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**Working Paper**

## Inequality and the changing nature of work in Peru

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# DATA APPENDIX

## Inequality and the changing nature of work in Peru

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### 1 Data description

The data source is the Peruvian National Household Survey (*Encuesta Nacional de Hogares*, ENAHO). This survey contains information related to diverse characteristics of education, health, income, wealth, physical assets, employment, and other social aspects of households and individuals. This survey is the main data source for microeconomic analysis in diverse topics for the country.

Conducted by the Peruvian National Institute of Statistics and Informatics (INEI, by its acronym in Spanish), ENAHO takes place since 1995. The original purpose of this survey was to assess the evolution of living conditions. ENAHO was constantly improved both in terms of technical issues and the addition of more relevant topics in its questionnaire, including data regarding some social programmes.

In its current methodology, ENAHO has information available since 2004 and allows making inquiries chiefly in topics related to poverty, welfare, and living conditions, but there is also available detailed data in different socioeconomic areas at the individual and household level (e.g., education, health, employment, financial access, democratic participation, etc.).

#### *Survey design, data collection, and structure*

ENAHO intends to collect representative data for all Peruvian households (excluding jails, quarters, asylums, hospitals, etc.). The sampling design is based on the Peruvian Census of Population and Housing, and constantly updated cartographic information, and uses a three-stage sampling design that varies by area of residence.

- In the urban area:
  - The Primary Sampling Unit is the urban populated centre with a population of more than two thousand.
  - The Secondary Sampling Unit is the *conglomerado* (cluster) which has on average 120 particular dwellings.
  - The Tertiary Sampling Unit is the particular dwelling.
- In the rural area:

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- There are two types of Primary Sampling Unit:
  - \* The urban populated centre with a population of more than five hundred, but less than two thousand.
  - \* The *Area de Empadronamiento Rural* (Rural Enumeration Area), which contains on average one hundred particular dwellings.
- The related Secondary Sampling Unit is of two types:
  - \* The *conglomerado* (cluster) which has on average 120 particular dwellings.
  - \* The particular dwelling.
- The Tertiary Sampling Unit, if applicable, is the particular dwelling.

The microdata contains information on the sampling weights and cluster information in order to compute population estimates based on the survey data. The data is collected continuously and is available both quarterly and yearly.. Researchers are encouraged to use the yearly structure. For any structure, ENAHO provides information on which month each datum was collected, making possible to control for seasonal components and the school calendar.

## 1.1 Information on occupation, labour, and socioeconomic outcomes

The main variables we used through the analysis are the following:

- Occupation: on ISCO 88 nomenclature, available up to two digits disaggregation. Constructed using the occupation codes on ENAHO, which were also tailored to Peruvian statistical needs but developed taking ISCO-88 as reference.
- Industry/branch: based on ISIC revision 3.
- Real earnings: weekly earnings in Peruvian soles (PEN) of 2009.
- Education achievement: classified in four groups: no schooling, primary, secondary, and tertiary according to the Peruvian education system. Tertiary education corresponds to higher education, either university or not. We also have schooling years available.
- Other demographic characteristics including gender and age.
- Routine tasks contents obtained from US O\*NET statistics, the US PIACC survey, and Peru's country specific PIAAC.

Below, we describe these variables in more detail, and how we gathered and processed this data from ENAHO.

### *Classification of occupations*

ENAHO classifies workers into Peru's country specific classification of occupations. This particular classification is, however, compatible with the International Standard Classification of Occupations (ISCO), in its ISCO-88 version. Since 2016, ENAHO also offers a classification based in ISCO-15. ENAHO provides a data appendix that allows the mapping of their occupation codes to their equivalent ISCO-88 and ISCO-15 classifications. These scheme relate both classifications, although some occupations might not be available in both classifications. For instance, in the country specific ISCO-88

occupations tables, it is possible to find 66 different two-digit occupations, which is way more than the 43 occupational codes defined at the official ISCO-88.

To transform the ENAHO occupations data into the international standard (ISCO-88), we relied on [the conversion table](#) provided by LIS, available as an appendix of [Mahutga, Curran, and Roberts](#), published in the LIS Inequality Matters Newsletter.

The exact application of this conversion table caused some inconsistencies. The employment share of group 1 (managers) was excessively large across our period of analysis, while group 5 employment share (craft and related trades workers) seemed quite small. To solve this issue, we deviated from the coding suggested by LIS and followed UNU-WIDER researchers' advice by mapping the following three occupations as follows :

- Occupation 364 (*tecnicos en administracion*) to 34 (other associate professionals) not 12 (corporate managers);
- Occupations 571 (*comerciantes vendedores al por mayor*) and 572 (*comerciantes vendedores al por menor (no ambulatorio)*) to 52 (models, salespersons, and demonstrators).

The following table summarizes the occupation codes conversion up to this point.

Observations with	Freq.	Per cent
Occupation codes according to INEI translated to two-digit ISCO-88 following LIS guidelines	841,800	99.46
Occupation codes reported by INEI that do not exist in the LIS guide (only in the INEI classification)	64	0.01
Occupation codes reported by INEI that are listed in the LIS guide but do not have a RTI/offshoring score, therefore are considered as missing	4,474	0.53
Total	846,338	100

Source: authors' compilation based on data.

In addition, we relied on the description of the codes in the survey to use the following conversions for cases not included in the LIS table but whose descriptions are close enough to the description of ISCO-88 two-digit definitions:

Code	Description of the survey	Suggested ISCO 88 2 digits
121	Directory member in agriculture, hunting, fishing, and forestry companies.	12 (Corporate managers)
128	Production or operations director in agriculture companies	12 (Corporate managers)
132	Production or operations director in commercial companies	12 (Corporate managers)
211	Physicist	21 (Physical, mathematical, and engineering science professionals)
259	Museum curators	24 (Other professionals), since this includes 2431: Archivists and curators
363	Supervisor / sales Manager	13 (Managers of small enterprises)
383	Licensing officer	34 (Other associate professionals), because this includes 344: Customs, tax, and related government associate professionals
417	Operator of data processing machinery	41 (Office clerks), because it includes 4113: Data entry operators
432	Railroad traffic chief	93 (Labourers in mining, construction, manufacturing, and transport)
434	Head of air transport traffic	93 (Labourers in mining, construction, manufacturing, and transport)
583	Unspecified commerce	9999 (missing)
634	Whale hunter	61 (Skilled agricultural and fishery workers), because it includes 615: Fishery workers, hunters and trappers
732	Chemical treatment in thermal installations	81 (Stationary plant and related operators) because it includes 815: Chemical-processing-plant operators
833	Print digitizer	73 (Precision, handicraft, craft printing, and related trades workers)
837	Photocopy, photographs, and film printer.	73 (Precision, handicraft, craft printing, and related trades workers)
874	Riggers and cable splicers	81 (Stationary plant and related operators)
882	Machine chamber worker on ships	82 (Machine operators and assemblers)

Source: authors' compilation based on data.

As a robustness check, the following table compares ENAHO raw occupational estimates and ISCO-88 classification with the distribution of occupations gathered from 'Encuesta Nacional del Empleo', an urban enterprise survey. Panel A presents the distribution of occupations (1-digit) using the raw classification provided by INEI. Panel B presents the distribution occupations that resulted from the mapping from ENAHO classification (Panel A) to ISCO-88 using the LIS correlation tables. Finally, Panel C presents an exogenous classification obtained from 'Encuesta Nacional del Empleo'. The comparison is performed over the urban population only in order to match Panel C, our benchmark.

Table 1: Distribution of the labour force by occupation—Urban

	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Panel A: ENAHO—Original Occupation Codification</b>									
1. Managers	12.55	12.53	13.36	13.57	13.10	13.20	13.35	13.31	13.53
2. Professionals	8.53	8.85	9.21	9.07	9.16	8.79	8.84	8.70	9.01
3. Technicians and assoc. prof.	7.39	7.27	7.45	7.13	7.04	6.75	7.27	7.12	7.37
4. Clerks	6.22	6.72	7.46	7.67	7.77	6.99	6.86	7.24	6.95
5. Service and sales	10.43	10.25	10.00	10.15	10.39	9.77	10.11	10.32	10.56
6. Skilled agric. and fishery	3.90	4.05	3.90	4.17	4.15	4.23	4.82	4.55	4.87
7. Craft and related trades	12.67	12.81	12.72	12.29	11.94	12.07	11.38	11.18	10.79
8. Plant and machine operators	8.69	9.18	8.66	8.61	9.04	9.41	9.51	9.54	9.35
9. Elementary occupations	28.64	27.24	26.24	26.51	26.59	27.95	26.97	27.08	26.74
Not classified	0.97	1.10	1.01	0.84	0.84	0.86	0.90	0.97	0.84
<b>Panel B: ENAHO—Recodified</b>									
1. Managers	1.88	2.09	2.17	2.17	1.99	1.71	1.97	1.67	1.78
2. Professionals	8.53	8.85	9.21	9.07	9.16	8.79	8.84	8.70	9.01
3. Technicians and assoc. prof.	9.11	8.95	9.22	8.78	8.59	8.85	9.29	9.12	9.54
4. Clerks	6.22	6.72	7.46	7.67	7.77	6.99	6.86	7.24	6.95
5. Service and sales	19.39	19.00	19.42	19.91	19.93	19.16	19.48	19.96	20.14
6. Skilled agric. and fishery	3.90	4.05	3.90	4.17	4.15	4.23	4.82	4.55	4.87
7. Craft and related trades	12.67	12.81	12.72	12.29	11.94	12.07	11.38	11.18	10.79
8. Plant and machine operators	8.69	9.18	8.66	8.61	9.04	9.41	9.51	9.54	9.35
9. Elementary occupations	28.64	27.24	26.24	26.51	26.59	27.95	26.97	27.08	26.74
Not classified	0.97	1.10	1.01	0.84	0.84	0.86	0.90	0.97	0.84
<b>Panel C: ILO estimate—Permanent Employment Survey</b>									
1. Managers	0.70	0.80	0.70	0.60	0.60	0.50	0.60	0.70	0.70
2. Professionals	9.20	9.60	10.00	9.90	10.30	10.80	11.30	11.30	11.20
3. Technicians and assoc. prof.	12.20	12.00	12.40	12.40	12.10	13.00	12.40	12.80	12.50
4. Clerks	8.10	8.40	9.50	10.10	11.00	10.90	11.30	10.10	9.80
5. Service and sales	17.50	17.70	17.20	18.10	18.10	17.50	17.30	18.20	17.40
6. Skilled agric. and fishery	0.40	0.30	0.30	0.30	0.30	0.20	0.30	0.20	0.30
7. Craft and related trades	10.90	11.20	10.90	10.80	10.20	9.50	9.60	9.30	9.70
8. Plant and machine operators	11.70	11.60	11.30	11.50	11.40	12.20	12.30	12.10	12.90
9. Elementary occupations	28.10	27.30	26.40	25.40	24.80	24.40	23.80	24.10	24.50
Not classified	1.40	1.30	1.30	1.10	1.20	1.10	1.10	1.20	1.20

Source: authors' compilation based on data.

### *Industry classification (ISIC)*

ENAHO follows the ISIC industry classifications rev. 3.1 published from 2002 up to 2007 and rev. 4 since 2008. For the more recent datasets, ENAHO publishes both classifications. The 1-digit ISIC classification (revision 4) employed in our research is the following :

Sector	ISIC Class
Agriculture	≥100 and <300
Fishing	≥300 and <500
Mining	≥500 and <1000
Manufacture	≥1000 and <3500
Electricity and water	≥3500 and <4000
Construction	≥4000 and <4500
Commerce	≥4500 and <4900
Government	≥8400 and <8500
Services	≥4900 and <8400 or ≥ 8500 and <9998

Source: authors' compilation based on data.

## Wages and income

The information is collected for individuals older than 14 years old. We also have restricted the sample to include only working population between 15 and 64 years old. The information includes different income sources including wages, other retributions for work, earnings from transfers, rents, and other extraordinary incomes. These monetary variables are provided in the following definitions:

- Current value on field: is the value collected on field according to the informant at the time. May have missing values.
- Monetary deflated value: these are deflated and annualized using a consumer's price index at prices of the base year (2009).
- Monetary imputed value: if monetary values are missed, these are completed by imputation of median deflated values.

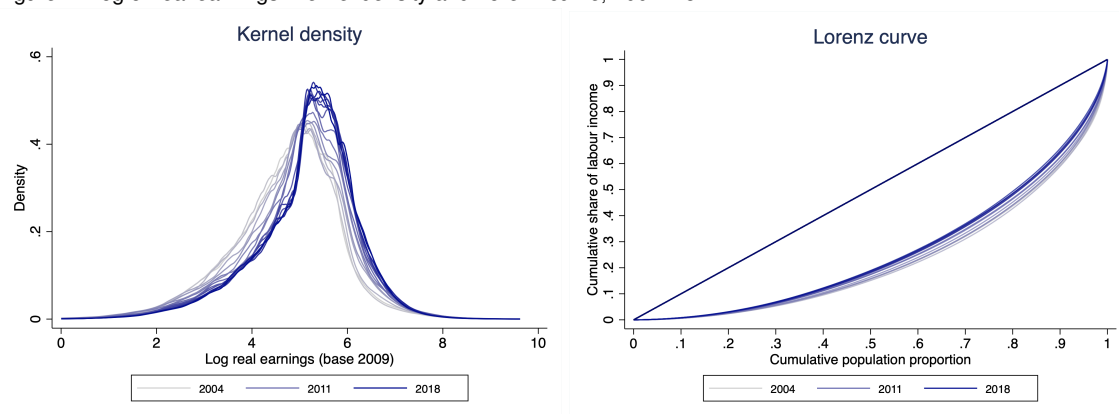
For our calculations, we use real weekly earnings (PEN of 2009)

## Educational levels

ENAHO provides detailed educational attainment information in three variables: 'last level achieved', 'last grade achieved', and 'last year achieved'. From these variables, we were able to build a years-of-education indicator.

## 2 Inequality trends

Figure 1: Log of real earnings: Kernel density and Lorenz curve, 2004–18



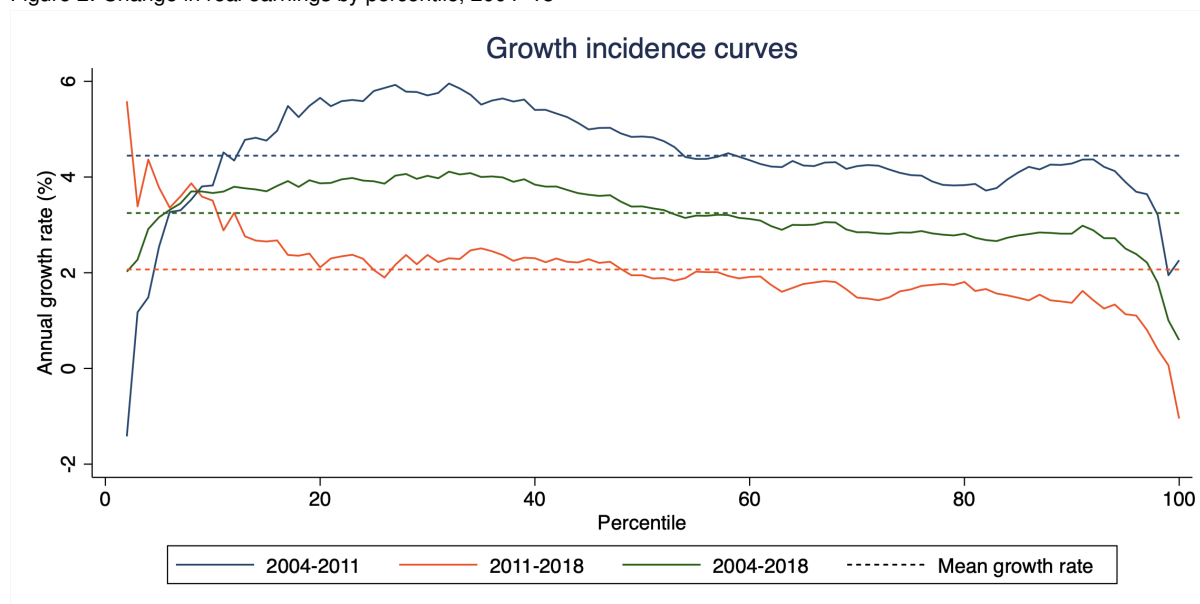
Source: authors' compilation based on data.

Table 2: Real earnings decile shares, 2004–18

	0–10	10–20	20–30	30–40	40–50	50–60	60–70	70–80	80–90	90–100
2004	0.007	0.019	0.031	0.043	0.057	0.073	0.091	0.117	0.156	0.405
2005	0.008	0.019	0.030	0.042	0.057	0.073	0.092	0.116	0.158	0.406
2006	0.008	0.019	0.030	0.043	0.058	0.073	0.092	0.118	0.160	0.399
2007	0.006	0.017	0.029	0.042	0.056	0.070	0.089	0.117	0.162	0.411
2008	0.006	0.018	0.031	0.044	0.058	0.073	0.091	0.119	0.161	0.398
2009	0.006	0.018	0.031	0.045	0.058	0.073	0.091	0.118	0.161	0.398
2010	0.007	0.019	0.033	0.047	0.060	0.075	0.093	0.119	0.160	0.388
2011	0.007	0.020	0.035	0.049	0.062	0.076	0.094	0.119	0.160	0.377
2012	0.007	0.021	0.035	0.049	0.063	0.077	0.096	0.119	0.159	0.375
2013	0.007	0.021	0.035	0.051	0.066	0.080	0.098	0.121	0.161	0.360
2014	0.008	0.022	0.036	0.052	0.065	0.080	0.098	0.122	0.162	0.355
2015	0.008	0.023	0.038	0.053	0.066	0.080	0.097	0.120	0.160	0.355
2016	0.008	0.022	0.036	0.052	0.065	0.079	0.097	0.121	0.161	0.359
2017	0.008	0.022	0.037	0.053	0.066	0.081	0.098	0.121	0.164	0.350
2018	0.008	0.023	0.038	0.054	0.067	0.081	0.099	0.124	0.165	0.342

Source: authors' compilation based on data.

Figure 2: Change in real earnings by percentile, 2004–18



Source: authors' compilation based on data.

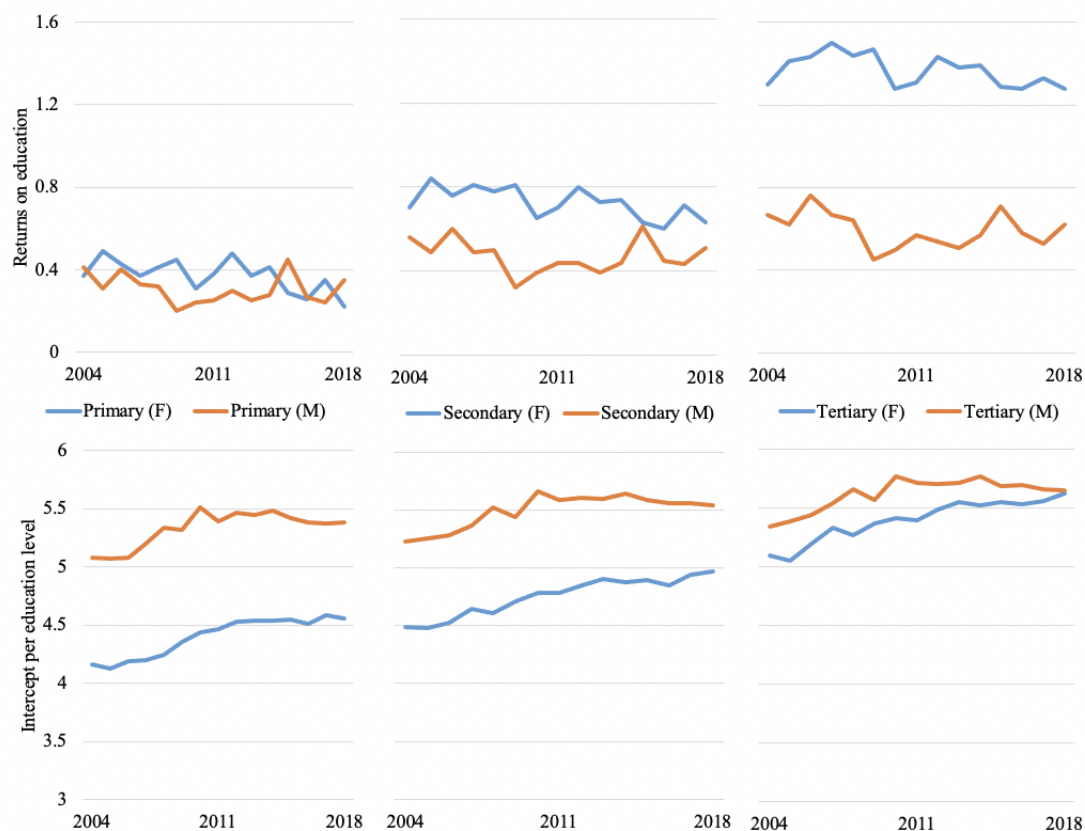
Table 3: Real earnings yearly growth rates (%) by percentile, 2004–18

	1st	5th	10th	25th	50th	75th	90th	95th	99th	Mean growth rate
2004-2011	-1.42	3.27	4.51	5.86	4.83	4.03	4.36	3.69	2.26	1.95
2011-2018	5.58	3.36	2.88	1.90	1.88	1.73	1.62	1.11	-1.05	0.07
2004-2018	2.02	3.31	3.70	3.86	3.34	2.87	2.98	2.39	0.59	1.00

Source: authors' compilation based on data.



Figure 3: Returns on education with respect to no-schooling and gender gap



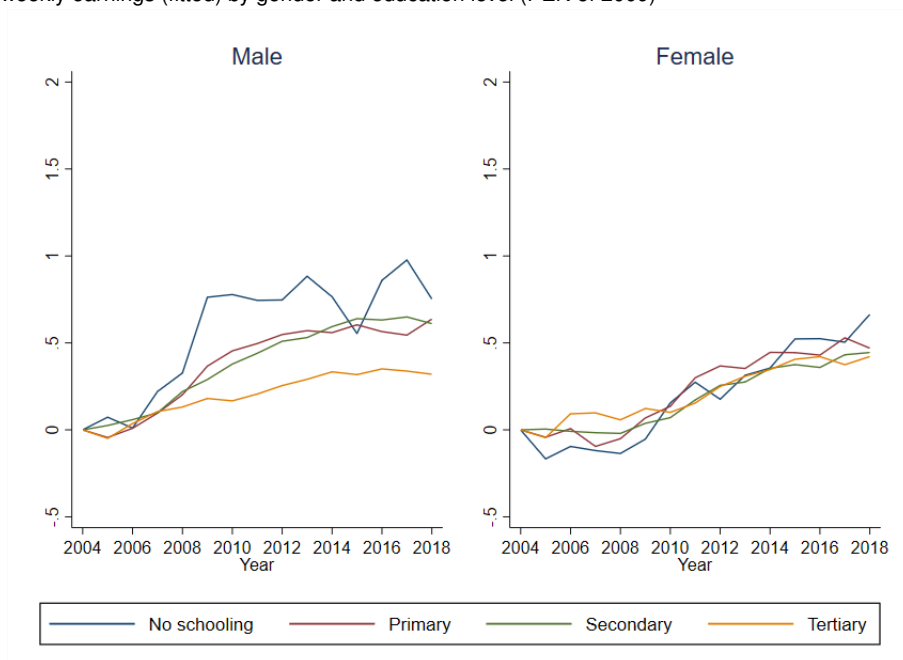
Source: authors' compilation based on data.

Table 4: Employment distribution by education level and gender in (%)

	2004 %	2006 %	2008 %	2010 %	2012 %	2014 %	2016 %	2018 %	Average %
<b>Men's education</b>									
No schooling	1.89	1.53	1.24	1.19	1.09	1.01	0.97	0.87	1.20
Primary	25.97	24.63	22.12	20.76	19.30	19.43	18.78	17.55	20.87
Secondary	47.00	47.26	47.11	47.51	47.10	48.81	48.40	47.90	47.67
Tertiary	25.14	26.58	29.52	30.54	32.50	30.76	31.86	33.68	30.26
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
<b>Women's education</b>									
No schooling	9.18	7.84	6.79	6.03	4.67	4.61	4.33	3.91	5.77
Primary	30.23	29.65	26.68	26.06	23.88	24.11	23.55	23.01	25.68
Secondary	37.25	37.42	37.88	37.61	37.13	37.32	37.50	38.37	37.58
Tertiary	23.34	25.09	28.65	30.30	34.31	33.96	34.62	34.70	30.97
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Source: authors' compilation based on data.

Figure 4: Real weekly earnings (fitted) by gender and education level (PEN of 2009)



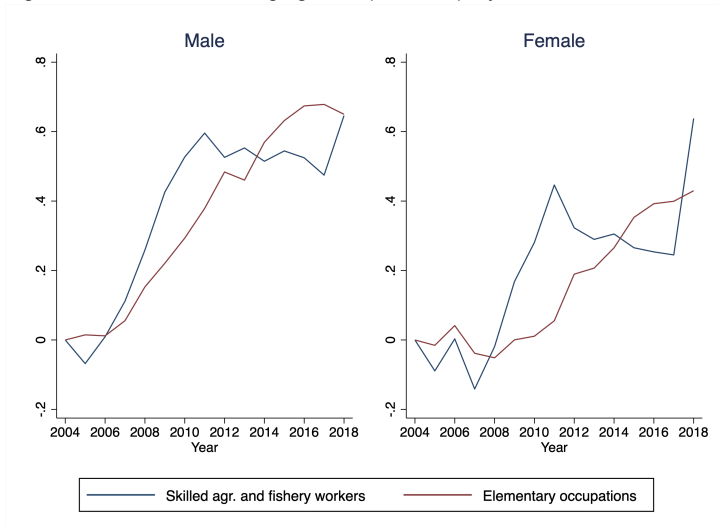
Source: authors' compilation based on data.

Table 5: Real weekly earnings (fitted) cummulated growth by gender and education level, 2004–18

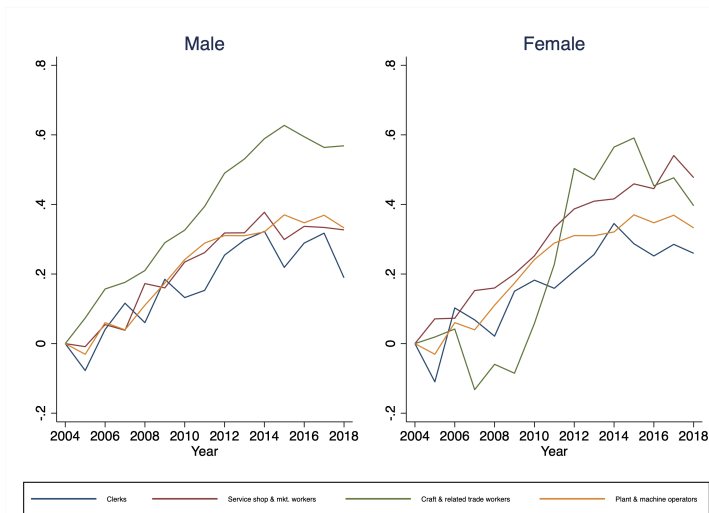
	2004	2006	2008	2010	2012	2014	2016	2018
<b>Men</b>								
No schooling	0.00	0.01	0.33	0.78	0.75	0.77	0.86	0.75
Primary	0.00	0.01	0.20	0.45	0.55	0.56	0.57	0.64
Secondary	0.00	0.06	0.22	0.38	0.51	0.59	0.63	0.61
Tertiary	0.00	0.04	0.13	0.17	0.25	0.33	0.35	0.32
<b>Women</b>								
No schooling	0.00	-0.10	-0.14	0.16	0.18	0.36	0.52	0.66
Primary	0.00	0.01	-0.05	0.14	0.37	0.45	0.43	0.47
Secondary	0.00	-0.01	-0.02	0.07	0.26	0.35	0.36	0.44
Tertiary	0.00	0.09	0.06	0.10	0.25	0.35	0.42	0.42

Source: authors' compilation based on data.

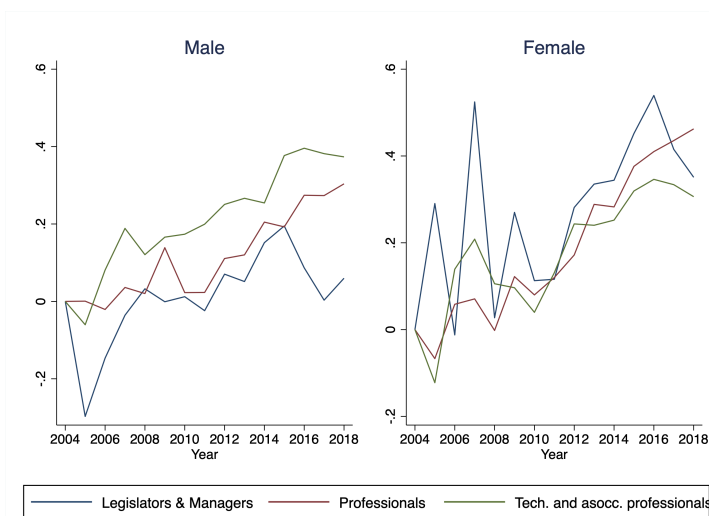
Figure 5: Cumulated earnings growth (2004–18), by skill level



(a) Low-skilled occupations



(b) Medium-skilled occupations



(c) High-skilled occupations

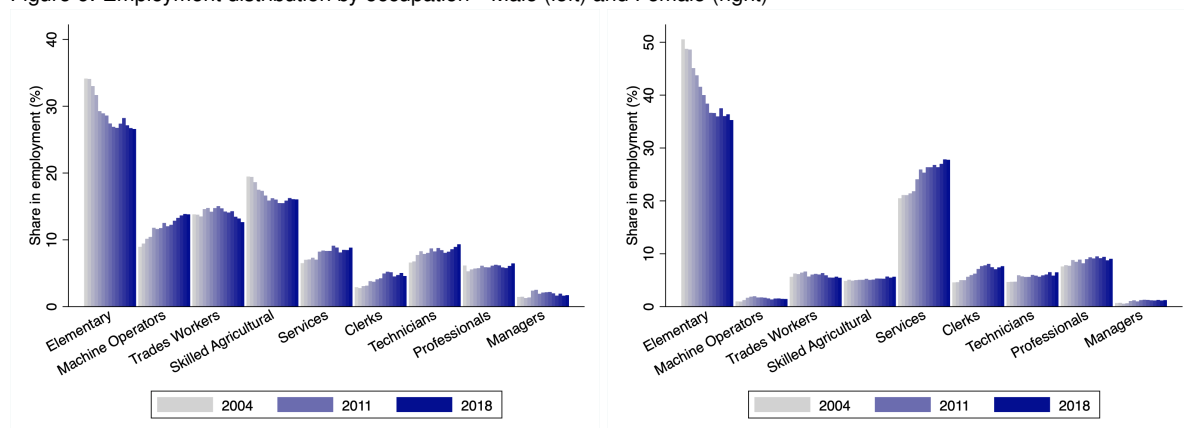
Source: authors' compilation based on data.

Table 6: Cumulated earnings growth by gender and skill level, 2004–18

	2004	2006	2008	2010	2012	2014	2016	2018
<b>Male</b>								
<i>Low skilled</i>								
6 Skilled agric. and fishery	0.00	0.01	0.26	0.53	0.53	0.51	0.52	0.65
9 Elementary Occupations	0.00	0.01	0.15	0.29	0.48	0.57	0.67	0.65
<i>Medium skilled</i>								
4 Clerks	0.00	0.04	0.06	0.13	0.25	0.32	0.29	0.19
5 Service and sales	0.00	0.05	0.17	0.23	0.32	0.38	0.34	0.33
7 Craft and related trades	0.00	0.16	0.21	0.33	0.49	0.59	0.59	0.57
8 Plant and machine operators	0.00	0.06	0.11	0.24	0.31	0.32	0.35	0.33
<i>High skilled</i>								
1 Managers	0.00	-0.15	0.03	0.01	0.07	0.15	0.09	0.06
2 Professionals	0.00	-0.02	0.02	0.02	0.11	0.20	0.27	0.30
3 Technicians and Assoc. Profes	0.00	0.08	0.12	0.17	0.25	0.25	0.40	0.37
<b>Female</b>								
<i>Low skilled</i>								
6 Skilled agric. and fishery	0.00	0.00	-0.02	0.28	0.32	0.31	0.25	0.64
9 Elementary Occupations	0.00	0.04	-0.05	0.01	0.19	0.27	0.39	0.43
<i>Medium skilled</i>								
4 Clerks	0.00	0.10	0.02	0.18	0.21	0.35	0.25	0.26
5 Service and sales	0.00	0.07	0.16	0.25	0.39	0.42	0.45	0.48
7 Craft and related trades	0.00	0.04	-0.06	0.06	0.50	0.56	0.45	0.40
8 Plant and machine operators	0.00	0.24	0.28	0.25	0.35	0.73	0.54	0.51
<i>High skilled</i>								
1 Managers	0.00	-0.01	0.03	0.11	0.28	0.34	0.54	0.35
2 Professionals	0.00	0.06	-0.00	0.08	0.17	0.28	0.41	0.46
3 Technicians and assoc. prof.	0.00	0.14	0.11	0.04	0.24	0.25	0.35	0.31

Source: authors' compilation based on data.

Figure 6: Employment distribution by occupation—Male (left) and Female (right)



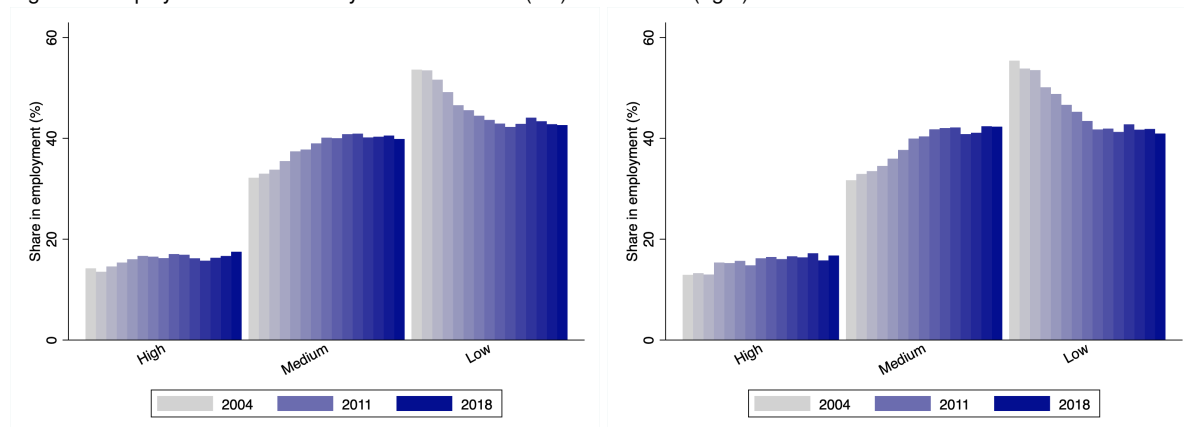
Source: authors' compilation based on data.

Table 7: Employment distribution by occupation

	2004	2006	2008	2010	2012	2014	2016	2018
<b>Male</b>								
1 Legislators, Senior Officials	1.45	1.28	2.39	1.92	2.15	1.98	1.93	1.71
2 Professionals	6.16	5.56	5.75	5.89	6.13	6.17	5.78	6.47
3 Technicians and Assoc Profes	6.59	7.73	7.89	8.71	8.76	8.05	8.59	9.33
4 Clerks	2.91	3.08	3.82	4.09	4.95	5.15	4.73	4.58
5 Service, shop and market work	6.51	7.06	7.03	8.40	8.34	8.85	8.49	8.82
6 Skilled agricultural and fish	19.48	18.63	17.32	15.87	16.02	15.48	16.25	16.04
7 Craft and related trade worke	13.80	13.50	14.77	14.75	14.71	14.08	13.45	12.65
8 Plant and machine operators a	8.96	10.15	11.79	11.76	12.03	12.85	13.65	13.81
9 Elementary Occupations	34.14	33.01	29.25	28.61	26.91	27.39	27.14	26.59
<b>Female</b>								
1 Legislators, Senior Officials	1.45	1.28	2.39	1.92	2.15	1.98	1.93	1.71
2 Professionals	6.16	5.56	5.75	5.89	6.13	6.17	5.78	6.47
3 Technicians and Assoc Profes	6.59	7.73	7.89	8.71	8.76	8.05	8.59	9.33
4 Clerks	2.91	3.08	3.82	4.09	4.95	5.15	4.73	4.58
5 Service, shop and market work	6.51	7.06	7.03	8.40	8.34	8.85	8.49	8.82
6 Skilled agricultural and fish	19.48	18.63	17.32	15.87	16.02	15.48	16.25	16.04
7 Craft and related trade worke	13.80	13.50	14.77	14.75	14.71	14.08	13.45	12.65
8 Plant and machine operators a	8.96	10.15	11.79	11.76	12.03	12.85	13.65	13.81
9 Elementary Occupations	34.14	33.01	29.25	28.61	26.91	27.39	27.14	26.59

Source: authors' compilation based on data.

Figure 7: Employment distribution by skill level—Male (left) and Female (right)



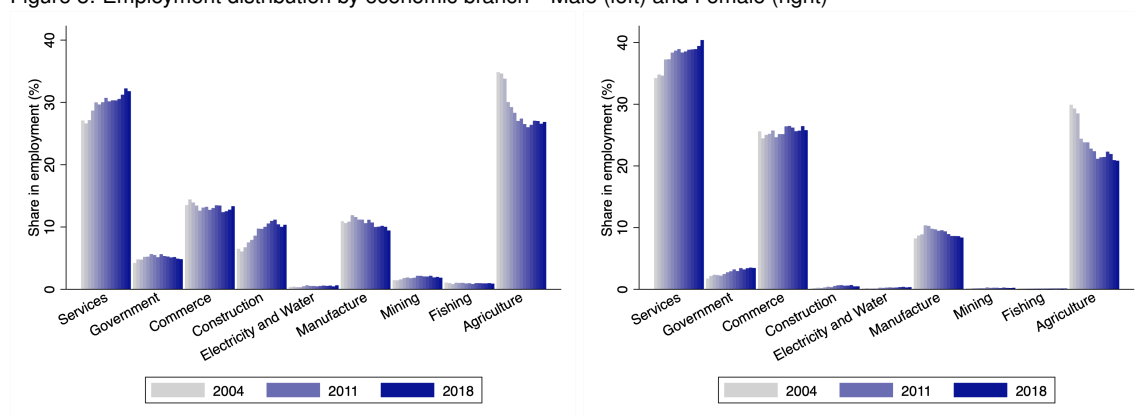
Source: authors' compilation based on data.

Table 8: Employment distribution by skill level

	2004	2006	2008	2010	2012	2014	2016	2018
<b>Male</b>								
Low	53.62	51.63	46.57	44.48	42.93	42.87	43.39	42.63
Medium	32.18	33.79	37.40	39.00	40.03	40.93	40.31	39.86
High	14.21	14.58	16.02	16.52	17.04	16.20	16.30	17.50
<b>Female</b>								
Low	55.39	53.52	48.79	45.25	41.76	41.26	41.70	40.94
Medium	31.68	33.50	35.96	39.95	41.77	42.14	41.09	42.30
High	12.92	12.99	15.25	14.80	16.47	16.60	17.20	16.75

Source: authors' compilation based on data.

Figure 8: Employment distribution by economic branch—Male (left) and Female (right)



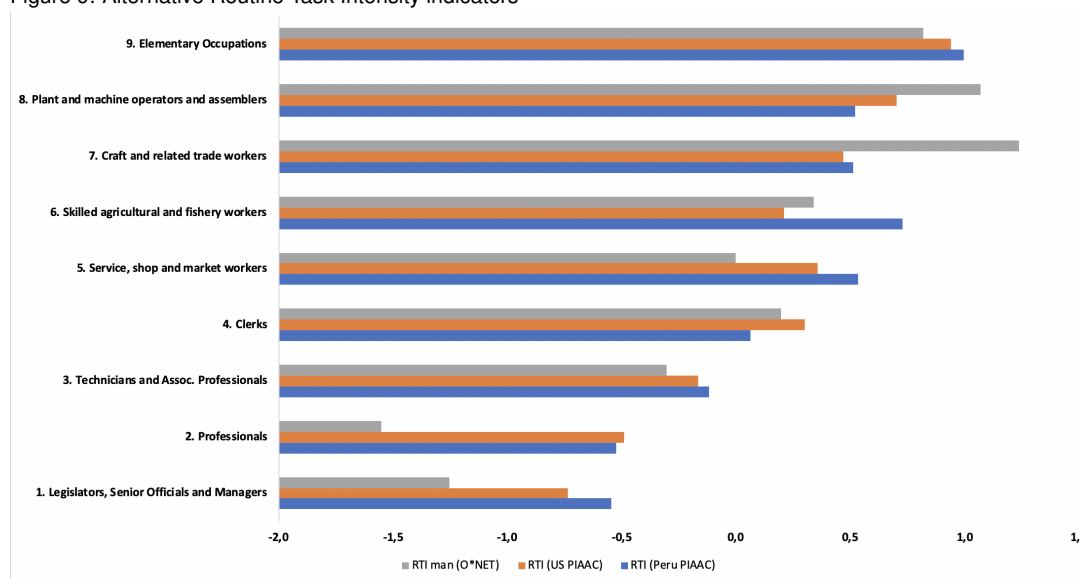
Source: authors' compilation based on data.

Table 9: Employment distribution by economic branch

	2004	2006	2008	2010	2012	2014	2016	2018
<b>Male</b>								
Agriculture	33.38	32.23	27.55	25.21	25.11	24.83	25.69	25.51
Fishing	1.10	0.87	1.06	0.98	0.90	1.02	0.98	0.94
Mining	1.54	1.69	2.04	1.98	2.31	2.19	2.05	1.99
Manufacture	11.38	11.38	12.22	11.66	11.57	10.41	10.53	9.77
Electricity and Water	0.39	0.37	0.53	0.53	0.48	0.60	0.58	0.60
Construction	6.87	7.07	8.33	10.28	10.57	11.60	10.98	10.91
Commerce	13.71	14.24	12.73	13.49	13.06	13.43	12.52	13.21
Government	3.10	3.68	4.28	4.58	4.63	4.49	4.32	4.01
Services	28.52	28.47	31.26	31.28	31.37	31.43	32.35	33.06
<b>Female</b>								
Agriculture	27.84	26.50	21.97	20.78	19.38	19.69	20.25	19.16
Fishing	0.01	0.03	0.04	0.04	0.07	0.07	0.09	0.10
Mining	0.15	0.21	0.22	0.31	0.27	0.21	0.24	0.26
Manufacture	8.49	9.18	10.50	9.91	9.79	9.21	8.83	8.59
Electricity and Water	0.05	0.10	0.13	0.22	0.26	0.25	0.37	0.29
Construction	0.07	0.27	0.32	0.36	0.68	0.62	0.72	0.51
Commerce	25.92	25.29	25.95	25.43	26.49	26.25	25.63	25.71
Government	1.70	2.38	2.19	2.78	3.30	3.44	3.39	3.42
Services	35.76	36.05	38.68	40.16	39.76	40.25	40.47	41.96

Source: authors' compilation based on data.

Figure 9: Alternative Routine Task Intensity indicators



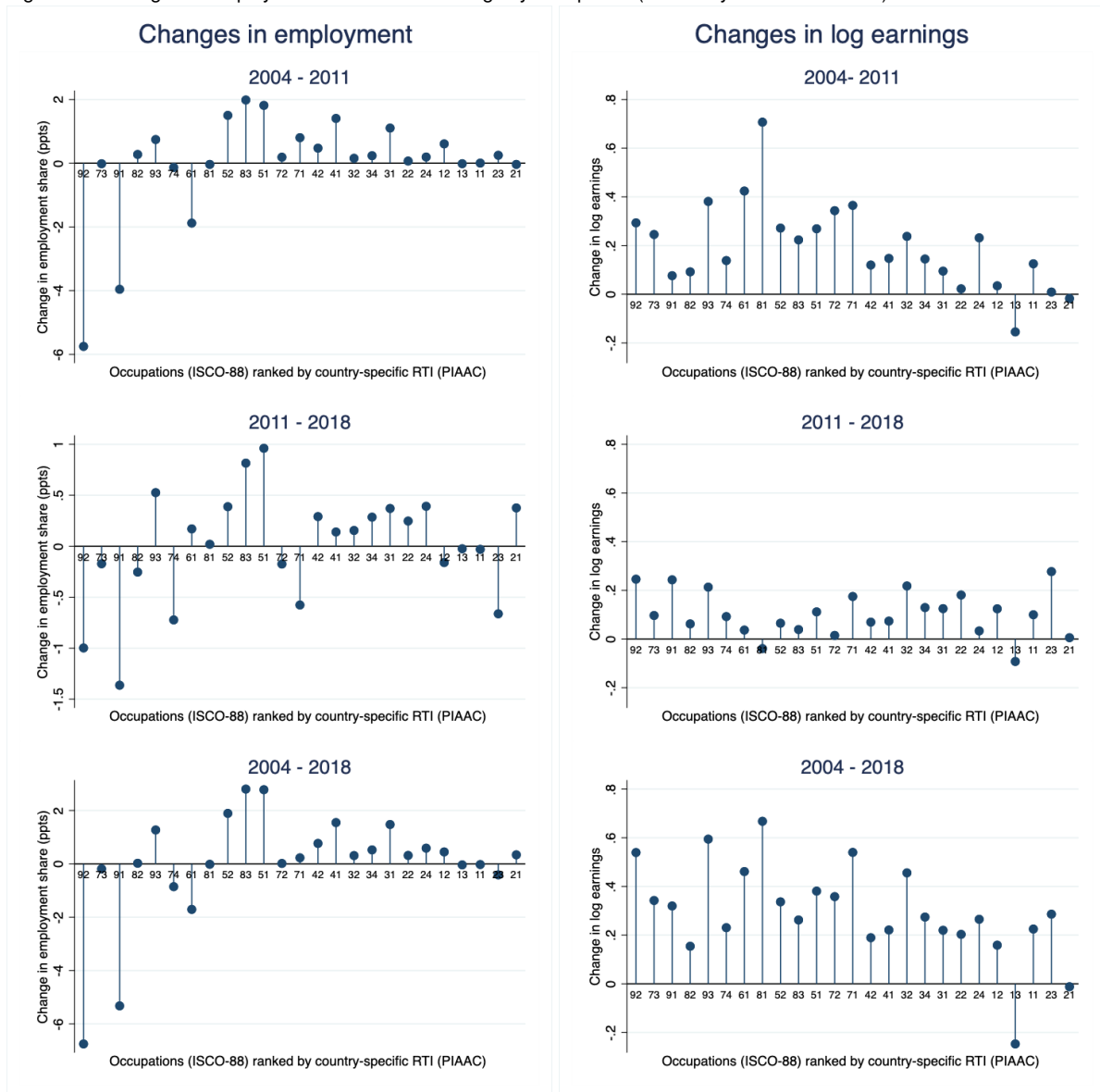
Source: authors' compilation based on data.

Table 10: Peru: Routine Task Indices—ISCO 2 digits

ISCO 88 - 2 digits	RTI man (O*NET)	RTI (Peru PIAAC)	RTI (US PIAAC)
11 Legislators and senior officials	-3.261	-0.547	-0.879
12 Corporate managers	-1.129	-0.546	-0.730
13 Managers of small enterprises	-1.305	-0.546	-0.730
21 Physical, mathematical, and engineering science professionals	-0.695	-0.711	-0.618
22 Life science and health professionals	-0.649	-0.250	-0.273
23 Teaching professionals	-2.027	-0.587	-0.477
24 Other professionals	-1.072	-0.422	-0.620
31 Physical and engineering science associate professionals	-0.060	-0.152	-0.348
32 Life science and health associate professionals	-0.238	-0.055	0.143
34 Other associate professionals	-0.484	-0.114	-0.139
41 Office clerks	0.229	0.032	0.309
42 Customer services clerk	0.094	0.161	0.265
51 Personal and protective services worker	0.015	0.454	0.469
52 Models, salespersons, and demonstrators	-0.012	0.569	0.305
61 Skilled agricultural and fishery workers	0.339	0.728	0.209
71 Extraction and building trades workers	1.068	0.219	0.426
72 Metal, machinery, and related trades workers	0.931	0.295	0.232
73 Precision, handicraft, craft printing, and related trades workers	1.016	0.991	0.824
74 Other craft and related trades workers	1.526	0.737	0.583
81 Stationary plant and related operators	1.014	0.611	0.837
82 Machine operators and assemblers	1.873	0.841	0.790
83 Drivers and mobile plant operators	0.925	0.457	0.678
91 Sales and services elementary occupations	0.689	0.884	0.940
92 Agricultural, fishery, and related labourers	0.557	1.191	0.985
93 Labourers in mining, construction, manufacturing, and transport	2.076	0.824	0.810

Source: authors' compilation based on data.

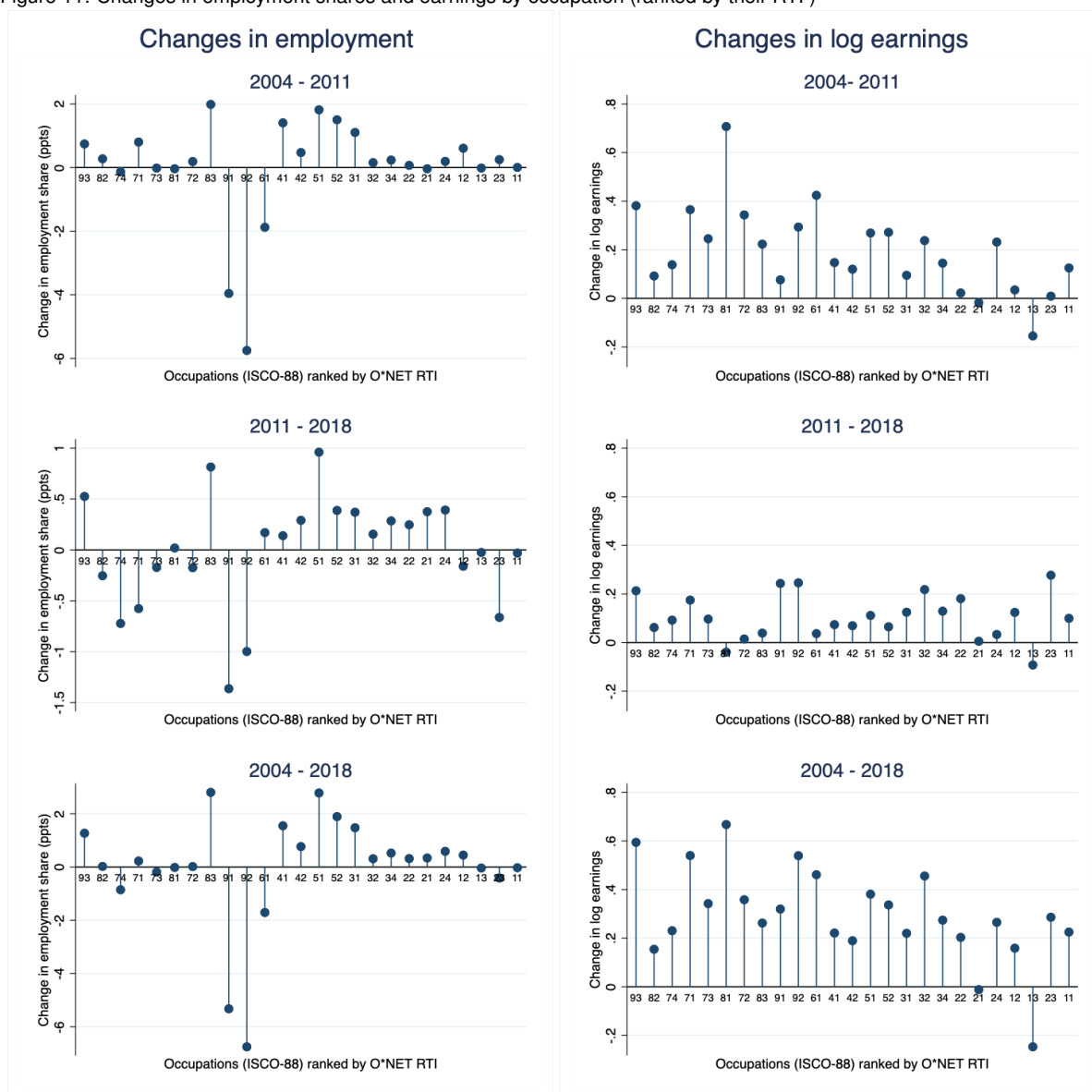
Figure 10: Changes in employment shares and earnings by occupation (ranked by their PIAAC RTI)



Source: authors' compilation based on data.



Figure 11: Changes in employment shares and earnings by occupation (ranked by their RTI )



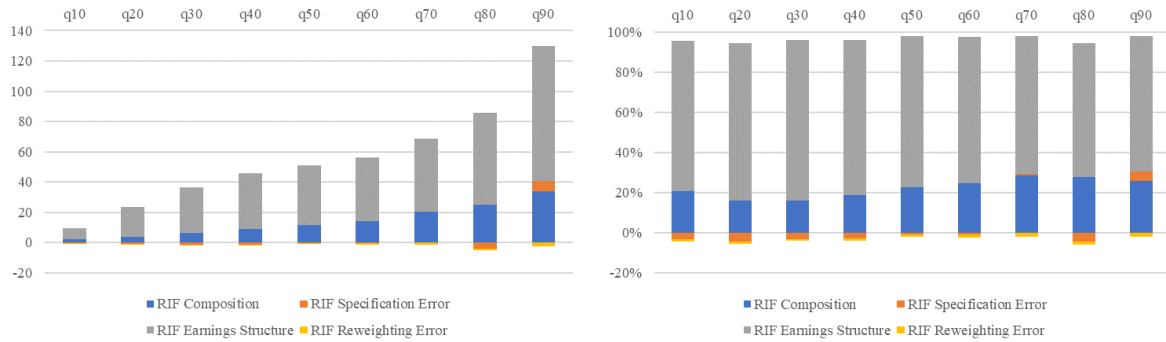
Source: authors' compilation based on data.

Table 11: Gini decomposition—occupation and task content (RTI O\*NET)

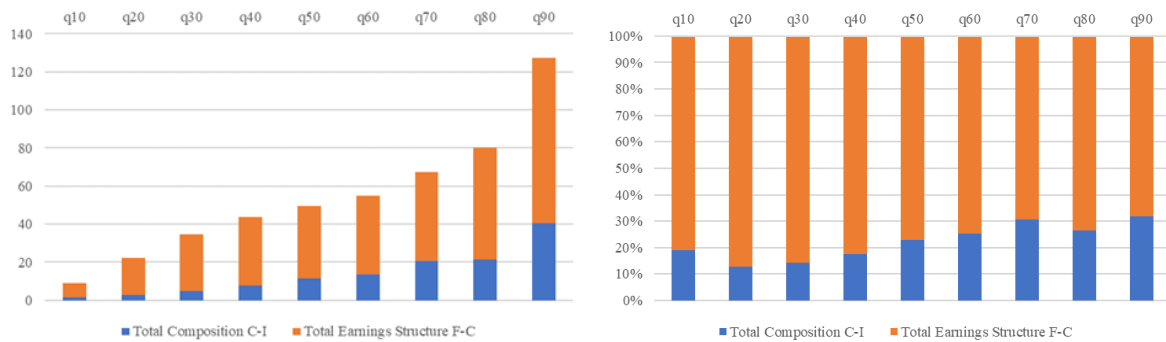
Gini	Actual			Shares constant			Means constant		
	2004	2011	2018	2004	2011	2018	2004	2011	2018
1. Overall	0.533	0.504	0.469	0.533	0.504	0.469	0.533	0.533	0.502
Shapley decomposition									
2. Between-occupation contribution	0.199	0.153	0.152	0.199	0.149	0.148	0.199	0.201	0.202
% 2/1	37%	30%	32%	37%	30%	32%	37%	38%	40%
3. Within-occupation contribution	0.334	0.351	0.351	0.334	0.355	0.321	0.334	0.333	0.300
% 3/1	63%	70%	75%	63%	70%	68%	63%	62%	60%
4. Gini between occupations	0.316	0.254	0.249	0.316	0.247	0.241	0.316	0.320	0.315
5a. Concentration index (-RTI O*NET)	0.210	0.166	0.166	0.210	0.155	0.149	0.210	0.222	0.220
Ratio (5a/4)	67%	65%	67%	67%	63%	62%	67%	69%	70%
5b. Concentration index (-RTI PIAAC)	0.289	0.242	0.234	0.289	0.234	0.220	0.289	0.298	0.295
Ratio (5b/4)	92%	95%	94%	92%	95%	91%	92%	93%	94%

Source: authors' compilation based on data.

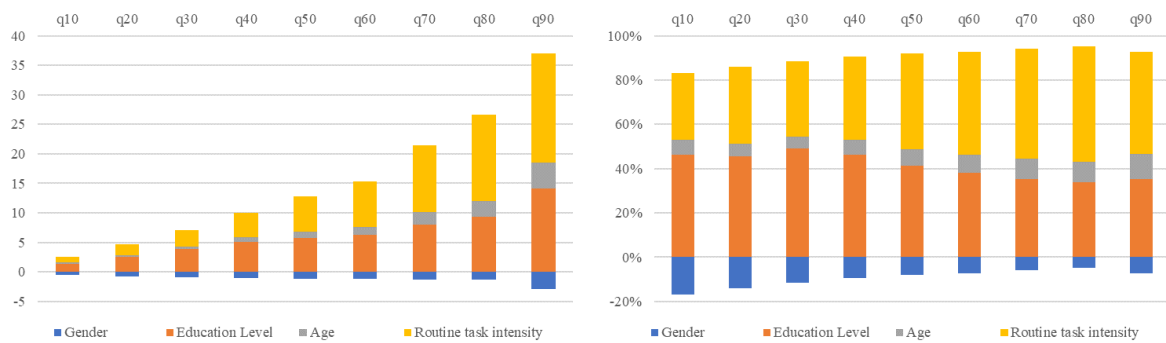
Figure 12: RIF—Inequality decomposition 2004–11 (real earnings)



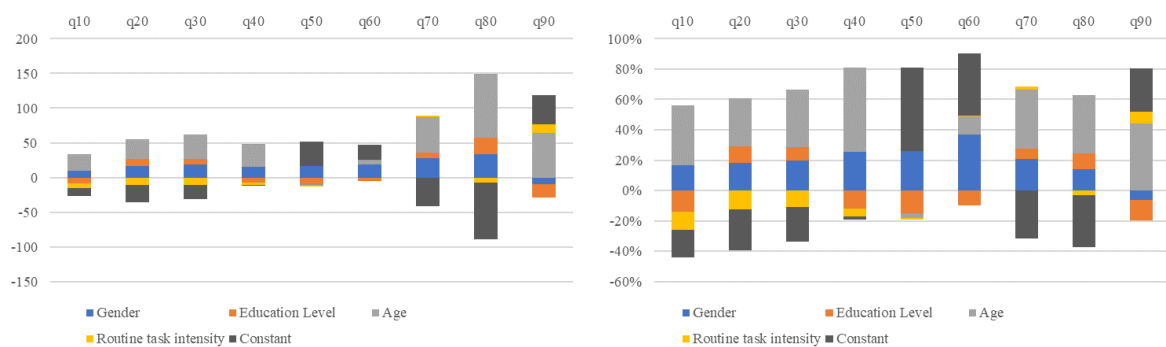
(a) RIF aggregate decomposition



(b) Total change decomposition



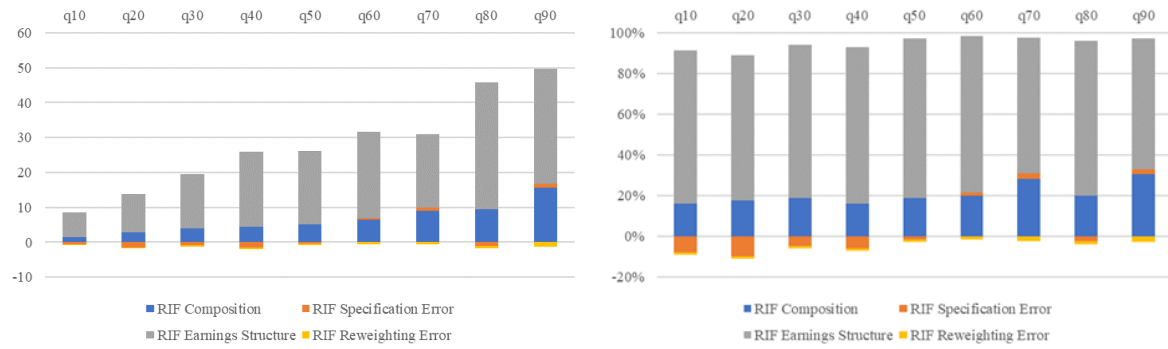
(c) RIF composition



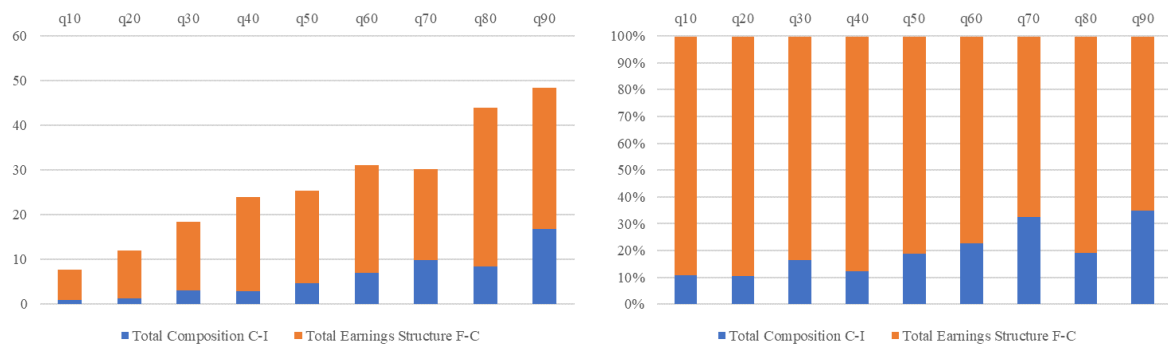
(d) RIF earnings structure

Source: authors' compilation based on data.

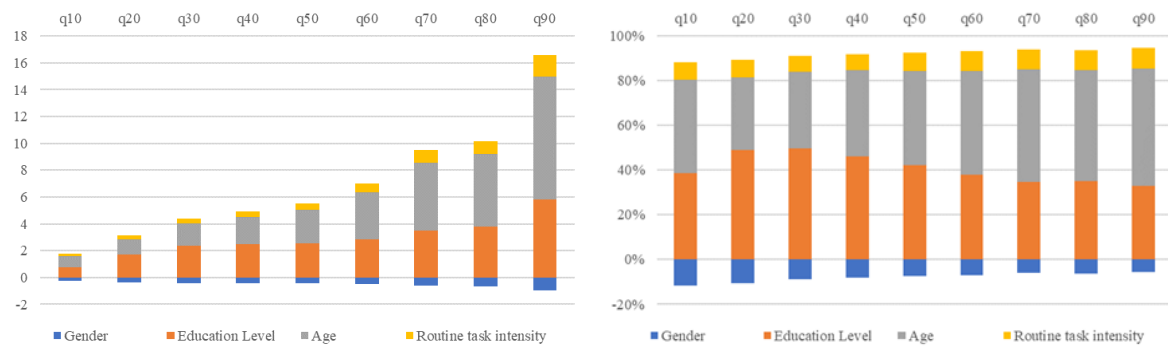
Figure 13: RIF—Inequality decomposition 2011–18 (real earnings)



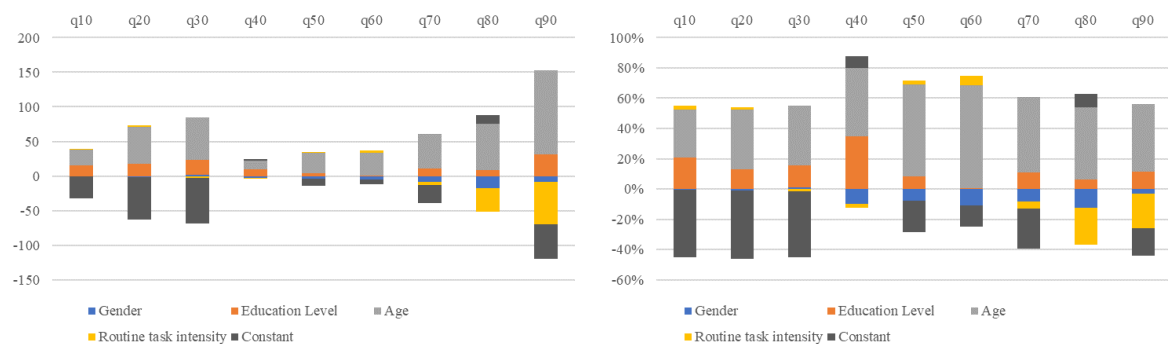
(a) RIF aggregate decomposition



(b) Total change decomposition



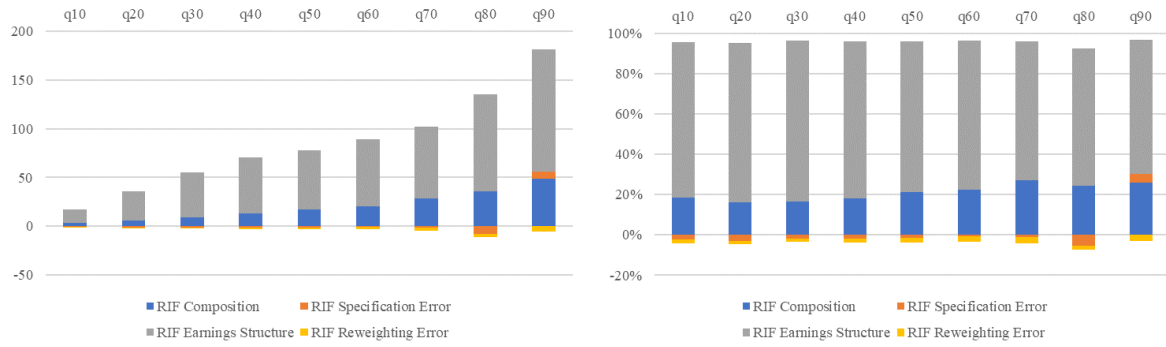
(c) RIF composition



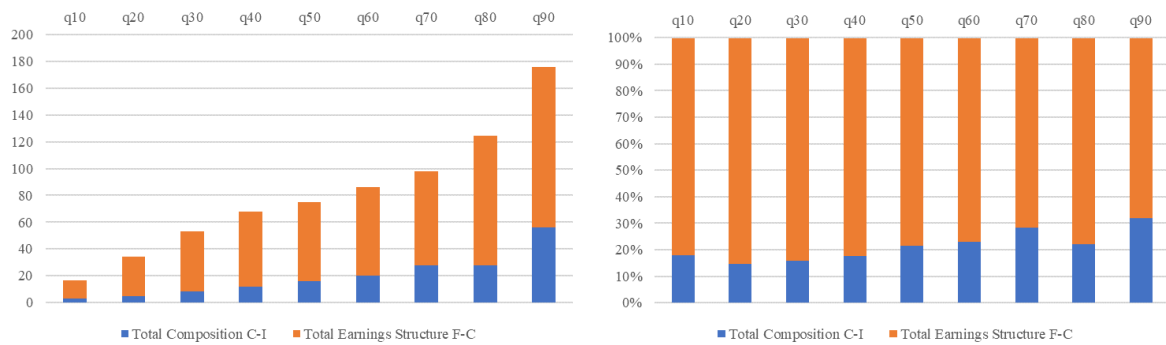
(d) RIF earnings structure

Source: authors' compilation based on data.

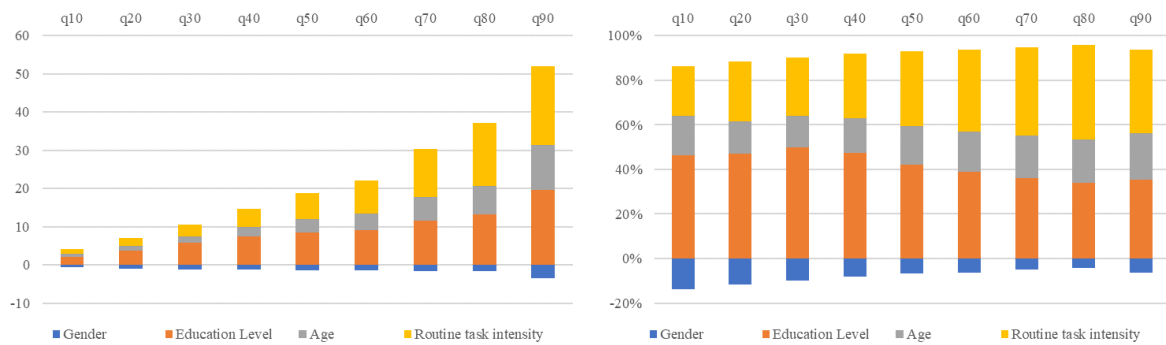
Figure 14: RIF—Inequality decomposition 2004–18 (real earnings)



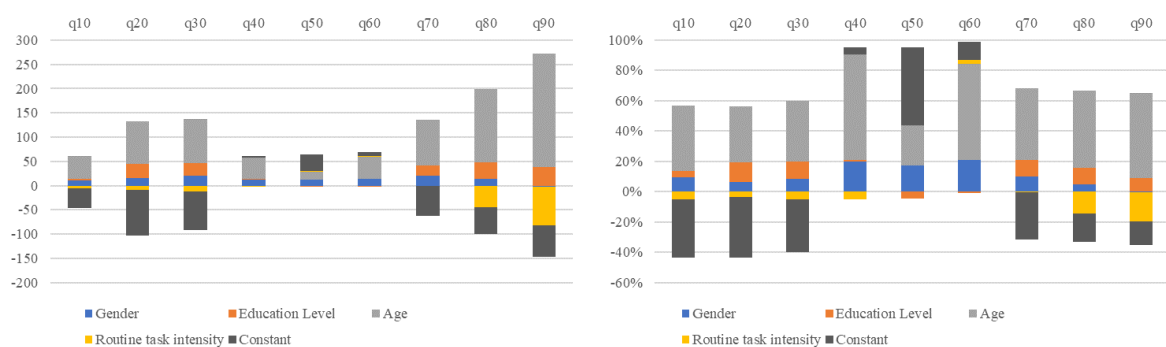
(a) RIF aggregate decomposition



(b) Total change decomposition



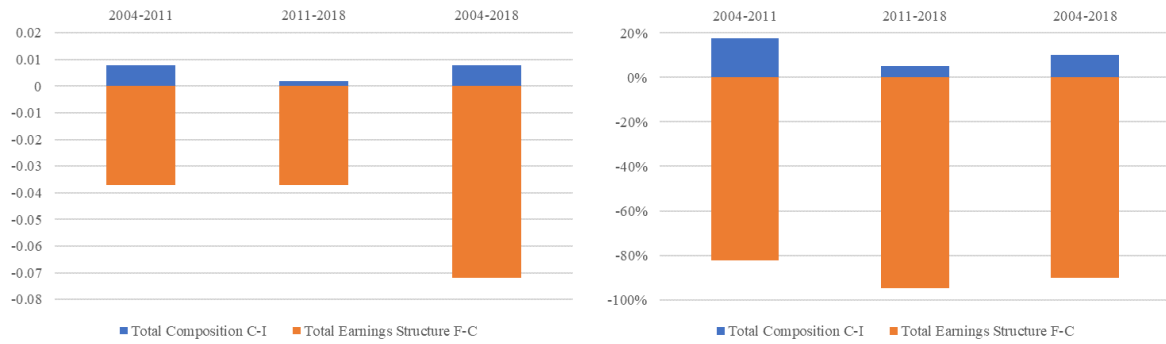
(c) RIF composition



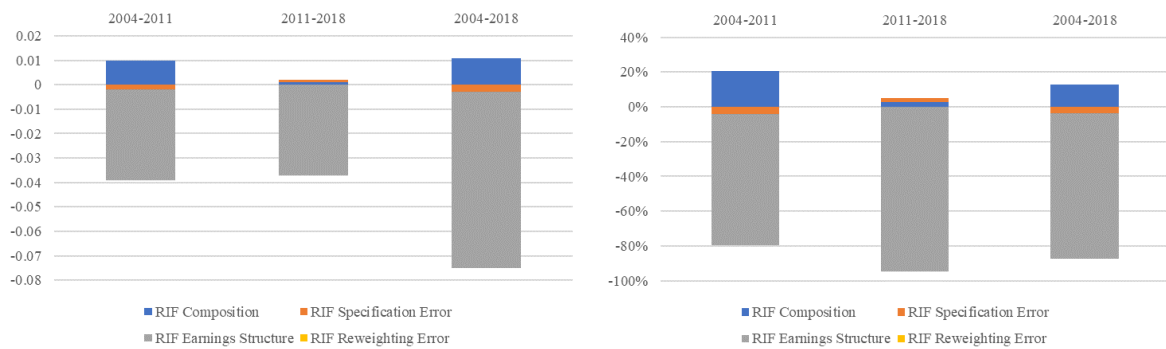
(d) RIF earnings structure

Source: authors' compilation based on data.

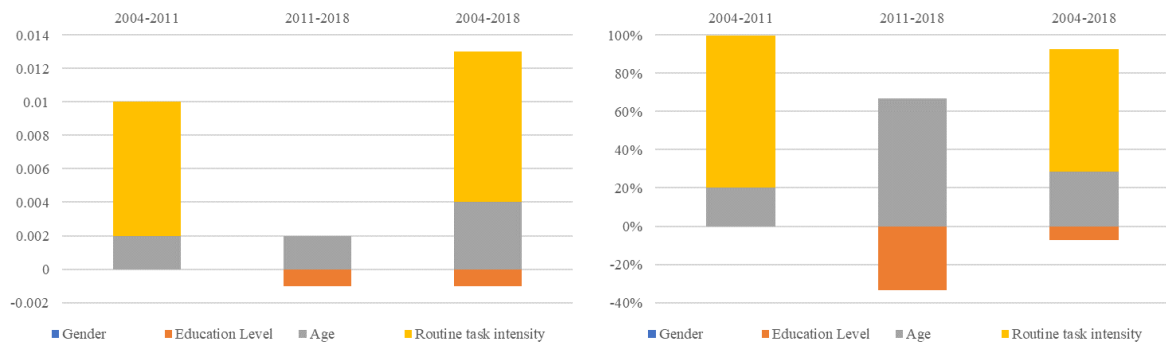
Figure 15: RIF—Inequality decomposition 2004–18 (changes in real earnings Gini index)



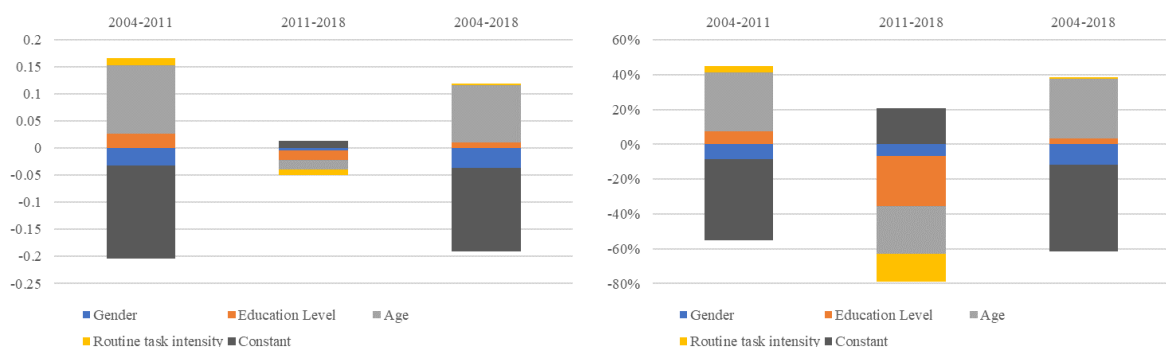
(a) RIF aggregate decomposition



(b) Total change decomposition



(c) RIF composition



(d) RIF earnings structure

Source: authors' compilation based on data.

Table 12: RIF inequality decomposition, 2004–11 (real earnings)

	q10	q20	q30	q40	q50	q60	q70	q80	q90	Gini
Distribution										
Final F	34.242***	70.450***	107.033***	142.078***	176.432***	213.197***	267.664***	341.252***	491.444***	0.504***
Initial I	25.222***	48.213***	72.300***	98.323***	126.654***	158.423***	200.209***	260.880***	364.193***	0.533***
Total Change F–I	9.019***	22.237***	34.733***	43.755***	49.779***	54.773***	67.454***	80.372***	127.250***	-0.029***
Reweighting Decomposition										
Counterfactual C	26.949***	51.074***	77.254***	105.952***	138.039***	172.187***	220.839***	282.258***	404.657***	0.541***
Total composition C–I	1.727***	2.860***	4.954***	7.628***	11.385***	13.764***	20.630***	21.378***	40.464***	0.008***
Total earnings structure F–C	7.293***	19.376***	29.779***	36.127***	38.394***	41.010***	46.825***	58.994***	86.787***	-0.037***
RIF aggregate decomposition										
RIF composition	2.047***	3.963***	6.133***	8.931***	11.766***	14.109***	20.170***	25.280***	34.128***	0.010***
RIF specification error	-0.321	-1.103***	-1.179***	-1.302**	-0.381	-0.345	0.460	-3.901***	6.336*	-0.002
RIF earnings structure	7.416***	19.611***	30.135***	36.643***	39.110***	41.984***	48.201***	60.290***	89.339***	-0.037***
RIF reweighting error	-0.124***	-0.235***	-0.356***	-0.516***	-0.716***	-0.975***	-1.376***	-1.296***	-2.553***	-0.000**
RIF composition										
Gender	-0.525***	-0.760***	-0.922***	-1.031***	-1.105***	-1.224***	-1.298***	-1.314***	-2.886***	-0.000
Education level	1.429***	2.504***	3.909***	5.106***	5.753***	6.299***	8.071***	9.404***	14.125***	-0.000
Age	0.218***	0.307***	0.431***	0.726***	1.064***	1.372***	2.081***	2.646***	4.456***	0.002***
Routine task intensity	0.925***	1.912***	2.716***	4.130***	6.053***	7.662***	11.316***	14.543***	18.433***	0.008***
Explained	2.047***	3.963***	6.133***	8.931***	11.766***	14.109***	20.170***	25.280***	34.128***	0.010***
RIF earnings structure										
Gender	9.887***	16.553***	18.272***	14.945***	16.364***	19.192***	27.343***	33.785***	-9.249	-0.032***
Education level	-8.433	9.861	8.475	-6.895	-9.568	-4.988	8.816	23.962**	-19.595	0.027
Age	23.854***	28.570**	34.803***	32.882**	-1.987	6.133	50.568**	91.114***	64.675	0.126*
Routine task intensity	-7.159***	-11.090***	-10.185***	-3.327**	-0.610	0.269	2.498	-6.847	11.658	0.014
Constant	-10.733	-24.283	-21.230	-0.961	34.910**	21.378	-41.024	-81.724**	41.851	-0.172**
Unexplained	7.416***	19.611***	30.135***	36.643***	39.110***	41.984***	48.201***	60.290***	89.339***	-0.037***
Observations	89,540	89,540	89,540	89,540	89,540	89,540	89,540	89,540	89,540	89,540

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Source: authors' compilation based on data.

Table 13: RIF inequality decomposition, 2011–18 (real earnings)

	q10	q20	q30	q40	q50	q60	q70	q80	q90	Gini
Distribution										
Final F	41.997***	82.506***	125.412***	166.027***	201.770***	244.302***	297.904***	385.130***	539.766***	0.469***
Initial I	34.242***	70.450***	107.033***	142.078***	176.432***	213.197***	267.664***	341.252***	491.444***	0.504***
Total change F–I	7.755***	12.056***	18.379***	23.949***	25.337***	31.106***	30.241***	43.878***	48.322***	–0.035***
Reweighting decomposition										
Counterfactual C	35.066***	71.716***	110.034***	145.013***	181.170***	220.217***	277.471***	349.631***	508.322***	0.505***
Total composition C–I	0.824**	1.266***	3.001***	2.935***	4.737***	7.021***	9.807***	8.379***	16.878***	0.002**
Total earnings structure F–C	6.931***	10.790***	15.378***	21.014***	20.600***	24.085***	20.433***	35.499***	31.443***	–0.037***
RIF aggregate decomposition										
RIF composition	1.534***	2.750***	3.942***	4.496***	5.093***	6.489***	8.899***	9.466***	15.659***	0.001*
RIF specification error	–0.710**	–1.484***	–0.941**	–1.561***	–0.356	0.532	0.909	–1.086	1.219	0.001
RIF earnings structure	7.044***	10.995***	15.673***	21.357***	21.009***	24.607***	21.102***	36.240***	32.830***	–0.037***
RIF reweighting error	–0.113***	–0.205***	–0.295***	–0.342***	–0.408***	–0.522***	–0.669***	–0.741***	–1.386***	–0.000
RIF composition										
Gender	–0.235*	–0.366*	–0.418*	–0.427*	–0.449*	–0.515*	–0.598*	–0.696*	–0.950*	0.000
Education level	0.778***	1.708***	2.369***	2.468***	2.536***	2.844***	3.502***	3.821***	5.821***	–0.001***
Age	0.835***	1.126***	1.641***	2.059***	2.515***	3.499***	5.076***	5.387***	9.176***	0.002***
Routine task intensity	0.156	0.281	0.350	0.396	0.492	0.661	0.919	0.954	1.612	0.000
Explained	1.534***	2.750***	3.942***	4.496***	5.093***	6.489***	8.899***	9.466***	15.659***	0.001*
RIF earnings structure										
Gender	–0.175	–1.698	1.488	–2.733	–3.771*	–5.361*	–8.013***	–17.162***	–8.719	–0.004
Education level	15.224*	17.710**	22.122**	9.941	4.039	0.379	11.123	8.561	30.748	–0.018
Age	22.576**	53.588***	61.006***	12.769	29.307*	33.302	49.332**	67.034***	121.505	–0.017
Routine task intensity	1.875**	2.410	–2.208	–0.809	1.289	3.222	–4.665	–34.585***	–60.914***	–0.010
Constant	–32.455**	–61.014***	–66.734***	2.189	–9.855	–6.935	–26.676	12.392	–49.790	0.013
Unexplained	7.044***	10.995***	15.673***	21.357***	21.009***	24.607***	21.102***	36.240***	32.830***	–0.037***
Observations	114,114	114,114	114,114	114,114	114,114	114,114	114,114	114,114	114,114	114,114

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Source: authors' compilation based on data.

Table 14: RIF inequality decomposition 2004–18 (real earnings)

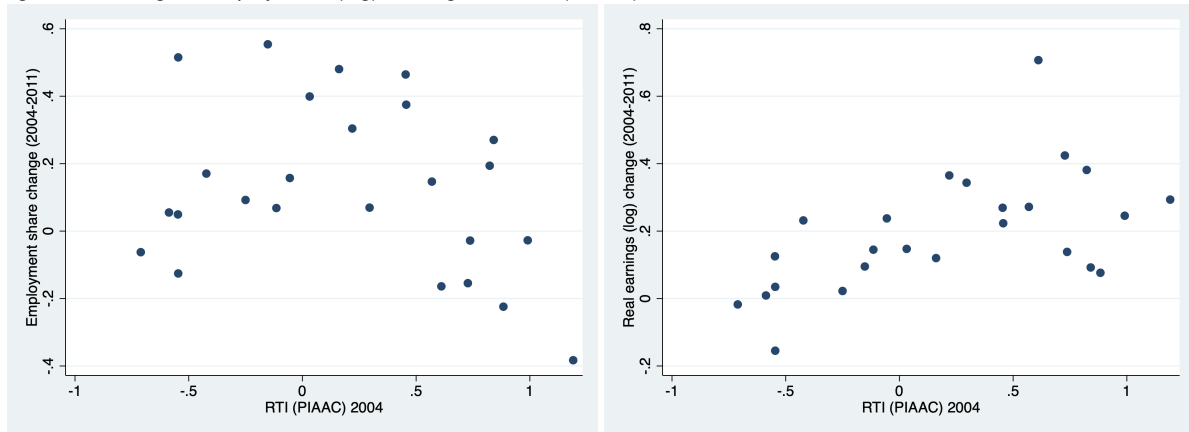
	q10	q20	q30	q40	q50	q60	q70	q80	q90	Gini
Distribution										
Final F	41.997***	82.506***	125.412***	166.027***	201.770***	244.302***	297.904***	385.130***	539.766***	0.469***
Initial I	25.222***	48.213***	72.300***	98.323***	126.654***	158.423***	200.209***	260.880***	364.193***	0.533***
Total Change F–I	16.775***	34.293***	53.112***	67.704***	75.116***	85.879***	97.695***	124.251***	175.572***	–0.064***
Reweighting decomposition										
Counterfactual C	28.227***	53.291***	80.689***	110.299***	142.858***	178.282***	227.952***	288.468***	420.449***	0.541***
Total Composition C–I	3.004***	5.078***	8.389***	11.976***	16.205***	19.859***	27.743***	27.588***	56.255***	0.008**
Total Earnings structure F–C	13.770***	29.215***	44.723***	55.728***	58.912***	66.020***	69.952***	96.663***	119.317***	–0.072***
RIF aggregate decomposition										
RIF composition	3.395***	6.145***	9.394***	13.373***	17.338***	20.565***	28.782***	35.460***	48.540***	0.011***
RIF specification error	–0.391	–1.067**	–1.004*	–1.397**	–1.134	–0.707	–1.039	–7.872***	7.715**	–0.003***
RIF earnings structure	14.134***	29.879***	45.749***	57.143***	60.772***	68.489***	73.172***	99.521***	124.801***	–0.072***
RIF reweighting error	–0.364***	–0.665***	–1.026***	–1.415***	–1.860***	–2.468***	–3.220***	–2.859***	–5.484***	–0.000
RIF composition										
Gender	–0.650***	–0.940***	–1.141***	–1.275***	–1.366***	–1.514***	–1.606***	–1.625***	–3.570***	–0.000
Education level	2.177***	3.777***	5.822***	7.530***	8.454***	9.148***	11.500***	13.175***	19.647***	–0.001
Age	0.829***	1.160***	1.661***	2.478***	3.449***	4.323***	6.172***	7.568***	11.752***	0.004**
Routine task intensity	1.040***	2.149***	3.052***	4.640***	6.802***	8.609***	12.715***	16.342***	20.712***	0.009***
Explained	3.395***	6.145***	9.394***	13.373***	17.338***	20.565***	28.782***	35.460***	48.540***	0.011***
RIF earnings structure										
Gender	9.906***	15.136***	19.818***	12.487***	11.704***	14.442***	20.145***	14.429***	–1.862	–0.036***
Education level	4.288	29.933***	26.360***	0.853	–3.085	–0.615	20.755**	33.045***	37.972*	0.011
Age	45.964***	87.833***	91.922***	43.913***	17.449	44.218**	94.675***	152.388***	234.487***	0.106
Routine task intensity	–5.235***	–8.381***	–12.203***	–3.123*	0.155	2.010	–0.587	–43.861***	–79.992***	0.002
Constant	–40.789***	–94.642***	–80.149***	3.012	34.550**	8.434	–61.817*	–56.480	–65.803	–0.154**
Unexplained	14.134***	29.879***	45.749***	57.143***	60.772***	68.489***	73.172***	99.521***	124.801***	–0.072***
Observations	104,462	104,462	104,462	104,462	104,462	104,462	104,462	104,462	104,462	104,462

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

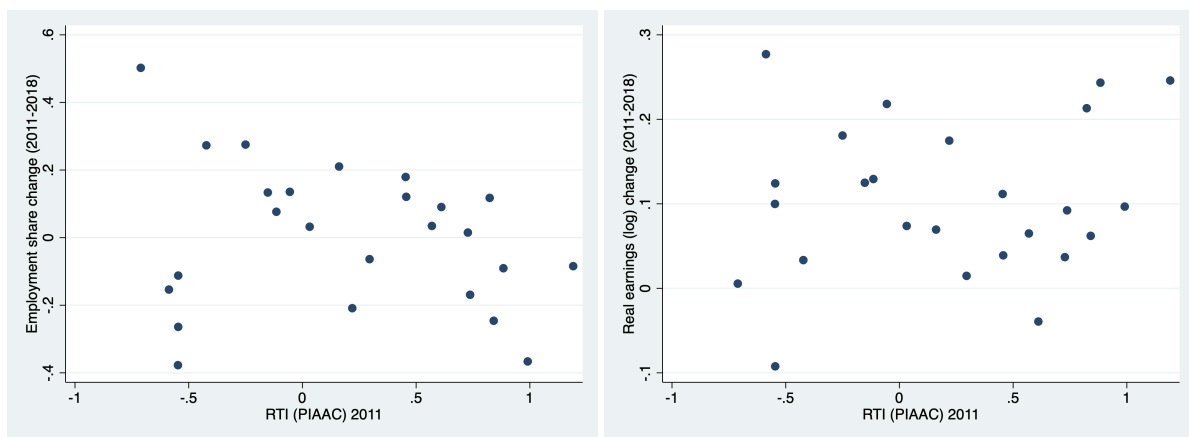
Source: authors' compilation based on data.



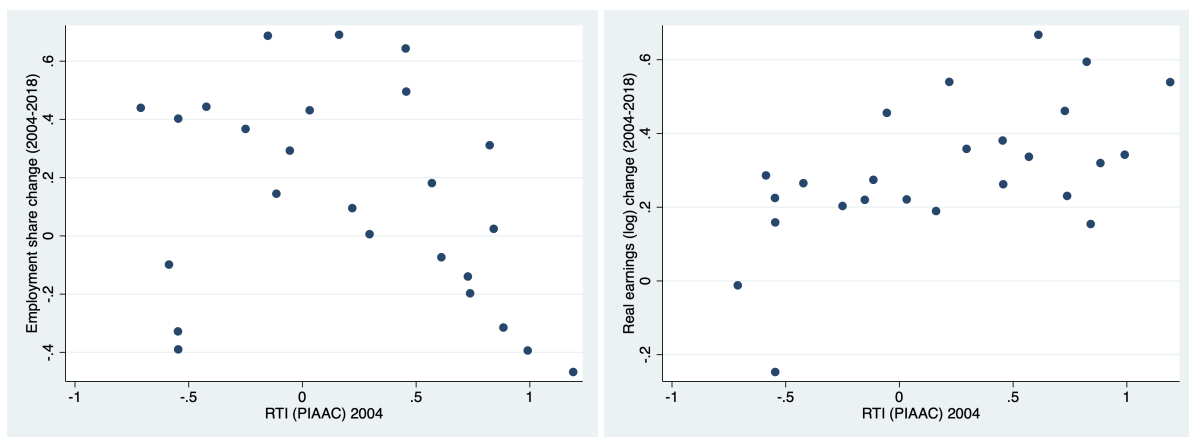
Figure 16: Change in employment, (log) earnings, and RTI (PIAAC)



(a) Change in employment and earnings 2004–11



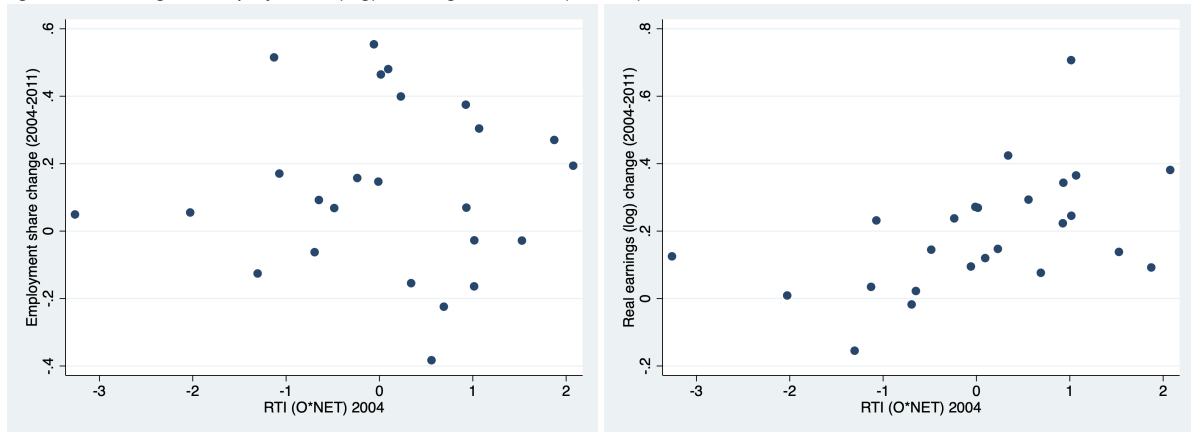
(b) Change in employment and earnings 2011–18



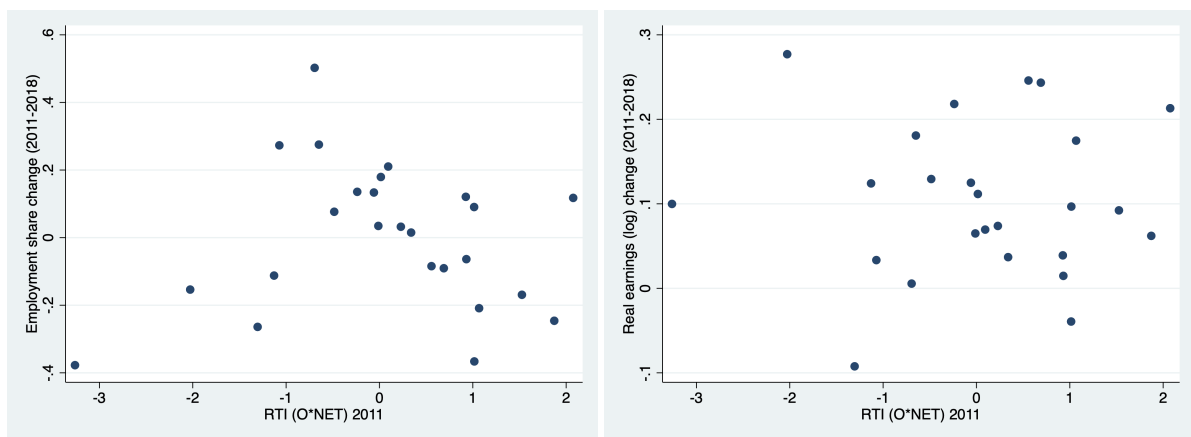
(c) Change in employment and earnings 2004–18

Source: authors' compilation based on data.

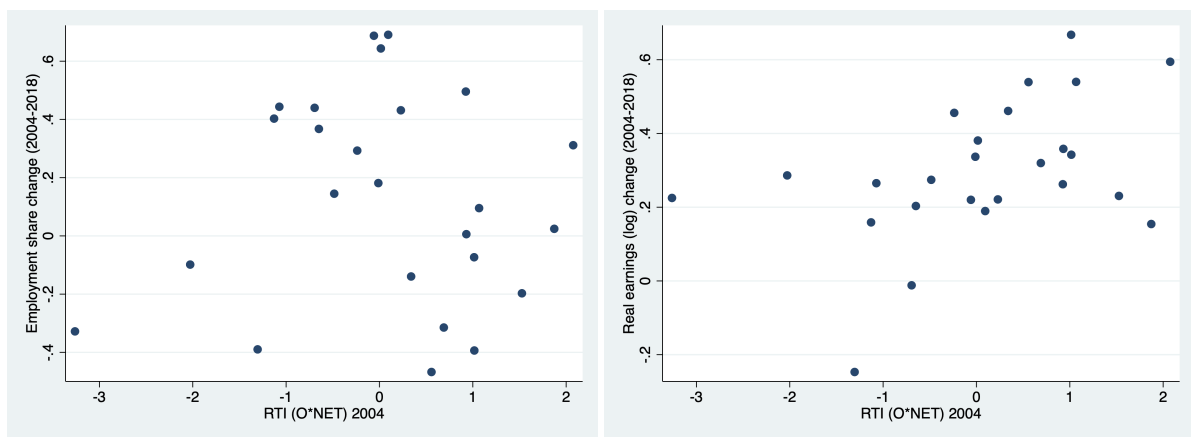
Figure 17: Change in employment, (log) earnings, and RTI (O\*NET)



(a) Change in employment and earnings 2004–11



(b) Change in employment and earnings 2011–18



(c) Change in employment and earnings 2004–18

Source: authors' compilation based on data.