an income of at most 120% of the social minimum	5.4	146.6	0	11.1
Minorities	Non-western minorities	3.0	197.4	0	14.3





Estimation results based on Matching Function

A matching function relates flow data during a certain period to its 'building' stock variables at the start of that period

$$F_{X,Y,t} = \gamma_t X_{t-1}^{\alpha} Y_{t-1}^{\beta}$$

- $F_{X,Y,t}$ is the flow of persons moving towards a job between *t-1* and *t,* starting from the initial stock of job searchers, ***X***, in a certain area, along with the initial stock of available vacant jobs, ***Y***, in that area
- γ_t in (1) represents *the matching efficiency*, i.e. the ability of a (regional) labour market to match job searchers to vacant jobs

Outflow from UI		$\log\left(\frac{F_{UI\rightarrow}}{P_{15-64,-1}}\right)_t$					
	Constant	-198.1 (-12.63)	-203.4 (-12.82)	-193.7 (12.38)	-192.1 (-12.36)	-195.1 (-12.86	-192.5 (-12.76)
Matching	$\log\left(\frac{UI}{P_{15-64}}\right)_{t-1}$	0.346 (9.23)	0.343 (9.22)	0.335 (9.46)	0.336 (9.48)	0.330 (15.99)	0.335 (16.35)
	$\log\left(\frac{V}{P_{15-64}}\right)_{t-1}$	0.033 (2.69)	0.049 (3.32)	0.042 (3.02)	0.036 (2.98)	0.045 (3.23)	0.037 (3.04)
Efficiency	$\log\left(\frac{CH}{P_{15-64,-1}}\right)_t$		-0.054 (-1.95)	-0.025 (-0.84)		-0.044 (-1.41)	
Specific stocks	$\log\left(\frac{Inc_{low}}{P_{15-64}}\right)_{t-1}$			0.361 (9.43)	0.365 (9.59)	0.384 (10.20)	0.371 (10.15)
	$\log\left(\frac{Minor}{P_{15-64}}\right)_{t-1}$			-0.038 (-2.95)	-0.044 (-3.93)	-0.052 (-3.29)	-0.051 (-4.45)
	time trend	0.098 (12.63)	0.100 (12.71)	0.097 (12.45)	0.096 (12.42)	0.098 (12.92)	0.096 (12.82)
	Regional dummies	×	×	×	×		
	Urban density (5 categories)**						
	very strong					-0.062 (-0.89)	
	strong					0.076 (1.70)	
	moderate					0.093 (2.38)	0.058 (2.28)
	weak					0.024 (0.82)	
	Number of observations	2004	2004	2004	2004	2004	2004
	R^2	0.25	0.26	0.29	0.29	0.29	0.29

Outflow from UI		$\log\left(\frac{F_{UI\rightarrow}}{P_{15-64,-1}}\right)_t$ (1)					
	Constant	-198.1 (-12.63)	-203.4 (-12.82)	-193.7 (12.38)	-192.1 (-12.36)	-195.1 (-12.86	-192.5 (-12.76)
Matching	$\log\left(\frac{UI}{P_{15-64}}\right)_{t-1}$	0.346 (9.23)	0.343 (9.22)	0.335 (9.46)	0.336 (9.48)	0.330 (15.99)	0.335 (16.35)
	$\log\left(\frac{V}{P_{15-64}}\right)_{t-1}$	0.033 (2.69)	0.049 (3.32)	0.042 (3.02)	0.036 (2.98)	0.045 (3.23)	0.037 (3.04)
Efficiency /Churning	$\log\left(\frac{CH}{P_{15-64,-1}}\right)_t$		-0.054 (-1.95)	-0.025 (-0.84)		-0.044 (-1.41)	
Specific stocks:	$\log\left(\frac{Inc_{low}}{P_{15-64}}\right)_{t-1}$			0.361 (9.43)	0.365 (9.59)	0.384 (10.20)	0.371 (10.15)
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	time trend	0.098 (12.63)	0.100 (12.71)	0.097 (12.45)	0.096 (12.42)	0.098 (12.92)	0.096 (12.82)
Regional	dummies	no	no	no	no	yes	yes

Outflow from UI		$\log\left(\frac{F_{UI\rightarrow}}{P_{15-64,-1}}\right)_t$ (2)					
	Constant	-198.1 (-12.63)	-203.4 (-12.82)	-193.7 (12.38)	-192.1 (-12.36)	-195.1 (-12.86	-192.5 (-12.76)
Regional	dummies	no	no	no	no	yes	yes
	Urban density						
Ref. Cat.	(5 categories)**						
Non-urban	very strong					-0.062 (-0.89)	
	strong					0.076 (1.70)	
	moderate					0.093 (2.38)	0.058 (2.28)
	weak					0.024 (0.82)	
	Number of observations	2004	2004	2004	2004	2004	2004
	R^2	0.25	0.26	0.29	0.29	0.29	0.29

Outflow from SA		$\log\left(\frac{F_{SA\rightarrow}}{P_{15-64,-1}}\right)_t$ (1)					
	Constant	-2.320	-3.710	-4.991	-6.111	-3.211	-4.154
		(-0.37)	(-0.59)	(-0.80)	(-1.10)	(-0.52)	(-0.75)
Matching	$\log\left(\frac{UI}{P_{15-64}}\right)_{t-1}$	0.975	0.988	1.008	1.006	1.023	1.031
		(68.32)	(69.12)	(63.81)	(64.58)	(62.07)	(67.38)
	$\log\left(\frac{V}{P_{15-64}}\right)_{t-1}$	-0.011	-0.001	-0.001		-0.002	
		(-1.52)	(-0.10)	(-0.14)		(-0.32)	
Efficiency /churning	$\log\left(\frac{CH}{P_{15-64,-1}}\right)_t$		-0.075	-0.020		0.013	
			(-4.22)	(-1.03)		(0.65)	
Specific stocks:	$\log\left(\frac{Inc_{low}}{P_{15-64}}\right)_{t-1}$			0.062	0.064	0.036	
				(2.47)	(2.60)	(1.45)	
	$\log\left(\frac{Minor}{P_{15-64}}\right)_{t-1}$			-0.063	-0.069	-0.027	-0.020
				(-6.31)	(-7.75)	(-2.24)	(-1.83)
	time trend	0.001	0.001	0.002	0.003	0.001	0.002
		(0.18)	(0.40)	(0.69)	(0.99)	(0.43)	(0.60)
Regional	dummies	no	no	no	no	yes	yes
						-0.268	-0.273

Outflow from SA		$\log\left(\frac{F_{SA\rightarrow}}{P_{15-64,-1}}\right)_t$ (2)					
	Constant	-2.320	-3.710	-4.991	-6.111	-3.211	-4.154
		(-0.37)	(-0.59)	(-0.80)	(-1.10)	(-0.52)	(-0.75)
Regional	dummies	no	no	no	no	yes	yes
	Urban density						
Ref. Cat.: Non-urban	(5 categories)**						
	very strong					-0.268	-0.273
						(-4.73)	(-4.96)
	strong					-0.151	-0.159
						(-4.20)	(-4.71)
	moderate					-0.176	-0.179
						(-5.76)	(-6.23)
	weak					-0.101	-0.103
						(-4.52)	(-4.77)
	Number of observations	1996	1996	1996	1996	1996	1996
	R^2	0.86	0.86	0.87	0.87	0.87	0.87

Inflow into UI from a job		$\log\left(\frac{F_{J\rightarrow UI}}{P_{15-64,-1}}\right)_t$ (1)							
	Constant	-323.3	-326.1	-312.3	-310.9	-311.9	-312.5	-313.9	-316.2
		(-21.9)	(-22.4)	(-21.3)	(-21.3)	(-21.3)	(-21.4)	(-21.3)	(-21.55)
Matching	$\log\left(\frac{J}{P_{15-64}}\right)_{t-1}$	0.025	0.421	0.349	0.352	0.348	0.349	0.389	0.377
		(0.64)	(4.90)	(4.25)	(4.30)	(4.29)	(4.29)	(4.56)	(4.45)
Efficiency Churning	$\log\left(\frac{CH}{P_{15-64,-1}}\right)_t$		-0.369	-0.309	-0.346	-0.333	-0.331		
			(-5.22)	(-4.32)	(-5.10)	(-4.6)	(-4.63)		
Work Rea	$\log\left(\frac{WR}{P_{15-64,-1}}\right)_t$							-0.478	-0.372
								(-4.39)	(-4.76)
Job Rea	$\log\left(\frac{JR}{P_{15-64,-1}}\right)_t$							0.097	
								(1.41)	
Specific stocks	$\log\left(\frac{Inc_{low}}{P_{15-64}}\right)_{t-1}$			0.482	0.454	0.516	0.503	0.514	0.503
				(9.76)	(9.76)	(10.4)	(10.18)	(10.31)	(10.22)
	$\log\left(\frac{Minor}{P_{15-64}}\right)_{t-1}$			-0.030		-0.054	-0.057	-0.052	-0.058
				(-1.61)		(-2.35)	(-2.79)	(-2.27)	(-2.86)
	time trend	0.159	0.160	0.156	0.155	0.155	0.156	0.156	0.158
		(21.89	(22.17	(21.39)	(21.35)	(21.37	(21.41)	(21.43)	(21.61)

Inflow into UI from a job		$\log\left(\frac{F_{J\rightarrow UI}}{P_{15-64,-1}}\right)_t$ $\log\left(\frac{F_{J\rightarrow UI}}{P_{15-64,-1}}\right)_t$ (2)							
	time trend	0.159	0.160	0.156	0.155	0.155	0.156	0.156	0.158
		(21.89)	(22.2)	(21.4)	(21.35)	(21.4)	(21.41)	(21.43)	(21.61)
Regional	Urban density	no	no	no	no	yes	yes	yes	yes
	(5 category.)**								
Ref. Cat.: non-urban	very strong					-0.080		-0.084	
						(-0.78)		(-0.81)	
	strong					0.135	0.110	0.132	0.105
						(2.05)	(2.26)	(2.00)	(2.18)
	moderate					0.158	0.132	0.157	0.130
						(2.74)	(3.17)	(2.72)	(3.14)
	weak					0.057		0.055	
						(1.35)		(1.30)	
	Number of observations	2015	2015	2015	2015	2015	2015	2015	2015
	R^2	0.15	0.15	0.22	0.22	0.23	0.22	0.23	0.23

Inflow into SA from a job or UI		$\log\left(\frac{F_{\rightarrow SA}}{P_{15-64,-1}}\right)_t$ (1)						
	Constant	-280.1	-280.0	-263.3	-266.7	-266.7	-267.5	-266.8
		(-45.2)	(-45.3)	(-40.9)	(-41.4)	(-41.3)	(-41.4)	(-41.4)
Matching	$\log\left(\frac{J}{P_{15-64}}\right)_{t-1}$	0.199	0.256	0.191	0.155	0.161	0.167	0.172
		(4.39)	(4.77)	(3.57)	(2.93)	(3.05)	(3.12)	(3.24)
Efficiency Churning	$\log\left(\frac{CH}{P_{15-64,-1}}\right)_t$		-0.075	-0.107	-0.120	-0.116		
			(-1.99)	(-2.82)	(-3.15)	-3.08)		
Work Rea	$\log\left(\frac{WR}{P_{15-64,-1}}\right)_t$						-0.161	-0.156
							-2.84)	-2.77)
Job Rea	$\log\left(\frac{JR}{P_{15-64,-1}}\right)_t$						0.018	
							(0.54)	
Specific stocks	$\log\left(\frac{Inc_{low}}{P_{15-64}}\right)_{t-1}$			0.222	0.239	0.237	0.239	0.237
				(5.97)	(6.42)	(6.38)	(6.43)	(6.39)
	$\log\left(\frac{Minor}{P_{15-64}}\right)_{t-1}$			0.156	0.051	0.070	0.052	0.072
				(6.38)	(1.69)	(2.70)	(1.75)	(2.77)
	time trend	0.137	0.137	0.130	0.131	0.131	0.132	0.131
		(44.3)	(44.36)	(40.7)	(41.18)	(41.2)	(41.3)	(41.19)

Inflow into SA from a job or UI		$\log\left(\frac{F_{\rightarrow SA}}{P_{15-64,-1}}\right)_t$ (2)						
Regional	Urban density	no	no	no	yes	yes	yes	yes
	(5 categories)							
Ref. cat.: Non-urban	very strong				0.736	0.694	0.737	0.694
					(4.82)	(5.22)	(4.82)	(5.22)
	strong				0.465	0.440	0.467	0.440
					(4.92)	(6.31)	(4.93)	(6.32)
	moderate				0.100		0.102	
					(1.20)		(1.23)	
	weak				-0.060		-0.059	
					(-0.95)		(-0.94)	
	Number of observations	2004	2004	2004	2004	2004	2004	2004
	R^2	0.13	0.12	0.29	0.37	0.36	0.37	0.36

Overview of the regression results of the final models

Final model	OUTFLOW		INFLOW	
	Unem Ins	Social Ass	Unem Ins	Social Ass
Matching				
Stock UI / SA	+	+	+	+
Stock of Vacancies	+		n.a	n.a.
Effiency				
Churning			-	-
Worker reallocation			-	-
Job reallocation				
Stocks				
Low income recipients	+		+	+
Minorities	-	(-)	-	+
Urban	+	-	+	+

Conclusions

1. A more flexible labour market (i.e. more churning) leads to lower unemployment because of less inflow of workers to unemployment (so eventually 'the right worker ends up at the right job'), but not to more outflow.
2. The effect of churning is three times as strong for *UI* inflow than for *SA* inflow. The effects on outflow are weak. Low income groups show higher outflow and inflow, minorities mixed.
3. In dense urban areas the inflow into *SA* is higher, while outflow is lower, illustrating the low prospects of long term (*SA*) unemployed and the excluded bottom end of the labour market. Only a weak effect of urban density on *UI* in- and outflow.
4. Although more labour market flexibility lowers unemployment there is also a downside: insiders with a job stay more in employment, while outsiders without a job are not affected and thus more flexibility increases the gap between in- and outsiders.

Thank you for your attention

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