

## **Establishing an activity tracker in Eastern Europe and Central Asia: Lessons from Ukraine**

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## About the German Economic Team

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Financed by the Federal Ministry for Economics and Energy, the German Economic Team (GET) advises the governments of Ukraine, Belarus, Moldova, Kosovo, Armenia, Georgia and Uzbekistan on economic policy matters. Berlin Economics has been commissioned with the implementation of the consultancy.

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## About the Centre for Economic Strategy

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The Centre for Economic Strategy is an independent research agency on public policy issues. The mission of the CES is to support reforms in Ukraine to achieve sustainable economic growth. The Centre contributes to the development of Ukraine's economic growth strategy, performs an independent analysis of the most important aspects of public policy, and works on strengthening the public support for reforms. It was established in May 2015.

Our principles:

- Economic freedom (liberalization, deregulation, privatization)
- Free and fair competition
- Reduction of the role of the state
- Information transparency and freedom of speech
- The rule of law and the protection of private property
- Healthy and stable public finances
- Knowledge-based economy

For more information on the CES, please contact Andrii Fedotov, Director of Communications (tel.: (044) 492-7970, [office@ces.org.ua](mailto:office@ces.org.ua)).

Please visit our website [www.ces.org.ua](http://www.ces.org.ua) and follow the link on the social media [facebook.com/ce-sukraine](https://facebook.com/ce-sukraine) or [twitter.com/ces\\_ukraine](https://twitter.com/ces_ukraine).

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## 1 Background and rationale

The Activity Tracker allows for real-time observation of the population's behaviour and economic reaction to the COVID-19 pandemic and preventive policies aimed at its combating (i.e. lockdowns) and economic activity in general. Having long time series that also cover the pre-crisis period allows making conclusions on the effect of the pandemic and restrictions on economic activity. Policymakers can also use this data for predictions and preparing policy decisions; businesses can use it for planning their economic activity.

Overall, this tracker establishes a high-frequent path of economic recovery, it shows its distance to the pre-crisis level as a benchmark and the development of economic activity.

Such a tracker was already established in 2020 in Ukraine by the Centre for Economic Strategy (CES), one of the leading think tanks in Ukraine, and a cooperation partner of GET. As the region, as well as the global economy, is currently still slowly and unevenly recovering, we think a similar tracker for other countries in Eastern Europe and Central Asia can be a useful instrument. The following chapters explain the tracker in Ukraine in more detail.

## 2 What categories do we track?

### 1. Community Mobility

We use Google mobility reports to track the changes in visits at different places compared to a pre-pandemic baseline. We track visits to the following categories: retail & recreation, Grocery & pharmacy, Transit stations and Workplaces.

### 2. Labour market

We use data from the local job posting websites to track the labour market reaction from both supply and demand sides - number of vacancies and resumes postings. We also track the number of job postings that allow for remote and part-time work.

### 3. Most affected industries

We track the reaction of some of the most affected industries relevant to Ukraine, such as restaurants, hospitality, and travel. Specifically, we use the data on the changes in the number of operating restaurants and their turnover, railway ticket purchases and flight bookings.

### 4. Residential rent prices

We track rent prices in Kyiv since they can provide insights about the housing demand as a leading indicator for economic activity.

### 5. Electricity consumption

We track electricity consumption (adjusted for the temperature to exclude the weather effect) since it is one of the most accurate indicators of economic activity.

### 6. Bank payments

We use the data from Privatbank (No. 1 in Ukraine) about the number of unique transactions via POS terminals and online app. This data allows tracking the consumption activity of the population to some extent.

### 7. Vaccinations

We use the official statistics of the Ministry of Health to track the cumulative share of people that have received at least one dose, and the number of vaccine doses administered per

100 000 people over the past week. This data allows us to track vaccination pace in general and to see its current dynamics.

#### **8. Lockdown stringency index**

We use the “Oxford Government Response Index” to compare how lockdown stringency affects mobility, industries, and other categories. The index is measured based on nine indicators including school closures, workplace closures, and travel bans.

### **3 How do we select data sources?**

Data are selected to have high-frequent and accurate observations of the path of the economic recovery and its distance to the pre-pandemic level as a benchmark.

#### **1. High frequency**

Ideally, the data should have daily or weekly frequency and be updated every week. This allows for almost real-time tracking.

#### **2. Reliability**

The data must come from official sources or reliable websites or services that collect accurate data. It should be updated regularly and be easily accessed (ideally, no text or pdf data). For most of the charts, we get data from open sources, for several - directly from companies.

#### **3. Long time series**

Ideally, the data should also cover pre-pandemic times to assess the effect of the pandemic and preventive policies.

### **4 What technologies do we use?**

The use of high-frequent and non-textbook indicators for economic recovery requires programme-driven approaches for data gathering and data visualization.

#### **1. Python scripts**

We use Python programming language to automate data gathering, cleaning and processing. For example, we have developed a script that scrapes both electricity consumption and temperature data, performs data adjustment and correction using linear regression, saves the prepared dataset for further visualizations. Alternatively, R programming language or any other statistical software can be used.

#### **2. Microsoft Excel spreadsheets**

Spreadsheets are used to save, transform, update and visualize the data. We use Excel spreadsheets since they can be easily shared, manipulated and understood by other analysts or stakeholders.

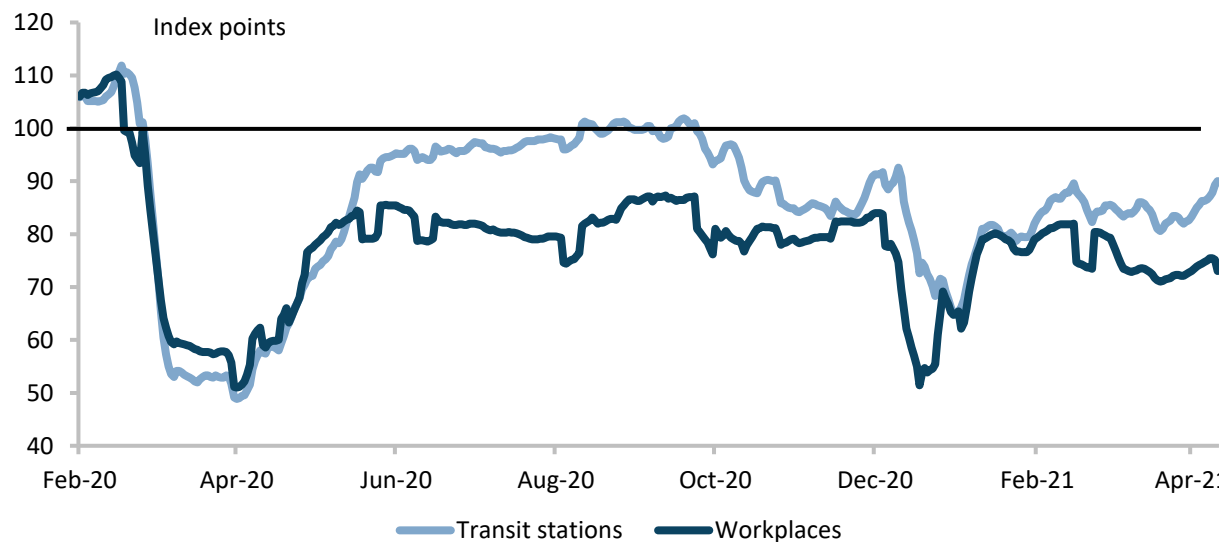
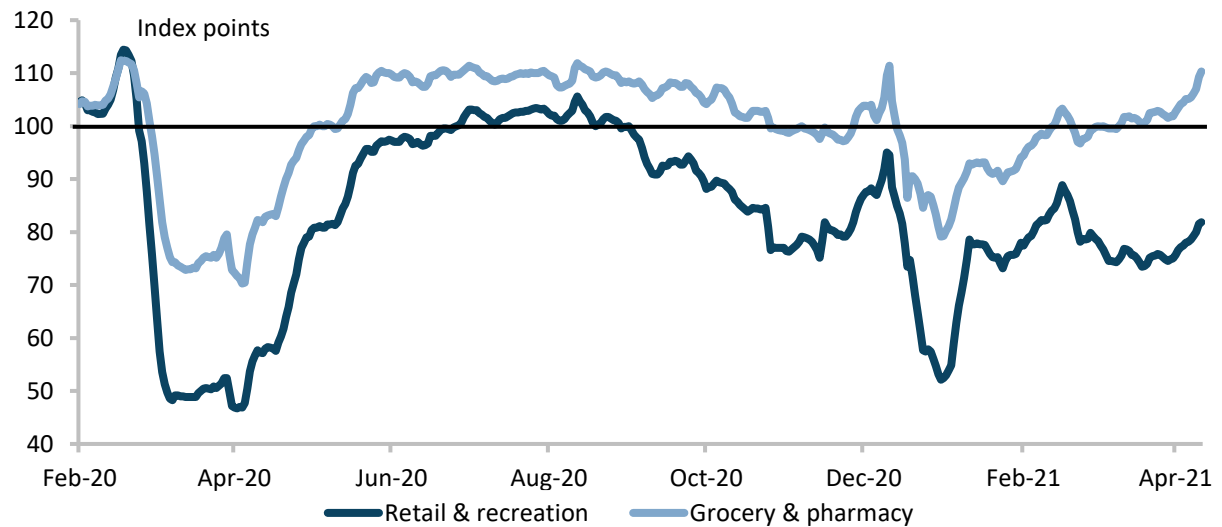
#### **3. [Datawrapper](#)**

It is an open-source chart tool that allows embedding interactive charts on a website. Updating the data is done manually every Monday. Any other software or service can be used, such as Microsoft Power Bi or Tableau.

## 5 Examples

In Ukraine, we update the tracker weekly and publish it on the Centre for Economic Strategy [website](#). We provide a detailed description of the methodology and data sources under each graph. We compare all data points to the baseline and present only relative data (in percentages). When possible, we present daily frequency data (using a 7-day moving average). Some data have a weekly frequency.

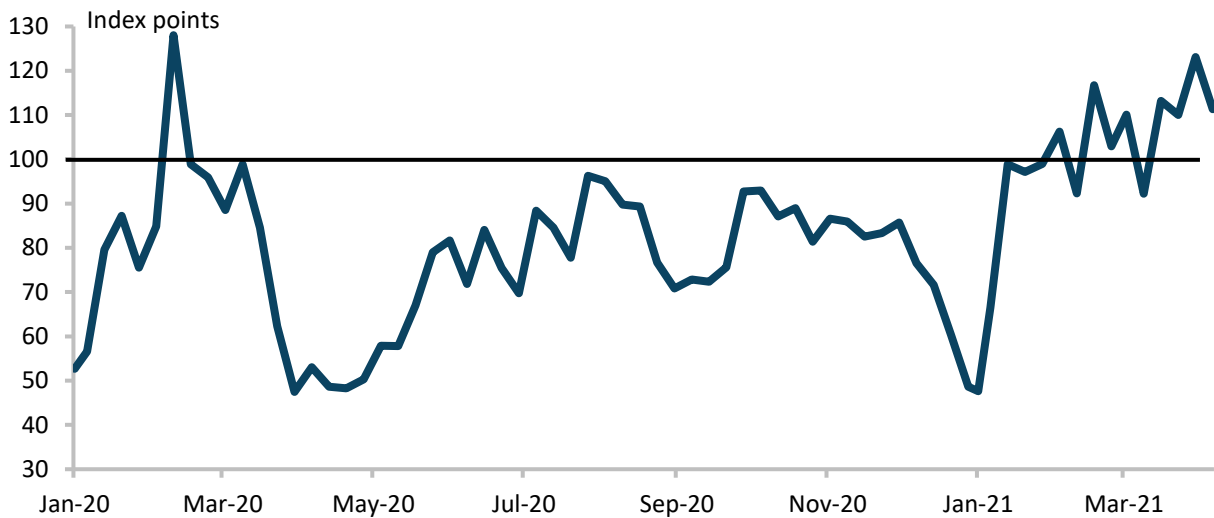
### 5.1 Community Mobility



*Data: the number of visitors, median of the corresponding day of the week measured during January 3 - February 6, 2020 = 100, 7-day moving average, according to Google Mobility Report, CES calculations.*

We use Google mobility reports to track the mobility of the population. Google publishes aggregated mobility data for almost all the countries in the world with some exceptions (e.g., Belarus is not represented). Since all data points are already in relative terms, we simply transform it so the baseline=100% and calculate the 7-day moving average.

## 5.2 Labour market: Number of vacancies

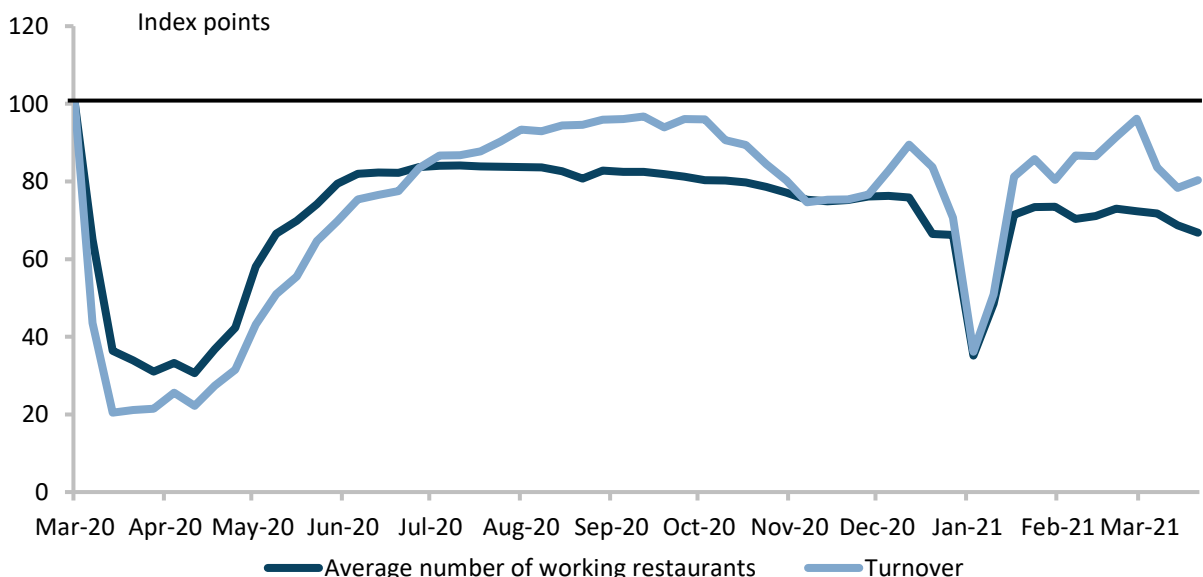


Data: synthetic indices of the number of new vacancies, 100= average of 2019, according to [rabota.ua](#) and [Jooble](#) data, CES calculations.

We use two sources for this graph: [rabota.ua](#) and [Jooble](#) (Jooble data is not public). This data has a weekly frequency. We first calculate relative indicators (compare all data points to the average of 2019) for each source and then combine two series into one by calculating the average.

## 5.3 Most affected industries

### 5.3.1 Restaurants

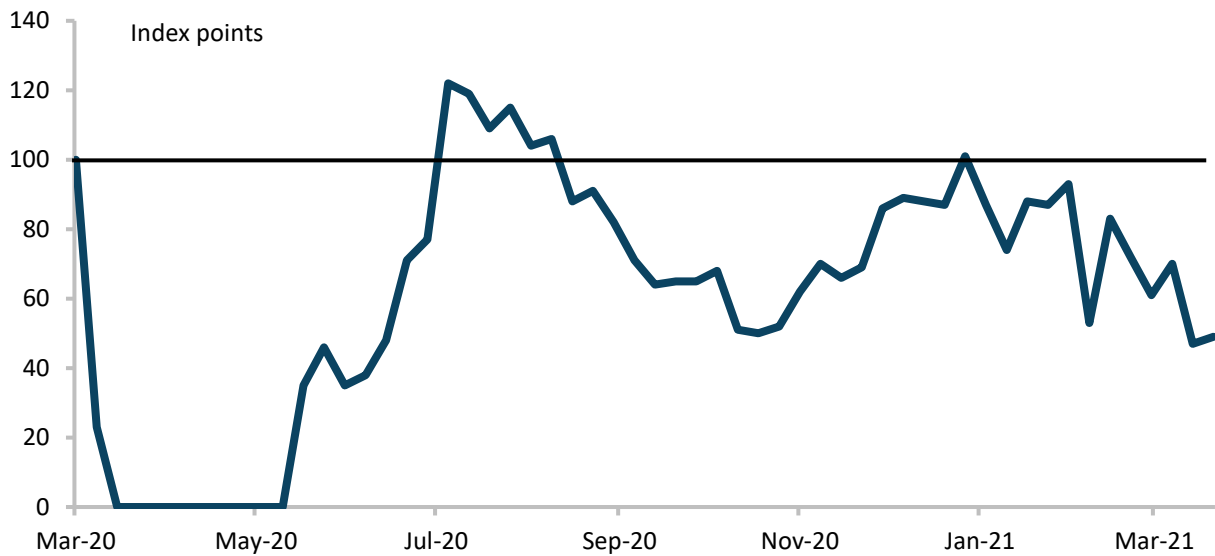


Data: weekly turnover of restaurants; number of active restaurants, March 15, 2020 = 100, weekly average, according to [Poster](#) data, [Poster](#) calculations.

We use [Poster](#) data (non-personalized aggregate data of 6000+ [Poster](#) client establishments) that is shared with us internally. The data also has a weekly frequency. Calculations of the average number of working restaurants and turnover are made by [Poster](#).



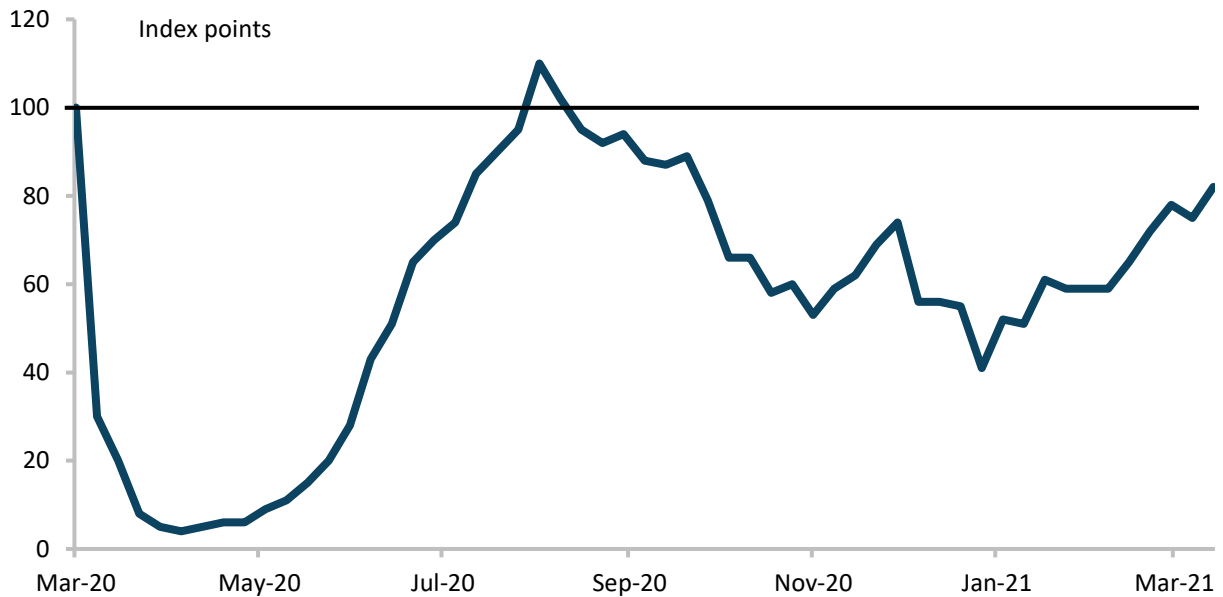
### 5.3.2 Railway ticket purchases



Data: the number of train tickets purchased per week, March 15, 2020 = 100, according to railwaybot.com, Opendatabot calculations.

We use data that is available on [Opendatabot](#). Opendatabot analysts count the share of railway tickets purchased based on [Railwaybot](#) – a railway ticket search bot – and publish the data weekly.

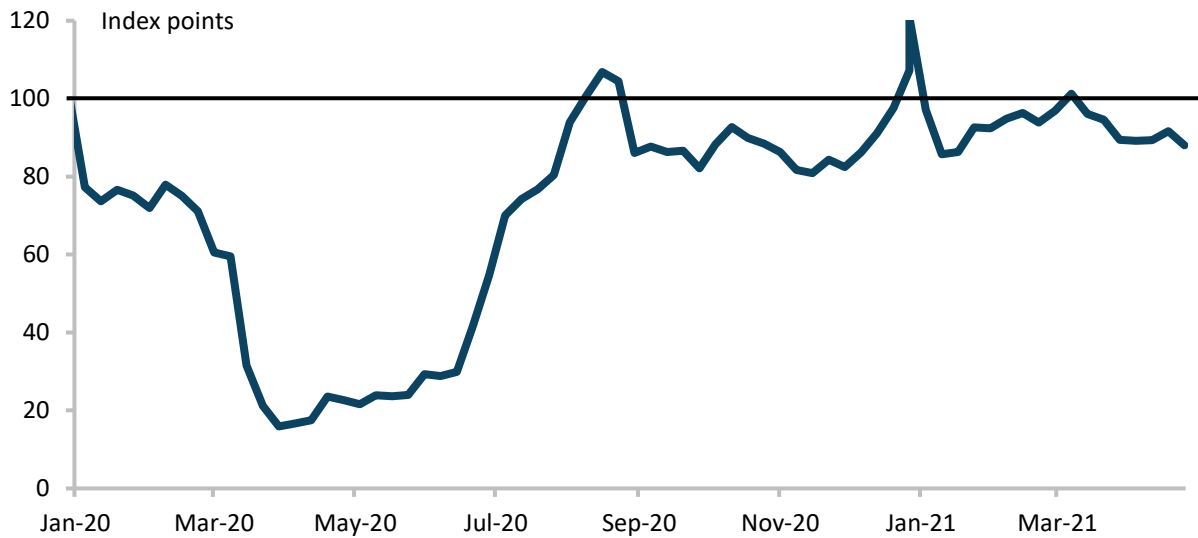
### 5.3.3 Airline ticket purchases



Data: the number of airline tickets booked per week (both international and domestic flights), March 15, 2020 = 100, according to Aviasales.ua, Opendatabot calculations.

For airline ticket purchases we use weekly data from [Opendatabot](#) as well. [Aviasales](#) data is used to count the share of airline ticket reservations.

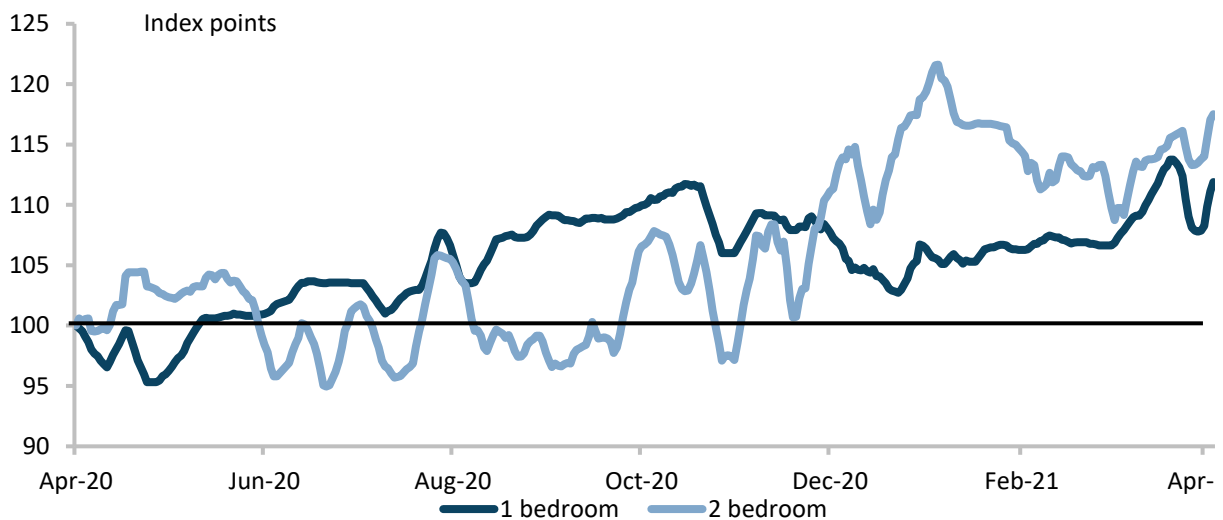
### 5.3.4 Hospitality: Occupancy



Data: the number of properties booked per week, the average of 2019 = 100, according to Airbnb and Booking.com, Transparent calculations.

We use the share of properties booked data from [Transparent](#) – a platform that tracks worldwide vacation rental statistics. The data has a weekly frequency and is shared with us within access to a personalized query. We compare all data points to the average of 2019.

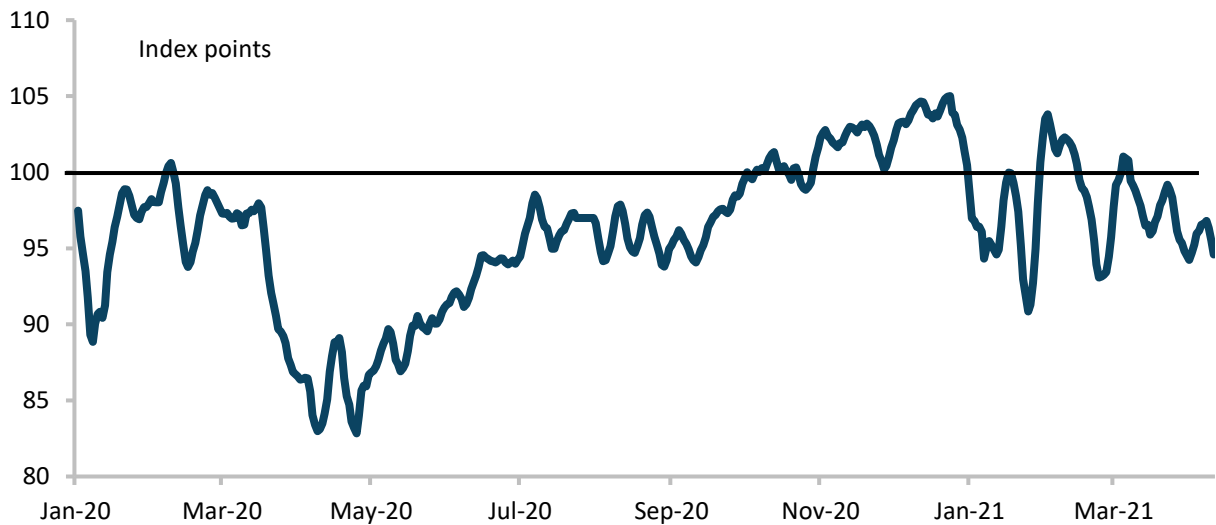
### 5.4 Housing rent prices



Data: daily median prices of apartments in Kyiv, 7-day moving average, average for the first week of April 2020 = 100, according to the data from the portal [lun.ua](#), CES calculations.

We use [Lun](#) public data to track changes in rent prices. Lun publishes daily data on median rent prices of apartments in Kyiv. We calculate the 7-day moving average and transform the data, so the baseline for each group equals 100.

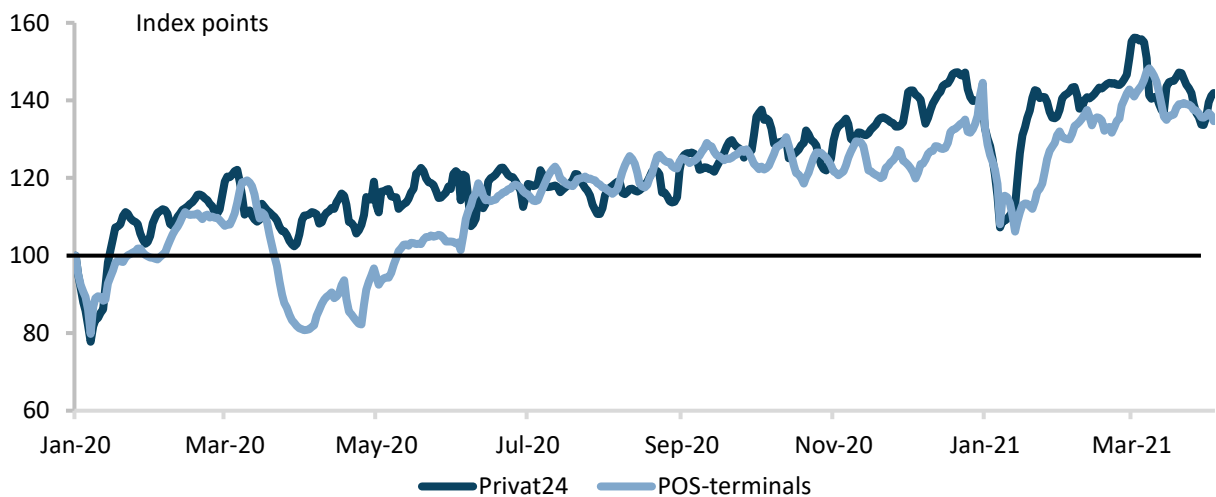
## 5.5 Electricity consumption



*Data: temperature-weighted electricity consumption, 7-day moving average, compared to the average of 2019, Ukrenergo data, Dragon Capital and CES calculations.*

We download the daily electricity consumption data from the [Ukrenergo website](#) and adjust it for temperature using linear regression (we use Python, but R or any other statistical software can be used). We download temperature data from the [Meteopost website](#). We count a 7-day moving average and compare all data points to the average of 2019.

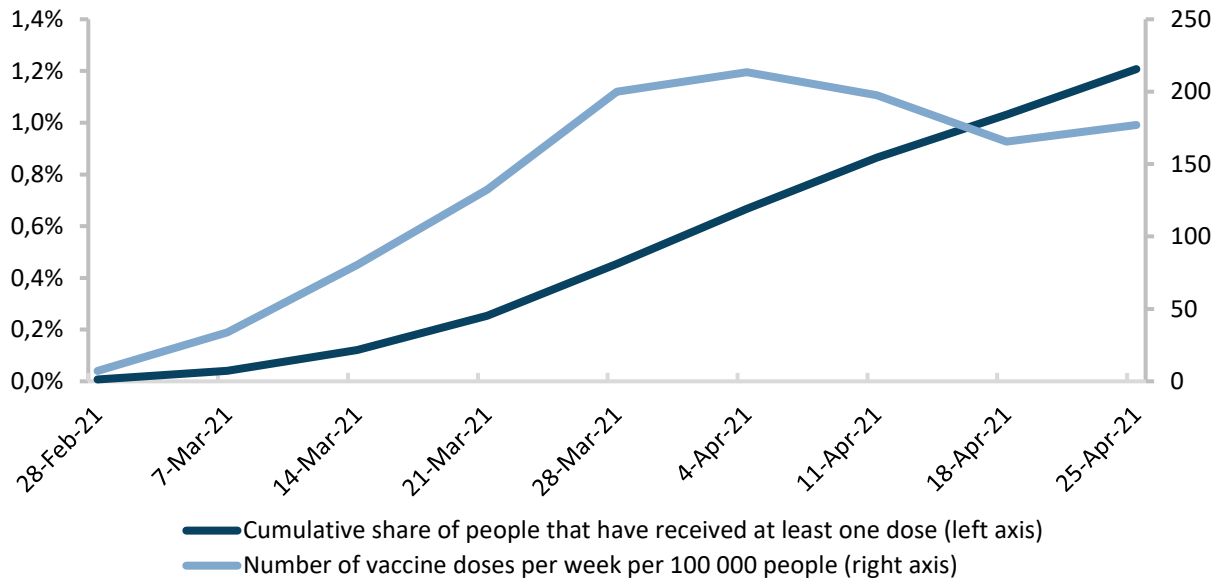
## 5.6 Bank payments



*Data: the number of unique contacts through POS-terminals and Privat24, 7-day moving average, first week of 2020 = 100, according to PrivatBank data, CES calculations.*

[PrivatBank](#) shares with us their daily data every week. The same as in an example with rent prices, we calculate the 7-day moving average to smooth the data and change the baseline so that first week of 2020 equals 100. We track two indicators: the number of unique transactions via POS-terminals and the number of unique transactions via Privat24 online app.

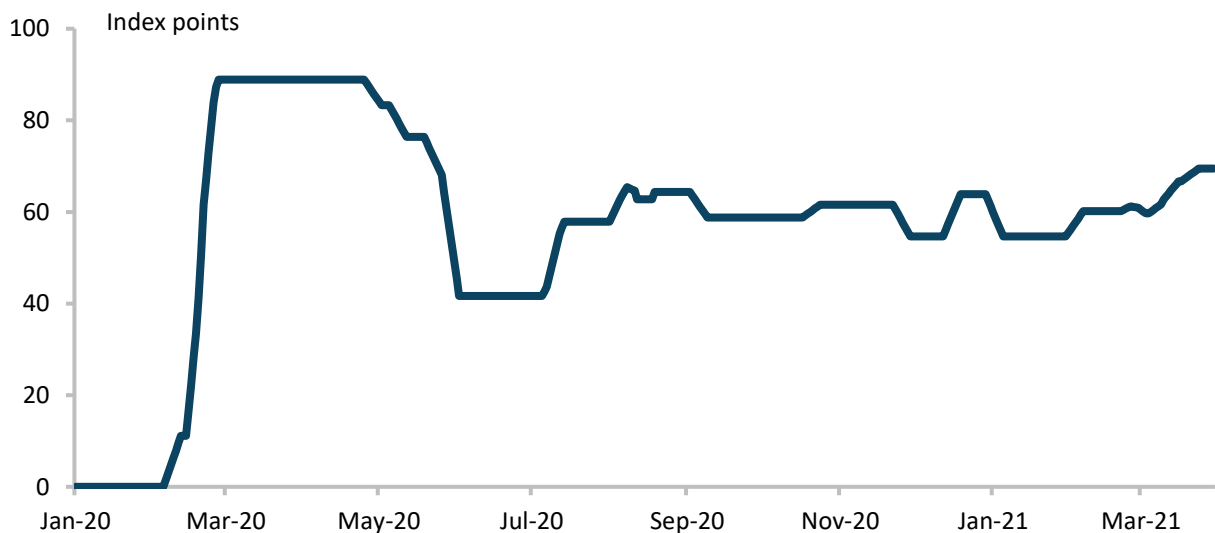
## 5.7 COVID-19 vaccinations



Data: COVID-19 vaccinations, share of people that have received at least one dose, number of vaccine doses administrated per 100 000 people over the past week, according to Ministry of Health data, CES calculations.

We use the data published in the [Ministry of Health portal](#) to track the share of the total population of Ukraine that received at least one vaccine dose and the number of vaccine doses administrated per 100 000 people over the past week. Also, such data for the whole world can be found in [Our World In Data](#).

## 5.8 Lockdown stringency index



Data: COVID-19 stringency index in Ukraine, rescaled to a value from 0 to 100 (100 = strictest), 7-day moving average, according to "A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker)".

We use [Oxford Government Response Index](#) daily data as it is a composite measure based on nine indicators, including school closures, workplace closures, and travel bans. The data is of good use to compare how lockdown stringency affects all the other sections we track. We download the row data and count the 7-day moving average to smooth it.

## 6 Implications

In our Activity Tracker in Ukraine, we track the specific indicators that are most relevant for providing a real-time measure of economic activity in our country, so that the list of indicators can change country-wise.

For establishing a tracker in countries of Eastern Europe and Central Asia, we suggest the following:

1. A list of indicators relevant for real-time tracking of activities.
2. A list of data sources that meet the data source principles we described above.
3. A list of alternative indicators if suggested indicators are not available.

## 7 References/Sources

### *International sources:*

- Community mobility – [Google Community Mobility Reports](#)
- Vaccination – [Our World In Data](#)
- Lockdown stringency index – [Oxford Government Response Index](#)
- Hospitality – [Transparent](#)

### *Local sources:*

- Labour market – [rabota.ua](#), [Work.ua](#), [Jooble](#) (Jooble data is not public)
- Rent prices – [lun.ua](#) daily data that is published [here](#)
- Electricity consumption – [Ukrenergo](#), [Meteopost](#)
- Bank payments – [PrivatBank](#) (data is not public)
- Restaurants – [Poster](#) (data is shared internally, also is available [here](#))
- Railway tickets purchases – [Opendatabot.ua](#)
- Airline tickets purchases – [Opendatabot.ua](#)
- Vaccinations - [Ministry of Health portal](#)