» Labour market worker flows estimates for Portugal

**8th Workshop on LFS Methodology
Statistics on Labour Market Dynamics**

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Sónia Torres (sonia.torres@ine.pt)

Statistics Portugal / Labour Market Statistics Unit

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Statistics on Labour Market Dynamics

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1. Introduction

- LFS estimates published every quarter/year: **stocks** and **changes** over a time interval.

- Impossible to disentangle the **movements underlying those changes**. **Example:**

Change in U **(+ or -)** = flows into U **(+ or -)** – flows out of U **(- or +)**

Flows into U = flows EU + flows IU

Flows out of U = flows UE + flows UI

U = unemployment; E = employment; I = inactivity (15 and over)

Same result / different sources → different economic meaning

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1. Introduction

Flows analysis advantages:

- **Complement to the analysis of main indicators** (employment and unemployment levels; employment and unemployment rates; % of long-term unemployment; etc.).

- Better understanding of the labour market performance, by allowing:

  - To distinguish the **sources of the observed changes**.

  - To measure the **contribution of each flow to those changes**.

  - To evaluate its **cyclical behaviour of each flow** (long series).

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2. The measurement of quarterly labour market worker flows in Portugal

2.1. Estimates produced from the Portuguese LFS data

- The LFS **rotational pattern** + the availability of **unique identifiers of individuals** allow the calculation of worker flows among labour market states (for any given state space). *Statistics Portugal option*

- In two consecutive quarters, it is possible to follow the answers provided by individuals from almost **5/6 of the sample of common households both quarters** (there are other possibilities but with less precision). *Statistics Portugal option*

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2. The measurement of quarterly labour market worker flows in Portugal

2.1. Estimates produced from the Portuguese LFS data

- LFS quarterly sample size: 22,554 households (more than de 40,000 individuals) → **Subsamples of remarkable size** (around 80% the original sample size) ,which allows obtaining flows estimates with high precision.

- **Reweighting procedure** in order to achieve consistency between total population (15 years old and over) from the labour market flows estimates and the population independent estimates.

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2. The measurement of quarterly labour market worker flows in Portugal

2.1. Estimates produced from the Portuguese LFS data

- **Currently**, the movements into and out of the survey scope are not being considered:

  - The differences between the movements into and out of labour market states (net flows), in two consecutive quarters, may not equal the quarterly changes published for those states (differences in stocks).

  - It is only assured that the sum of all flows equals total population (15 and over) in quarter t, i.e.:

    EU + EI + UE + UI + IE + IU = Population 15+ in t

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2. The measurement of quarterly labour market worker flows in Portugal

2.1. Estimates produced from the Portuguese LFS data

- **Recently**, Statistics Portugal developed a statistical procedure in order to achieve consistency between the net flows and the quarterly changes in stocks (*Margin Error Adjustment*), i.e.:

  E inflows (UE + IE) – E outflows (EU + EI) = quarterly change in E

  U inflows (EU + IU) – U outflows (UE + UI) = quarterly change in U

  I inflows (EI + UI) – I outflows (IE + IU) = quarterly change in I

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2. The measurement of quarterly labour market worker flows in Portugal

2.1. Estimates produced from the Portuguese LFS data

- The **new series** (from the 2ⁿᵈ quarter of 1998) will be published along with the results for the 1ˢᵗ quarter 2014 (**May 2014**), as this is the dissemination date for the LFS series revised by Census.

- The new series will be released along with a **technical note**.

- The differences between the results from the current and the new methodology are small, but the achieved consistency allows publishing **new data: number of movers between states** (not only rates, as currently).

2. The measurement of quarterly labour market worker flows in Portugal

2.2. Concepts

- Estimates for the number of individuals moving between any two labour market states **from one quarter to another** (quarterly flows).

- **3 states** corresponding to the three labour force status for the population aged 15 and over: employment (E), unemployment (U) and inactivity – 15 and over (I).

- Flows organized in transition matrices of size [3x3].

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Quarterly worker flows (from quarter *t-1* to quarter *t*) between 3 labour market states				
State in previous quarter (*t-1*)	State in current quarter (*t*)			Total in previous quarter (*t-1*)
	E	U	I	
Employment (E)	EE	EU	EI	E_{t-1}
Unemployment (U)	UE	UU	UI	U_{t-1}
Inactivity (I)	IE	IU	II	I_{t-1}
Total in current quarter (*t*)	E_t	U_t	I_t	

3 ways of presenting flows data: 1) as a % of the number of individuals in the initial state (transition rates/probabilities); **2)** as % of the number of individuals in the final state; **3)** as a % of population aged 15 and over or of active population. *Reference to Statistics Portugal option*

2. The measurement of quarterly labour market worker flows in Portugal

2.3. Published information

- First release along with the publication *Employment Statistics – 1st quarter of 2006*.

- Every quarter since then: 2 matrices (flows as a % of the initial state and as a % of population aged 15 and over); total flows broken down by gender; 1 diagram; results analysis.

- Along with the publication *Employment Statistics – 4th quarter of 2011*, Statistics Portugal released also:

  - **Back series** from the 2nd quarter of 1998: 54 series of data.

  - **An article** = technical note + results analysis.

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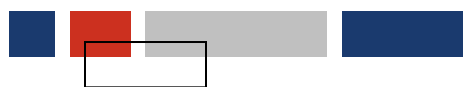
3. Some results analysis based on the series from the 2nd quarter of 1998 onwards

- Selection of elements extracted from the Publication, the Press Releases, and the article.

- Tables in next slides: **1)** 1q2013; **2)** averages 2q1998-4q2010; **3)** averages 2q2011-1q2013 (new series of data).

3.1. Magnitude of flows

- Flows **as a % of total population (15 and over)**.

- Totals of lines: outflows by state.

- Totals of columns: inflows by state.

- Common denominator → possibility to calculate net changes in each state = inflows – outflows.

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Quarterly worker flows between labour force states (as a % of population aged 15 and over) Averages 2q98-4qt10

t-1 / t	Employment	Unemployment	Inactivity	Outflows
Total				
Employment	56.30	0.61	0.75	**1.36**
Unemployment	0.70	2.67	0.67	**1.37**
Inactivity	0.72	0.71	36.86	**1.43**
Inflows	**1.42**	**1.32**	**1.41**	
Male				
Employment	**64.32**	**0.63**	0.65	**1.28**
Unemployment	**0.71**	2.65	0.55	**1.26**
Inactivity	0.64	0.57	29.28	**1.21**
Inflows	**1.35**	**1.20**	**1.20**	
Female				
Employment	48.97	0.59	**0.84**	**1.43**
Unemployment	0.70	**2.70**	**0.77**	**1.47**
Inactivity	**0.79**	**0.84**	**43.80**	**1.63**
Inflows	**1.49**	**1.43**	**1.61**	

	Employment	Unemployment	Inactivity	Outflows
Quarterly worker flows between labour force states (as a % of population aged 15 and over) Averages 2q11-1qt13				
t-1 \ t				
Total				
Employment	48.45	1.68	2.43	**4.11**
Unemployment	1.51	5.67	1.28	**2.79**
Inactivity	2.21	1.49	35.28	**3.70**
Inflows	**3.72**	**3.17**	**3.71**	
Male				
Employment	**53.66**	**1.94**	2.48	**4.43**
Unemployment	**1.70**	**6.36**	1.15	**2.84**
Inactivity	**2.41**	1.36	28.94	**3.76**
Inflows	**4.10**	**3.30**	**3.63**	
Female				
Employment	43.66	1.44	2.38	**3.82**
Unemployment	1.34	5.04	**1.40**	**2.74**
Inactivity	2.03	**1.61**	**41.10**	**3.64**
Inflows	**3.37**	**3.05**	**3.78**	

Quarterly worker flows between labour force states (as a % of population aged 15 and over)				
4q2012 \ 1q2013	Employment	Unemployment	Inactivity	Outflows
Total				
Employment	46.93	1.71	2.28	**3.99**
Unemployment	1.44	6.99	1.43	**2.87**
Inactivity	1.63	1.57	36.02	**3.19**
Inflows	**3.07**	**3.27**	**3.72**	
Male				
Employment	**51.31**	**2.13**	2.44	**4.57**
Unemployment	**1.66**	**7.74**	1.30	**2.96**
Inactivity	**1.99**	1.44	29.98	**3.44**
Inflows	**3.65**	**3.57**	**3.74**	
Female				
Employment	42.93	1.33	2.14	**3.46**
Unemployment	1.24	6.31	**1.55**	**2.79**
Inactivity	1.30	**1.68**	**41.54**	**2.97**
Inflows	**2.53**	**3.00**	**3.69**	

3. Some results analysis based on the series from the 2nd quarter of 1998 onwards

3.2. Transition rates

- Flows **as a % of the initial state** (quarter *t-1*).

- Totals of lines: 100%.

- Totals of columns: % of population (15 and over) by state in quarter *t*.

- Different denominator in each line.

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t-1 \ t	Employment	Unemployment	Inactivity	Quarter t-1
Total				
Employment	97.6	1.1	1.3	100
Unemployment	17.3	66.2	16.5	100
Inactivity	1.9	1.9	96.3	100
Quarter t	**57.7**	**4.0**	**38.3**	100
Male				
Employment	**98.0**	1.0	1.0	100
Unemployment	**18.0**	**67.9**	14.1	100
Inactivity	**2.1**	1.9	96.0	100
Quarter t	**65.7**	**3.9**	**30.5**	100
Female				
Employment	97.2	**1.2**	**1.7**	100
Unemployment	16.7	64.7	**18.6**	100
Inactivity	1.7	1.8	**96.4**	100
Quarter t	**50.5**	**4.1**	**45.4**	100

Caption: **Quarterly worker flows between labour force states (as a % of the initial state)** Averages 2q98-4qt10

t-1 \ t	Employment	Unemployment	Inactivity	Quarter t-1
Total				
Employment	92.2	3.2	4.6	100
Unemployment	17.8	67.0	15.1	100
Inactivity	5.7	3.8	90.5	100
Quarter t	**52.2**	**8.8**	**39.0**	100
Male				
Employment	**92.4**	**3.3**	4.3	100
Unemployment	**18.4**	**69.1**	12.5	100
Inactivity	**7.4**	**4.2**	88.5	100
Quarter t	**57.8**	**9.7**	**32.6**	100
Female				
Employment	92.0	3.0	**5.0**	100
Unemployment	17.2	64.8	**18.0**	100
Inactivity	4.5	3.6	**91.9**	100
Quarter t	**47.0**	**8.1**	**44.9**	100

Title: **Quarterly worker flows between labour force states (as a % of the initial state)** Averages 2q11-1qt13

Quarterly worker flows between labour force states (as a % of the initial state)				
4q2012 / **1q2013**	**Employment**	**Unemployment**	**Inactivity**	**4q2012**
Total				
Employment	92.2	3.4	4.5	100
Unemployment	14.6	70.9	14.5	100
Inactivity	4.2	4.0	91.9	100
1q2013	**50.0**	**10.3**	**39.7**	100
Male				
Employment	91.8	**3.8**	4.4	100
Unemployment	**15.5**	**72.4**	12.2	100
Inactivity	**6.0**	**4.3**	89.7	100
1q2013	**55.0**	**11.3**	**33.7**	100
Female				
Employment	**92.5**	2.9	**4.6**	100
Unemployment	13.6	69.3	**17.1**	100
Inactivity	2.9	3.8	**93.3**	100
1q2013	**45.5**	**9.3**	**45.2**	100

3. Some results analysis based on the series from the 2nd quarter of 1998 onwards

3.3. Time pattern. Charts with the time pattern of:

- Unemployment rate; long-term unemployment rate; employment rate; unemployed and employed population. *Next slide*

- **Outflows by state (as a % of the initial state)** – total and broken down by state of destiny. *Following slide (only for U)*

- **Inflows and outflows by state (as a % of population aged 15 and over)**. *Following slide (only for U)*

Employment rate (15 and over) and unemployment rate (%)

Employment rate (left)
Unemployment rate (right)
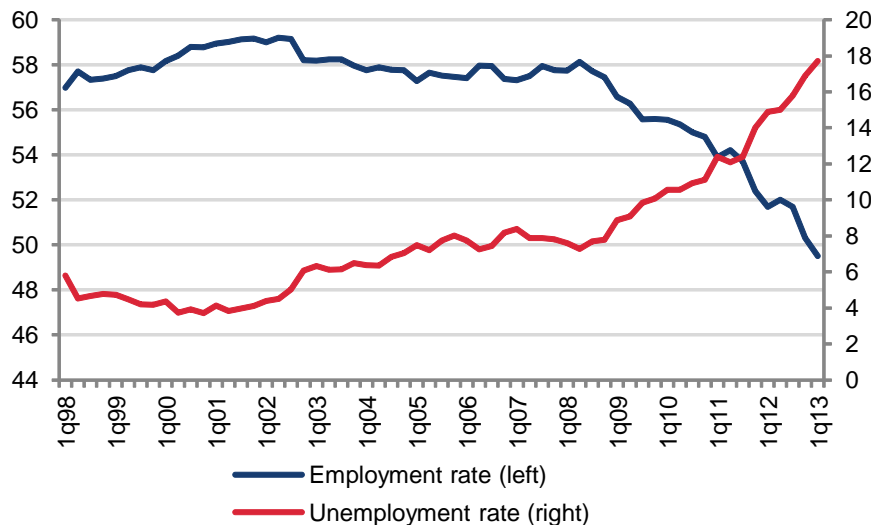
Employed population and unemployed population (Thousand individuals)

Employed population (left)
Unemployed population (right)
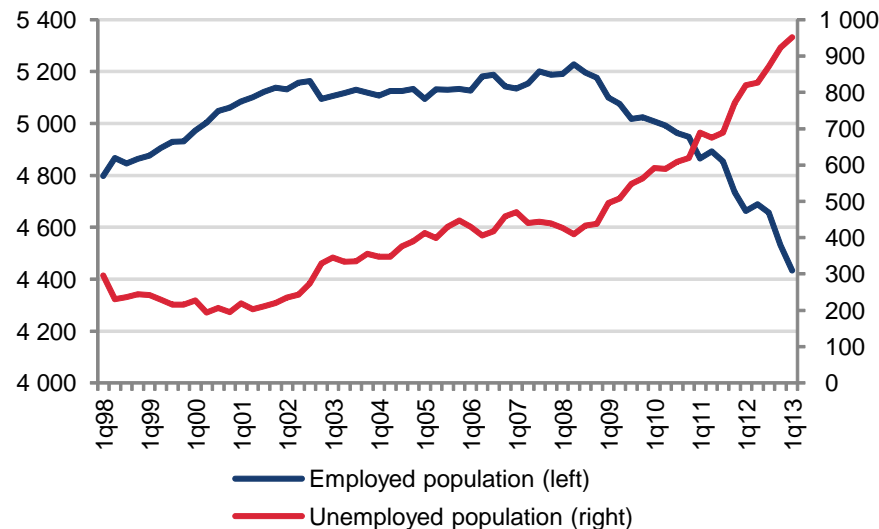
Unemployment rate and long-term unemployment rate (12 months or longer) (%)
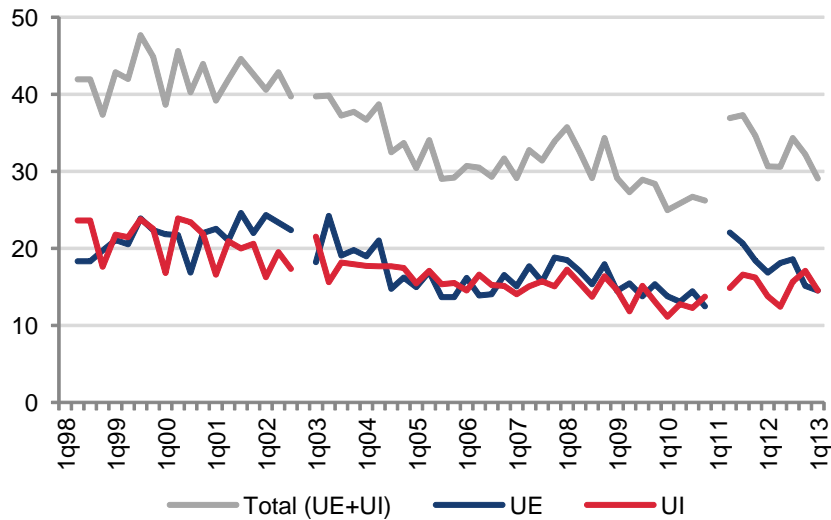

Unemployment rate
Long-term unemployment rate
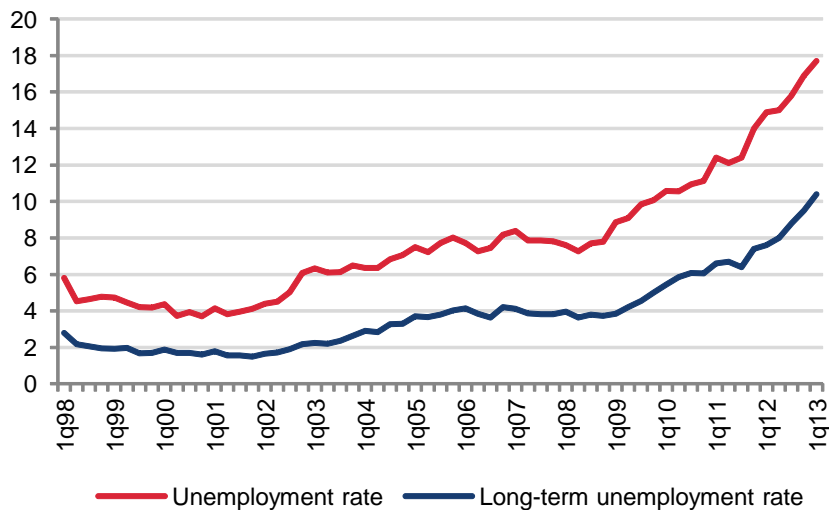
The unemployment rate decreased until 3q2000 and increased from then on, from 3.7% (4q2000) to 11.1% (4q2010) and 17.7% (1q2013).

The unemployed population increased fivefold from 1q1998 to 1q2013. Acceleration of growth from 3q2008 onwards.
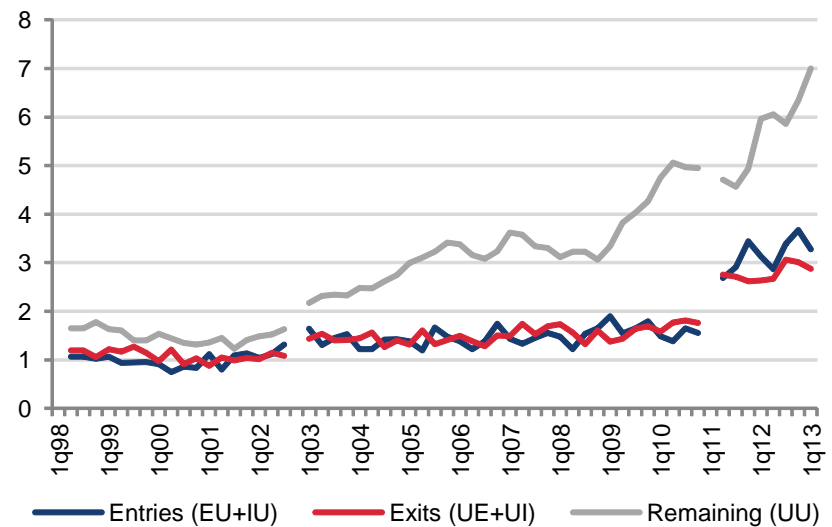
The employed population decreased. The employment rate decreased by 7,5 p.p.

The % of long-term unemployment increased from 48.2% to 58.9%.

Quarterly worker flows out of Unemployment
(as a % of the initial state: Unemployment)

Total (UE+UI) — UE — UI

Quarterly worker flows into and out of Unemployment
(as a % of population aged 15 or over)

Entries (EU+IU) — Exits (UE+UI) — Remaining (UU)

The unemployment outflow rates (UE + UI) decreased, from 42.0% (2q1998) to 26.2%/ 29.1%(4q2010/1q2013); both transition rates (UE and UI) decreased; UE rates slightly larger than UI rates. **1st chart**

The % of those who remained unemployed in two consecutive quarters increased, from 1.65% to 4.95%/6.99%, mainly from the beginning of 2009 → helps explaining the long-term unemployment increase. **2nd chart**

Throughout the period, mainly after 2000, the unemployment inflows/outflows increased (moderately). From 3q2008 onwards (except 2010), inflows outweighed outflows, helping explaining the increase in both the unemployment level and the unemployment rate. **2nd chart**

4. Why did the unemployment rate in Portugal increase from 1998 and 2010*?

- Petrongolo and Pissarides (2008) methodology: **decomposition of the quarterly change in the unemployment rate** into 4 components related to unemployment inflows (EU and IU) and outflows (UE e UI).

- Period: **2q1998 to 4q2010**.

- Series of quarterly worker flows **seasonally adjusted**.

- Flows data used: **transition rates**.

* A new series of data was initiated in 1q2011. This exercise results were not updated yet, but the new results are likely to reinforce the results shown here for the most recent period.

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Unemployment outflows and inflows contributions to the unemployment rate quarterly change [Petrongolo e Pissarides (2008) methodology]						
	UE	UI	EU	IU	Unemployment outflows (UE+UI)	Unemployment inflows (UE+UI)
Betas (%)						
2q98-4q10	**26.4**	**5.4**	**46.7**	**21.5**	**31.8**	**68.2**
2q98-3q00	34.9	28.4	8.5	28.2	63.3	36.7
4q00-4q10	26.1	4.1	49.0	20.7	30.2	69.8

Around 2/3 (1/3) of the quarterly change in the unemployment rate was explained by changes in the **inflows (outflows) into (from) U**.

Behaviour that mirrors what happened in the **sub period 4q2000-4q2010** but in sharp contrast with that of the previous sub period 2q1998-3q2000.

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4. Why did the unemployment rate in Portugal increase from 1998 and 2010?

- The unemployment rate increased throughout the last decade was explained mainly by the increase in the unemployment inflows rather than the decrease in the unemployment outflows.

- The **unemployment inflows (EU + IU)** explained 68.2% of the change in the unemployment rate.

  - Flows EU: 46.7%; flows IU: 21.5%.

- The **unemployment outflows (UE + UI)** explained 31.8% of the change in the unemployment rate.

  - Flows UE: 26.4%; flows UI: 5.4%.

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5. Main conclusions and hints for future work

- Quarterly worker flows are **sizeable** and often exhibit seasonal and cyclical patterns.

- Quarterly worker flows are **important** to understand the labour market functioning, namely to identify the origin of the employment and unemployment changes.

- The analysis of quarterly worker flows series can be complemented in several ways:

  - **Cyclical pattern analysis**, by using correct instruments, which require long series.

  - **Decomposition exercise,** as shown in previous slides (several methodologies available in economic literature).

  - **Markov-chain** analysis to infer about long-run results.

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5. Main conclusions and hints for future work

- It is important to achieve **consistency** between the net flows and the quarterly changes in stocks.

- Although the differences might be small (as happened to be the case in Portugal), consistency is important as:

  - It prevents from generating misinterpretations from users.

  - It allows publishing, along with % and transition rates, absolute figures (number of movers between labour market sates).

- **Flexible approach**: whenever necessary, and subject to precision constraints, consider the use of a **different space of states** (Ex.: including professional status and type of work contract) or **other breakdowns** (Ex.: age groups, educational level, and region).

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