THE DEMOGRAPHY OF THE SELF-EMPLOYMENT SEGMENT IN THE AFTERMATH OF THE COVID-19 PANDEMIC IN CZECHIA AND AUSTRIA

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Abstract

The goal of the article is to analyse the changes in labour market participation in the older age groups with particular interest in the role of self/employment. This is done utilizing the LFS aggregate data (2019-2023) and the SHARE dataset (2019-2021), based on which the text analyses the impact of the COVID-19 pandemic on the participation rates of older generations (aged 50+ in 2019) on the labour market in the Czech Republic and Austria with particular focus on the role of the self-employed. Descriptive statistics and logistic regression on the SHARE microdata are the main analytical methods.

The participation rates of the older age groups didn't drop in neither country, we see a rise in the rates and a rise in absolute numbers due to demographic ageing. While in the overall self-employment rate there has been a drop and recovery in both countries, for older age groups this is the case only for Austria, in Czechia there was a significant drop in the share of self-employed among the older age groups and also in absolute numbers. The broader country sample SHARE microdata suggest, that if age is taken into account the self-employed still are less likely to retire. The Czechia case might be idiosyncratic in European context, either due to a specific demographic structure or a particularly bad pandemic recovery.

Key words: Elderly participation rate, Self-employment, labour market, COVID-19 crisis

JEL code: J14, J21, J82

Introduction

The health status of the elderly is an important determinant of the elderly labour market participation rate. Even though intuitive, this basic fact has been confirmed also empirically, e.g. (Youlu & Ying, 2020). The COVID-19 pandemic presented a strong population wide health challenge with some effects being long-term and described while some may have gone unnoticed by statistics yet. It is also well documented that the illness itself particularly affected people of older age.

The goal of this exercise thus is to observe the changes in labour market participation in the older age groups. Because of the particular role the self-employed (further in text referred to as SE) the focus is the influence the changes in the numbers of SE have on the overall participation. Methodologically, the analysis also checks the viability and usability of data from SHARE, a non-dedicated survey, to get bits of information about the SE group which is otherwise rather elusive to general survey work. Czechia is the country of interest and Austria is chosen as a country geographically and culturally close, with expected similar natural course of the pandemic, where the differences would be limited to policy and labour market structure factors.

There is a broad literature dealing with the impact of COVID-19 on the labour market. A comprehensive review is out of a scope and required limits of a few page contribution so I select some of the more relevant ones. (Forsythe et al., 2022) as part of a broader analysis of the U.S. labour market point out the role of excess retirements during the pandemic. (Cortes & Forsythe, 2020) point out the disproportionate impact of COVID on low skill workers, ale on the case of U.S. (Jung & Suh, 2024) document a fall in participation rate for the older age groups in the US. (Rajevska et al., 2021) work with the SHARE data and on the case of Baltic countries show the opposite trend, growing participation rates of the older workers, also arguing that the segments where the older workers are most concentrated were least hit by the pandemic. (Chen & Gardiner, 2019) do a useful review trying to summarize the factors influencing the older workers participation decision. Surprisingly, they see the flexible working arrangements as less important rather than job autonomy and supporting work environment. However, they don't deal with the SE. Most of the respondents in the reviewed studies would be corporate employees – only one of the 27 studies mentioned self-employment. Can we rule out the hypothesis that exactly the workers choosing self-employment are the ones preferring flexibility?

There is less published on our countries of interest and in particular there is almost no literature on the particular role of the SE segment, despite it playing a specific role in providing the extra flexibility on the market and despite the literature that the SE have been hit particularly hard given the business areas they concentrate in and generally worse access to state compensation policies as compared to employees. This gap is the primary target of this research - a part of which is presented below.

The text is structured as this: The methods and data are introduced first, then the results in descriptive form, followed by the information gained from the SHARE dataset. A discussion of the results and potential directions of further analysis follows.

1 Methods and Data

The two culturally, economically and geographically close countries, Czechia and Austria are chosen for the study to show an interesting contrast in how the demographics of the older age groups participating on labour market changed over the COVID-19 pandemic. If not said otherwise, the focus group of the article are people between 50 years and 75 years of age in 2019. The range is arbitrary but is chosen pragmatically as there are just very few workers over 74 in the sample (and likely also in the society).

2 First, we look at the age specific workforce participation rates and also the absolute number of employed and self-employed people in different age categories. For capturing the role of self-employment on the labour market, the ratio of self-employed on total employment is used. Interestingly the development is highly heterogeneous with respect to the age group (see the analysis shown in Error! Reference source not found. **and**

2.1. The general age specific participation rate

Table 3 shows the development of age specific labour force participation rate and absolute numbers of workers in the older groups over between 2019 and 2023 in the selected countries. The general gradient of participation dropping with age is the dominant factor here. In absolute numbers the amount of people in the older cohorts grew which is the general result of aging population.

However, we can see that the actual participation rates for older workers grew and diminished for the youngest of our groups. This effect seems stronger in CZ. Given that we see it in participation rates and not only in absolute numbers, it cannot be attributed to aging population.

Table 3 - Age specific participation rates and the COVID-19 period, 1.1.2023 vs 1.1.2019

AT Participation Rate			
age_group	2019	2023	Saldo p.p.
Y50-54	87.17%	86.66%	-0.51%
Y55-59	76.80%	81.18%	4.38%
Y60-64	32.03%	35.56%	3.53%
Y65-69	8.47%	11.20%	2.73%
Y70-74	5.21%	5.17%	-0.04%

CZ Participation Rate			
age_group	2019	2023	Saldo p.p.
Y50-54	93.39%	87.77%	-5.61%
Y55-59	90.91%	82.90%	-8.01%
Y60-64	46.75%	59.57%	12.82%
Y65-69	14.88%	16.95%	2.07%
Y70-74	6.17%	6.80%	0.63%

AT Number of workers (thousands)			
age_group	2019	2023	Saldo
Y50-54	623.8	583.5	-6.46%
Y55-59	512.2	577.7	12.79%
Y60-64	174.0	224.3	28.91%
Y65-69	37.8	56.0	48.15%
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age_group	2019	2023	Saldo
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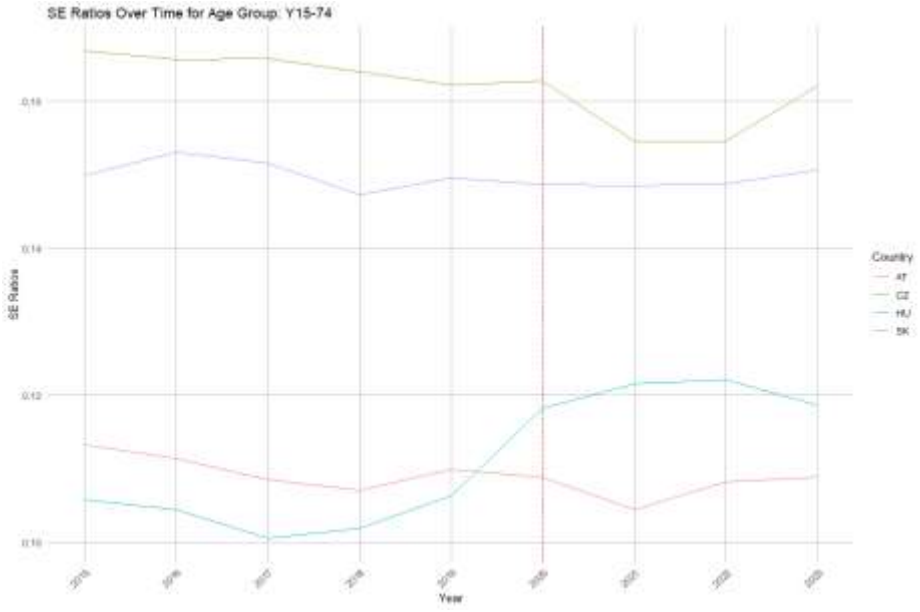
Y65-69	101.2	110.7	9.39%
Y70-74	36.4	41.7	14.56%

Source: Own calculations based on LFS aggregate data – download through "eurostat" library for R on October 6th 2024.

2.2. The relative role of the Self-employed

The role of SE in the total workforce defined here in the age range between 15-74 is relatively stable and even though it has taken a blow in both Czechia and Austria, it has also somehow recovered to the previous levels - in Austria already in 2022 and in Czechia a year later (see Figure 1).

Figure 1 – the SE rate trend for the working age population for selected central european countries



Source: Own calculations based on LFS aggregate data – download through "eurostat" library for R on October 6th 2024.

The situation is less simple if we look at the specific rates for the oldest age groups. The older age group we take, the more important role self-employment plays (Table 4), the SE rate is increasing with age group steadily probably because the self-employed are generally retiring slower and gradually. However, looking at the dynamics for the age specific older groups over time, we can see that the SE rate is falling, and moreover the fall is proportionate to the age in the Czech Republic. That's not the case at all in Austria where the proportion of the self-employment on the employment is much more stable even in the older groups(see "Saldo" column).

Table *4*). The aggregate data come from Eurostat, mostly originate from the LFS survey and were downloaded for processing in R using the Eurostat library for R(Leo Lahti et al., 2017, 2023).

This descriptive above is supplemented by analysis of data from the SHARE dataset. Even though the representation of the SE in the sample is not optimal, it provides some additional insight into the role the SE status plays in the employment of older generations. A simple logistic regression model is constructed to distinguish between the age factor and other influences. It's important to note that for single countries subsamples, getting statistically significant results while building very complex models with larger pool of included variables, is not realistic due to low number of respondents in the subgroups.

However, given the SE group is very diverse but not getting a lot of respondents in the major survey work in general, the scraping of little bits of information from these existing sources and connecting the information together contributing to the overall picture might be the only way. That is until a dedicated internationally comparable survey for the subgroup is conducted. Working with SHARE even for this purpose thus opens some alleys to connect the information with other sources like the LDP or ACCP which also have small subsamples of self-employed respondents and cover the pandemic period well.

The data from SHARE survey (Scherpenzeel et al., 2020) collected between 2019 and 2021 were used. The standard wave 8 contains the full set of usual variables but the collection had to be interrupted at the start of the pandemic. The representativeness of the overall sample is thus not as good as in the usual waves but for our purpose the great advantage is that the data collected have been collected right at the start of the pandemic. This shot of the exact pre-covid situation makes the data a very relevant source despite the limitations which can be addressed

in the analysis through usage of weights[1]. Then COVID-19 dedicated waves were conducted in 2020 and 2021. The set of variables is different. The analysis is performed for the change in status roughly between 2019 and 2021, thus utilizing the data from wave 8 and the second SHARE Corona Survey(SCS) – see Table 1.

Table 1 - The collection dates of the SHARE waves during the COVID-19 pandemic

Wave 8	2019-2020
1st SCS	*2020*
2nd SCS	2021

Source: Author

The subsample used here consists of the respondents taking part in both these surveys and the files were merged through "mergeid" variable for that purpose. Then most importantly the initial working status is determined from "Ep009_" from Wave8 and the change of this to retired status is determined from "Caep005_" in 2nd SCS. The list of key variables and their transformations from the dataset is below in Table 2. The general characteristics of the subsample are presented in the Results section for better context, namely in Table 6, Table 7,

Table ***8***, Table 9.

Table 2 - List of variables and transformations from SHARE dataset

Dataset

Dn003_	Birth
Dn042_	Gender
Ep009_	Employment status 2019
Caep005_	Current employment 2021

Generated

ccavek	2019-yearof birth
gender	Dummy, male =1
SE	Dummy if SE in 2019

Source: Author

The model is a logistic regression with new retirement as the dependent variable for which we calculate the odds and age, sex and initial SE status as independent variables. The data on SE are limited so only few regressors are chosen but if the whole sample of multiple

[1] The differences between weighted and unweighted analysis are not presented in this document.

countries was the target in a broader study, then it would be possible to enhance the set and distinguish e.g. between different areas of business or work income categories.

The computing has been performed in R and RStudio as an IDE, using the libraries "eurostat", "dplyr", "haven" and "ggplot2" over the standard package, with the final formatting for this document done in MS Excel. The R codes are available upon request. For coding purposes, the usual AI LLM support has been used.

3 The results

2.3. The general age specific participation rate

Table 3 shows the development of age specific labour force participation rate and absolute numbers of workers in the older groups over between 2019 and 2023 in the selected countries. The general gradient of participation dropping with age is the dominant factor here. In absolute numbers the amount of people in the older cohorts grew which is the general result of aging population.

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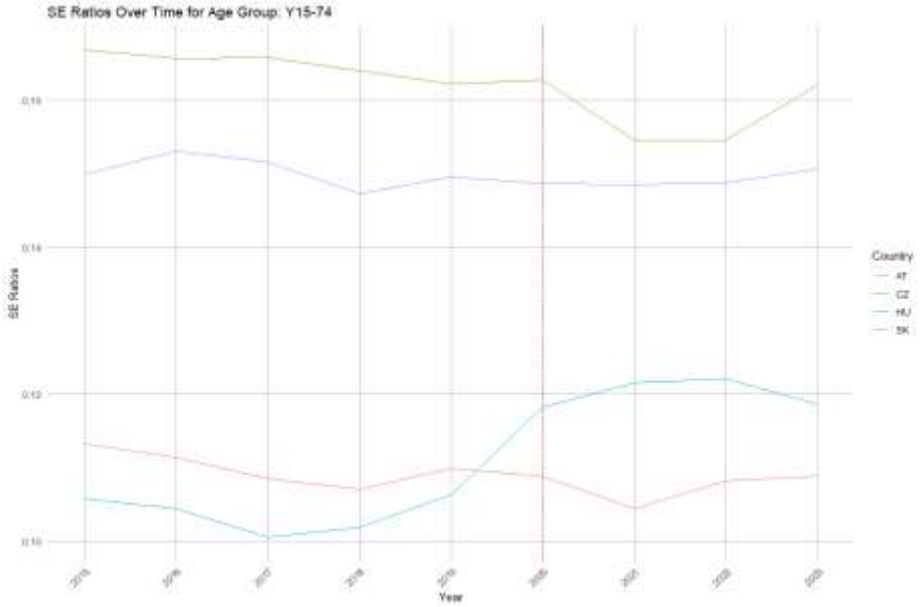
Source: Own calculations based on LFS aggregate data – download through "eurostat" library for R on October 6th 2024.

2.4. The relative role of the Self-employed

The role of SE in the total workforce defined here in the age range between 15-74 is relatively stable and even though it has taken a blow in both Czechia and Austria, it has also somehow recovered to the previous levels - in Austria already in 2022 and in Czechia a year later (see Figure 1).

Figure 1 – the SE rate trend for the working age population for selected central european countries



Source: Own calculations based on LFS aggregate data – download through "eurostat" library for R on October 6th 2024.

The situation is less simple if we look at the specific rates for the oldest age groups. The older age group we take, the more important role self-employment plays (Table 4), the SE rate is increasing with age group steadily probably because the self-employed are generally retiring slower and gradually. However, looking at the dynamics for the age specific older groups over time, we can see that the SE rate is falling, and moreover the fall is proportionate to the age in the Czech Republic. That's not the case at all in Austria where the proportion of the self-employment on the employment is much more stable even in the older groups(see "Saldo" column).

Table 4 – The age specific Self-employment rate and its change after the COVID-19 crisis in Czechia and Austria

CZ	2019	2023	Saldo
Y15-74	16.23%	16.21%	-0.02%
Y50-54	17.73%	17.38%	-0.35%
Y55-59	17.80%	17.03%	-0.77%
Y60-64	22.67%	18.27%	-4.40%
Y65-69	32.77%	27.84%	-4.93%
Y70-74	38.74%	32.85%	-5.88%

AT	2019	2023	Saldo
Y15-74	11.00%	10.89%	-0.11%
Y50-54	15.28%	13.95%	-1.33%
Y55-59	15.90%	15.34%	-0.56%
Y60-64	20.74%	19.10%	-1.65%
Y65-69	37.04%	37.14%	0.11%
Y70-74	35.64%	35.51%	-0.13%

Source: Own calculations based on LFS aggregate data – download through "eurostat" library for R on October 6th 2024.

To get a basic insight into the force behind this, the division of workforce change and SE change in absolute number is shown in Table 5. On the left side we see that in Austria the numbers of workers in older groups grow regardless of the SE status, the changes are comparable and always with the same sign for the particular bracket. That's not the case for the Czech Republic where the general growth of numbers of older workers is the same but the numbers of SE workers were falling and that drop happens in all age categories with the biggest 10.3% drop in the 60-63. Given the proportion and the opposite tendency in the overall workforce this clearly cannot be attributed to general demographic change.

Table 5 - The absolute numbers of workforce and SE in CZ and Austria between 2019 and 2023

AT Number of workers (thousands)			
age_group	2019	2023	Saldo
Y50-54	623.8	583.5	-6.46%
Y55-59	512.2	577.7	12.79%
Y60-64	174.0	224.3	28.91%
Y65-69	37.8	56.0	48.15%
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Y60-64	317.4	355.0	11.85%
Y65-69	101.2	110.7	9.39%
Y70-74	36.4	41.7	14.56%

AT Number of SE (thousands)			
age_group	2019	2023	Saldo
Y50-54	92.8	78.5	-15.41%
Y55-59	78.5	85.1	8.41%
Y60-64	35.1	41	16.81%
Y65-69	14	20.8	48.57%
Y70-74	7.2	7.6	5.56%

CZ Number of SE (thousands)			
age_group	2019	2023	Saldo
Y50-54	112.8	110.9	-1.68%
Y55-59	99.4	94.9	-4.53%
Y60-64	70.9	63.6	-10.30%
Y65-69	33	30.6	-7.27%
Y70-74	14.1	13.7	-2.84%

Source: Own calculations based on LFS aggregate data – download through "eurostat" library for R on October 6th 2024.

The falling importance of Self-employment in Czechia for older age groups may have several causes.

- First of them is the retirement of the strong wave of entrepreneurs who started their business shortly after the regime change in 1989. These people now lead their businesses for 34 years and the following generations have never been as willing to start a new business as this unique generation. The coincidence of them reaching the retirement age during the pandemic might be a factor.
- It may also be, that the employment itself has started to offer more flexible arrangements for the older workers, given the Czech labour market is highly saturated and in a situation of shortage of the labour force. That hypothesis is supported by the growth in participation rates for older workers.
- The third possible explanation would be in the COVID-19 pandemic and also related restrictive policies, which generally have been harder on the self-employed for various reasons, have strongly accelerated the retirement of the self-employment segment.

It is very likely that the three factors to some degree have all been present. The fact that in geographically and culturally close Austria we cannot see this particular effect would suggest the emphasis on the policy differences or the unique wave of entrepreneurship from 1990, idiosyncratic to post-communist country, playing a more important role.

2.5. SHARE dataset

To look into the reasons why the older people left their businesses in the Czech Republic and not in Austria, the SHARE dataset is utilized. **Table *6*** shows the retirement rate of the SHARE respondents from wave 8(collected in 2019 before the pandemic) and the 2nd dedicated Corona wave collected 2021 and 2022. The data for the whole sample, i.e. all countries, are shown here.

Table 6 - How many respondents retained employment and how many retired between the 2nd Corona Wave (2021-2022) and Wave8(2019). The employment status at the end of the pandemic for respondents employed in wave 8. All countries in the subsample.

Employed respondents in the total sample			
Retirement status during the pandemic - data collected 2021-2022	**W8 2019 Private sector employee**	**W8 2019 Public sector employee**	**W8 2019 Self-employed**
Retired	1287	741	542
Employed including SE	2444	1611	722
Unemployed	105	44	20
Disabled	72	27	12
Household keeper	65	15	42
Other	47	31	8

Relative values			
Retired	**32.01%**	**30.01%**	**40.27%**
Employed including SE	**60.80%**	**65.25%**	**53.64%**
Unemployed	2.61%	1.78%	1.49%
Disabled	1.79%	1.09%	0.89%
Household keeper	1.62%	0.61%	3.12%
Other	1.17%	1.26%	0.59%
Any	100.00%	100.00%	100.00%

Source: Authors computation based on SHARE data merge between wave 8 and 2nd Corona wave

We can see that in that sample the self-employed were much more likely to retire during the pandemic years. Approximately 40 % of them retired as compared to 30% among the standard employees. An ambitious interpretation or speculation would be that the more independent the workers were on state, the more likely they were to retire during the pandemic, but the difference between private and public sector employees is not large enough to be significant in statistical sense. So, let's leave that as a hypothesis for future research.

As seen in the **Table *7*** below, the SHARE sample does not offer a large enough sample of the self-employed to allow a very detailed analysis at a country level. Larger effects could still be seen despite the larger confidence intervals.

With the limitations given by small number of respondents in the sample, the analogous results at country level for Czech Republic and Austria is shown below. Despite the numbers being much smaller we can see the same pattern seen at the total sample being repeated at the individual country level for Czechia and Austria. [2] Again, even though the numbers would suggest a speculation towards this trend being more pronounced in Czechia, thus corresponding

[2] The small numbers in some of the cells required the omission of some of the rows to comply with the precautious anonymisation standard. That also means that the column sums don't necessarily add up to 100%.

with the above presented aggregate LFS data, the number of respondents in the subgroups are too low to justify such precise distinction by themselves.

Table 7 - the representation of SE in SHARE wave 8 sample

Country	Private sector employee	Public sector employee	Self-employed	Total SE rate in the sample
AT	265	84	91	26.07%
CZ	358	203	122	21.75%

Source: Own computation from SHARE wave 8, ep dataset. Non-response is not presented but is less than 5%.

Table 8 – Czechia and Austria: The employment status at the end of the pandemic vs. in wave 8

Respondents in the sample CZ			
Retirement status during the pandemic - data collected 2021-2022	W8 2019 Private sector employee	W8 2019 Public sector employee	W8 2019 Self-employed
Retired	108	72	48
Employed including SE	56	43	16

Retired	63.91%	62.07%	75.00%
Employed including SE	33.14%	37.07%	25.00%

Respondents in the sample AT			
Retirement status during the pandemic - data collected 2021-2022	W8 2019 Private sector employee	W8 2019 Public sector employee	W8 2019 Self-employed
Retired	56	17	31
Employed including SE	33	13	13

Retired	60.87%	54.84%	67.39%
Employed including SE	35.87%	41.94%	28.26%

Source: Authors computation based on SHARE data merge between wave 8 and 2nd Corona wave. Non-response is not presented but is less than 5%.

Table 9 shows the age structure of the samples SHARE provided. Apparently, the SE respondents were on average older, meaning that the age itself could be an explanation.

Table 9 - the structure of the SHARE sample by age

Average age in 2019 in the sample			
	Private sector employee	Public sector employee	Self-employed
CZ	62.13	62.87	66.68
AT	57.73	57.67	64.19
Whole sample	59.67	59.93	63.26

Source: Authors computation based on SHARE data merge between wave 8,.

To filter out the expected age effect from the employment status, a simple model in a logistic form explaining the likelihood of retiring based on the factors whether the person is self-employed, the persons age and gender, is constructed.

Age (ccavek)[3] was confirmed as the significant factor, not surprisingly. That is the case for the country subsamples as well as for the total SHARE sample. The coefficient for SE status is negative and significant for the whole sample but not significant for the subsamples. This tells us that even in the pandemic, the SE people tend to retire less likely given their age as compared to standard employees. The fact that the SE are on average older, even within the group of 50+ workers is the dominant factor for their increased retirement rate. If age is taken into account, they still are less likely to retire, even during the pandemic. The subsamples of AT and CZ in this case just didn't provide enough observations, even though the sign of the relationship is negative in both cases as well.

4 Conclusion and discussion

It was shown that despite the health shock, the participation rate for older age groups not only didn't fall in CZ and AT but even rose. The role of self-employment in that is unclear as on one hand the self-employed still even during the pandemic were less likely to retire given their age group but on the other hand their share on the labour force dropped significantly in Czechia, in Austria the development within the SE group was more proportionate to the workforce as a whole. Is Czechia a special case going against the trend? The idiosyncratic SE structure as well as generally worse economic recovery from COVID-19 pandemic, hypothetically related to policies, might be an explanation. But the data analysed here don't provide a definitive answer. The results seem to be more in line with the analysis of (Rajevska et al., 2021), i.e. the case of the Baltic countries and in contradiction with the U.S. data based findings in (Cortes &

[3] The detailed regression results were cut out on reviewer's request for the short conference format and are available upon request.

Forsythe, 2020). There might be a Europe vs. U.S. distinction in the impact of COVID-19 on the retirement decisions.

The descriptive analysis above is based on the LFS aggregate data but they ultimately come from the LFS microdata and it's fair to say that the niche analysis of the self-employment in the oldest age groups would likely be subject to wider confidence intervals than the bulk cohorts in their prime – the number of respondents is lower. All the trends identified and discussed here should be taken with that in mind and somewhat unsystematic behaviour of the trends in particular age group might be influenced by possible statistical error. This influence would be higher than usual and this concern is of course even more pronounced for the SHARE dataset.

Despite the data limitations and low subsample sizes for singular countries, the results give hope that on a more aggregated sample of countries a more comprehensive insight into the retirement decisions of the self-employed could be gained for the data. For Czechia and Austria, some information is still hidden in the "Life during the pandemic" and Austria Corona Panel Project" survey data. If two albeit small samples somehow showed the same trends, it would add to the significance, or the contrary take from it – a combination of the two samples, potentially using a Bayesian method could shed more light on the situation. The microdata from LFS could also still hide pieces of information yet unpublished by statistical offices. Unfortunately for a diverse but smaller group the SE, extracting information from tiny bits of data from different sources might still be a way to go, as long as we don't have a dedicated survey to cover this group.

The next step in the research thus would be a more comprehensive SHARE based model for an aggregation of countries and also working with the wave 9 from 2022. For CZ and AT, getting more details would require work with other data sources and possibly of combination of samples. An analysis of a longer timeline, differentiating the long-term trend from the COVID shock would be a necessary next step.

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