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IZA DP No. 14345

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ABSTRACT

"Too Shocked to Search": The COVID-19 Shutdowns' Impact on the Search for Apprenticeships*

This study is, to the best of our knowledge, the first analysis of apprenticeship supply that allows us to analyse the effects of the shutdowns triggered by the COVID-19 pandemic before, during and after these shutdowns by means of daily searches for vacant apprenticeships. Analysing over 10 million search queries on the national administrative platform for apprenticeship offers from February 2020 until April 2021 we find a sharp reduction of up to 40% in the daily number of search queries associated to the first shutdown in March 2020, followed by some catch-up effect thereafter. Although we find a strong relationship between the intensity of the politically imposed restrictions due to the COVID-19 pandemic and daily search queries, this relationship weakens over time as the pandemic progresses. Finally, we find a large heterogeneity of effects, but all regions and occupational groups studied show a statistically significant negative effect of the measures on the search intensity for apprenticeships.

JEL Classification: I20, J22
Keywords: COVID-19, Switzerland, stringency index, apprenticeship

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1 Motivation

Switzerland is proud of its well-functioning vocational education and training system (VET). Training young people specifically for the demands of a profession, as well as the needs of a company has proven to be a good remedy against youth unemployment and counteracts the shortage of skilled workers (e.g., Bolli, Oswald-Egg, and Rageth, forthcoming). Furthermore, apprentices benefit from the system as well, as they earn theoretical knowledge and working experience while they are trained to become professionals in the respective job.

However, all these advantages are also counterbalanced by the potential disadvantage that the supply of apprenticeship places depends on the economic situation and does not simply follow the demographic trend of young people looking for post-compulsory education, as is the case with school-based types of education (for an overview see e.g., Brunello, 2009). In fact, the apprenticeship market consists of two sides, firms on the one side, demanding apprentices and on the other side the supply of young people willing to learn an occupation. The total number of training contracts therefore reflects the equilibrium of the number of training positions offered by firms willing to train, as well as the number of individuals willing to learn a job. In the past, it could be established for Switzerland (Lüthi & Wolter, 2020) that the number of signed apprenticeship contracts was sensitive to the economic cycle. However, one could only observe the apprenticeship contracts that were concluded – not supply and demand separately. Thus, it was not possible to predict whether the influence of the restrictions on the apprenticeship market, triggered by COVID-19 and the resulting economic slump, would rather come from the demand for apprentices or reactions on the side of the supply of apprentices. This study addresses the latter and is, to the best of our knowledge, the first analysis of apprenticeship supply that allows us to analyse the effects of the shutdowns triggered by the COVID-19 pandemic before, during and after these shutdowns by means of daily searches for vacant apprenticeships.

Concerning the likely consequences of an economic downturn, as the one experienced during the COVID-19 pandemic, it was first and foremost feared that it would affect the demand for apprentices. Companies adjust their demand for apprentices according to their current needs for manpower, as well as the future needs for trained specialists (for an overview on the economics of apprenticeship see e.g., Muehlemann & Wolter, 2020 or Wolter & Ryan, 2011). During times of an economic downturn, it was therefore likely, that firms would reduce the number of offered apprenticeship positions because of an immediate lack of work which is necessary for apprentices to generate the value-added to the firm that covers the training expenditures or an expected decrease of the vacancies for skilled workers in the near future that would have been filled by own trainees. Furthermore, it was realistic to assume that firms willing to train would go bankrupt and thus their demand for apprentices would also be lost.

At the same time as the COVID-19 pandemic could have a negative impact on the demand for apprentices, it was also conceivable that the crisis would have a negative impact on the apprenticeship market via the supply of apprentices. The supply side of prospective apprentices consists of graduates of compulsory school, those entering the apprenticeship market after an interim solution, youth re-orienting after having dropped out of general education or even those intending to train for a second occupation after having already successfully completed an apprenticeship or a general education. For them, applying to occupations also became more difficult during the COVID-19 pandemic. From the perspective of these individuals, the situation they were confronted with was unique in several aspects. Firstly, with the classification of the evolving COVID-19 pandemic as “exceptional situation”, the daily life of youth changed radically. It required significant sacrifice and acclimatisation, e.g., to a life of closed schools and distance learning. Secondly, there was great uncertainty about the length and intensity of this crisis. Applying for vacant apprenticeship posts may not be advisable, as the firms might run into financial problems or might not be able to provide a full vocational

education and training for other reasons. Thirdly, as many businesses were forced to close their operations or work from home during the shutdown, the application process became difficult and complicated, so much so that many potential applicants tended not to apply at all. Fourthly, although this was more of concern for the cohort looking for an apprenticeship in 2021, the usual training fairs and information days in the companies, as well as trial (apprenticeships) working days could not take place. Young people were therefore not able to inform themselves about potential employers and job profiles as was the practice in previous years.

This study contributes not only to a better understanding of the functioning of the apprenticeship market in Switzerland, as for the first time the supply of apprenticeship seekers can be tracked over time. In addition, this study adds also to two strands of the emerging literature on the COVID-19 effects, in general, as well as more specifically how it affected job search and the apprenticeship system.

In general, there is a fast-growing COVID-19 related literature investigating economic consequences of the pandemic (compare e.g., Baker et al., 2020; Chetty et al., 2020; Goolsbee, Syverson, 2021; among many others). For Switzerland, an array of papers was published documenting the COVID-19 impact[1], often using very novel data available on an hourly, daily, weekly, or monthly base. The outcomes included new measures of GDP (Burri and Kaufmann, 2020), mobility and sales (Eckert and Mikosch, 2020; Persson, Parie, and Feuerriegel, 2021), trade (Büchel et al., 2020), or shifts in retail payments (Kraenzlin, Meyer and Nellen, 2020).

There is also a growing literature on the effects of the pandemic on the labour market (e.g., Gupta et al., 2020; Forsythe, Kahn, Lange, Wiczer, 2020; Coibion, Gorodwichenko, Weber, 2020; among others) and more specifically on job search, which is a topic that comes closest to this paper. For the Swiss labour market Lalive, Lehmann, and Siegenthaler (2020)

[1] The Swiss Journal of Economics and Statistics, among other journals, started a special focus with many more articles on the economic outcomes of the COVID-19 pandemic in 2020.

found that jobseekers during the crisis invested less time in their job search than before the Corona crisis. This was driven by a decline in the number of vacancies, as well as due to being afraid of becoming infected with the virus during the recruitment process. In another study using Dutch survey data, Balgova, Trenkle, Zimpelmann, and Pestel (2021) found that unemployed individuals reduced their effort in searching for a job, while employed individuals searched rather more intensively. Finally, Marinescu, Skandalis, and Zhao (2021) found job applications during the covid pandemic to decrease. They further found this to be related to increased unemployment benefits. This relationship weakened as the number of job applications increased again starting in May 2020.

Finally, the above-described implications and observations for the labour market in general can also be found in the apprenticeship market, even though the conditions for potential apprentices and the objectives of companies are different than in the case of regular workers. In an early approach to predict the supply and demand side of the German apprenticeship market in the first year of the COVID-19 crisis, Mühlemann, Pfeifer, and Wittek (2020) estimated, in contrast to the Swiss market, a COVID-19 induced 6% reduction in signed apprenticeship positions in 2020 in Germany. Similar predictions with different data sets and methods were made by Maier (2020) predicting a reduction in signed apprenticeship contracts in Germany induced by a simultaneous decrease in supply and demand and Oeynhausen et al. (2020) confirming, that indeed during the COVID-19 crisis there was a substantial decrease in firms demand for apprentices but also applications sent to companies and consequently a reduction also in the number of signed contracts in the official German statistics. The German studies have the possibility to rely on proxies for the potential supply of new apprentices by using data on the registered applicants in the data base of the Federal Employment Agency. A data set that does not exist in Switzerland as apprenticeship seekers cannot register in an official register.

So, although there is no data on the total number of apprenticeship seekers in Switzerland, this work fills the gap in the literature by investigating the supply side in the apprenticeship market in Switzerland using a new and promising data source to proxy the number of individuals interested in an apprenticeship by revealed preferences daily. Although this does not show the supply of apprenticeship seekers as such, it does show the search intensity, which could not automatically be derived from the number of registered apprenticeship seekers. Our data base consists of every user query searching for an apprenticeship on the public national online apprenticeship platform[2]. Analysing over 10 million search queries from end of February 2020 until April 2021 we found a sharp decrease of up to 40% in search queries during the first shutdown followed by a catch-up effect afterwards. Further, we find a habituation effect, as the effect of politically imposed restrictions on the search intensity decreases over time. Consequently, we found a lower impact of the second shutdown starting in December 2020 until February 2021 on the intensity of searching for an apprenticeship. While every Swiss region and every occupation category was concordantly affected, in "Latin-Switzerland", as well as the *construction*, and *food, hospitality and housekeeping* sector the demand for apprenticeships decreased most with increasing restrictions.

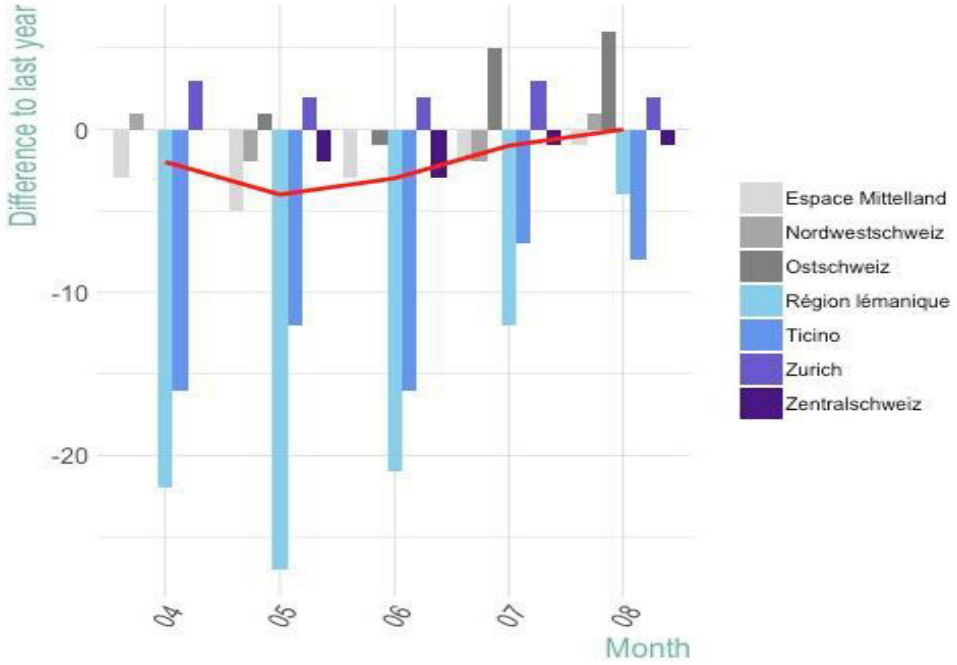
The rest of this work is structured as follows. Section 2 provides a short overview of the apprenticeship market in Switzerland in 2020. Section 3 introduces the methodology, data base and some descriptive statistics. Section 4 presents the results of the analysis, followed by concluding remarks in Section 5.

[2] berufsberatung.ch (de; fr: orientation.ch ; it: orientamento.ch) is the official platform for information about and searching for apprenticeships offered by the swiss service centre for vocational education and training (SDBB | CFSO), which is an institution of the Swiss Conference of Cantonal Ministers of Education. There are also private platforms and there are other ways to search for apprenticeships.

2 The apprenticeship market in Switzerland in 2020

As already mentioned, there are no official data sources in Switzerland that would have allowed the supply of and demand for apprenticeships to be monitored periodically and at high frequency. However, because of the emerging economic consequences of the pandemic, the federal government set up a task force which, among other things, also took on the regular monitoring of the situation on the apprenticeship market. As one of these measures, the cantons reported monthly on the apprenticeship contracts signed and compared these with the number of contracts signed in the same month of the previous year. In this way, the situation on the apprenticeship market could be monitored at least monthly, starting from April 2020 onwards. Looking at these figures (Figure 1), one can see that the number of signed apprenticeship contracts declined in the first half of the year 2020 relative to 2019, but also a catch-up effect reaching the same number of apprenticeship contracts by August 2020 compared to the previous year.

Figure 1: Difference in signed apprenticeship contracts compared to previous year



Notes: The red solid line represents the Swiss average. Data source: "Taskforce Force Perspektive Berufslehre 2020".

Regarding the demand for apprentices alone, there are concurrent indications that the number of offered positions to start the apprenticeship in 2020 did not change substantially compared to previous years.[3] Therefore, the focus of this work is to investigate whether the labour supply side in the Swiss apprenticeship market during the COVID-19 pandemic crisis could explain this striking pattern of an initial decline in signed apprenticeship contracts and subsequent catch-up.

3 Data and Methodology

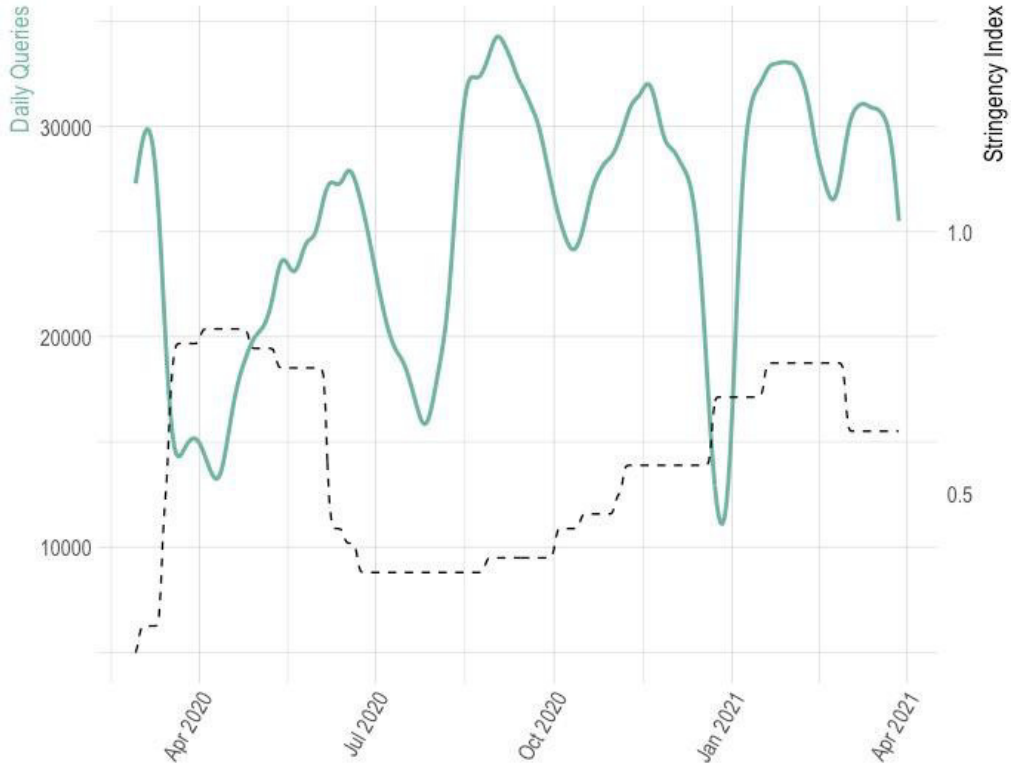
From the 28th February 2020 until the 04th April 2021 our database consists of every user query on the national public Swiss online apprenticeship platform, *berufsberatung.ch*, searching for an apprenticeship position. On this official platform people interested in starting an apprenticeship can search in all four national languages by occupation and location for open apprenticeships. In the investigated 13 months we observe over 10 million search queries.[4,5] Figure 2 shows how the number of daily search queries evolved over this time.

[3] The so-called "Nahtstellenbarometer" of the State Secretariat for Education, Research and Innovation (SERI), monitors the training companies twice a year in April and in August. These representative surveys showed that the demand for apprentices had not changed in 2020 relative to 2019. In August 2020, most of the companies reported, that they had not changed their number of apprenticeship positions in 2020, and the share of companies that have offered more or fewer had hardly changed. More specifically, the number of firms that had reduced their numbers of positions was unchanged compared to the previous years (2020: 8%; 2019: 8%; 2018: 9%).

[4] We cleaned the data base by removed queries for which there is no location, or no occupation defined. Further, we removed all automated (crawler/bot) queries.

[5] The 10 million search queries result not only from individuals interested in an apprenticeship position. Parents, teachers, firms, administrations, and career guidance centres gather information there for advising the potential apprentices. Still, the search for a suitable apprenticeship is complex and requires searching several times on several days until a contract is signed or interest in training is lost. During the COVID crisis (no trial apprenticeships, no information days, etc.) individuals searching for an apprenticeship were more dependent than usual on the help of confidants and institutions. Thus, even though we cannot distinguish the senders of search queries, if having a bias, we expect the estimated effect to be a conservative, lower bound effect.

Figure 2: Total daily queries and stringency index



Note: Green solid line represents the daily queries, Nadaraya-Watson Kernel-smoothed (left axis), the black broken line is the stringency index (right axis), exemplarily for the canton Zurich.

The (weekly) average of daily queries one and two weeks before and after the first shutdown on March 16th, 2020 are shown in Table 1.We observe decreasing numbers of daily search queries in 2020 accompanied by an increasing Stringency index, a measure of toughness of the politically imposed restrictions in response to the pandemic – which is described in more detail in the following. For 2021 both, daily queries and the Stringency index are rather on a constant level comparable to the "pre-crisis" level.

Table 1: Daily queries before and after the first shutdown, 2020 vs. 2021

	2020		2021	
	Daily queries (7 days average)	Stringency index	Daily queries (7 days average)	Stringency index
March, 02. – 08.	30801	0.250	31005	0.620
March, 09. – 15.	26971	0.349	30936	0.620
March, 17. – 23.	13261	0.771	30771	0.620
March, 24. – 30.	15164	0.787	29035	0.620

Notes: Averages of daily queries in week 2 and week 1 before and after the date of the first shutdown, March 16th, 2020. The Stringency index is a measure for restrictiveness of politically imposed countermeasures, which is decribed later in this section.

For the further analysis we aggregate the individual queries by day, canton, and occupation category, leading to a total of 512148 observations.[6] The major advantage of our measure of apprentices supply, even though we do not know the number of potential apprentices[7], is that we observe revealed preferences on a daily basis, with those interested in apprenticeships sending search queries. Further, they stop searching as soon as they found an apprenticeship or lost interest (also temporarily) for other reasons, which gives us a good proxy for the daily interest in apprenticeship training positions, by field of occupation and region. Other measures are mainly only available on a yearly basis or as rough proxies.

To measure the effect of the shutdown policy on the number of search queries we focus on two variables of interest. Firstly, a binary variable is constructed which is equal to 1 starting with the national shutdown from the 16th March, 2020 onwards until the (second) easing of the national restrictions on the 11th May, 2020.[8] Secondly, we use the "*KOF Stringency Index / KOF Stringency Index Plus*" (KOF High Frequency Economic Monitoring Dashboard, 2021), which are constructed as composite measures of the different restrictions and are ranging from 0 (no restrictions) to 1 (full shutdown).[9] The availability of the KOF Stringency Index on a cantonal base gives us the advantage that we can capture not only the impact of variations of this index over time but also between geographical regions, as in Switzerland, like in other countries, different levels of restrictions were in function for different regions at the same time.

[6] We chose to use the subgroups of the SwissDoc-number classification, resulting in 49 occupational groups. 402 (days) x 26 (cantons) x 49 (occupations) = 512148 observations

[7] As mentioned before, potential apprentices are not only those youngsters leaving compulsory school and looking for an upper-secondary education, but also those who have dropped out of upper-secondary programs (general education or VET-programs), those who have spent a year or more in interim solutions or even adults who are looking for their first or second upper-secondary education.

[8] To investigate if the effect is driven by the definition of this variable, as well as to see how the effect evolved over time, we chose to add various other definitions, i.e., for 7, 14, 30, 80 and 100 days, as well as until the first easing of the restriction (25th April, 2020). To investigate the second shutdown a binary variable is created which equals 1 for the days from the 22nd December 2020 until 28th February 2021.

[9] It combines 9 indicators to a one-dimensional index: school closures, workspace closures, cancellation of public events, closure of public transport, restrictions on gatherings, requirements to stay at home, internal movement restrictions, international travel controls and public info campaigns. The "plus" variant of the stringency index adds a tenth, i.e., facial coverings, as well as refines workplace closures to incorporate reduced opening hours. For the detailed construction of the indices, we refer to the KOF High Frequency Economic Monitoring Dashboard (2021) and the documentations provided there.

The construction of the daily KOF Stringency Indices follows closely the *Oxford Covid-19 Government Response Tracker*, but refines the measure to account for cantonal differences within Switzerland. Figure 2 shows the Stringency Index over the investigated time period exemplary for the canton of Zurich.

To investigate if the effect of the restrictions is declining or growing over time[10] a variable "Stringency over time" is constructed as follows:

$$Stringency\ over\ time = Stringency\ \times \frac{t}{100},$$

where t = 1,…,T is an increasing numbered index for the respective day, i.e. is equal to 1 for the 28th February 2020, up to 402 for the 4th April 2021. Dividing by 100 leads to more interpretable coefficients, which can now be seen as for every 100 days the stringency coefficient is changed by the stringency over time coefficient.

Table 2: Descriptive Statistics

	Mean	SD	Min	Max
	Outcomes			
# Queries by day	25386.61	11513.79	3259	52105
# Queries by day, canton and occupation	14.520	56.787	0	7353
Log(# Queries by day, canton and occupation)[1)]	1.381	1.442	0	8.903
	Covariates			
Stringency index	0.559	0.179	0.194	0.815
Stringency plus index	0.554	0.167	0.175	0.750
Stringency over time[2)]	1.153	0.842	0.002	2.753
Public holidays	0.025	0.157	0	1
School vacation	0.256	0.437	0	1
Share signed apprenticeship contracts[3)]	0.709	0.271	0.001	1

Notes: 512148 Observations. SD= standard deviation. [1)] to avoid NA values due to undefined log(0) we chose to add +1 to each value before log-transformation. [2)] Stringency index multiplied by an in time increasing variable as described in the text. [3)] Due to missing information in the monitoring 389844 observations.

[10] The analysis of the time-dependency of the stringency index on outcomes is motivated by the observation of a so-called Covid-19 shutdown fatigue. Goldstein, Yeyati, and Sartorio (2021) e.g., found that there is a fading effect of the COVID-19 related restrictions on mobility and health outcomes, using a panel of about 150 countries.

To control for specific (COVID-unrelated) patterns we construct several variables. Repeated weekly patterns are accounted for by including binary variables for each day of the week, while seasonal variations are captured using monthly indicators. For general cantonal differences canton dummies are included, as well as dummies to account for the occupation group in which the search was done. Since search intensity is generally lower on public holidays, as well as school vacations those are also included on a cantonal level. Traditionally, within Switzerland there is a variation in the timing when apprenticeship contracts are signed. This is closer to the start of the apprenticeship for the non-German speaking cantons, which Figure 6 in the Appendix documents for April 2020. To take into account that apprenticeship contracts are concluded at different times in the year, depending on the region we include the already signed apprenticeship contracts as share of the previous years total number as an additional control variable. Descriptive statistics on some of these variables can be found in Table 2.

In the following we analyse the relation between the shutdown indicators and the number of search queries in a linear regression framework. To check the dependence of the results on the choice of the method in the appendix the main results are replicated using Pseudo-Poisson Maximum Likelihood (Santos Silva & Tenreyro, 2006).

4 Results

To investigate the influence of the restrictions imposed due to the COVID-19 pandemic on the demand for apprenticeship positions, we first analyse the correlation of the Stringency Index on the number of daily search queries by canton and occupation.

Important for the interpretation of the coefficients is that the outcome, the number of daily search queries, is used in a log-transformation. The unconditional correlation in Table 3, column (1) can therefore be interpreted as for an increase of 1 unit in the Stringency Index we observe

19.6% less search queries. Further, it is important to keep in mind that an increase from 0 to 1 in the Stringency would translate to a switch from no restrictions to the maximum possible restrictions (the maximum observed Stringency Index value in the data was 0.815). To put this index into perspective, we have seen that the first shutdown in March 2020 resulted in an increase of about 0.5 units.[11]

Table 3: Main results, stringency index

	(1)	(2)	(3)	(4)	(5)
Stringency	-0.196***	-0.617***	-0.682***	-0.579***	-0.569***
	(0.016)	(0.014)	(0.015)	(0.017)	(0.017)
Public holiday		-0.304***	-0.303***	-0.277***	-0.280***
		(0.009)	(0.009)	(0.009)	(0.009)
School vacation		-0.208***	-0.209***	-0.200***	-0.187***
		(0.006)	(0.006)	(0.006)	(0.006)
Stringency over time			0.091***		
			(0.012)		
Share signed apprentice. contr.					-0.604***
					(0.059)
Other controls		x	x	x	x
Time range	28.02.2020 - 04.04.2021	28.02.2020 - 04.04.2021	28.02.2020 - 04.04.2021	28.02.2020 - 31.08.2020	28.02.2020 - 31.08.2020
Observations	512148	512148	512148	236964	236964

Notes: Outcome is the log(daily queries per canton and occupation). Other controls are dummies for: Days of the week, month, occupation, canton, year. Standard errors in parentheses are clustered standard errors on occupation x canton level. *** marks statistical significance at the 0.1% level.

Conditional on a range of control variables, in column (2), for the whole sample, as well as column (4) for the time range until the apprenticeships 2020 started in the beginning of September, we observe coefficients of -0.617 and -0.579, respectively. To set these numbers into perspective, for the first shutdown in March 2020 this translates to a decrease of about 30% of search queries. This is in the range of the decrease in search queries during public holidays (with coefficients of -0.304 and -0.277, respectively) and larger in magnitude compared to the effect of school vacations (with coefficients of -0.208 and -0.200, respectively).

[11] An increase in 0.5 is due to a bundle of imposed or tightened restrictions. Some more concrete examples are: Closing all schools and universities increases the *Stringency Index* by 0.111, while allowing gatherings of 50 instead of 10 people decreases the index by 0.028.

Although, (Table 3, column 5) the share of signed apprenticeship contracts in the respective NUTS-2 region has the expected negative impact on search activities, there is almost no change in the effect of the restriction index on daily search queries. In other words, the restrictions themselves affected the search activities of those still in search of an apprenticeship at the time the restrictions were imposed, in a similar magnitude irrespective of the number of outstanding contracts at that time in their region.

To investigate the effect of the restrictions over time column (3) in Table 3 includes the *Stringency over time* variable, showing that for each additional 100 days, the correlation between the Stringency Index and the number of search queries becomes smaller in effect by 0.091. Therefore, after 1 year the effect of the Stringency Index measured restrictions on the daily search queries is halved. Tables 5 and 6 in Appendix B investigate the sensitivity of those results for the choice of the Stringency versus an extended *Stringency plus* Index (Table 5), as well as with regard to the estimation method (Table 6). For both, the Stringency plus Index, as well as the Pseudo-Poisson Maximum Likelihood approach, the results are comparable to our main results in Table 3 and the conclusions drawn do not change.

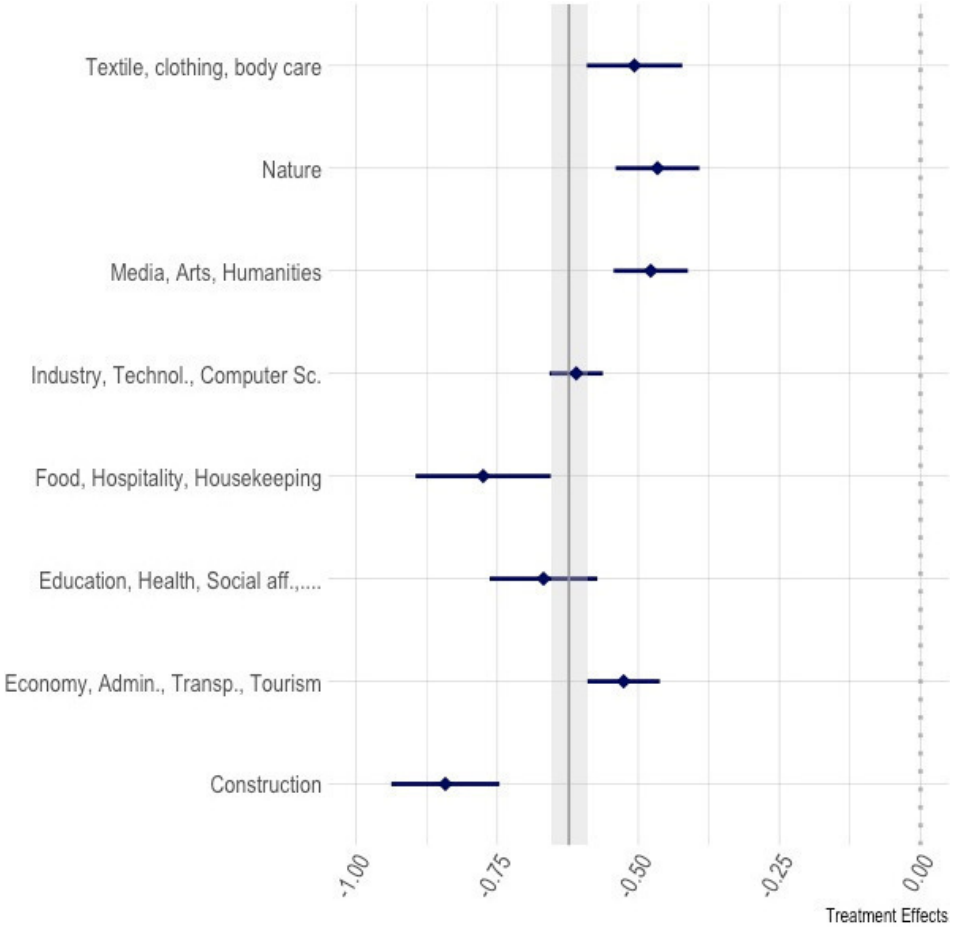
Table 4: Main results, shutdowns

	(1)	(2)	(3)
Shutdown 1	-0.394***	-0.379***	-0.407***
(16.03. – 11-05. 2020)	(0.006)	(0.005)	(0.008)
Shutdown 2		-0.198***	-0.218***
(*22.12.2020 – 28.02.2021)*		(0.007)	(0.008)
Stringency			0.096***
			(0.019)
School vacation	-0.207***	-0.171***	-0.169***
	(0.006)	(0.006)	(0.006)
Public holiday	-0.326***	-0.277***	-0.279***
	(0.009)	(0.008)	(0.008)
Observations	512148	512148	512148

Notes: Outcome is the log(daily queries per canton and occupation). Other controls, included in every regression are dummies for: Days of the week, month, occupation, canton, year. Standard errors in parentheses are clustered standard errors on occupation x canton level. *** marks statistical significance at the 0.1% level.

The finding of a substantial, but over-time decreasing, effect is confirmed by investigating the two major shutdowns in Table 4. While the effect induced by the first shutdown (*Shutdown 1*) in column (1), with a decrease of about 40% of daily search queries, is slightly larger in magnitude compared to the previously implied result. For the second shutdown (*Shutdown 2*) in Table 4, column (2) we observe a decrease of only about 20%. Defining different lengths of the Shutdown 1, Figure 6 in the Appendix shows that the effect was strongest two weeks after the shutdown on the 16th of March and steadily decreased afterwards.

Figure 3: Treatment effect by occupation, 8 categories

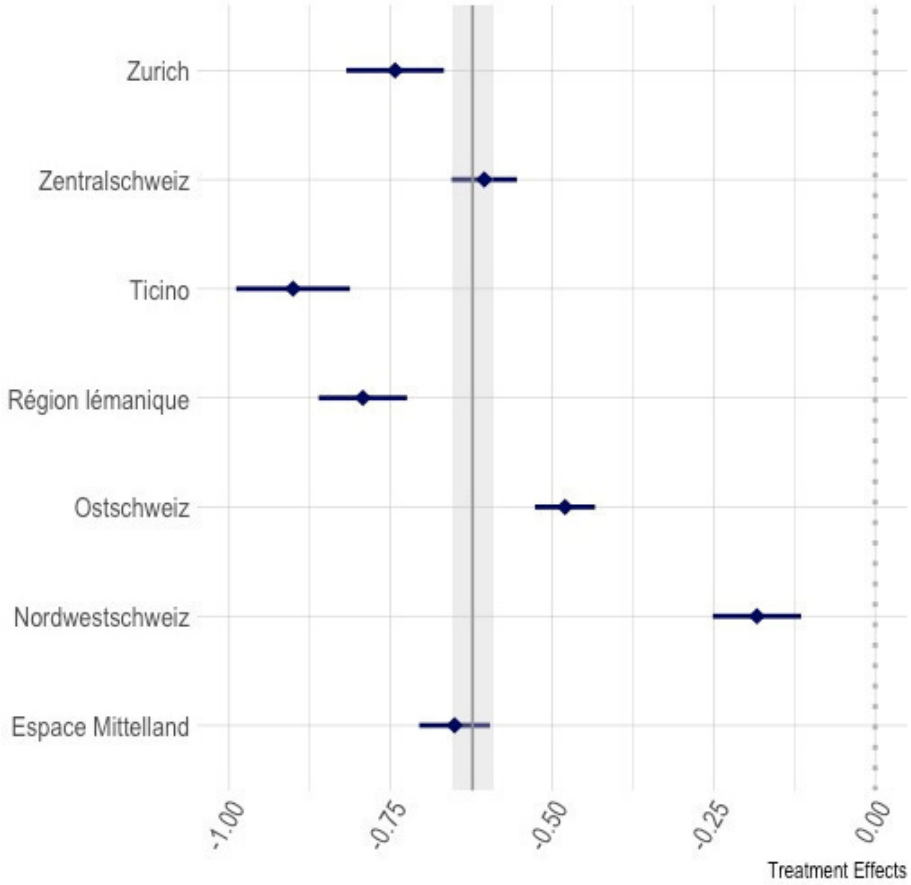


Notes: Correlation of Stringency Index and daily queries; linear model – specification as in Table 2, column (2). Blue diamonds are the point estimates for the specific region accompanied by the 95% confidence interval. Vertical solid grey line (with grey shaded confidence interval) is the population average effect. Eight categories according to the SwissDoc classification.

The effect of *Shutdown 2* in Table 4, columns (2) and (3) is lower in magnitude compared to *Shutdown 1*. This lower effect is also visible if we investigate the shutdowns descriptively

on a raw, daily basis in Figures 7 and 8 in the Appendix A. We find a clearly evident effect for *Shutdown 1*, regenerating slowly, while for the *Shutdown 2* we observe a short and strong effect, which is partly explainable by school vacations and the public holidays around Christmas and New Year.

Figure 4: Treatment Effects by NUTS-2 regions



Notes: Correlation of Stringency Index and daily queries; linear model – specification as in Table 2, column (2). Blue diamonds are the point estimates for the specific region accompanied by the 95% confidence interval. Vertical solid grey line (with grey shaded confidence interval) is the population average effect.

Investigating subgroups defined by eight occupation categories we find different occupation types to react differently to the restrictions in Figure 3.[12] Although effects differ by occupation categories, they are all significantly smaller than zero and similar in magnitude. Figure 4 sheds some light on differential effects by regions. The strongest effect is visible in the regions of *Ticino* and *Région lémanique*, which are also the regions first and, at least in the

[12] The eight occupation categories are chosen according to the super-categories in the official SwissDoc classification.

beginning of the pandemic, hardest affected by the Coronavirus. Though the results are heterogeneous, it can be noted that all the regions show significant responses to the stringency of restrictions.

5 Conclusion

This paper examines the impact of the economic, social and educational restrictions triggered by the COVID-19 pandemic on the behaviour of apprenticeship supply before, during and after these shutdowns. The behaviour of supply is analysed using a novel dataset formed by around 10 million searches for apprenticeships on the official public platform for apprenticeships. With this data, the search intensity for apprenticeships can be approximated and tracked daily. The analyses show a very strong, negative reaction in the search queries because of the first shutdown in mid-March 2020. The further development of the search queries correlates strongly with the KOF Stringency Index, which shows the degree of restrictions imposed daily and per canton. However, the analyses also show that the influence of the restrictions on search intensity decreases over time.

At present, we can only speculate about the reasons for the declining influence of the restrictions on search activities. Firstly, as with other behaviours such as geographic mobility, it may be that the same restriction measures have no longer elicited the same responses from the population over time, a phenomenon known as COVID-fatigue. In our case, this could also be interpreted as meaning that the young people had recovered from an initial "shock" and knew afterwards how to deal with the crisis situation. Secondly, state support measures could also have had an effect, by means of which school leavers in particular were motivated to actively seek apprenticeships again and in some cases also supported them in doing so. This would also explain the increase in search activities that was already evident towards the end of the first shutdown. Thirdly, the decreasing influence of the restrictions on search activities could also

be related to the fact that schools were only closed during the first lockdown. Even if the opening of the schools markedly lowers the stringency index and thus part of this effect would have to be absorbed by the stringency index, it must of course be taken into account when interpreting the results that not every measure that flows into the stringency index to a similar extent also has a proportional effect on the search behaviour for apprenticeships.

With regard to the development of the Swiss apprenticeship market during the 2020 pandemic year, the analyses provide an explanation for the initial decline in apprenticeship contract signings at the beginning of the first shutdown and the subsequent catch-up effect. Although there is no similar daily data available on apprenticeship supply before, during and after the shutdown, all available data sources indicate that there was no decline in apprenticeship supply in 2020. It is also unlikely that there would have been a temporary decline in apprenticeship vacancies during the first shutdown, as such apprenticeships are usually decided on by companies around a year before the start of training and are then also advertised publicly. In view of the fact that the course of the number of signed apprenticeship contracts correlates well in time with the search intensity for apprenticeships and assuming that there was a stable supply of apprenticeships in time, we can assume that the pattern of apprenticeship contracts was primarily, if not exclusively, determined by the search intensity of potential new apprentices.

Finally, it can be deduced from these correlations that the timing of the exogenous shock (COVID-19 pandemic), namely at a time when more than 60% of apprenticeship contracts for 2020 had already been signed, as well as the timing of the transition to reopened schools contributed to the fact that the economic slump in 2020 bypassed the apprenticeship market without leaving noticeable traces. Finally, for the future monitoring of the apprenticeship market, it can be concluded from the analyses that the data on the search activities for

apprenticeship positions provide a very good high-frequency indicator to follow the development on the supply side of the apprenticeship market in "real time".

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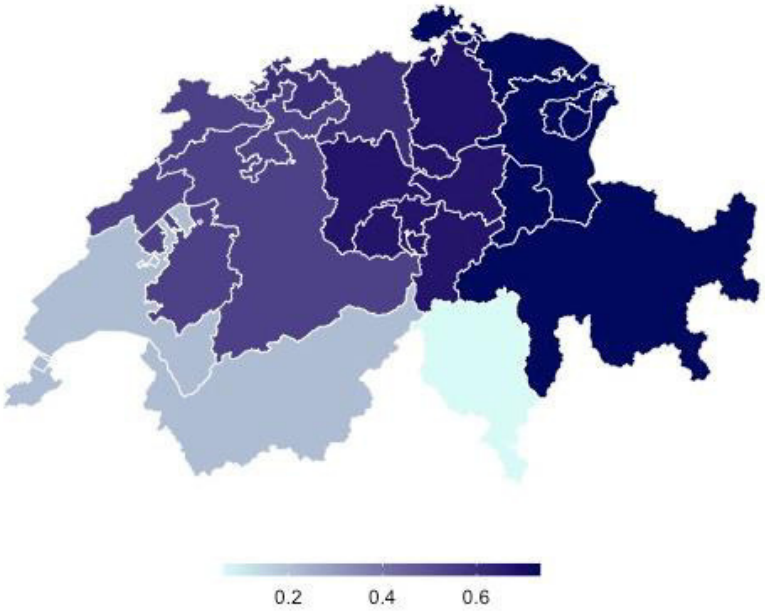
Appendices

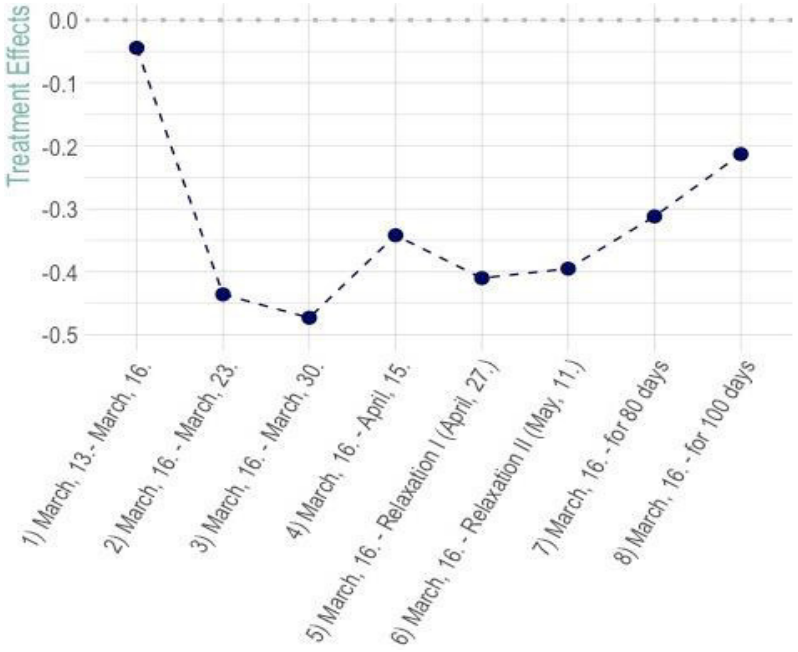
Appendix A: Additional Resources

Figure 5: Share of signed apprenticeship contracts, April 2020



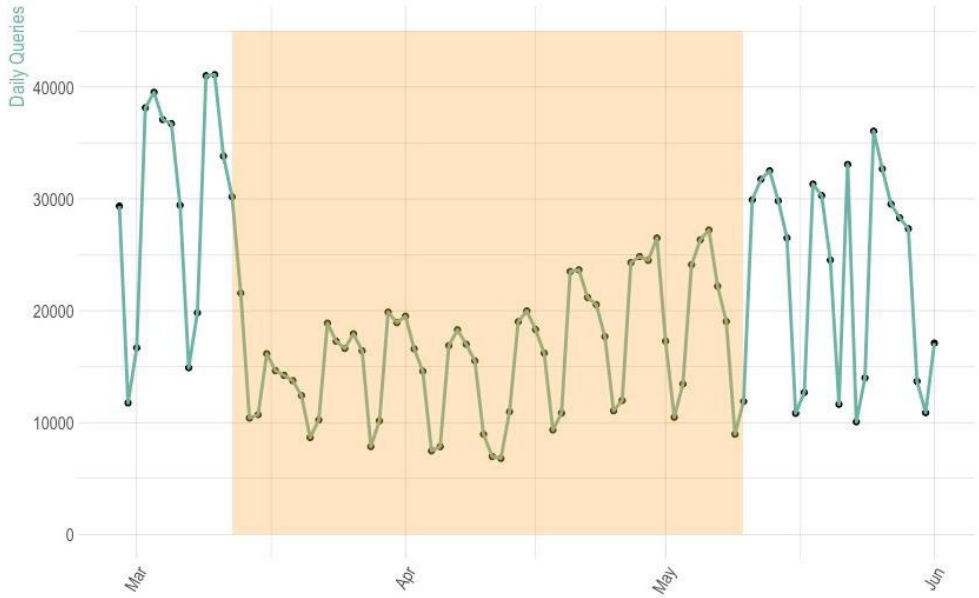
Notes: In April 2020 as a share of the number of previous years' total number of signed apprenticeship contracts within a NUTS-2 region.

Figure 6: Shutdown 1 effects for different time periods



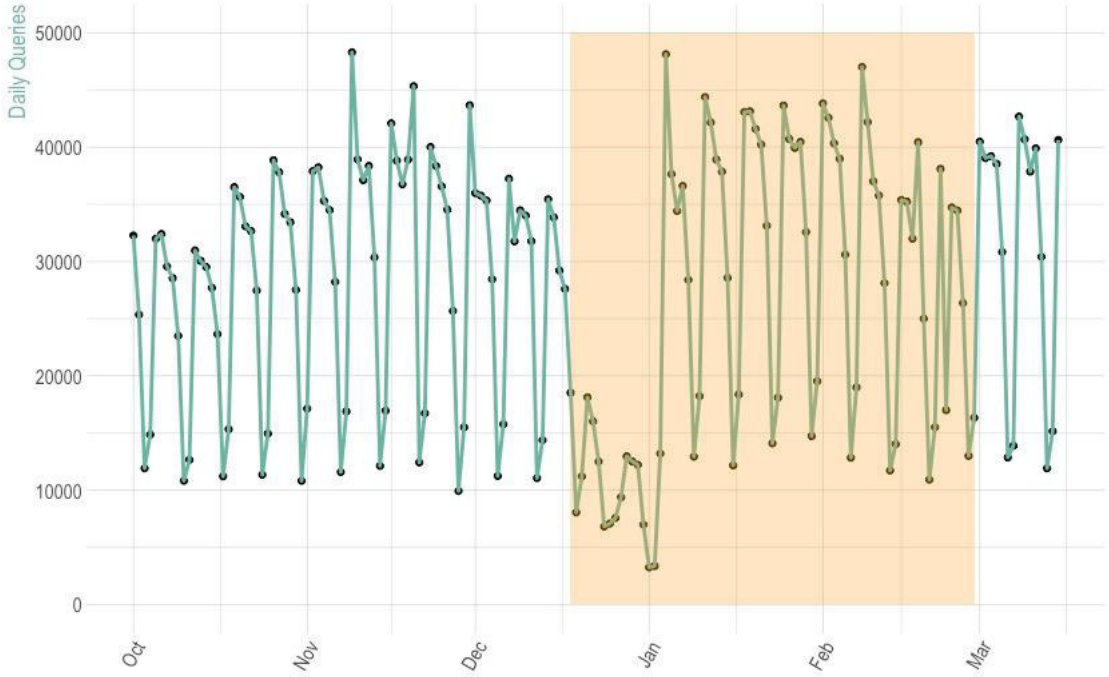
Notes: Treatment effects from separate regressions using different definitions, i.e., time spans, of the treatment variable. Since (canton by occupation clustered) standard errors are very small (<0.006) they are omitted in this illustration.

Figure 7: First shutdown, daily queries, Feb 28 - Jun 01, 2020



Notes: Green solid line connects for illustration purposes the daily queries (black points). Yellow shaded area represents the time between 13.03. and 11.05.2020.

Figure 8: Second shutdown, daily queries, Oct 01, 2020 - Mar 15, 2021



Notes: Green solid line connects for illustration purposes the daily queries (black points). Yellow shaded area represents the time between 22.12.2020 and 28.02.2021.

Appendix B: Additional Results

*Table 5: Main results, stringency **plus** index*

	(1)	(2)	(3)	(4)	(5)
Stringency	-0.137***	-0.664***	-0.734***	-0.620***	-0.610***
	(0.017)	(0.015)	(0.015)	(0.019)	(0.018)
Public holiday		-0.304***	-0.303***	-0.279***	-0.281***
		(0.009)	(0.009)	(0.009)	(0.009)
School vacation		-0.210***	-0.211***	-0.200***	-0.187***
		(0.006)	(0.006)	(0.006)	(0.006)
Stringency over time			0.087***		
			(0.012)		
Share signed apprentice. contr.					-0.605***
					(0.059)
Other controls		x	x	x	x
Time range	28.02.2020 - 04.04.2021	28.02.2020 - 04.04.2021	28.02.2020 - 04.04.2021	28.02.2020 - 31.08.2020	28.02.2020 - 31.08.2020
Observations	512148	512148	512148	236964	236964

Notes: Outcome is the log(daily queries per canton and occupation). Other controls are dummies for: Days of the week, month, occupation, canton, year. Standard errors in parentheses are clustered standard errors on occupation x canton level. *, **, and *** stands for significance on the 5,1,0.1% level.

Table 6: Main results, stringency index, PPML

	(1)	(2)	(3)	(4)	(5)
Stringency	-0.144***	-0.959***	-0.917***	-1.032***	-1.031***
	(0.028)	(0.022)	(0.028)	(0.029)	(0.029)
Public holiday		-0.504***	-0.506***	-0.317*	-0.317*
		(0.113)	(0.113)	(0.160)	(0.161)
School vacation		-0.383***	-0.382***	-0.380***	-0.376***
		(0.009)	(0.009)	(0.016)	(0.011)
Stringency over time			0.058**		
			(0.021)		
Share signed apprentice. contr.					-0.076
					(0.205)
Other controls		x	x	x	x
Time range	28.02.2020 - 04.04.2021	28.02.2020 - 04.04.2021	28.02.2020 - 04.04.2021	28.02.2020 - 31.08.2020	28.02.2020 - 31.08.2020
Observations	512148	512148	512148	236964	236964

Notes: Outcome is the daily queries per canton and occupation. Other controls are dummies for: Days of the week, month, occupation, canton, year. Standard errors in parentheses (no clue how this is calculated).*, **, and *** stands for significance on the 5,1,0.1% level.