Technical Annnex

ILO Brief "The impact of the Ukraine crisis on the world of work: Initial assessments"

Annex 1. Estimating employment losses

Data and estimation limitations

The gold standard for measuring employment and work conditions in a country is carrying out a labour force survey. Nonetheless, the system of data collection and production of labour force statistics is severely hampered during a war due to operational and logistical difficulties. Hence, it is not surprising that labour statistics for Ukraine are not available at the moment.

Moreover, there is extreme scarcity of such data being produced anywhere else in comparable situations.[1] For instance, no complete labour force data are available from the wars in the Balkans, Georgia, Iraq, Syria, or Yemen (which have been used in assessments by other international organizations of the war in Ukraine).

In addition, any high frequency data that could be used as a proxy is affected by severe limitations in wartime. For instance, data publication might be stopped altogether (such as the Google Mobility Reports data for Ukraine). Information quality can also deteriorate, for instance searches of news in repositories such as GDELT[2] no longer yield economically meaningful results for the country.

Finally, given the very particular set of circumstances that affect an economy during a war, statistical and economic models that would usually provide reliable descriptions of the economy of Ukraine, are now far less useful.

Estimates from international organizations of impact on Ukraine's economy

The estimates recently published by international organizations are based on national accounts data from countries that experienced war. For instance, on the 14th of March the IMF released the first estimates of potential impact, suggesting a contraction in the

[1] In this context, using data from Ukraine during the 2014-2016 period as a lower bound of the effect on employment might seem promising. This is however not the case. Whereas the earlier conflict between the Russian Federation and Ukraine resulted in large losses of employment in both 2014 and 2015, this was driven overwhelmingly by the loss of statistical coverage of the population. In 2014, employment data ceased to include the occupied territory of the Autonomous Republic of Crimea and the city of Sevastopol, and in 2015 part of the Donetsk and Luhansk provinces.

[2] GDELT Project (https://www.gdeltproject.org/)

downward scenario of 25-35 per cent. The estimates are based on real GDP contractions recorded in contemporary conflicts (Iraq, Lebanon, Syria, Yemen).

More estimates based on direct use or extrapolation of national accounts data will likely be released in the case of Ukraine. For instance, a comprehensive World Bank report on the toll of war in Syria heavily relies on national accounts data from Syria itself. In short, international organizations rely heavily on direct evidence of the effect of wars. That is, they rely on measurements in the affected country or outside the affected country, carried out during war periods.

Empirical strategy for estimating labour market impacts

The best course of action, in terms of mitigating data limitations and modelling difficulties, is to find "direct evidence" of the effects of conflict on the labour market. To the best of the authors' knowledge, there is only a single case of concurrence of intense violent conflict and labour statistics data availability that would be suitable for the "direct evidence" approach. The microdatasets of the labour force survey conducted by the Palestinian Central Bureau of Statistics are available in the ILO harmonized microdata collection. The survey spans the period of the 2014 Gaza conflict and separate labour statistics for Gaza and the West Bank can be produced. Contextual evidence on France during the Second World War, Yemen and Syria will be also discussed below, however it must be noted that whereas in these countries the data provides useful reference information, limitations in definitions, geographical coverage, and temporal coverage of the conflict limit the extent to which it can be used in the analysis.

There are clearly many differences between Ukraine and Gaza. Not only in economic, political, and social dimensions but also in the nature of the armed conflict. Nonetheless, comparability limitations are unavoidable in this type of exercise as was shown above for estimates on economic impact and poverty by other organizations that all relied on a very limited number of countries, all of which are very different from Ukraine.[3] Furthermore, the armed conflict in those countries had in many cases very different characteristics from the current events in Ukraine.

The 2014 episode in Gaza was characterised by intense violent conflict. The OCHA estimated[4] that 44 per cent of Gaza was either a no-go area or the object of evacuation warnings. The UNRWA estimates that 2'251 Palestinians were killed in Gaza during the seven weeks of the conflict and that internal displacement reached a peak of close to half a million people. To put this in perspective, this represented the death of 0.13 per cent of the total population. Additionally, 28 per cent of persons in Gaza became

[3] The oil-dependency of the economies of countries considered is a key limitation to comparability. As an example, oil rents accounted for roughly 50 per cent of GDP in Libya in 2011 and for 65 per cent in Iraq in 2004.
[4] Office for the Coordination of Humanitarian Affairs (OCHA), Occupied Palestinian Territory: Gaza Emergency Situation Report, 22 July 2014, p. 1.

internally displaced (or 19.8 per cent became newly displaced).[5] Using Ukraine's population, this would represent 50'000 fatalities and more than 8 million persons becoming newly internally displaced. For reference, an International Organization for Migration (IOM) study carried out between the 24th of March and 1st of April 2022 estimated 7.1 million newly internally displaced persons (after roughly three weeks of war).

In conclusion, the events in Gaza during 2014 can be characterised as an armed conflict of high intensity. At the same time, labour force survey data is available for the entire period. Furthermore, the timing of the military operation is fully contained within the data collection period for the third quarter of 2014. Given the extremely rapid economic disruption caused by conflict, this is critical to estimate labour market disruption.

The drawback of using such data is clearly the lack of comparability between Ukraine's current situation and the one in Gaza in 2014. For instance, the conflict in Gaza affected a larger share of territory. Military tactics are very different as well. We do not have enough data and evidence to infer the impact of such differences on labour market dynamics. This, in turn, implies that the resulting estimates have a high degree of uncertainty. Data from other countries are used as comparators to mitigate the risk of identifying idiosyncratic effects.

How is the impact estimate computed?

1. Identification of a case of armed conflict with measured impact on the labour market. This is the critical step of the estimation approach, identification of an "armed conflict shock".
    a. As described above, only labour force statistics data from Gaza during 2014 have been identified as a potential source.
    b. The employment-to-population ratio in Gaza declined by 19.5 percent between 2013Q3 and 2014Q3.
    c. International comparability. This decline matches, in order of magnitude, available data from other conflict situations. In Yemen, during 2015, a small survey[6] of 700 respondents was conducted to assess the labour market situation in three regions accounting for around a fifth of the country's population. In the two regions where the conflict was most intense, employment losses were 17.6 and 11.6 per cent during the reference period of 7-8 months covered by the survey. In a retrospective study in Syria from 2014,[7] the findings were consistent with very steep declines in employment. With respect to France during the Second World War, Occhino, Ooserlinck and White (2006)[8] draw from various sources and find declines in employment of similar magnitudes.

[5] According to UNCHR by the end of 2013 there were 146'000 internally displaced persons, which can be subtracted to obtain an approximate number of newly internally displaced persons.
[6] https://www.ilo.org/wcmsp5/groups/public/---arabstates/---ro-beirut/documents/publication/wcms_501929.pdf
[7] http://cbssyr.sy/population_statuse/Table3.pdf
[8] https://www.nber.org/papers/w12137.

2. Time duration adjustment. The 2014 Gaza conflict lasted for approximately 7 weeks, hence the rest of the third quarter of 2014 was not affected by direct conflict. An adjustment is needed to estimate the effect per day of conflict.
    a. The employment-to-population ratio decrease between 2014Q4 (after the conflict) and 2013Q4 in Gaza was 1.8 per cent. This suggests a strong rebound in employment after conflict. By the first quarter of 2015 the employment recovery was complete (with just a 0.3 percentage point decrease inter-annually), suggesting that the recovery process was very quick.
    b. International comparability. Given the exceptional structure of the labour market in Gaza, it is important to cross-check if the rebound effect is present in other sources. In France, during 1945, Occhino, Ooserlinck and White (2006) report that employment had recovered to its pre-war level (and that 1944 was the trough of the crisis). Given that allied forces retook Paris on the 25th of August of 1944, and that during the rest of 1944 allied progress towards the east of the country was highly contested, a full employment recovery by 1945 indicates a very rapid employment expansion. In the Yemen survey of 2015, in one of the regions surveyed, fighting stopped for a period of around 2 months out of the data collection period of 7-8 months. The employment decline in the region was 5.4 per cent, compared to 11.6 and 17.8 per cent in the other two regions. These data are compatible with a strong rebound effect.
    c. The rebound rate is assumed to linearly increase over the days following the conflict in Gaza during the third quarter of 2014. Moreover, for the initial days prior to the military activity, a zero loss is assumed. Finally, the last day of the third quarter is derived from a linear increase together with no overshooting in employment conditions.[9] This, together with an average decline during the third quarter of 2014 of 19.5 per cent, results in an estimated 25.7 per cent decline in the employment-to-population ratio on average for the remaining days of the quarter (50, counting all days in the 8/July – 26/August period).
    d. Using this as an estimate for the "armed conflict shock", the expected employment-to-population ratio in Ukraine during a week of war would be 37 per cent. In comparison, the employment-to-population ratio stood at 50 per cent in 2020.[10]
3. Refugee situation. As discussed, the number of internally displaced persons in Gaza was very high at the peak of the crisis. Nonetheless, due to difficulties in

[9] If we assume a linear increase in activity and no over-shooting, the lower bound of activity during the first day of the fourth quarter of 2014 would be a loss in employment-to-population ratio of 3.9 percentage points. This is assumed to be the same as the ending day of the third quarter. Similarly, under these assumptions, an employment-to-population ratio 1.8 percentage points below the pre-war situation would be reached in approximately 2.5 months.

[10] Whereas in 2020 there was a sizeable COVID-19 impact, it is negligible given the size and uncertainty of the estimated effect. Additionally, estimates from the State Statistics Service of Ukraine suggest that early in 2022 the labour market had not yet recovered from the COVID-19 pandemic disruption amid rising geopolitical tensions before the invasion.

crossing borders, the possibility to seek refuge abroad was not widely available. In contrast, in Ukraine, many have managed to exit the country and seek refuge in neighbouring countries.

   a. As computed in annex 2, approximately 47.5 per cent of refugees were children.
   b. Applying this ratio to the latest UNHCR count results in an estimated adult refugee population of 2.75 million.
   c. These adults are assumed in a counterfactual situation of closed borders to have been working at the national rate estimated above, adjusted by the difference in the pre-war period between the national rate and the participation of potential refugees identified as described in annex 2, resulting in an employment-to-population ratio of 31 per cent. This effect must be added to the losses.[11] Given the assumption of the adult refugee population counterfactually working at an estimated rate below the national level, this reduction does not result in a further reduction of the employment-to-population ratio, which remains at 37 per cent.[12] It does, however, produce an additional loss of employment of approximately 0.7 million during active conflict.

4. Scenarios
   a. The scenario of hostility cessation and withdrawal of occupation forces is computed assuming the rebound rate of the comparator case in the last quarter of 2014 and assuming that the refugee population does not yet return. Withdrawal of occupation is used in this context as withdrawal from any newly occupied territory. Hence, territories not covered in the 2020 Labour Force Survey are assumed to continue to be occupied in this scenario.
   b. The scenario of military escalation is defined as a geographical spread of the conflict with respect to the active conflict estimate. Based on the Institute for the Study of War, 7th of April assessment, we estimate that provinces (Oblasts) that are – or have been until very recently in the case of Northern Ukraine – in direct contact with a front-line accounted for 46 per cent of employment in 2020. We define the military escalation scenario as conflict spreading from the initial assessment into all provinces that are either contiguous or eastward of the Dnipro river or in the black sea coast. In this case, the affected provinces would account for 66 per cent of employment in 2020, this represents an increase of 43 per cent with respect to the baseline exercise. The loss of employment of the escalation scenario is assumed to be 43 per cent higher than the baseline exercise. The underlying assumption is that the spread of the conflict geographically will result in increases proportional to the employment level of the affected regions prior to the crisis. .

[11] This implies assuming that the opening of borders leads to further employment losses via the decline in working-age population.

[12] In fact, it slightly increases to 37.5 per cent, as the proportional decline in the national adult population is in excess of the proportional decline in national employment caused by the change of country of residence of the refugees.

5. Comparison of results with available data.
    a. The percentage loss of employment might seem to be a more favourable outlook than other assessments[13] based on direct evidence of economic activity. This is not the case. Employment tends to react less strongly than GDP in crisis situations. In fact, the direct evidence available for intense conflict suggests that GDP tends to contract at a substantially larger rate than employment. Whereas there are many reasons for this, one critical cause is that those who are employed might be temporarily not at work. This flexibility helps the labour market partially cope with the disruptions in activity.

Annex 2. Estimating the employed refugee population

Based on the following data sources, we produce estimates of the current total refugee population, the current total adult refugee population, and the current number of previously employed refugees in 31 recipient countries:

1. Estimates of the total number of refugees that have entered immediate border countries of Belarus, Hungary, Poland, Romania, Russian Federation and Slovakia from the UNHCR Operational Data Portal: Ukraine Refugee Situation, available at https://data2.unhcr.org/en/situations/ukraine. The data from this source were obtained on 26 April 2022.
2. Estimates of the total number of refugees that moved to secondary countries from the border countries were collected by the ILO through press coverage of official government figures and announcements.
3. Estimates of refugees who were employed at the onset of the war are based on the Ukrainian Labour Force Survey microdata from 2019 and 2020.

The methodology for producing the above country estimates is as follows:

1. Using UNHCR refugee population estimates, an adjustment is made to the reported country estimates to correct for double counting of some refugees reported in both Moldova and Romania. Specifically, we calculate the difference between the total refugee figure reported by UNHCR and the total derived by summing the refugee entries reported by initial destination countries. The estimated over-count of refugees in Moldova and Romania is calculated as this difference multiplied by the respective country's share of their combined total refugee count. This is subtracted from the reported refugee figures in each country.[14]

[13] https://www.ceps.eu/download/publication/?id=35907&pdf=EaP-Bulletin-No-19.pdf, https://ua.interfax.com.ua/news/general/811081.html

[14] No adjustment is made for Ukrainians re-entering Ukraine, as reliable data are not yet available. As of 27 April, UNHCR figures based on the State Border Guard Service of Ukraine indicate that there have been more than 1.2 million cross-border movements of Ukrainians entering Ukraine. However, UNHCR notes that it is premature to infer actual numbers as these movements can be pendular.

2. We adjust the UNHCR figures in initial destination countries to account for onward migration to secondary countries. We assume that all migration into Schengen countries comes from Schengen border countries (Hungary, Poland, and Slovakia). For each of these countries, we multiply the country's share of refugees reported by UNHCR (in Hungary, Poland, and Slovakia) by the total number of Ukrainian refugees currently reported to have moved onward to Schengen countries. This figure is subtracted from the total country count reported by UNHCR. For onward refugees currently living in non-Schengen countries, we assume that these departed the initial host countries in proportion to each country's share of total refugees.

3. The estimated adult refugee population is based on UNICEF/UNHCR estimates regarding the number of refugee children and their share in the total refugee population. We multiply the estimated total refugee population figures obtained for each country following the steps above by 0.525 to obtain an estimated adult refugee population.

4. Finally, we obtain the estimate of previously employed refugees based on official labour force survey microdata from the State Statistics Service of Ukraine. Using the 2019 microdata, we produce a refugee proxy sample from the microdata that includes women aged 20+ and men aged 65+. In both cases, the sample is restricted to persons who resided in areas directly affected by combat. The previous labour market characteristics of this refugee proxy sample are estimated directly from the microdata. This results in an estimated employment-to-population ratio among the refugee population of 43.5 per cent. This is multiplied by the adult refugee population benchmark to obtain estimates of previously employed refugees.