

Why is Social Insurance Coverage Declining in Egypt? A Decomposition Analysis

Ragui Assaad and Sarah Wahby



WHY IS SOCIAL INSURANCE COVERAGE DECLINING IN EGYPT? A DECOMPOSITION ANALYSIS

Ragui Assaad¹ and Sarah Wahby²

Working Paper No. 1658

November 2023

This paper was supported by a grant to the Economic Research Forum by the Ford Foundation for the project “Renewing the Social Contract: Working Toward a More Inclusive Social Insurance System in Egypt.” The authors appreciate the comments of participants in the “Workshop on social insurance in Egypt”.

Send correspondence to:

Ragui Assaad

Humphrey School of Public Affairs, University of Minnesota

assaad@umn.edu

¹ Humphrey School of Public Affairs, University of Minnesota. E-mail: assaad@umn.edu

² Humphrey School of Public Affairs, University of Minnesota. E-mail: wahby001@umn.edu

First published in 2023 by
The Economic Research Forum (ERF)
21 Al-Sad Al-Aaly Street
Dokki, Giza
Egypt
www.erf.org.eg

Copyright © The Economic Research Forum, 2023

All rights reserved. No part of this publication may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems, without permission in writing from the publisher.

The findings, interpretations and conclusions expressed in this publication are entirely those of the author(s) and should not be attributed to the Economic Research Forum, members of its Board of Trustees, or its donors.

Abstract

We analyze in this paper the decline in social insurance coverage in Egypt from 2007 to 2021 to determine the extent to which it was due to compositional shifts in the structure of the economy or the workforce as opposed to changes in coverage for specific types of jobs and workers. We conclude that only a fraction of the decline in coverage can be attributed to structural changes in the economy or to changes in the characteristics of firms and workers. The largest decline in coverage occurred in the period from 2014 to 2017 and were concentrated among male new entrants with no formal education in private sector services working in micro and small enterprises. Although the declines occurred for both wage and nonwage workers, they were larger for the latter. Correcting for firm size, we see that there was a slight reversal in the declining trend post 2018, but coverage rates in 2021 remain well below what they were in 2014 when the declining trend accelerated.

Keywords: Social insurance, structural change, decomposition, Egypt

JEL Classifications: J32, J38, J26, J46

ملخص

نحلل في هذه الورقة تراجع تغطية التأمين الاجتماعي في مصر من عام 2007 إلى عام 2021 لمعرفة إلى أي مدى كان ذلك بسبب الضربات التركيبية في هيكل الاقتصاد أو القوى العاملة بدلاً من التغييرات في تغطية أنواع محددة من الوظائف والعمال. نستنتج أن جزءاً بسيطاً فقط من الانخفاض في التغطية يمكن أن يُعزى إلى التغييرات الهيكلية في الاقتصاد أو إلى التغييرات في خصائص الشركات والعمال. حدث أكبر انخفاض في التغطية في الفترة من 2014 إلى 2017 وتركز بين الوافدين الجدد الذكور الذين لم يحصلوا على تعليم رسمي في خدمات القطاع الخاص العاملين في المشاريع الصغيرة والمتناهية الصغر. على الرغم من أن الانخفاضات حدثت لكل من العمال الأجورين وغير الأجورين، إلا أنها كانت أكبر بالنسبة للأخير. بتصحيح حجم الشركة، نرى أن هناك انعكاساً طفيفاً في الاتجاه الهبوطي بعد عام 2018، لكن معدلات التغطية في عام 2021 لا تزال أقل بكثير مما كانت عليه في عام 2014 عندما تسارع الاتجاه الهبوطي.

1. Introduction

The Egyptian labor market has always been characterized by a high degree of informality, but what has been notable in recent years is that informality of employment has been rising substantially (Amer et al., 2021; Assaad et al., 2022). This informalization is undoubtedly partly due to the long-term decline in the share of the public sector in employment, which began in the mid-1990s, but cannot be exclusively attributed to this. In fact, as we will see below, rates of social insurance coverage have been falling within the private sector among both wage and nonwage workers (Roushdy & Selwaness, 2019; Selwaness & Ehab, 2022).

The main question we address in this paper is the extent to which the falling rates of social insurance coverage in Egypt can be attributed to structural change in the economy rather than to declining coverage within given sectors or even within given types of jobs. By structural change, we mean the changing composition of employment by sector of ownership, status in employment, and branch of economic activity. We attempt to answer this question in two ways. First, we undertake a set of decompositions that break down the change in overall social insurance coverage into a component associated with changes in composition across sector of ownership, employment status and branch of economic activity vs, one that is associated with within-sector change in coverage. We do this first at the aggregate level with fairly aggregated sectors, and then for specific sub-components of interest, such as non-agricultural wage and nonwage employment with a more detailed disaggregation by industry sector. Second, we conduct multivariate analyses to determine how the annual trend in coverage changes when various compositional aspects of employment are controlled for besides structural change, such as firm size category, broad occupational category, education, sex and marital status, and tenure on the job.

The decomposition of change in aggregate variables into their within and structural components is a common approach, especially used for labor productivity decomposition (Martins, 2014; McMillan et al., 2014; Voskoboynikov, 2020). Gasparini (2002) employed a decomposition technique to study the effect of change of the employment structure on the increase of informality rates among wage workers in the greater Buenos Aires area in Argentina. While the market underwent important structural change reflected in an increase in the fraction of people working in small firms, a decline of seniority in jobs, an increase in part-time jobs as well as a shift away from industry in favor of services, he found that the structural change had a minor effect on the increase of informality. He attributed the decline in social insurance coverage to a higher tendency to evade labor taxes. Traditionally, the formality of employment in Egypt was measured as either having coverage by social insurance or having a written employment contract (Assaad & Krafft, 2015). The most recent international recommendation adopted in the 17th International Conference of Labour Statisticians (ICLS-17) held in 2003 is to define informality of employment for employees as “not being in law or in practice subject to national labor legislation, income taxation, social protection or entitlement to certain employment benefits” (ILO, 2003). This can generally be operationalized by whether the employee has social insurance coverage (ILO, 2022).

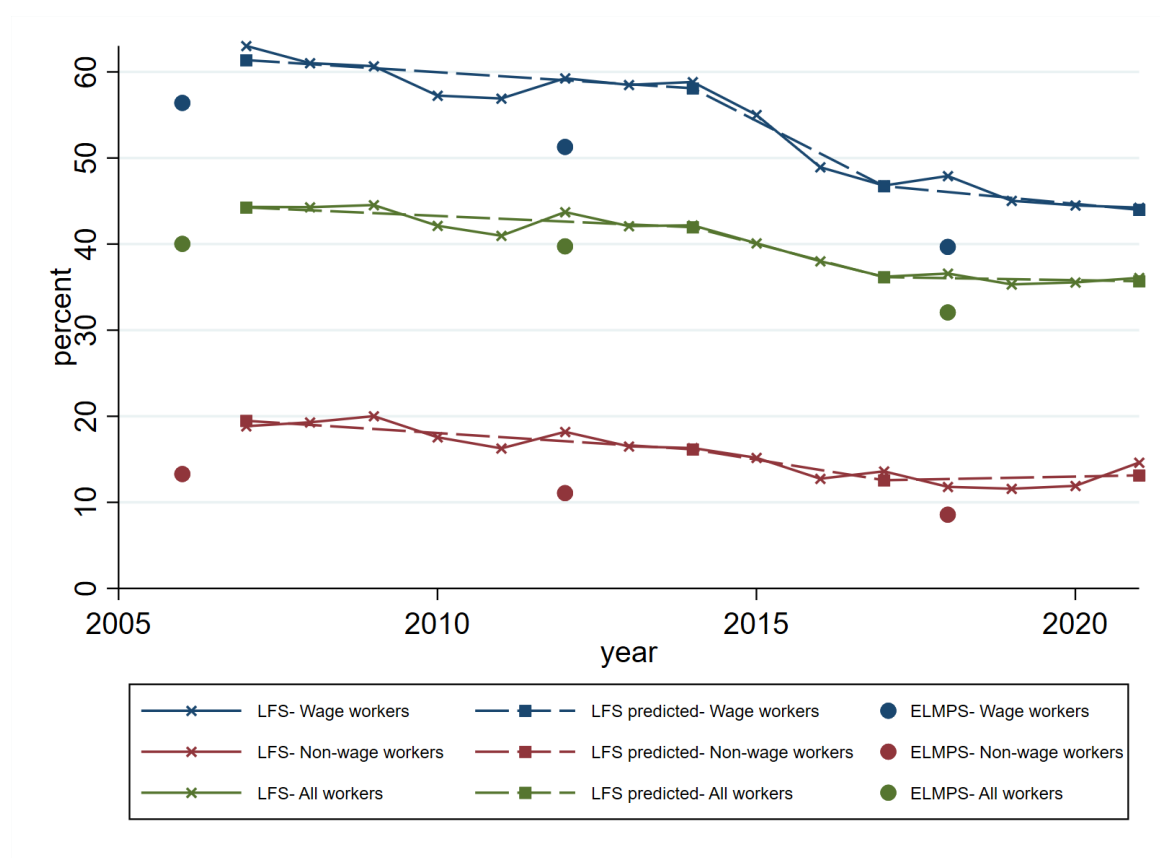
For employers and own-account workers the definition of employment informality according to the ICLS-17 recommendation depends on the formality of their enterprises, whereas unpaid contributing family workers are always considered informal, irrespective of the formality of the enterprise in which they work (ILO, 2003). Since owners of formal firms in Egypt must register for social insurance, in effect, coverage by social insurance – the focus of this paper – is the primary marker of employment formality in Egypt. Nonetheless, we will henceforth be referring in this paper to coverage by social insurance rather than employment informality to avoid any possible confusion.

As shown in Figure 1, rates of coverage by social insurance in Egypt have tended to decline from the mid-2000s to the early 2020s. The figure shows the annual percent of employment covered by social insurance as self-reported by workers in the official Labor Force Survey (LFS) from 2007 to 2021.³ It also shows the fitted linear trend of the LFS estimates for three sub-periods 2007-2014, 2014-2017 and 2017-2021 and the estimates of percent covered from the Egypt Labor Market Panel Survey (ELMPS) waves of 2006, 2012 and 2018. Both sources show a secular decline in the share of employment covered by social insurance, with the overall share falling from 44 percent in 2007 to 36 percent in 2021 according to the LFS, and from 40 percent in 2006 to 32 percent in 2018 according to the ELMPS. While the levels across the two surveys are different, the relative decline over time appears to be similar. Furthermore, the decline among all workers reflects declines among both wage and nonwage workers according to both sources.

Our choice of sub-periods for the linear trends shown in **Error! Reference source not found.** is based on our assessment of shifts in trend in the annual data. The decline in the initial sub-period from 2007 to 2014 is relatively slow. It accelerates in the middle sub-period from 2014 to 2017 and then slows again in the final sub-period from 2017 to 2021. The decline even reverses in the case of nonwage workers in that final sub-period. We use this periodization to subdivide our decomposition analysis using the LFS data into three sub-periods in addition to the decomposition for the whole period from 2007 to 2021. For our replication analysis using the ELMPS, we are limited by the periodicity of the survey to two sub-periods 2006-2012, 2012-2018, besides the overall period of 2006 to 2018.

³ The Labor Force Survey began measuring coverage by social insurance for the first time in 2007. The wording of the question which is addressed to all workers is: “Is [name] enrolled in social insurance through this work?”

Figure 1: Percent of workers with social insurance coverage by employment status, year and survey type



Source: Authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021) and Egypt Labor Market Panel Surveys (2006, 2012, 2018)

Note: Wage workers are employees. Nonwage workers include employers, own-account workers, and unpaid contributing family workers.

While such a rapid decline in social insurance coverage could suggest changes in measurement, we believe that this is unlikely to be the case. The measurement of social insurance coverage was consistent across surveys in the period we're examining. In addition, measurement of women employment, a typical source of measurement error has been consistent throughout the period (Assaad & Krafft, Forthcoming).

Our findings indicate that within-sector loss of coverage rather than compositional shifts in the economy or the workforce is responsible for the bulk of the decline in coverage, especially over the period of rapid decline from 2014 to 2017. Structural change factors resulted in countervailing effects which canceled each other out, which included the decreasing share of the high-coverage government/public sector in employment and the decreasing share of the low-coverage agricultural sector. Structural shifts within wage and non-wage employment outside agriculture did not contribute much to changes in coverage. . Controlling for other aspects of jobs such as firm size

category as well as individual characteristics such as occupation, education, sex, marital status and tenure on the job did not substantially alter this conclusion, only to suggest that coverage was declining for specific types of jobs rather than because the composition of jobs was changing. The decline in coverage was most pronounced for wage workers in private service activities such as health and education, non-wage workers in food service, information, finance and business services, workers in micro and small establishments, workers with no education, single male workers, and workers with less than 4 years of job tenure.

By ruling out changes in the composition of the economy and workforce as drivers of the decline in coverage, we must conclude that the observed decline is due to factors that altered the cost-benefit calculus of obtaining coverage among employers and workers. These be related to changes in the rules or the administration of the social insurance system itself or to changes in related policies that affect the calculus of enrolling. We speculate about these factors could be in the concluding section of the paper.

The rest of the paper is organized as follows. In Section 2 we present our data sources and discuss our methodology for the decomposition and the multivariate analysis of the trends in coverage. In Section 3, we present a descriptive analysis of coverage trends for the economy as a whole and in various sub-sectors as well as the results of our decomposition. In Section 4, we present our multivariate results for the trend in coverage further controlling for the composition of employment by firm size category, occupational class, education, sex, marital status and length of job tenure. Section 5, concludes.

2. Data and Methodology

2.1. Data sources

Our primary source of data is the official Labor Force Survey (LFS) for which we have data for the years 2007 to 2021. The LFS is implemented quarterly by the Central Agency for Public Mobilization and Statistics and harmonized and made publicly accessible by the Economic Research Forum (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021).⁴ Over the entire period we have a sample of 1,422,142 individuals. We use the pooled quarterly rounds for each year. In 2007, the LFS began asking about whether the individual was enrolled in social insurance through their job, allowing us to specify the binary coverage variable at the individual worker level. The LFS also includes information on employment status, sector of ownership, industry, occupation and length of tenure on the job.

To ensure that the trends we observe are not simply the result of potential measurement issues, we replicate the decomposition analysis using data from the Egypt Labor Market Panel Survey

⁴ The harmonized public use samples of the Egyptian Labor Force Survey are available from the Economic Research Forum's Open Access Microdata Initiative (www.erfdataportal.com).

(ELMPS) waves of 2006, 2012, and 2018 for which we show the results in the appendix. Overall, the two data sources produce similar qualitative results and trends.

2.2. Methodology

To isolate the relative contributions of structural change and within-sector changes to changes in coverage over a period of time t to t' , we assume that the economy is sub-divided into S sectors defined by institutional sector, status in employment and branch of economic activity. The change in the share of workers covered by social insurance over the period can then be decomposed into a component that is due to within-sector change in coverage and a component that is due to structural change (or the change of employment composition across sectors) as follows:

$$\Delta C_{t,t'} = \sum_s \theta_{s,t} \Delta c_{s,t,t'} + \sum_s c_{s,t'} \Delta \theta_{s,t,t'} \quad (1)$$

C_t Share of workers covered by social insurance in time t

$\Delta C_{t,t'}$ Change in the share of workers covered by social insurance over the period t to t'

$c_{s,t'}$ Share of workers covered in sector s in time t'

$\Delta c_{s,t,t'}$ Change in the share of workers covered in sector s over the period from t to t'

$\theta_{s,t}$ Share of all workers employed in sector s in time t

$\Delta \theta_{s,t,t'}$ Change in the share of all workers employed in sector s in time t

Note that in the first term of equation (1) $\theta_{s,t}$ denotes the sector shares at the beginning of the period and in the second term $c_{s,t'}$ denotes the share of sector s employment covered by social insurance at the end of the period. The first term accounts for how each sector contributes to the within-sector change of coverage, the initial sector shares serving as weights for each sector, and the second term accounts for the structural change contribution of each sector, weighted by the terminal covered share of each sector.

We consider two different sector classifications in our decomposition. First, we look at an economy-wide sector classification, which we call the “aggregate classification”. The aggregate classification has 5 sectors: (i) government and public sector, (ii) nonwage agriculture, (iii) nonwage non-agriculture, (iv) private wage agriculture, (v) private wage non-agriculture. This classification is designed to examine the potentially opposing effects on overall coverage of the relative decline in the highly-covered government and public sector and the relative decline of the low-coverage agricultural sector. The second classification focuses sequentially on private non-agricultural wage and nonwage employment and decomposes them into nine branches of economic activity, namely: (i) mining, manufacturing and utilities (ISIC⁵: BCDE), (ii) construction (ISIC: F), (iii) wholesale and retail trade (ISIC: G), (iv) transportation and storage (ISIC: H), (v) accommodation and food service (ISIC: I), (vi) information, communication, finance, and business

⁵ The International Standard Industrial Classification of All Economic Activities

services (ISIC: JKLMNO), (vii) education (ISIC: P), (viii) human health and social work (ISIC: Q), (ix) other services (ISIC: RSTU). The purpose of this classification is to examine the potential role of structural change within these two sectors in the change in their coverage levels.

We also conducted a simulation of the pure within-sector effect and the pure structural effect. In the within-sector simulation we consider the rates of coverage had there not been any structural change. Similarly, in the structural effect simulation we consider the rates of coverage had there only been structural change. A simulation that is more reflective of the observed trend suggests that the effect it simulates is better at explaining the actual trend.

As mentioned in the introduction, the analysis that uses the LFS data is sub-divided into three periods 2007-14, 2014-17, 2017-21, as well as the overall 2007-21 period. To abstract from annual fluctuations and obtain a more accurate trend for each sub-period by sector, we smooth the data for sectoral employment and sectoral covered employment by using piecewise linear trendlines. We use these trendlines to predict initial and terminal sectoral employment and covered employment in each period. In order not to have different predictions for the years for which we have both an initial and terminal prediction (i.e. 2014 and 2017), we average these initial and terminal predicted employment figures for the same year to obtain a single prediction for the year. The predicted values of total employment and covered employment in a given sector in the relevant years (2007, 2014, 2017, 2021) are used to calculate the sector's contribution to employment in the economy $\theta_{s,t}$ and the share of workers covered within sector $c_{s,t}$.

In our multivariate analysis, we account for additional job and individual characteristics and their effect on the likelihood of social insurance coverage by estimating regressions of the rate of coverage over time that progressively add more characteristics as controls to the regression. For this analysis, we use a single sectoral classification, which starts with the aggregate classification but breaks down the private wage non-agricultural sector and the nonwage non-agricultural sector into their branches of economic activity. In addition, we include other job characteristics such as whether the job is in or out of an establishment and, for in-establishment jobs, the size category of the establishment. We also include the one-digit classification of occupation, the worker's education level, years of potential experience, an interaction between sex and marital status, and the tenure on the job (subdivided into less than 5 years and 5 years and more). The purpose of the regression exercise is to investigate the extent to which the observed trend in social insurance coverage is due to changes in job and workers composition in the economy or simply to changing coverage within given types of jobs and workers. We also use interactions between the year fixed effects and the various characteristics to determine what kinds of jobs and workers were most affected by the decline in coverage.

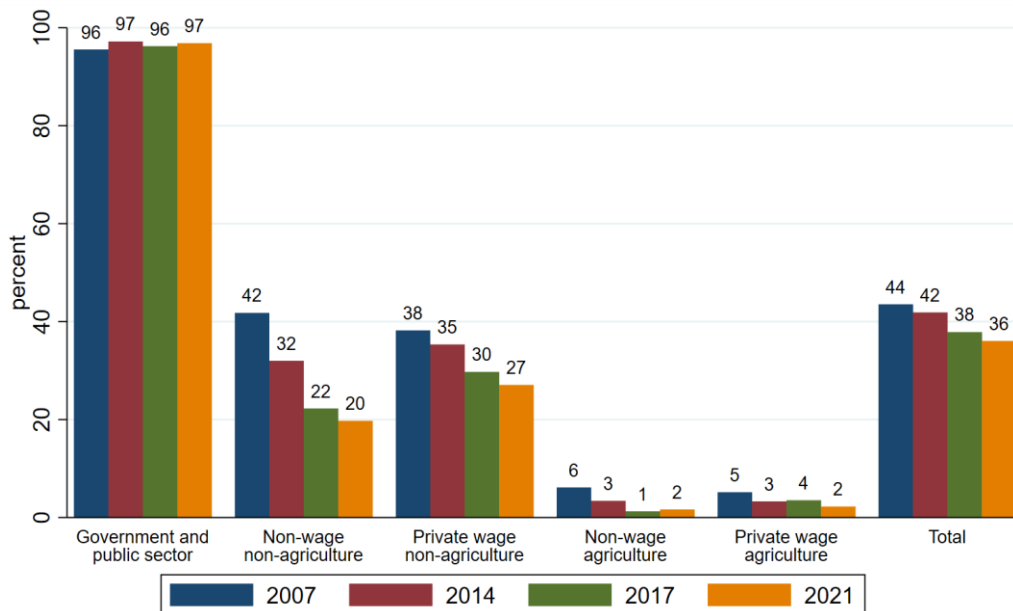
3. Descriptive Analysis and Decomposition

We discuss in this section the descriptive results and decompositions, first at the aggregate level, and then separately for the private wage non-agricultural sector and the nonwage, non-agricultural sector. In each case we show the evolution of the share of employment covered by social insurance over time by sector and the evolution of the distribution of employment across sectors.

3.1. Aggregate Analysis

The first thing that is clearly apparent from Figure 2 is the almost universal coverage in the government and public sector and the almost non-existent coverage in the agricultural sector in either its wage or nonwage components. Since these levels of coverage do not vary much over time, these two sectors will contribute to coverage primarily through their influence on the structural change component. The coverage shares of the private wage and nonwage components of the non-agricultural sector start at similar intermediate levels of coverage, but drop more precipitously in the nonwage component. As was shown in Figure 1, the fastest rate of decline in overall coverage is in the middle period (2014-2017) where coverage drops by 4 percentage points (p.p.) in three years compared to 2 p.p. in seven years in the first period and 2 p.p. in four years in the third period. The steeper fall in coverage in the middle period can be seen in nonwage and in private wage non-agricultural employment.

Figure 2: Percentage with social insurance coverage by sector and year

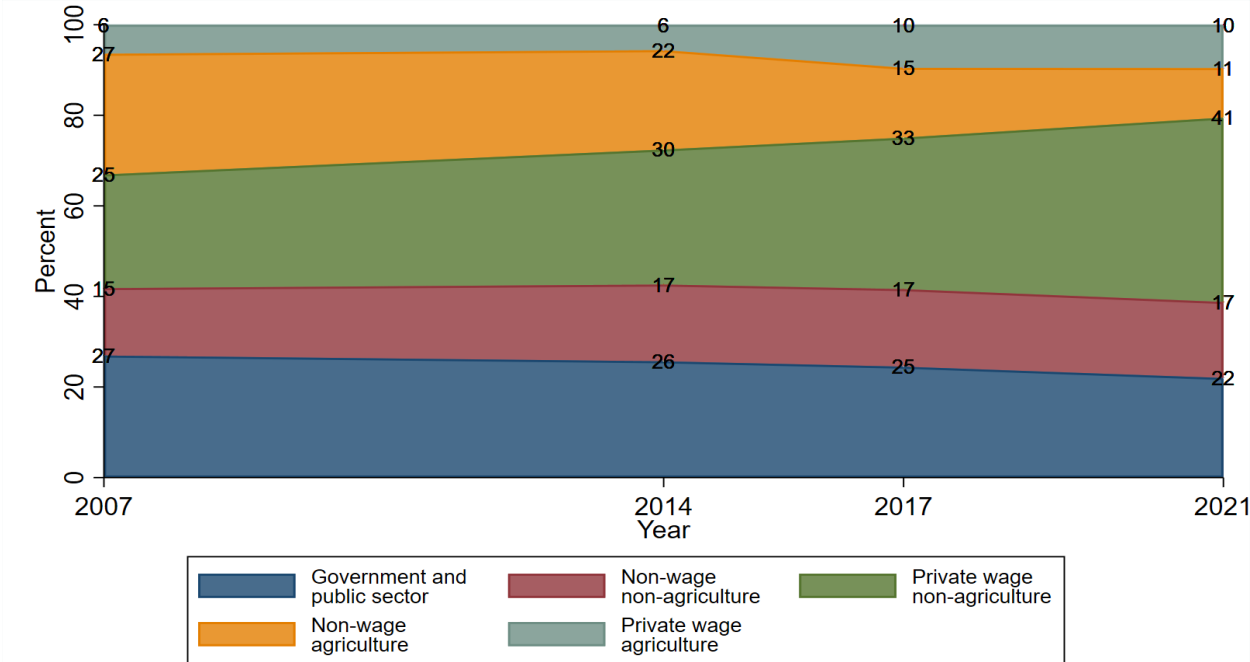


Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2017-2021)

Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

The structural shifts in employment over the 2007 to 2021 period, shown in Figure 3, confirm the gradual transition of the economy away from the high-coverage government and public sector and the low-coverage agricultural sector, primarily in favor of the private wage non-agricultural sector. These two structural trends have opposing effects on overall coverage. With most of the action in terms of change in coverage occurring in the private non-agricultural sector, we examine in sections 3.2 and 3.3 potential structural changes within its wage and non-wage components.

Figure 3: Share in total employment by sector and year



Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2017-2021)
 Source: authors’ calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

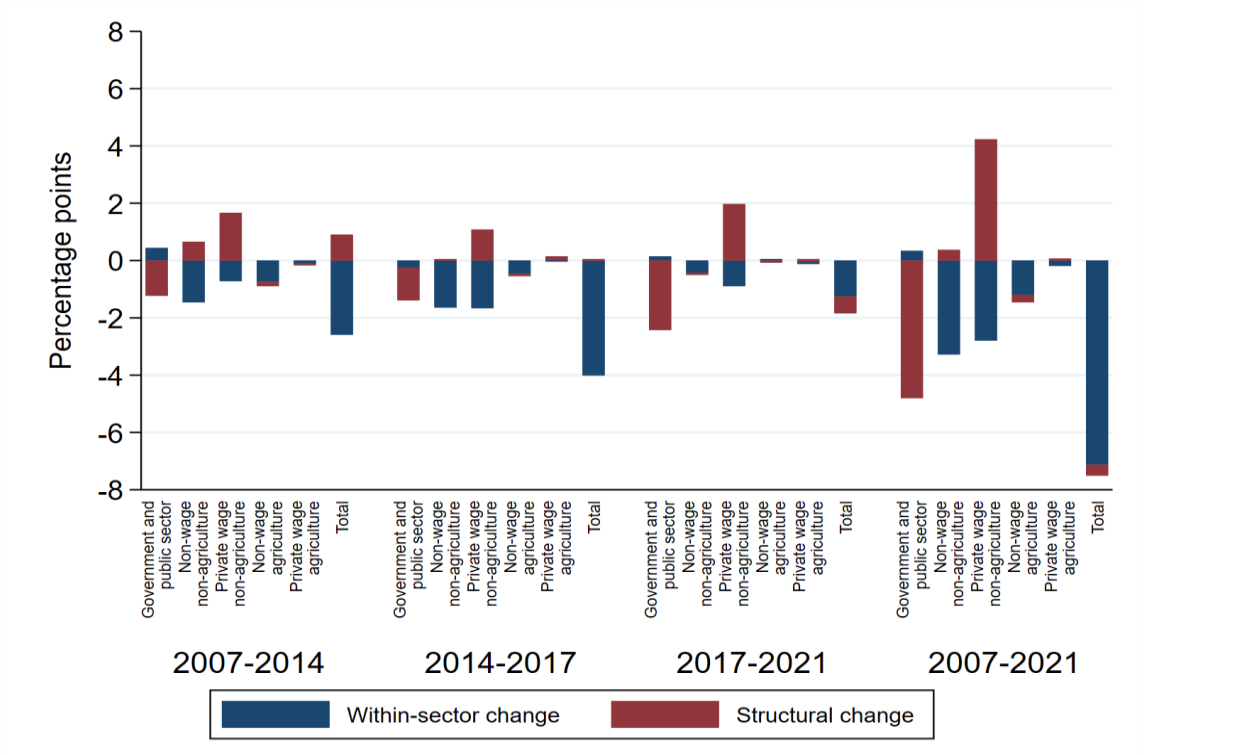
The trends shown in Figure 2 Figure 3 which use the Labor Force survey data are qualitatively confirmed by results using data from the Egypt Labor Market Panel Survey and shown in *Figure 20* *Figure 21* in the Appendix. The ELMPS shows a somewhat steeper decline in coverage, mostly accounted for by a larger decline in government/public sector coverage. The structural trends are almost identical, with the possible exception of the nonwage non-agricultural sector whose share increases slightly in LFS and falls slightly in ELMPS.

The results of the aggregate decomposition are shown in Figure 4. We start with the result for the period as a whole and then discuss the three sub-periods. The first thing to note is that the bulk of the decline in coverage from 2007 to 2021 was due to within-sector change rather than structural shifts across these aggregated sectors. Out of a decline of about 8 p.p., about 7.5 p.p. are accounted

for by within-sector change. There are major structural shifts, but they are in opposing directions. The decline of the highly-covered government/public sector results in a large negative structural shift in coverage, but the decline in agriculture in favor of the private wage non-agricultural sector causes an almost equal structural shift in the positive direction, resulting in a small negative shift overall. As expected the within sector changes are largest in the private wage and nonwage non-agricultural sectors, which have experienced large declines in coverage.

Within the sub-periods, we note that in 2007-2014, a large negative within-sector change is counteracted by a positive structural shift, resulting in a fairly small overall decline. The shift in favor of the private wage and nonwage non-agricultural sectors had a slightly larger structural effect than the declining share of the government/public sector. The second period, 2014-2017 saw the largest within-sector decline, with hardly any structural change effects. In that period, the negative structural change of the decline in government/public sector fully counteracts the positive effect of the decline of agriculture in favor of private wage non-agriculture. In the third period, 2017 to 2021, a relatively small negative structural shift reinforces a small negative within-sector change effect.

Figure 4: Contribution to social insurance coverage from the within-sector change and the structural change by sector and time period – Aggregate

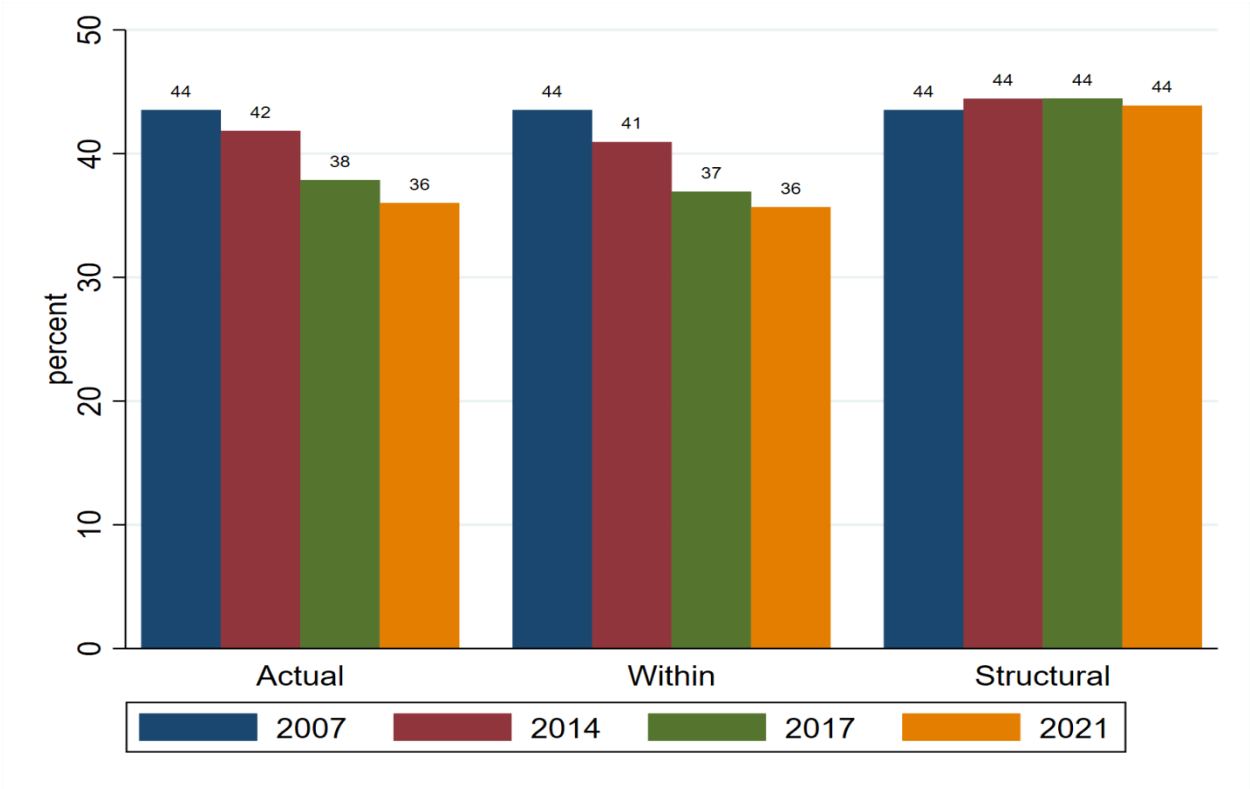


Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2017-2021)
 Source: authors’ calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

The results of the decomposition using ELMPS data shown in Figure 22 in the Appendix are qualitatively similar, but the contribution of the structural change component is somewhat larger, coming mostly from the decline in public sector employment in the 2012-2018 period.

We complete this analysis by carrying out a simulation of what would have happened to the coverage rate i) had there not been any structural change and ii) had there only been structural change. The results of this simulation are shown in Figure 5. As expected, 8 p.p. decline in coverage is almost completely caused by within-sector changes. Had there not been any within sector change in coverage, the coverage rate would have remained at 44 percent throughout the period.

Figure 5: Change in economy-wide social insurance coverage over time, actual, change accounting for within effect only, change accounting for structural effect only – Aggregate



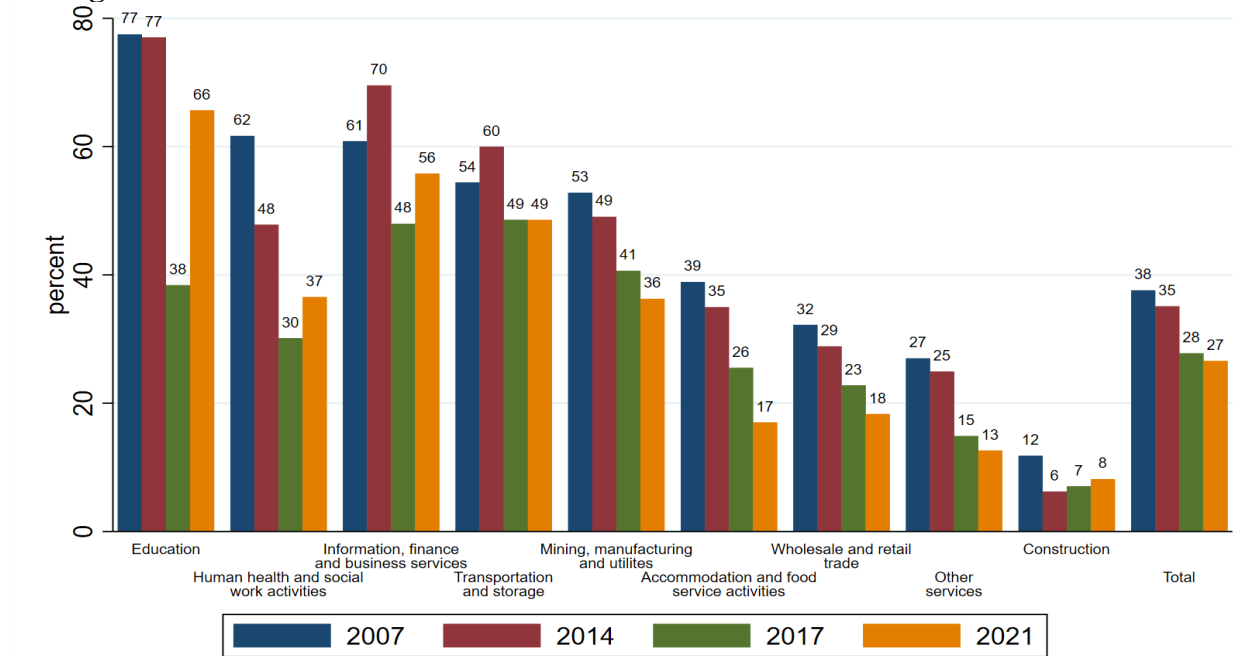
Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2017-2021)
 Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

3.2. Disaggregating the private wage non-agricultural sector

We focus in this section on the trend in coverage in the private wage non-agricultural sector, which has seen its share of employment grow substantially from 25 percent in 2007 to 41 percent in 2021, at the same time that its social insurance coverage has fallen from 38 percent to 27 percent.

We present in Figure 6, the percentage with social insurance coverage in the private wage non-agricultural sector by the 9 branches of economic activity we discussed above, sorted from highest to lowest coverage in the initial year. Within this sector, branches of economic activity with relatively high rates of coverage include education, human health and social work, and information, finance and business services. However, the share of these branches in total private sector wage employment was initially quite small and remained so over time (9% in 2007 and 10% in 2021) (Figure 7). All three branches exhibited fluctuating, but generally downward trends in coverage, especially in the 2014 to 2017 period. Branches that exhibited initially low levels of coverage, such as accommodation and food service, wholesale and retail trade, and other service activities, have also seen sharp declines in coverage; again with much of the decline concentrated in the 2014-2017 period (Figure 6). As expected, the construction sector, with its widespread casual employment and large fraction of employment outside fixed establishments, has very low rates of coverage, but exhibited slight increases since 2014. The share of employment in these low-coverage branches is high, making up more than half of private non-agricultural wage employment, but it has not changed appreciably over the 2007-2021 period (Figure 7). Branches of economic activity with intermediate level of coverage, such as transportation and storage and mining, manufacturing and utilities, have seen more modest declines in coverage than the low coverage sectors, but the decline for them is also sharpest in the 2014-17 period. Their contribution to private non-agricultural wage employment has been either falling (transportation and storage) or stable (mining, manufacturing and utilities) (Figure 7).

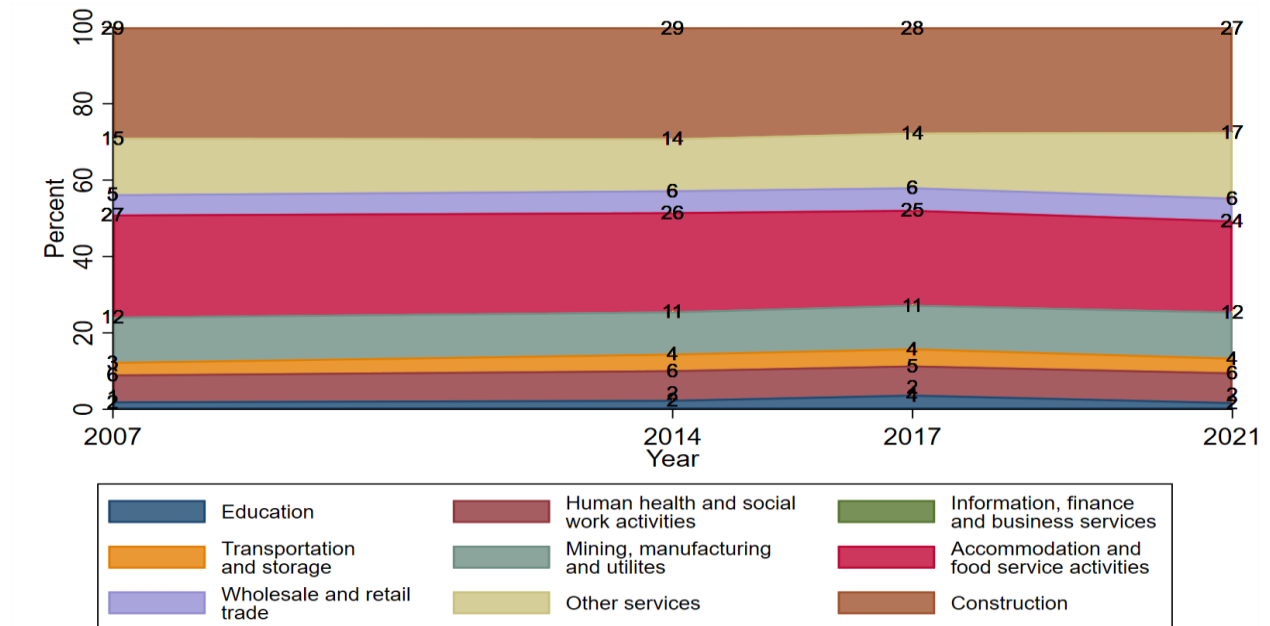
Figure 6: Percentage with social insurance coverage by sub-sector and year for private wage non-agriculture sector



Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2016-2021)

Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

Figure 7: Share in total employment by sub-sector and year for private wage non-agriculture sector



Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2017-2021)

Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

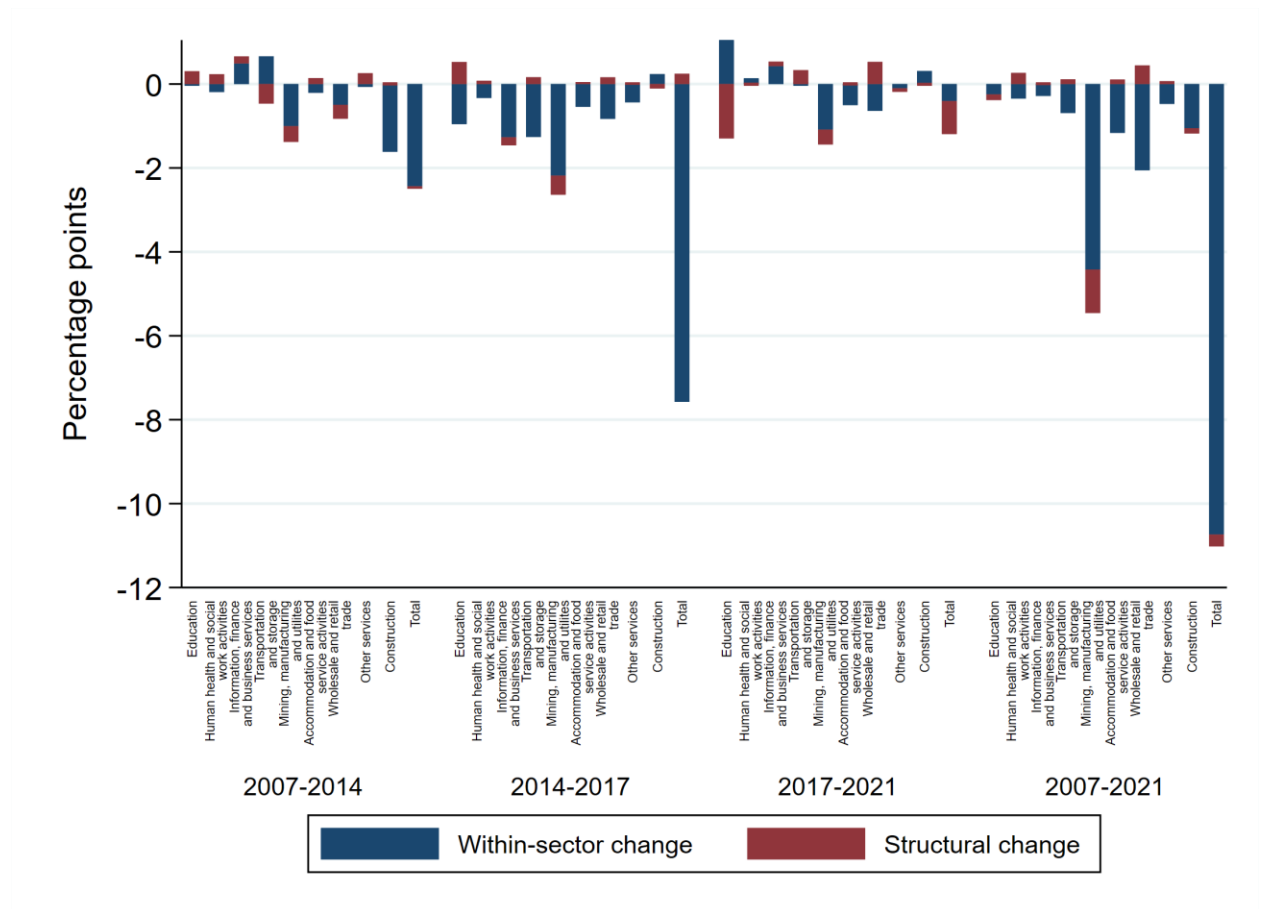
The results from the ELMPS data shown in Figure 24 in the appendix look generally similar in terms of the ordering of sub-sectors according to social insurance coverage and the time trend of coverage. The main exceptions are the lower initial levels of coverage for the human health and social work activities. As shown in Figure 25, the ELMPS data also show some more structural change than the LFS data, with the construction increasing share in employment substantially from 20 percent in 2006 to 28 percent in 2018 and the mining, manufacturing and utilities sector reducing its share from 28 percent to 20 percent.

With the relatively limited shifts among branches of economic activity with the private wage non-agricultural sector during the 2007-2021 shown in Figure 7, the structural change effects on coverage is expected to be small and this is confirmed in Figure 8. Virtually the entire change in coverage for this sector, 11 p.p. in all, is attributable to within-sector declines in coverage. We can see only limited structural change effects at the branch level. The change in social insurance coverage is, therefore predominantly due to the within-sector effect driven by a general decrease in coverage levels across all industries for the period as a whole.

Comparing the periods, we can see that period 2 (2014-2017) accounts for most of the change in coverage, with almost all of it due to within-sector change (Figure 8). As discussed earlier, the drop in coverage in periods 1 and 3 was more limited, but its source was different in both periods. In period 1, it was exclusively due to within-sector changes, whereas in period 3, the bulk of the drop comes from structural change effects. In fact, the largest component of the structural change effect comes from the highly-covered education branch, which has seen its share in employment drop by 50 percent. It was partially counteracted by the increasing coverage of the wholesale and retail trade sub-sector and the decline of the transportation and storage. The largest sector contributing to within-sector change is mining, manufacturing and utilities, a sector where coverage has declined appreciably and is moderate in size.

Again, the results based on ELMPS shown in Figure 26 in the Appendix are qualitatively similar, but have a somewhat larger structural change component that reinforces the decline in coverage. This component is mostly due to the declining employment share of mining, manufacturing and utilities, which has been happening throughout the 2006-2018 period.

Figure 8: Contribution to social insurance coverage from the within-sector change and the structural change by sector and time period – Private wage non agriculture

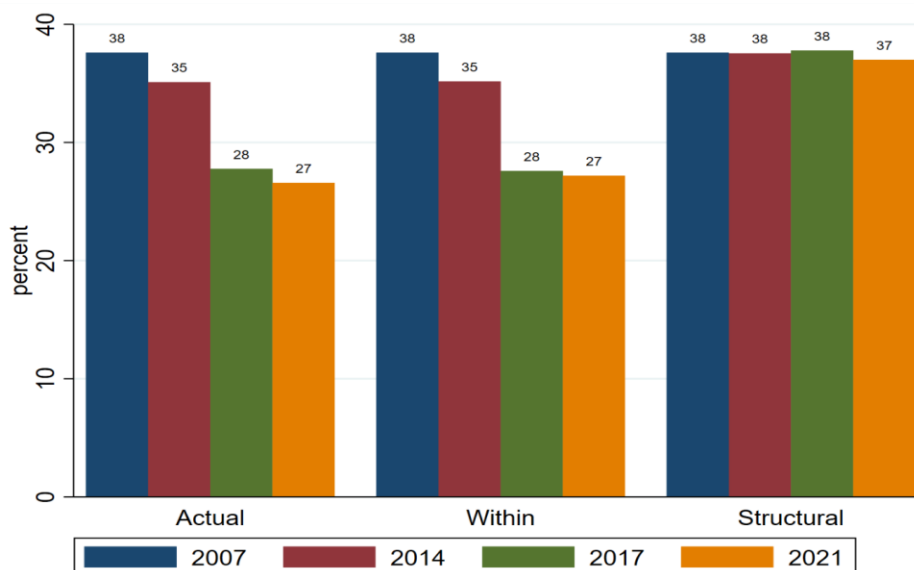


Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2017-2021)

Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

The simulation results shown in Figure 9 confirm that virtually all the change in coverage is due to the within-sector effect, and that the bulk of it happened in the 2014-2017 period. The structural change effect accounted for less than a 1 p.p. change in coverage out of a total of 11 p.p..

Figure 9: Change in social insurance coverage in the private wage non-agriculture sector over time, actual, change accounting for within effect only, change accounting for structural effect only



Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2017-2021)

Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

3.3. *Disaggregating the nonwage non-agricultural sector*

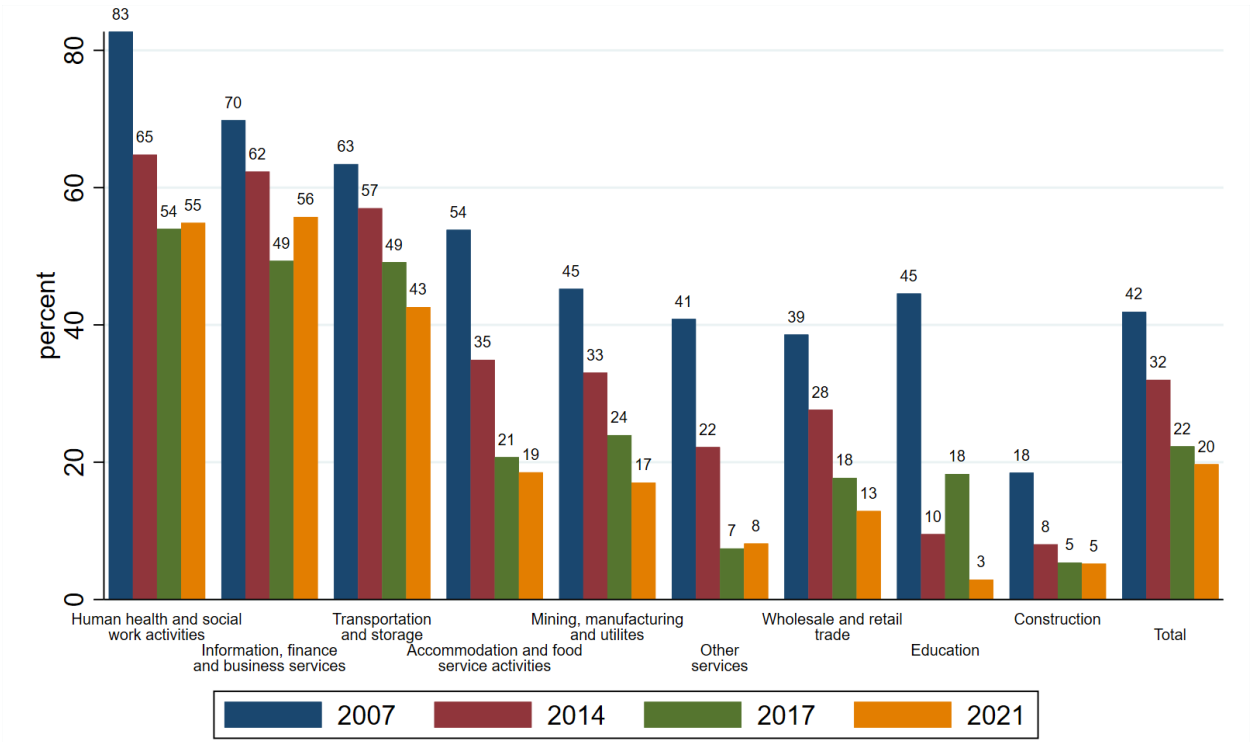
As we saw in Figure 2, the nonwage non-agricultural sector saw the sharpest drop in coverage among the aggregate sectors, with coverage falling from 42 percent in 2007 to 20 percent in 2021, while its share in employment increased slightly from 15 to 17 percent.

Within the nonwage non-agricultural sector, the education and human health and social work branches of economic activity make up a miniscule proportion and will therefore not be discussed further (Figure 11). Self-employed workers in information, finance, and business services make up about 6 percent of nonwage non-agricultural workers.

Similar to the private wage non-agricultural sector, there is generally little movement in terms of the share of different branches of economic activity in the employment of the non-wage non-agricultural sector. Among the exceptions is transportation and storage, a relatively high-coverage branch, that increases its weight over time and construction, a low-coverage branch that reduces its weight over time (Figure 11). One of the reasons self-employed operators of transport have high levels of coverage is that they are required to do so in order to obtain their commercial driver's license or their vehicle's license. Nevertheless, they have seen substantial declines in coverage,

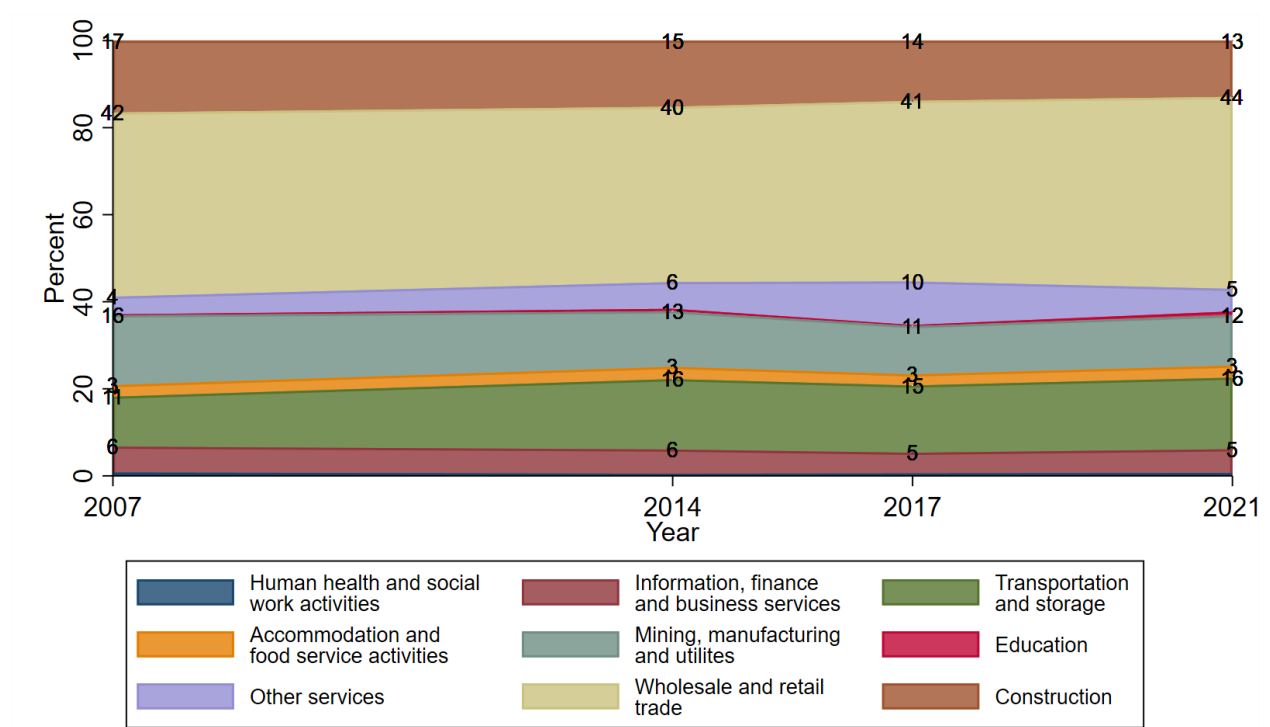
which is possibly connected to the introduction of new forms of transport, such as app-based on-demand transport services (Figure 10). Nonwage workers in accommodation and food service activities as well as mining, manufacturing and utilities also had relatively high initial rates of coverage, but saw even sharper declines, especially in the 2014 to 2017 period. The overall weight of the former in the sector was stable and the latter has declined over time. As expected, like their wage working counterparts, own-account construction workers have very low rates of coverage and they make up a declining share of overall nonwage non-agricultural employment. The largest branch of activity within nonwage non-agricultural employment is wholesale and retail trade, making up 44 percent of its employment in 2021. That branch has also seen sharp declines in coverage, with coverage falling by almost two-thirds over the entire period.

Figure 10: Percentage with social insurance coverage by sub-sector and year for private nonwage non-agriculture sector



Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2017-2021)
 Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

Figure 11: Share in total employment by sub-sector and year for private nonwage non-agriculture sector



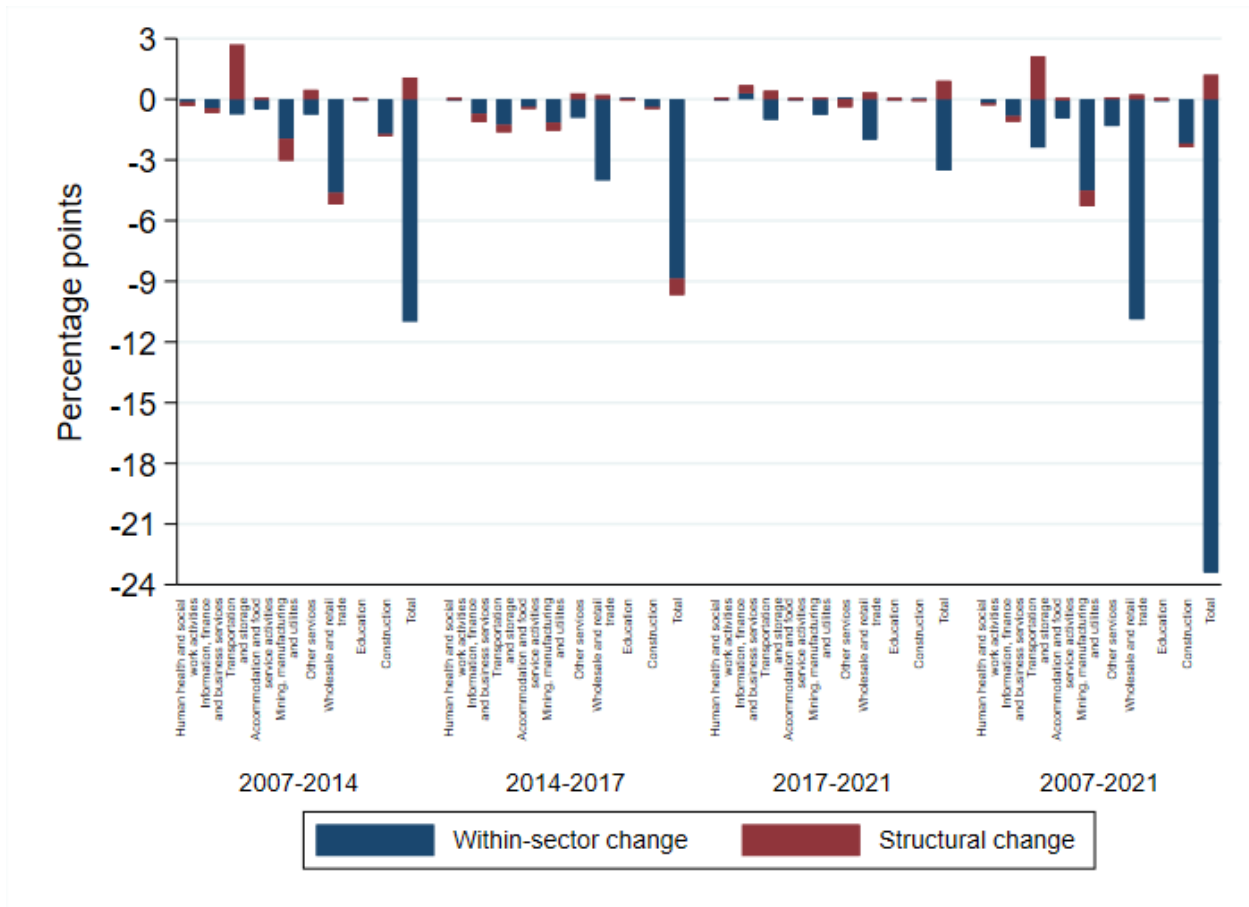
Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2017-2021)

Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

Results from ELMPS shown in Figure 28 reveal essentially the same declining pattern of coverage across sub-sectors. Again, the position of the very small health and social work sub-sector in the hierarchy of coverage is different from the LFS. In terms of structural change, the ELMPS confirms the dominant and relatively constant share of wholesale and retail trade, the falling share of construction and mining, manufacturing and utilities and the rising share of transportation and storage (Figure 29).

As Figure 12 suggests, the fall in social insurance coverage in the nonwage non-agricultural sector is entirely driven by within-sector change. Contribution of the structural change effect to the change in coverage is almost negligible except for the positive effect driven by a substantial increase of the weight of the transportation and storage sub-sector, a relatively high coverage sub-sector. The pattern is consistent across the different time periods. This is also reflected in Figure 13 where the trend accounting for the within effect only mirrors the actual trend and the trend accounting for structural effect only is stable. These results are wholly consistent with the results from ELMPS data for the 2012-2018 period shown in Figure 30 Figure 31.

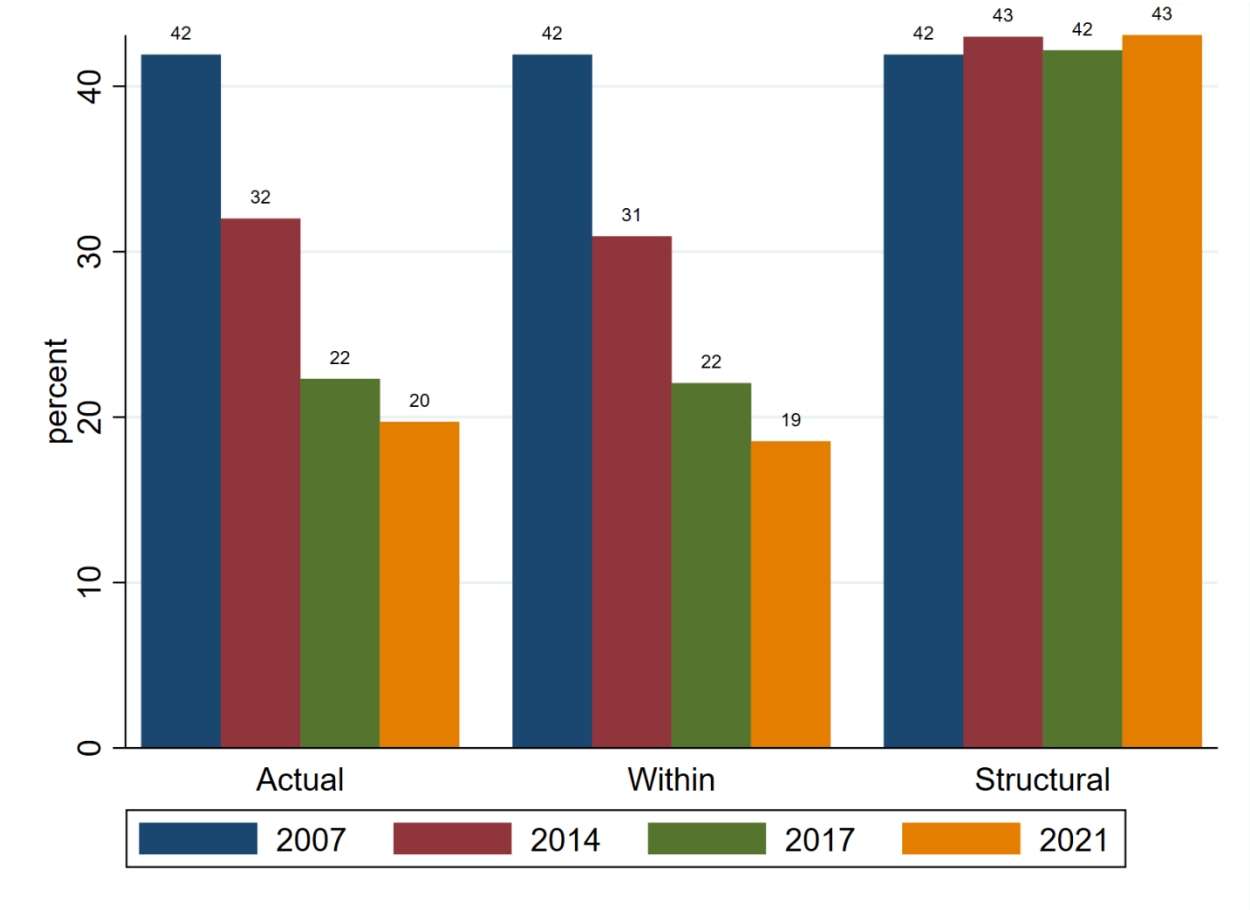
Figure 12: Contribution to social insurance coverage from the within change and the structural change by sector and time period – Private nonwage non-agriculture



Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2017-2021)

Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

Figure 13: Change in social insurance coverage for private nonwage non-agriculture over time, actual, change accounting for within effect only, change accounting for structural effect only



Note: Data is smoothed by fitting trend lines for each time period (2007-2014, 2014-2017, 2017-2021)
 Source: authors’ calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

4. Multivariate Results

As explained in the Methodology section, the purpose of the multivariate analysis is to see how the annual trend in coverage changes as we progressively introduce covariates that control for compositional effects, such as sector of ownership, branch of economic activity, work within establishments, size of establishment, occupational composition and individual characteristics of workers such as years of potential experience in the labor market, education level, sex, marital status and tenure on the job. We use microdata at the individual worker level for the 2007 to 2021 annual waves of the LFS. The dependent variable in all cases is whether or not the worker is covered by social insurance. All estimated models are linear probability models, estimated by OLS.

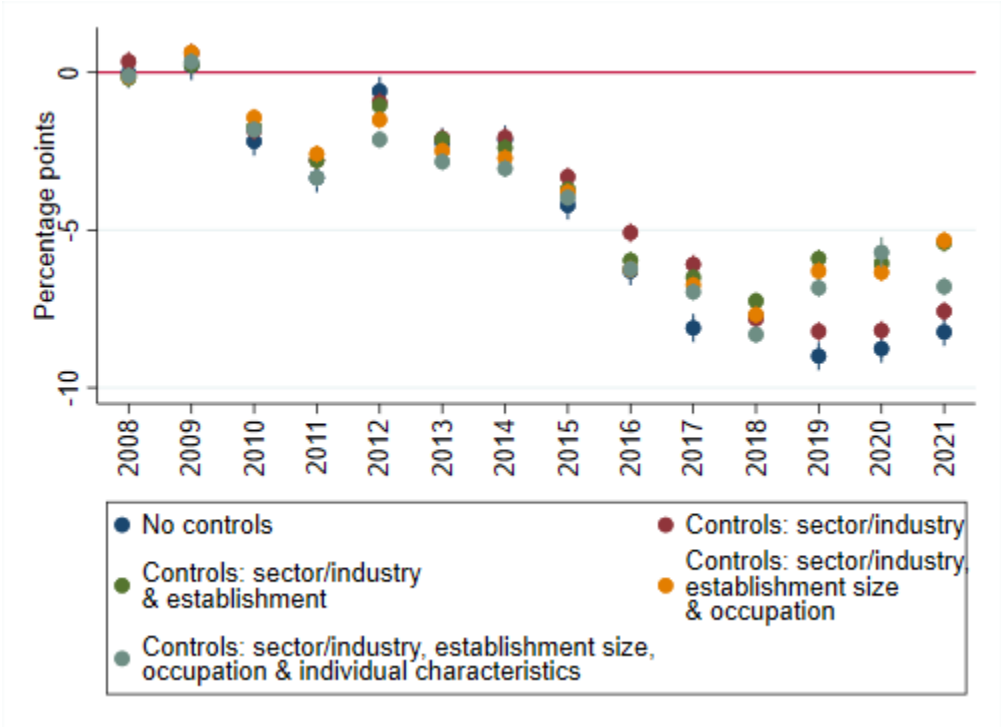
We combine all the sectors and branches of economic activity of the previous analyses into a single categorical sector variable that accounts for sector of ownership, status in employment (wage vs. non-wage) and branch of economic activity. This results in a total of 21 categories made up of 1 category for government/public sector, 10 categories for private wage employment in 10 branches of activity, and 10 categories for nonwage employment in 10 branches of economic activity. The second variable is for whether or not the worker works within a fixed establishment and, if so, the size category of the establishment. The categories are (i) out of establishments, (ii) micro establishments (1-4 workers), (iii) small establishments (5-24 workers), (iv) medium establishments (25-99), (v) large establishments (100+). We also define an occupation variable in 9 categories: (i) Legislators, senior officials and managers, (ii) Professionals, (iii) Technicians and associate professionals, (iv) Clerks, (v) Service workers and shop and market sales workers, (vi) Skilled agricultural and fishery workers, (vii) Craft and related trades workers, (viii) Plant and machine operators, and assemblers, (ix) Elementary occupations. For the individual characteristics, the years of potential experience variable account for the number of years since the individual has left schooling if they had 6 years of schooling or more and accounts for the number of years since age 12 if the person had less than 6 years of schooling. We include the years of potential experience as a series of dummy variables to allow for a flexible relationship between years of experience and coverage. The education level is also expressed as a series of dummy variables with the categories being i) no education (excluded), ii) elementary education, iii) secondary education, iv) post-secondary and above. To allow for the effect of sex to vary by marital status, the sex and marital status variables are combined in a series of dummy variables with the following categories: i) never married male, ii) never married female, iii) ever married male, iv) ever married female. Finally, we include a dummy variable for tenure on the job which takes 1 if tenure is 4 years or less, 0 otherwise.

We start by regressing coverage on the year dummies only to obtain the average time trend, keeping in mind that 2007 is the reference year (Regression 1). We then add the sector dummies (regression 2), then the establishment size dummies (regression 3), then the occupation dummies (regression 4) and finally we add all individual characteristics (regression 5). The coefficients of the year dummies are plotted from the 5 regressions in Figure 14 to ascertain how controlling for the composition of jobs along the characteristics mentioned above would affect the time trend in coverage.

As shown in Figure 14, the raw time trend is similar to what we saw in Figure 1, fluctuating from 2007 to 2014, but falling only slightly. The acceleration in the decline occurs from 2014 to 2017 as we saw before, and then a relative stability returns from 2017 to 2021, with some evidence of a reversal in the last two years. This pattern is essentially unchanged in regressions 2 through 5, suggesting that the trend is not due to compositional shifts in the type of jobs or workers in the economy. The main exception is that the coverage rate continues dropping through 2018 when sectors are controlled for and the reversal from 2019 to 2021 becomes more pronounced when we correct for the size composition of establishments. This suggests that controlling for establishment

size and the proportion working within establishments, the sharp drop in coverage that has occurred from 2014 to 2018 appears to have reversed in recent years, but coverage levels in 2021 are still far below where they were in 2014. This reversal coincides with the introduction of the new social insurance law in 2019 (Barsoum & Selwaness, 2022), which suggests that this law may have had some effect in reversing the previous declining trend.

Figure 14: Year fixed effects regressions of social insurance coverage sequentially controlling for sector, establishment size, occupational grouping, and individual characteristics



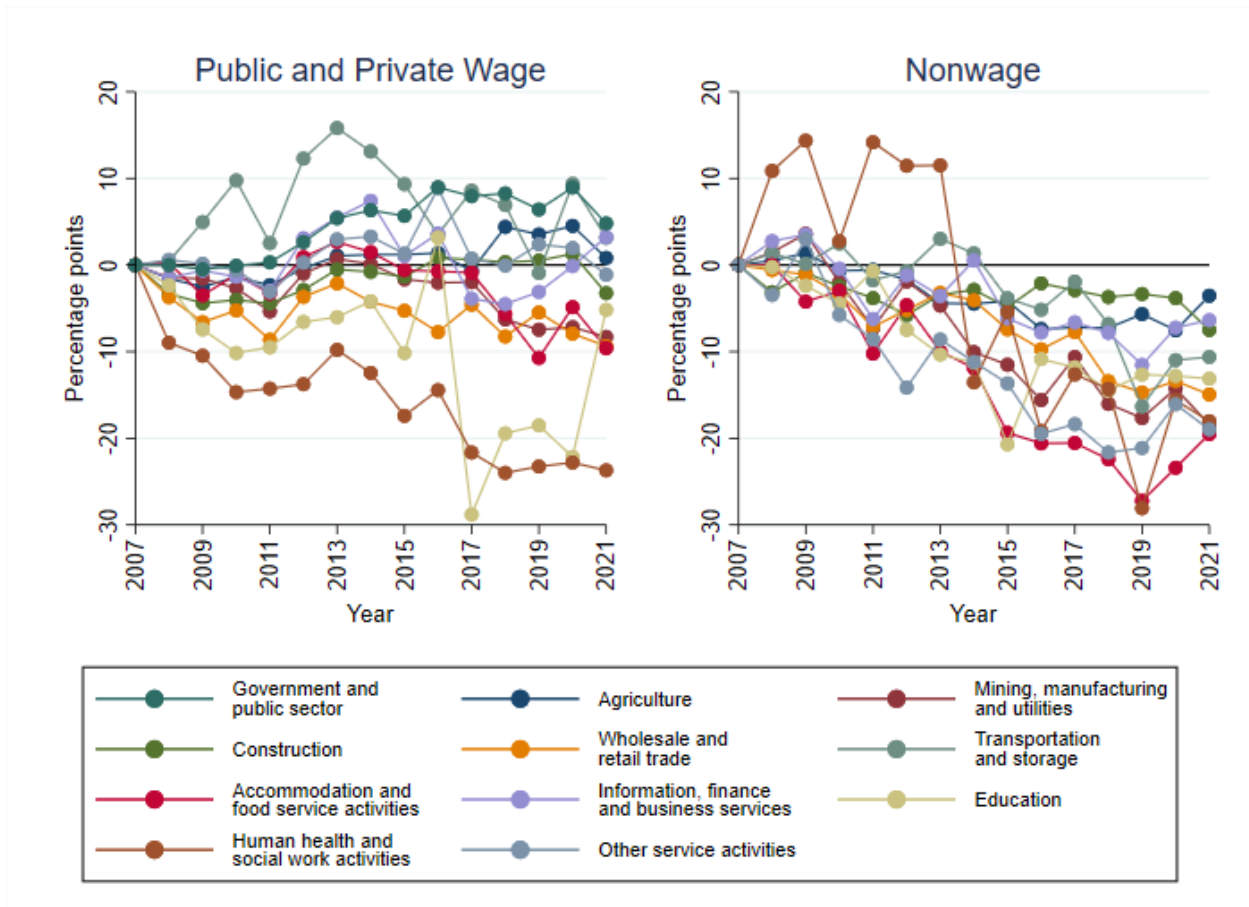
Note: individual characteristics are experience in the labor market, education level, sex, marital status and tenure on the job
 Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

The next exercise we undertake is to interact the year dummies with each of the composition variables one at a time, while controlling for all of the composition variables. This allows us to ascertain the specific time trends in coverage for different kinds of jobs and workers.

Figure 15 shows the differential trends in coverage by branch of economic activity for wage and nonwage employment, and in the case of wage employment, also the difference in trends between the government/public sectors and the private sector. The figure confirms that coverage has decreased the most in some branches of activity within nonwage employment, particularly in the accommodation and food service activities, other service activities, and mining manufacturing and utilities. Within private wage employment, the decline in coverage has been more modest, but it

is most pronounced in human health and social work (from 2013 to 2018) and in education (from 2014 to 2020 with some fluctuations in between). Wholesale and retail trade has also seen substantial declines in coverage from 2013 to 2017.

Figure 15: Trend of social insurance coverage across sectors and branches of economic activity controlling for job and individual characteristics

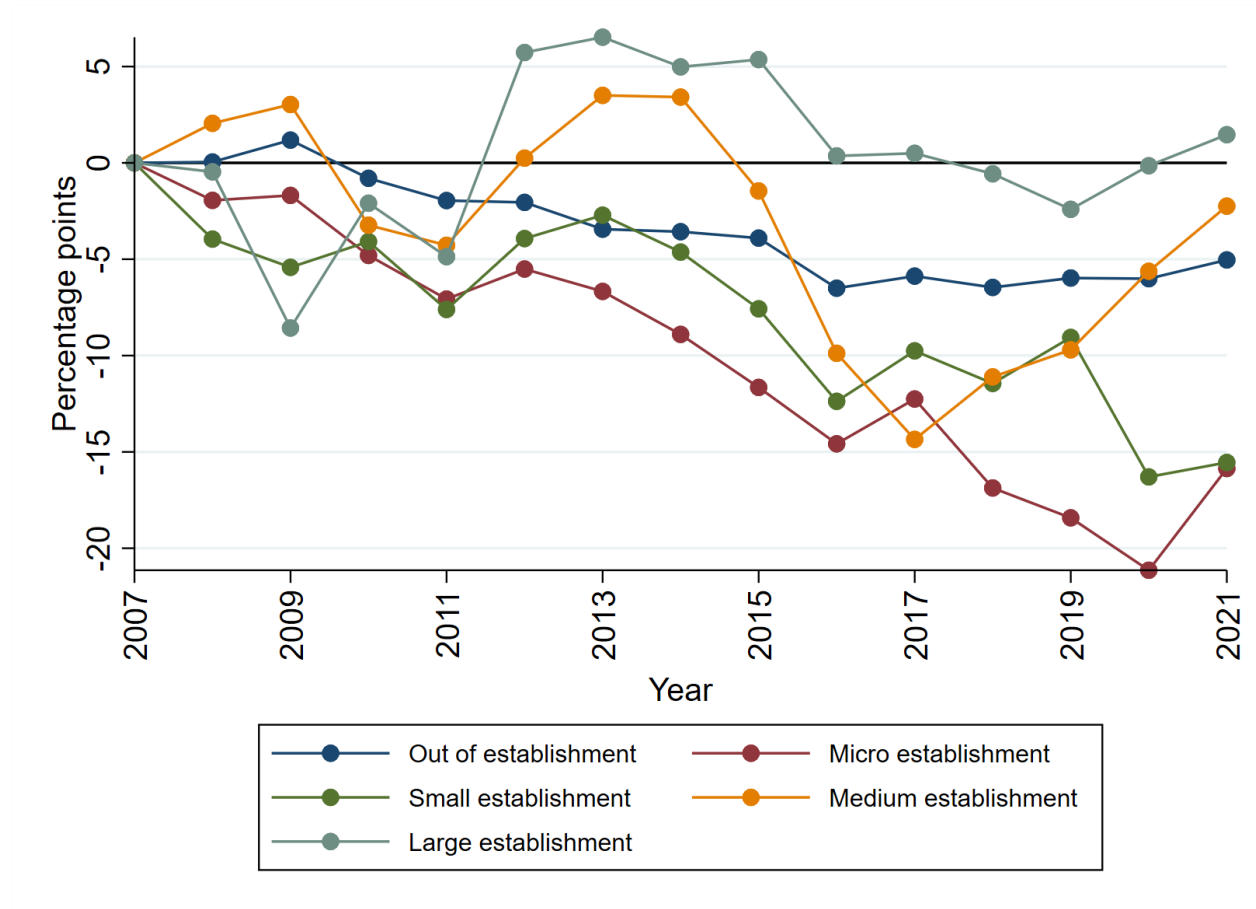


Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

The pattern is a little clearer when we examine the trend in coverage by establishment size shown in Figure 16. Micro establishments have had the largest drop in coverage, especially from 2013 to 2020, followed by small establishments whose coverage dropped substantially from 2013 to 2016, recovered somewhat then dropped again from 2019 to 2020. Medium establishments also experienced a major drop in coverage from 2014 to 2017, then their coverage recovered substantially from 2017 to 2021. Coverage in large firms was fairly stable over time. Although coverage dropped in micro, small and medium establishments in the 2014 to 2017 period, the largest drop occurred in the medium sized establishments. These trends coincide with a substantial increase in the contribution of small and medium establishments to job creation over the period

2006-2017 compared to the previous decade along with an important decrease in the contribution of micro and large establishments to job creation (Assaad et al., 2019). This highlights that the decreasing coverage within types of establishment is accompanied by structural shifts that would have had both positive and negative effects on coverage.

Figure 16: Trend of social insurance coverage across establishment size controlling for job and individual characteristics



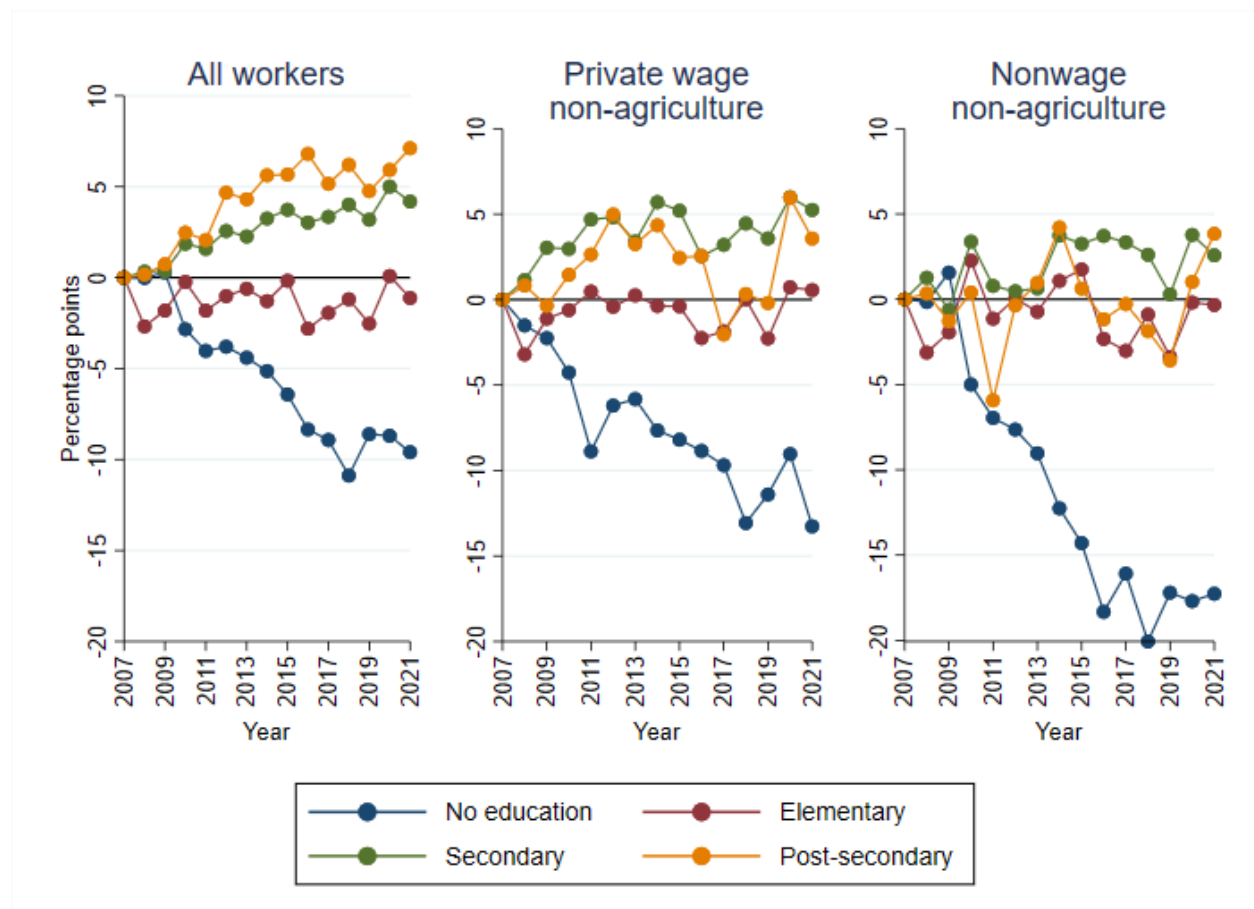
Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

Examining the trend of social insurance coverage by level of education (Figure 17), we see that the coverage fell rapidly for workers with no education over the whole period. Even the partial recovery towards the end of the period in 2019 and 2020 was reversed in 2021. The decline is particularly substantial among nonwage non-agricultural workers with no education. Workers with elementary education had a largely stable trend throughout the period, and this is true regardless of their employment status. As for more educated workers with secondary or post-secondary degrees, the trend is generally positive. Non-educated low-wage workers are, therefore, the most affected by the economy-wide decline in social insurance coverage. It is also worth noting that the

proportion of non-educated workers have declined over time, suggesting that if their proportion had remained constant we could have seen a greater decline in coverage.

At least for the nonwage workers with no education we see an even more rapid decline around 2015, which coincides with the rolling out of the Takaful and Karam cash transfers program. This lends some evidence to a scenario where non-educated low-wage workers dropped out of social insurance schemes to gain eligibility for Takaful and Karama program. This is also a period where the minimum insurable wage was rising substantially, potentially leading employers to drop coverage their lowest paid workers, presumably those with no education (Selwanes and Barsoum 2023). The minimum insurable wage also applies to nonwage workers, who may now find it more expensive to obtain coverage and may increasingly opt not to obtain it.

Figure 17: Trend of social insurance coverage across education levels controlling for job and individual characteristics

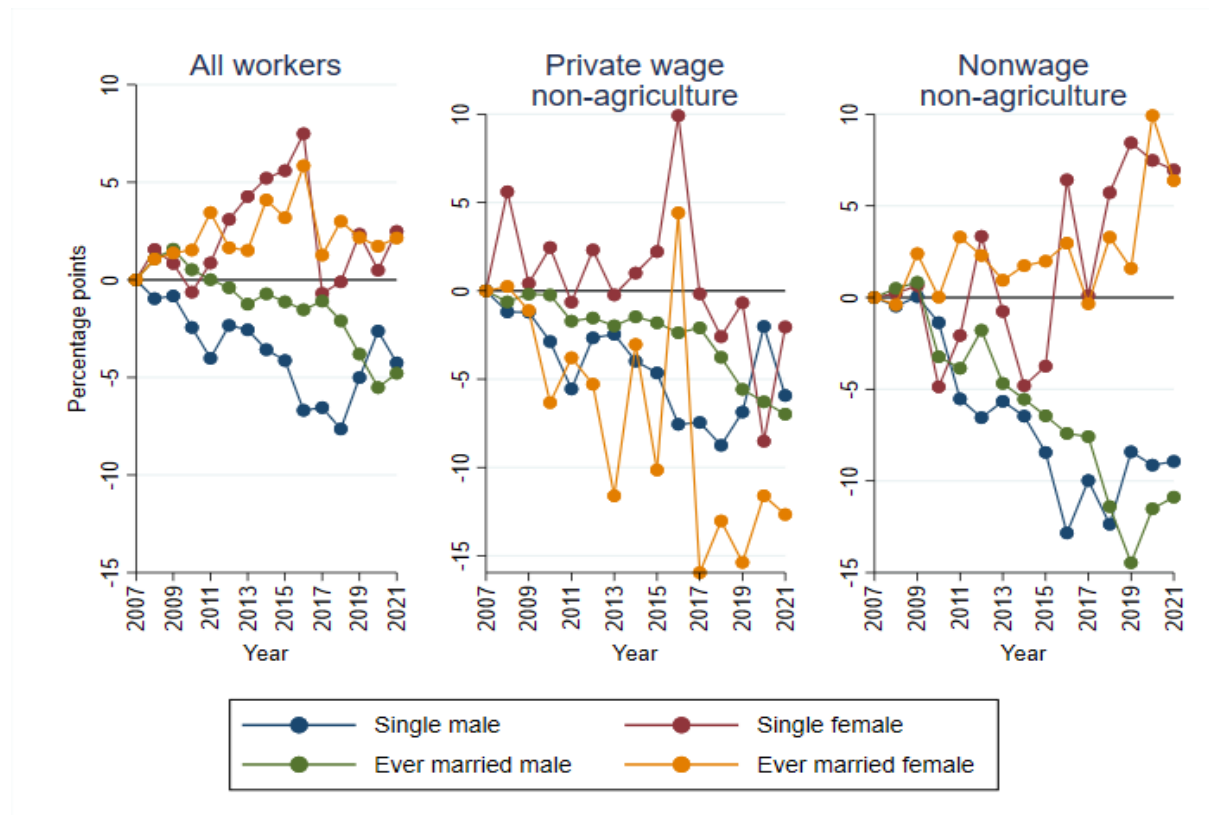


Note: job characteristics are sector, firm size and occupation, individual characteristics are experience in the labor market, sex, marital status and tenure on the job

Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

The trends of social insurance coverage by sex and marital status highlight a clear divide between men and women where the trend is declining for men but is rather stable for women. This confirms the selectivity of women for the type of job they are willing to accept compared to men who are willing to settle for less-than-ideal jobs. The trends for married and single women coincide, they both witness a period of rapid increase of coverage between 2012 and 2016 after which they regain the initial levels of coverage. This period of increase of coverage is counterintuitive given that it coincides with a moment of general decline of social insurance coverage in the economy. This could also be an indication of women choosing to drop out of the labor market in a moment where job quality is deteriorating. The trend holds across sectors for males with an even more pronounced declining trend for nonwage non-agricultural workers (similar to what we saw in Figure 17). Among females, we see a decreasing trend for women in private wage non-agriculture especially for ever married females. It is important to keep in mind that females make up a minimal proportion of private wage non-agricultural workers. At the peak in 2016, they made up 11% of private wage non-agricultural workers compared to 21% among all employees. As for female nonwage workers, they saw their coverage rates increase over time.

Figure 18: Trend of social insurance coverage across sex and marital status controlling for job and individual characteristics

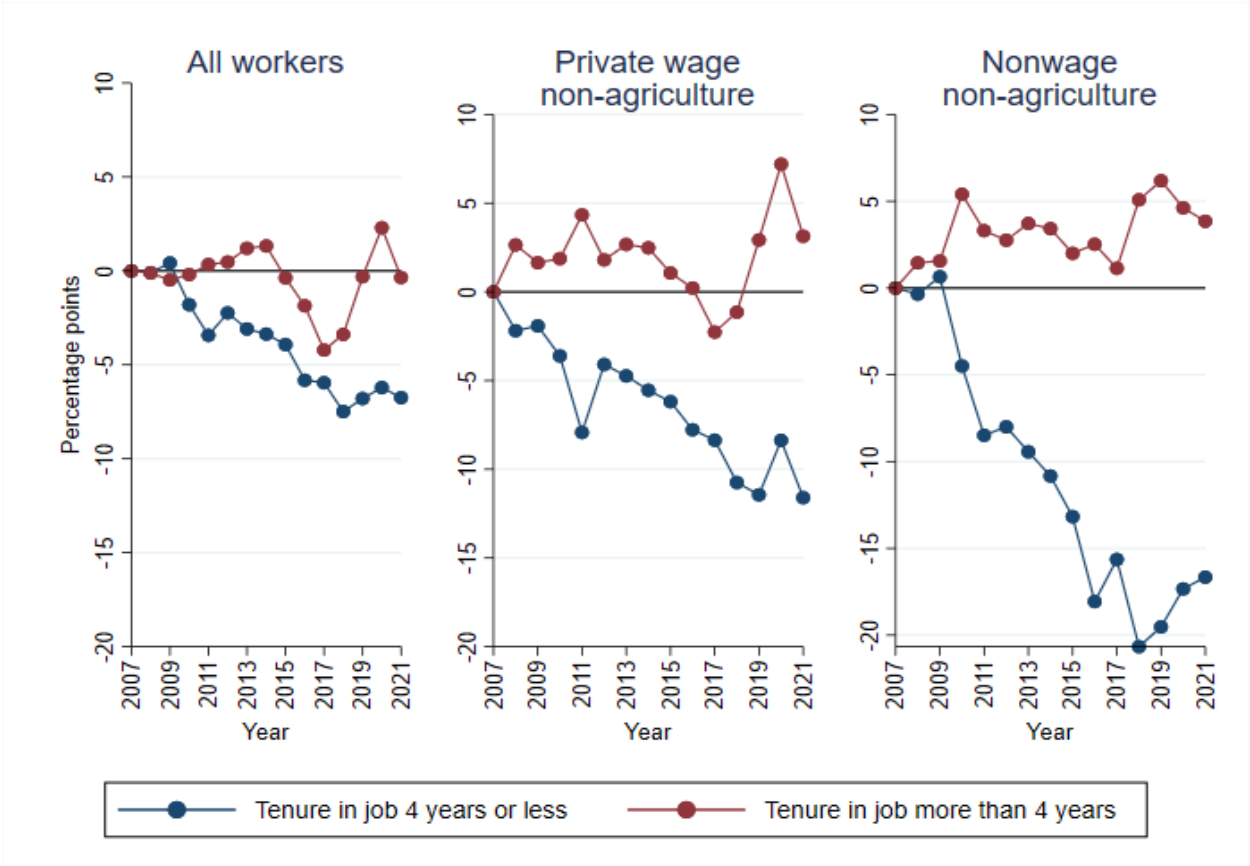


Note: job characteristics are sector, firm size and occupation, individual characteristics are experience in the labor market, education level and tenure in job

Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

Studying the trends of social insurance coverage by tenure on the job we see that the coverage rate was rapidly decreasing over time for those with 4 years or less on the job. This is especially true for nonwage non-agricultural workers whose coverage rates had decreased by 20 p.p. by 2018 before seeing a slight recovery afterwards. This suggests that the lack of social insurance coverage mainly affects new job entrants. For those with more than 4 years of tenure on the job, their coverage rates were overall stable. They have however seen a period of sharp decline between 2014 and 2017, consistent with the general trend of decline of social insurance coverage. The downward trend has slightly reversed after 2017. The trend for nonwage non-agricultural workers with more than 4 years of tenure is a little different from the general trend and from their private wage non-agriculture counterparts. While we can see an increase in coverage rates in 2018 consistent with the general trend, we cannot see the sharp decrease in the 2014-2017 period that we see for all workers. Nearly all of the sharp decline for these workers is concentrated among new entrants.

Figure 19: Trend of social insurance coverage across years of tenure on the job controlling for job and individual characteristics



Note: job characteristics are sector, firm size and occupation, individual characteristics are experience in the labor market, education level, sex and marital status
 Source: authors' calculations using Labor Force Surveys (2007-2021) (OAMDI, 2007, 2008, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021)

5. Conclusions

Our analysis of the changing levels of social insurance coverage over the 2007-2021 period showed that the sharp drop during the 2014-17 period is responsible for most of the observed drop in coverage. Accordingly, we set our periods in such a way as to highlight changes in that three-year sub-period. In general, we find that structural change in the economy, meaning the compositional shifts in the type of jobs generated by the economy, had a limited effect on the change in coverage. At the aggregate level, the expected positive effect on coverage resulting from the declining share of agricultural employment was counteracted by the negative effect on coverage of the decline in the share of the government/public sector. Most of the decline in coverage occurred in the private wage and nonwage non-agricultural sectors, leading us to examine more closely what was happening in these sectors.

Within the private wage non-agricultural sector, the within-sector component vastly dominates the structural change component and comes primarily from the 2014-2017 period. The largest sub-sector contributing to the fall in coverage within private wage non-agriculture is mining, manufacturing and utilities, which contributed negatively to both the within-sector component and the structural change component.

The within-sector component also dominates the structural change component in accounting for the drop in social insurance coverage in nonwage non-agricultural employment. In fact, structural change there would have contributed to a slight increase in coverage. The sub-sector contributing the most to the within-sector drop in coverage is wholesale and retail trade, which experienced substantial drops in coverage and makes up about 45 percent of nonwage non-agricultural employment.

Regression analysis confirms that the observed declines in coverage between 2014 and 2017 would have occurred even if compositional changes in the structure of employment are controlled for. They reveal however, that coverage would have recovered somewhat in the period from 2018 to 2021 had the percent working in establishments and establishment sizes not changed. Controlling for individual characteristics does not change the results of the regression which means that the decline in social insurance coverage cannot be explained by a change in the composition of workers.

Our results show that the largest declines in coverage occurred in specific branches of economic activity among both wage and non-wage workers. Among private wage workers, declines were largest in human health and social work and in education and to a lesser extent wholesale and retail trade. Among non-wage workers, the declines were largest in accommodation and food service and other service activities. We also show that declines in coverage were concentrated among

workers in micro and small establishments, and temporarily from 2014 to 2017 among workers in medium establishments. Along individual characteristics, declines in coverage were largest for male workers with no education and for married female private wage workers. Finally, the decline in coverage is concentrated among new entrants (with less than 5 years of job tenure), suggesting that the decline is due to new workers acquiring coverage at lower rates rather than currently insured workers losing their coverage. This is also the conclusion that Krafft and Hannafi (2023) come to after studying the dynamics of social insurance coverage in Egypt.

We conclude from this analysis that the drop in social insurance coverage in Egypt, especially the drop that occurred in the period from 2014 to 2017 or even 2018 occurred because specific types of jobs were less likely to be covered rather than because the nature of jobs in the economy changed. This suggests that the decline is due to changes intrinsic to the social insurance system itself or in the proximate policy environment that affects the calculus of employers and workers to obtain coverage. Selwaness and Barsoum (2023) make a convincing case that changes in the rule defining the minimum insurable wage starting in 2016 made it much more expensive for employers to cover low-paid workers. They show that the ratio of the minimum insurable wage to the monthly real wage rose substantially since 2015 for workers in the bottom two quintiles. If these rules also apply to nonwage workers, they could explain why low-paid nonwage workers would no longer find it worth it to acquire social insurance. An additional hypothesis worth investigating is the effect of the introduction of the Takaful and Karama cash transfer program in 2015. One of the eligibility conditions for Takaful and Karama is not to have social insurance coverage. It is therefore possible that many workers who feel they could otherwise be eligible (low-paid or less educated workers) increasingly opt not to obtain coverage in order to increase their chance of becoming eligible for Takaful and Karama. We note that after correcting for composition by work in and out of enterprise and enterprise size, we observe a slight reversal in the declining trend of social insurance coverage after 2018. Despite this reversal, coverage in 2021 remains well below its level in 2014 when the declining trend accelerated.

References

- Amer, M., Selwaness, I., & Zaki, C. (2021). Labour Market Vulnerability and Patterns of Economic Growth: The Case of Egypt. In *Regional Report on Jobs and Growth in North Africa 2020*. International Labour Organization.
- Assaad, R., Alsharawy, A., & Salemi, C. (2022). Is the Egyptian Economy Creating Good Jobs? Job Creation and Economic Vulnerability from 1998 to 2018. In C. Krafft & R. Assaad (Eds.), *The Egyptian Labor Market: A Focus on Gender and Vulnerability*. Oxford University Press.
- Assaad, R., & Krafft, C. (2015). The Structure and Evolution of Employment in Egypt: 1998-2012. In R. Assaad & C. Krafft (Eds.), *The Egyptian Labor Market in an Era of Revolution*. Oxford University Press.
- Assaad, R., & Krafft, C. (Forthcoming). *Connecting people to projects: A new approach to measuring women's employment in the Middle East and North Africa*.
- Assaad, R., Krafft, C., Rahman, K. W., & Selwaness, I. N. (2019). *Job Creation in Egypt A Sectoral and Geographical Analysis Focusing on Private Establishments 1996-2017*.
- Barsoum, G., & Selwaness, I. N. (2022). Egypt's reformed social insurance system: How might design change incentivize enrolment? *International Social Security Review*, 75(2), 47–74. <https://doi.org/10.1111/issr.12294>
- Gasparini, L. C. (2002). Microeconomic decompositions of aggregate variables: An application to labour informality in Argentina. *Applied Economics*, 34(18), 2257–2266. <https://doi.org/10.1080/00036840210127231>.
- Krafft, C. & Hannafi, C. (2023). The Dynamics of Social Insurance in Egypt. ERF working Paper No. YYYY, Economic Research Forum, Cairo, Egypt.
- ILO. (2003). Guidelines Concerning a Statistical Definition of Informal Employment. In *The Seventeenth International Conference of Labour Statisticians*. International Labour Organization.
- ILO. (2022). *Report of International Labour Organization on Informal Economy Statistics*. UN Statistical Commission 53rd Session. <https://unstats.un.org/unsd/statcom/53rd-session/documents/BG-3t-InformalEconomyStats-E.pdf>
- Martins, P. (2014). *Structural Change in Ethiopia: An Employment Perspective*.
- McMillan, M., Rodrik, D., & Verduzco-Gallo, Í. (2014). Globalization, Structural Change, and Productivity Growth, with an Update on Africa. *World Development*, 63, 11–32. <https://doi.org/10.1016/j.worlddev.2013.10.012>
- OAMDI. (2007). *Harmonized Labor Force Surveys (HLFS)* [dataset].
- OAMDI. (2008). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>

- OAMDI. (2009). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2010). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2011). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2012). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2013). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2014). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2015). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2016). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2017). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2018). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2019). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2020). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- OAMDI. (2021). *Harmonized Labor Force Surveys (HLFS)* [dataset]. <http://erf.org.eg/data-portal/>
- Roushdy, R., & Selwaness, I. (2019). Who Is Covered and Who Under-reports: An Empirical Analysis of Access to Social Insurance in Egypt. *Journal of International Development*, 31(8), 720–751. <https://doi.org/10.1002/jid.3434>
- Selwaness, I. & Barsoum, G. . 2023. When informality is costly and informality is legal: Social insurance design woes at a time of economic crisis. ERF Working Paper No. XXXX, Economic Research Forum, Cairo, Egypt.
- Selwaness, I., & Ehab, M. (2022). Social Protection and Vulnerability in Egypt: A Gendered Analysis. In C. Krafft & R. Assaad (Eds.), *The Egyptian Labor Market: A Focus on Gender and Vulnerability*. Oxford University Press.
- Voskoboynikov, I. B. (2020). Structural Change, Expanding Informality and Labor Productivity Growth in Russia. *Review of Income and Wealth*, 66(2), 394–417. <https://doi.org/10.1111/roiw.12417>

Appendix

Aggregate Analysis

Figure 20: Percent covered by sector and year – ELMPS data

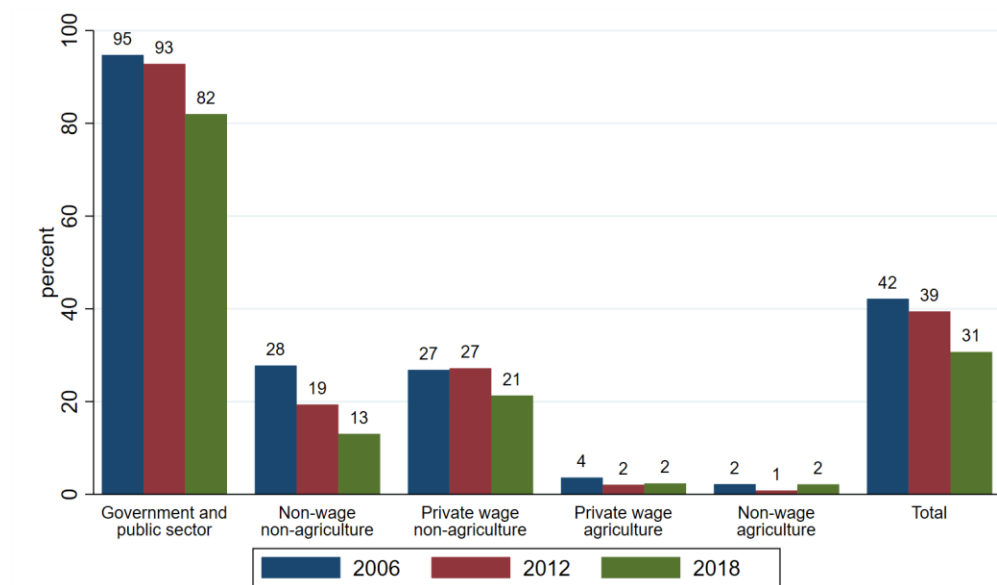


Figure 21: Share in total employment by sector and year – ELMPS data

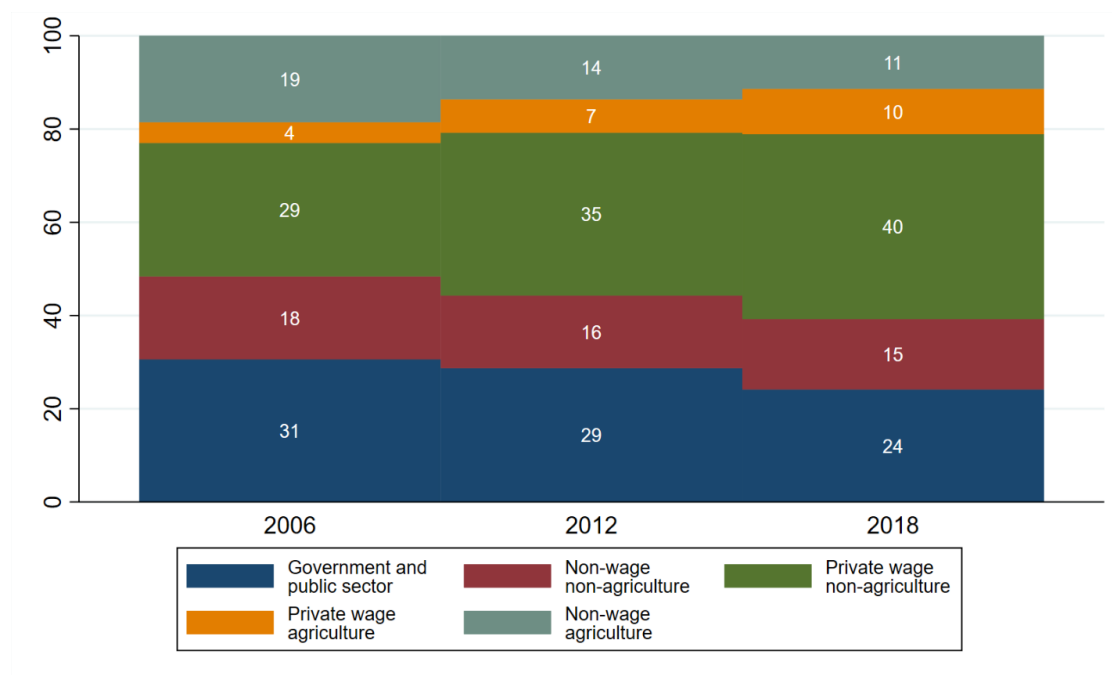


Figure 22: Contribution to social insurance coverage from the within change and the structural change by sector and time period – Aggregate – ELMPS data

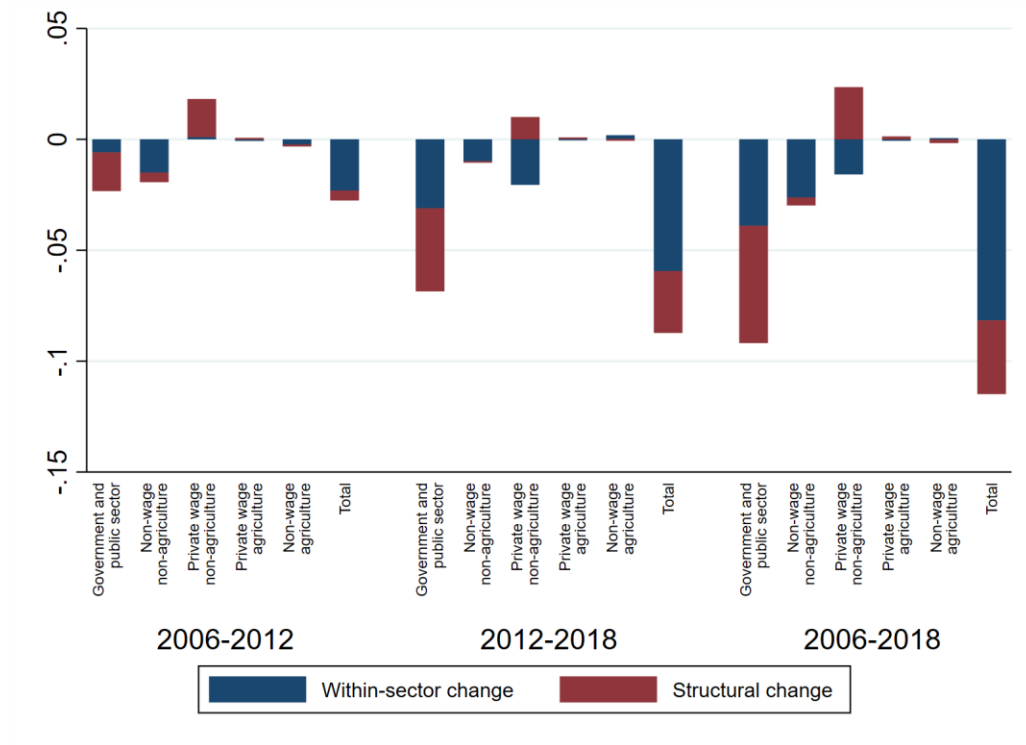
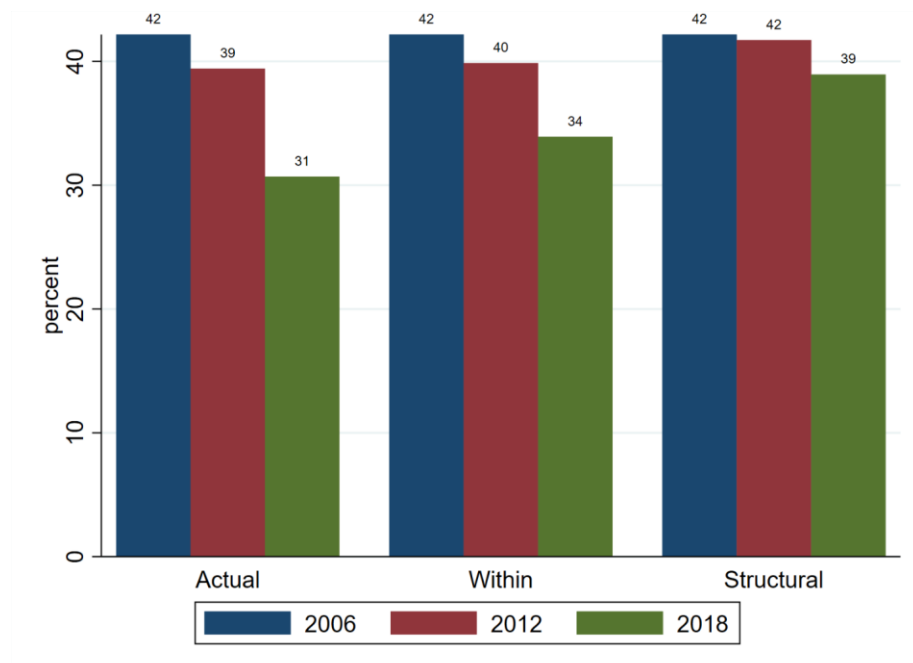


Figure 23: Change in economy-wide social insurance coverage over time, actual, change accounting for within effect only, change accounting for structural effect only – Aggregate



Private Wage Non-Agricultural Sector

Figure 24: Percent covered by sub-sector and year for private wage non-agriculture sector – ELMPS data

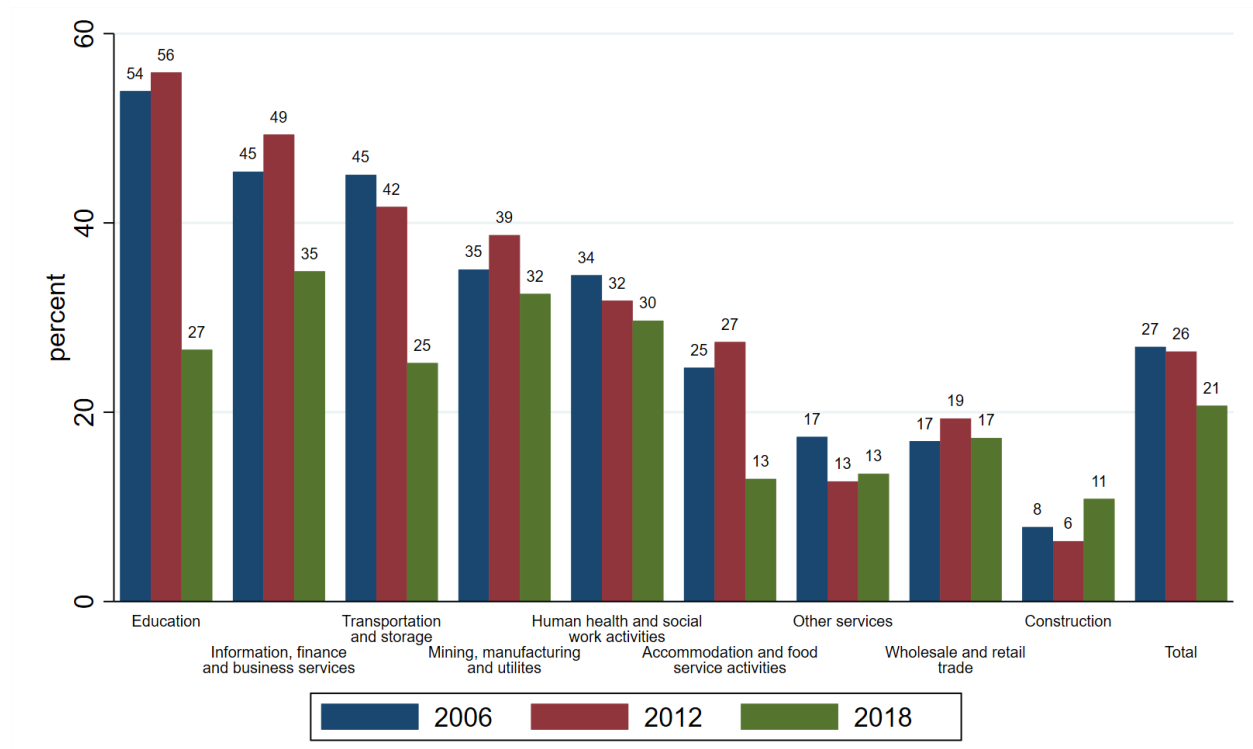


Figure 25: Share in total employment by sub-sector and year for private wage non-agriculture sector – ELMPS data

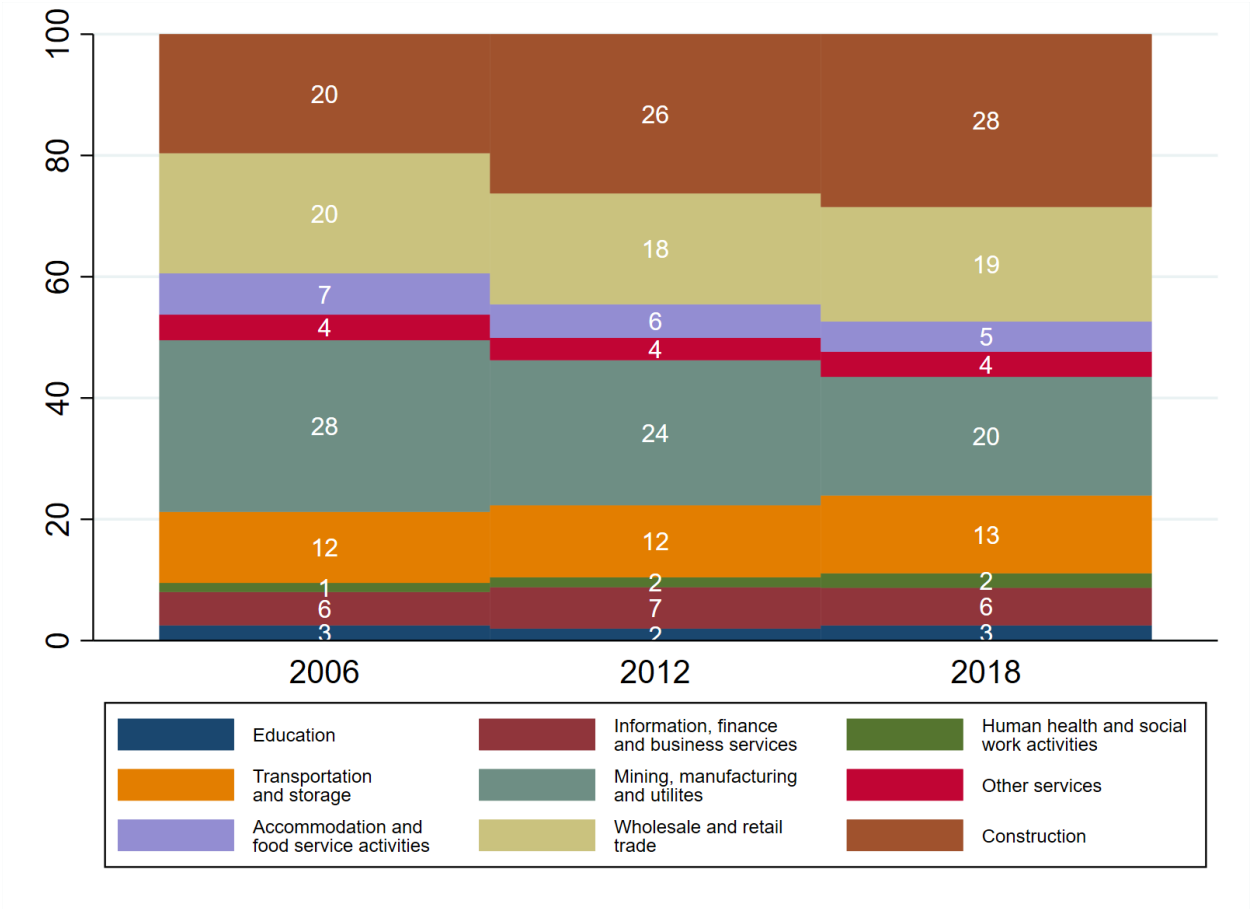


Figure 26: Contribution to social insurance coverage from the within change and the structural change by sector and time period – Private wage non agriculture – ELMPS data

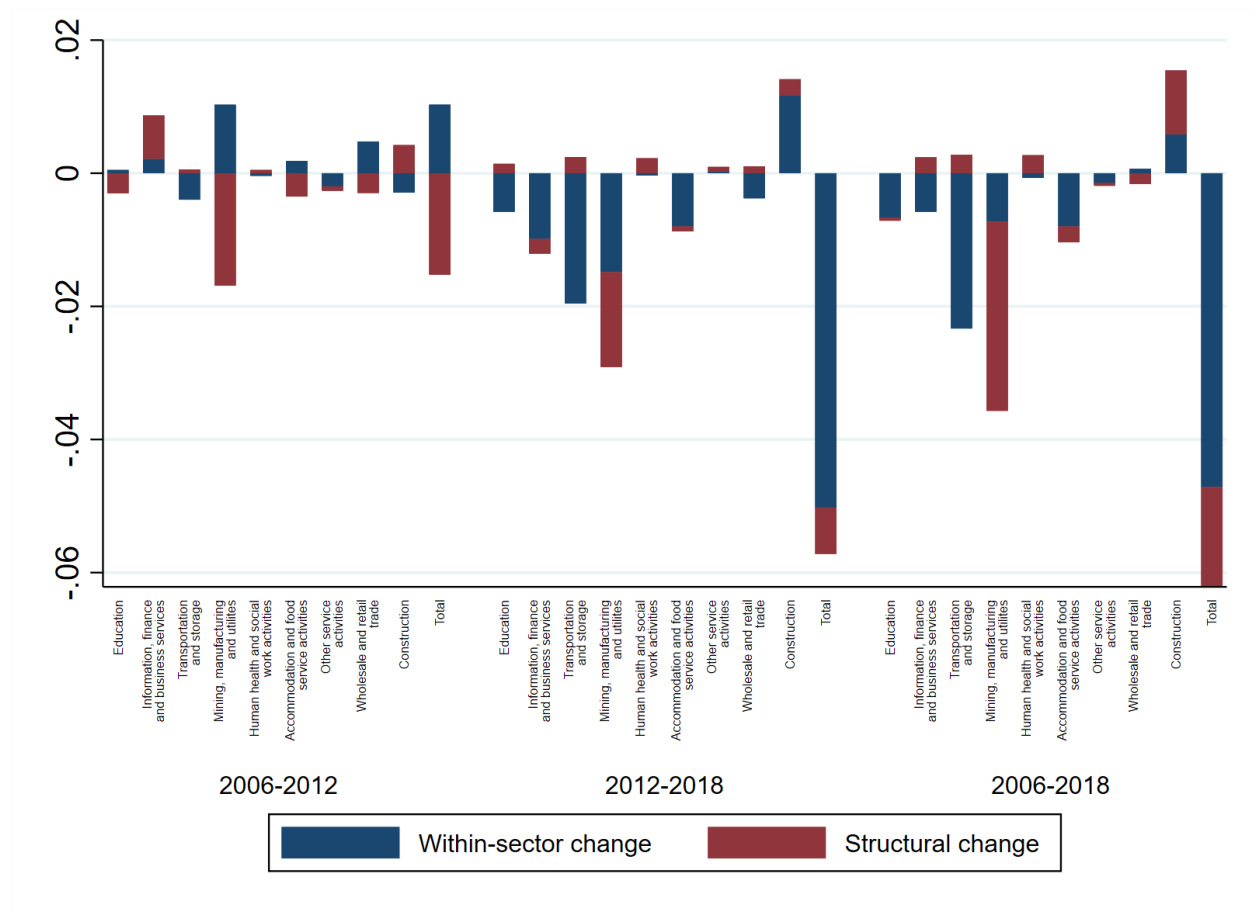
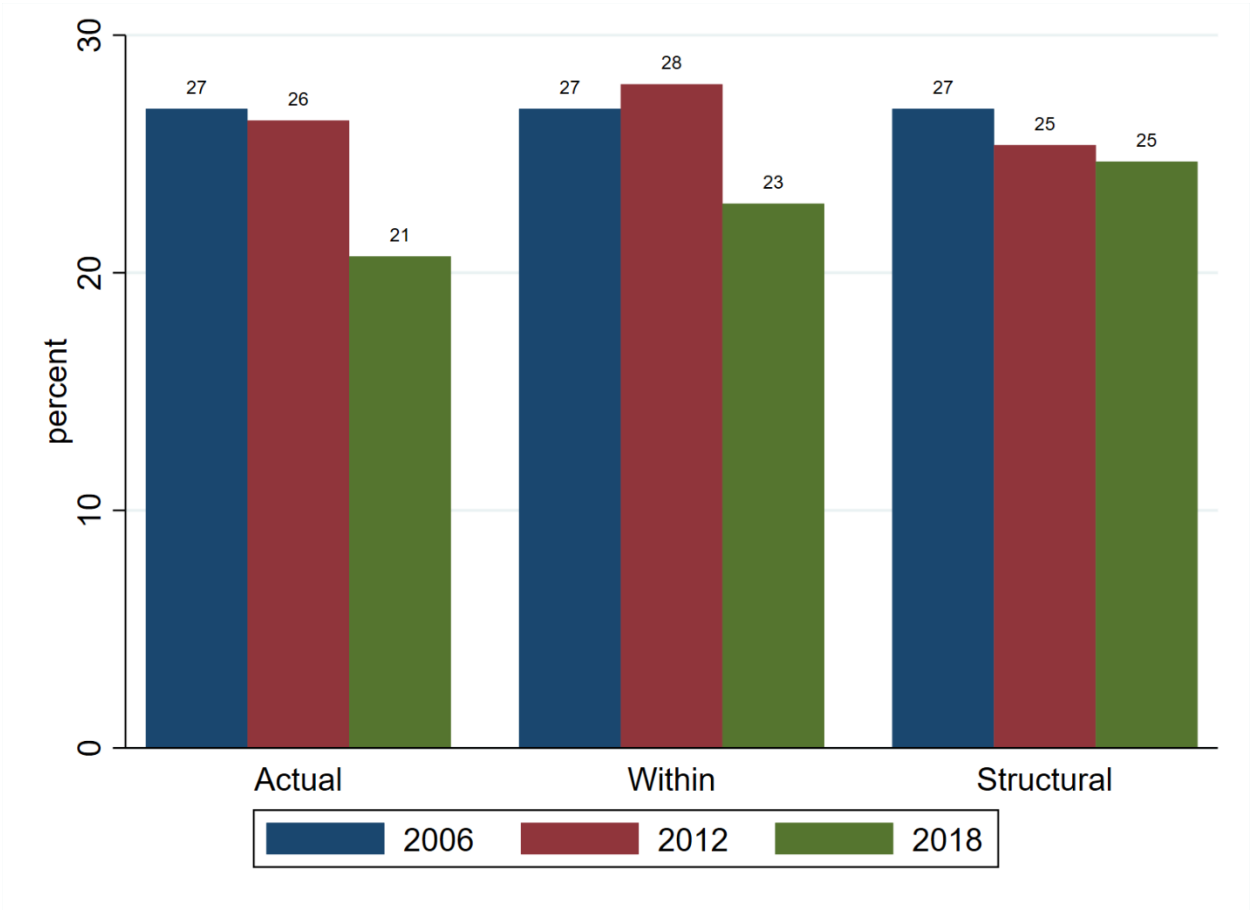


Figure 27: Change in social insurance coverage in the private wage non-agriculture sector over time, actual, change accounting for within effect only, change accounting for structural effect only – ELMPS data



Nonwage Non-agricultural Sector

Figure 28: Percent covered by sub-sector and year for private nonwage non-agriculture sector – ELMPS data

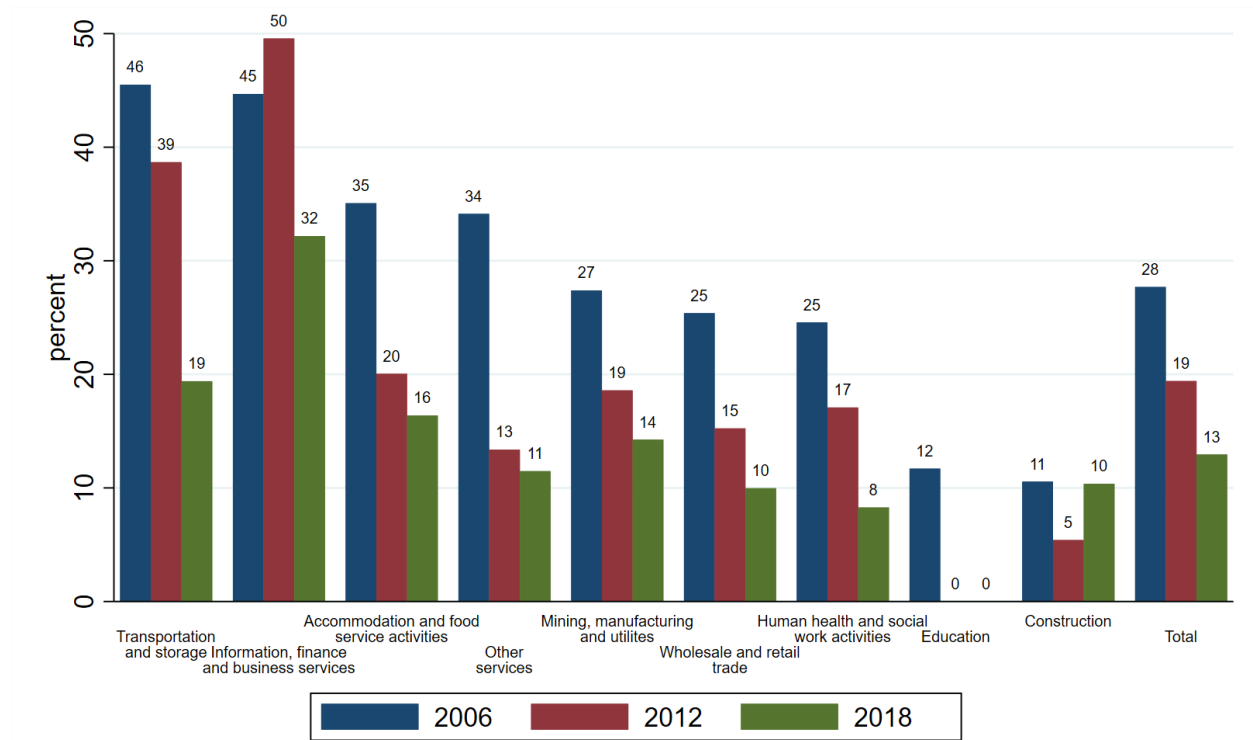


Figure 29: Share in total employment by sub-sector and year for private nonwage non-agriculture sector – ELMPS data

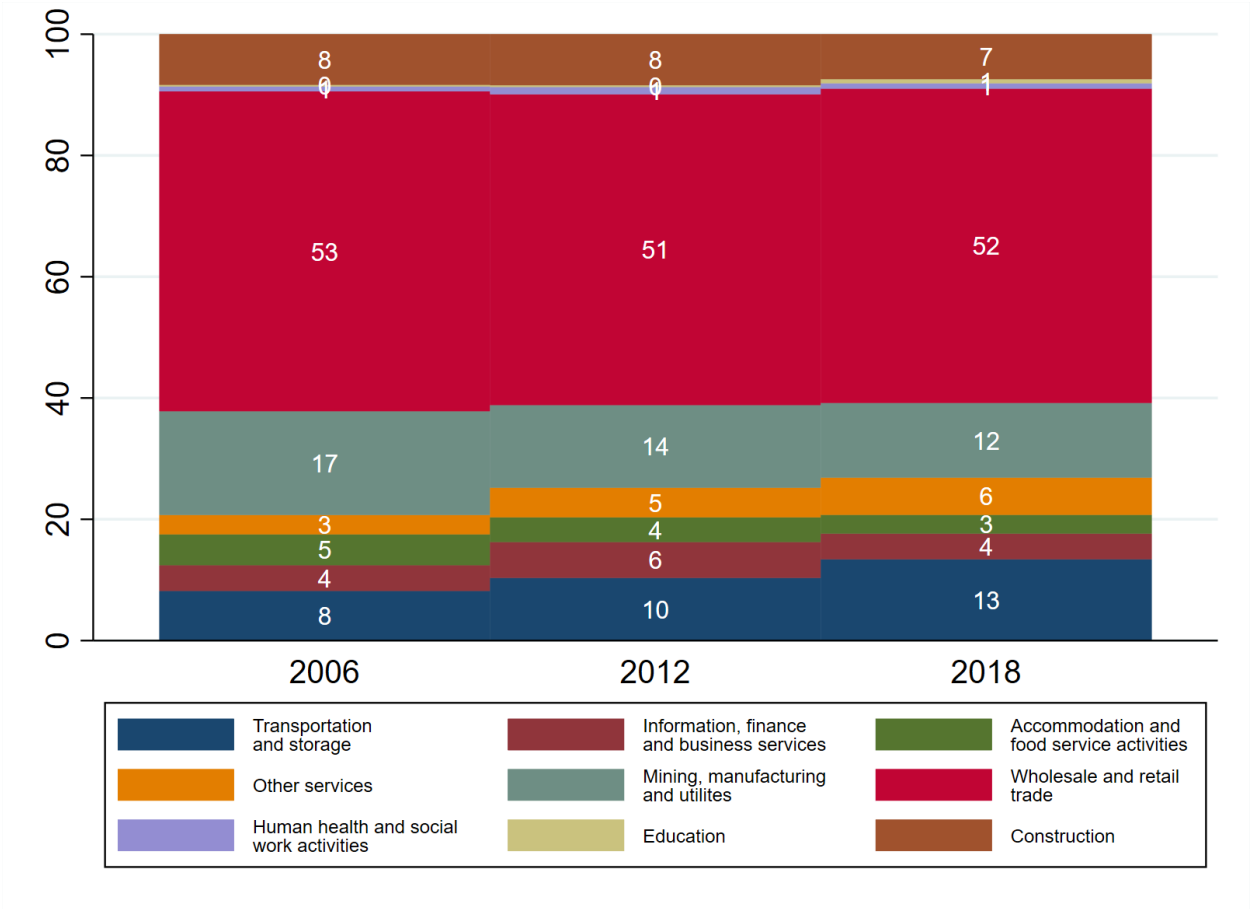


Figure 30: Contribution to social insurance coverage from the within change and the structural change by sector and time period – Nonwage non-agriculture – ELMPS data

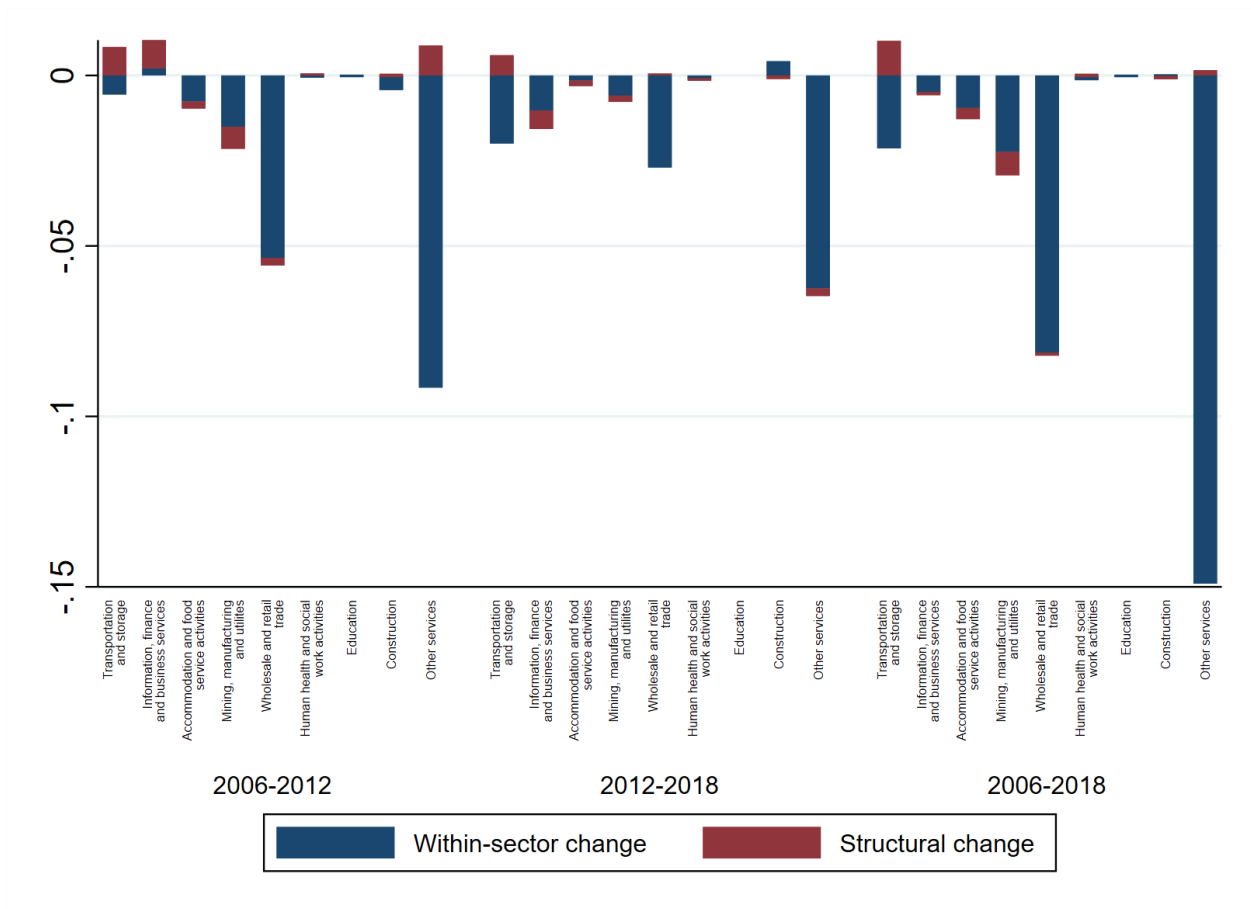


Figure 31: Change in social insurance coverage in the nonwage non-agriculture sector over time, actual, change accounting for within effect only, change accounting for structural effect only – ELMPS data

