

Surviving in the Time of War

How and Why Well-being
is Evolving in the Conflict
in Yemen



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Surviving in the Time of War: How and Why Well-being is Evolving in the Conflict in Yemen

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Executive Summary

This report aims to document how and why well-being has changed since Yemen's last poverty assessment, conducted immediately before the conflict (World Bank 2017). However, data collection in the country is very difficult given the ongoing conflict and difficulties in obtaining necessary approvals from authorities. As a result, it is difficult to use traditional approaches to precisely estimate how far the humanitarian situation has deteriorated, to understand how exactly households are experiencing the conflict, and to understand the efficacy of the humanitarian and development response.

Rather than relying on traditional data, we piece together data from a variety of non-traditional data sources. Given that no single form of data collection is ideal in Yemen's conflict, we triangulate between these data sources to best describe the evolution of well-being for the entire population. The data sources analyzed here include high-frequency mobile phone surveys of households over the course of the conflict, food and commodity price surveys, intermittent surveys of local governments, key informant interviews of a wide range of essential service providers, face-to-face household surveys, and novel internet-based surveys.

The lack of traditional data also limits our ability to construct estimates of monetary poverty. But given the convergence of poverty and poor food access in sufficiently dire circumstances, we focus primarily on tracking the evolution of poor food access and identifying how and why it is changing. However, when available, we also identify how a wide range of welfare dimensions and access to

essential services have changed since the start of the conflict as well.

With this approach, we:

- Present a conceptual framework that highlights the ways that the conflict might be impacting households, markets, and economic activity
- Estimate the immediate impacts of the conflict and illustrate the depth of the humanitarian emergency that was precipitated by the escalation of the conflict
- Empirically illustrate that following the onset of the humanitarian emergency, the severity of the crisis depends on the number and type of many conflict-related shocks that continually impact the country
- Highlight the multidimensional nature of the humanitarian crisis and the similarities and differences between the change in poor food access and the change in poor access to essential services
- Highlight the evolution of a particularly vulnerable group- internally displaced households (IDPs)- and estimate the causes and consequences of forced displacement
- Document the large humanitarian and development response and illustrate how critical that support is to a significant share of the population
- Illustrate precisely how data collection in the country has become more difficult as the conflict has progressed and how that is obscuring the severity of the overall humanitarian situation and critical ways in which the conflict is intersecting with Yemenis' lives

Although each of the above topics are based on a number of individual reports and analyses, discussing the collection of results together yields critical benefits. Just as it is important for individual analyses to triangulate between multiple data sources, the analysis above highlights the need for performing more triangulation between analyses to draw more definitive findings on bigger-picture issues. Yemen is a truly unique context where each and every data source is likely critically flawed individually and is also a context where many strong conflict-related shocks are happening at any single point in time, and thus it is often difficult to definitively point to the impact of a single shock. Thus, a greater weight should be placed on findings that generalize across many data sources and many experiments, and all results should be interpreted relative to the overall depth of the humanitarian emergency.

But despite a number of detailed empirical analyses illustrating how and why well-being is changing over the course of Yemen's conflict, one of the most robust findings across the report is the identification of significant limitations in our understanding of the welfare situation in Yemen. Although we can illustrate many critical ways in which Yemeni households have been affected by the conflict, there are countless other shocks and mechanisms pushing Yemenis to the brink of disaster. Each analysis highlights a number of important questions that need further investigation to better understand the depth of the humanitarian emergency, the types of shocks that are especially damaging to Yemeni households, and the ways to improve household resilience until the conflict ends.

There are many implications of each of the primary findings highlighted in this report, all of which are discussed in detail in the working papers and publications on which this work is based. However, more important than any individual analysis, the primary implication of the report is the significant benefit to the entire humanitarian and development response from collaborating on data collection and analysis.

Although the report describes data that spans a wide range of data, much of the analysis focuses on monthly mobile phone surveys performed by the WFP for the purpose of updating food security targeting. But the surveys have provided critical information far beyond just-in-time food security monitoring, jointly discovered by WFP and the World Bank while analyzing a subset of the data collected by WFP. Expanding the joint analysis beyond the monthly WFP monitoring survey to the rich set of survey and administrative data collected by organizations operating

in Yemen and further expanding the list of collaborators would likely yield significant benefits. Furthermore, such collaboration on a wide range of data sources would likely result in improved efficiency by reducing duplication and freeing up resources to collect new data and address unexplored issues and remaining questions.

Highlights of Each Empirical Section:

The Change in Food Access Immediately Following the Start of the Conflict

- The onset of the conflict in March 2015 led to an immediate humanitarian emergency, with 65 percent of Yemenis having poor or borderline consumption by November 2016
- Detailed estimates from a household survey being conducted as Houthi forces captured Sana'a in 2014 allow us to better understand the household response to the conflict
- The household results corroborate the large and immediate decline in well-being and illustrate important employment and individual-specific impacts of the conflict
- The results further suggest that the depth of the initial crisis cannot fully be explained by the large shocks most often cited- the decline in oil production, non-payment of government salaries, the restrictions on imports, and the decline in agricultural productivity

The Evolution of Well-being After the Beginning of the Humanitarian Crisis

- Following the onset of the humanitarian emergency, the overall severity of the emergency is strongly influenced by the number and type of shocks that are occurring at any one time
- Results illustrate that rapidly rising food prices and declines in humanitarian assistance are particularly important shocks that significantly worsen the severity of the crisis
- Although rapidly rising fuel prices and living in close proximity to violence are important shocks, they have less of an impact on poor food access than other shocks
- Nearly all households have had poor food access at one point over the course of WFP monitoring surveys and virtually no household is immune from the crisis and the volatility associated with the conflict

Multidimensionality of the crisis

- Similar to food access, a large share of the population did not have adequate access to a wide range of basic services and the vast majority of households experienced poor access to critical services at some point over the course of WFP monitoring surveys
- Unlike the relatively widespread availability of food, the availability and quality of essential services greatly varied across the country
- Institutional degradation caused by the conflict has also had significant impacts on the ability of households to access critical services
- Shocks impacting the affordability of food also have strong impacts on access to a range of essential services

The Evolution of Well-being Amongst Disadvantaged Groups- Forcibly Displaced Households

- There is little agreement on the share of the population that has been displaced, but all data suggest a large displacement surge in the first months of the conflict's escalation and smaller numbers of households becoming newly displaced and returning each subsequent month
- Displaced households have significantly worse food access than non-displaced households in all periods of the WFP monitoring survey- one of the most robust empirical patterns in the data
- Violence is a critical driver of displacement, but there is significant heterogeneity in the type of violence that primarily drives displacement and heterogeneity in individuals' tolerance for a poor security situation before becoming displaced
- Estimates from surveys reaching individual households both before and after they became displaced suggest a large initial but temporary decline in food access caused by displacement, with food access rebounding to pre-displacement levels by four months following displacement
- Combined, the results suggest that households with worse food access are more likely to become displaced

The Humanitarian Response

- Household surveys are critical instruments to better understand the degree to which the population is benefitting from the expansive humanitarian and development response
- By April 2020, 80 percent of households received some humanitarian assistance in the past three months, and

additional households likely benefit from the facility-level assistance

- Estimates suggest that the large decline in the frequency of food assistance in regions controlled by the Houthis resulted in substantial declines in food access, illustrating the critical role humanitarian and development assistance play in supporting the population
- Organizations are experimenting with ways to try and build resilience of the population to shocks and to lessen the need for emergency humanitarian assistance, but it is uncertain as to the degree to which resilience can be improved in the current environment

Novel Methods to Overcome Difficulties in Data Collection

- Authorities are increasingly interfering in data collection and strictly limiting the type of information collected
- Although it difficult to understand exactly how these limitations might be impacting the representativeness of surveys, novel data collection methods can better capture a number of sensitive questions which would likely not be approved by authorities
- Using anonymous internet-based surveys, we are able to ask a wide variety of questions about a respondents' feelings about the conflict that they might not be able to express in less anonymous settings
- Comparing the internet surveys to a concurrent mobile phone survey, internet-based respondents were much more likely to respond honestly than mobile phone respondents, and the difference was much larger than the difference for non-sensitive questions
- Although one needs to account for the different characteristics of the population that has access to the internet, there exist survey modalities that have the potential to elicit critical information from Yemenis about information that cannot be obtained through traditional modalities

List of Acronyms

ACAPS	initially known as the Assessments Capacity Project
ACLED	Armed Conflict Location & Event Database
EFSNA	Emergency Food Security and Nutrition Assessment
FAO	Food and Agriculture Organization of the United Nations
FCS	Food Consumption Score
GDP	Gross Domestic Product
GWP	Gallup World Poll
HBS	Household Budget Survey
IDP	Internally Displaced Person
IPC	Integrated Food Security Phase Classification
IRG	Internationally Recognized Government
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
RCSI	Reduce Coping Strategy Index
SMEPS	Small and Micro Enterprise Promotion Service
STC	Southern Transitional Council
TFPM	Task Force for Population Movement
UN	United Nations
UNICEF	United Nations Children's Fund
UNVIM	United Nations Verification and Inspection Mechanism
WFP	World Food Programme
YR	Yemeni Riyal

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SECTION

1



Introduction

A Although much of the world might not be paying close attention, Yemen has almost reached eight years of conflict. Occasionally Yemen is mentioned in international news, usually when the country encounters another horrific first in its conflict¹ or when it intersects with other stories.² But for the most part, the extraordinary suffering of the Yemeni population has continued unabated since the conflict escalated in March 2015 (e.g., OCHA 2021).

In 2014, the Houthi forces from northern Yemen took control of the capital city of Sana'a and aimed to advance toward the southern part of the country. However, a coalition of nine countries launched a military campaign in March 2015, which was successful in pushing the Houthi forces back to the north (World Bank 2017a). Over the past eight years, the Houthi forces have established control over Sana'a while the internationally recognized government (IRG) has been based in both Riyadh and in Aden.

It is difficult to overstate how much has changed for Yemeni households over the past eight years. The United Nations has been referring to Yemen as the world's worst humanitarian crisis for over three years running (e.g., United Nations 2019). Violence continues unabated-

ground battles, airstrikes, and terrorist attacks- all are present across different portions of the country, which has created a significant security crisis (e.g., ACLED 2022); underemployment has been exacerbated in a country where labor conditions were less than ideal even before the conflict escalated (e.g., World Bank 2017a); communicable diseases, including COVID-19, are raging out of control, in part due to the government being unable to provide basic sanitation services and the public able to receive preventative and urgent medical care (e.g., OCHA 2022); and the country has been in an ongoing food emergency, often teetering on the edge of famine, since the conflict escalated in 2015 (e.g., IPC 2015; IPC 2017; IPC 2018; IPC 2020; IPC 2022).

Despite these regular horrors being reported by a variety of sources on the ground, one of the more disturbing aspects of the conflict is the fact that there is so much that we cannot observe. Security concerns make it difficult to perform traditional data collection in the country, where the last official nationally representative household survey was conducted just prior to the escalation of the conflict (e.g., World Bank 2017a). Furthermore, when speaking to households on the ground- particularly in regions controlled by the Houthis- it is difficult to get an accurate

1 For example, when the UN first declared the country was experiencing famine-like conditions (e.g., UN 2017).

2 For example, when the presidential administrations of the United States change their support to the Kingdom of Saudi Arabia (e.g., the Guardian 2020).

sense of how bad things are on the ground. Conditions are so bad that it is difficult for households to even focus on issues that might be a first-order concern in less conflict-affected countries, and also because nearly all topics of conversation are sensitive and politicized in the current environment, including humanitarian conditions (e.g., Almoayad et al. 2020).

Sadly, conditions on the ground are this bad despite a massive humanitarian operation that is much larger than typically amassed in conflict-affected countries.³ At its peak in 2019, approximately US\$4 billion worth of humanitarian assistance was being provided annually, primarily through in-kind food assistance, cash transfer programs, and support for health clinics (e.g., OCHA 2022); and over half the population of the entire country was receiving at least some form of humanitarian assistance, many of which were beneficiaries of multiple programs (e.g., WFP 2020; Ghorpade and Ammar 2021).

Given the ongoing humanitarian crisis, this report aims to provide a detailed account of how and why well-being has changed since the conflict escalated in 2015. Unfortunately, traditional estimates of monetary poverty are unable to be constructed in the current context. As described above, the country is extremely data deprived given the poor security situation and the significant restrictions placed on data collection by authorities, and the detailed consumption and expenditure data required to construct poverty estimates do not exist (e.g., World Bank 2017a; Favari et al. 2021; etc.). Additionally, the country is continually experiencing conflict-related shocks that create conditions in which it is difficult to actually compare expenditures over time and across different regions of the country, and further create conditions in which a measurement of expenditure alone might be a poor overall measure of welfare (e.g., poorly functioning markets, etc.). And lastly, the strong conflict-related shocks that continually affect the country make any estimate of well-being quickly out-of-date.

Rather than rely on estimates of monetary poverty, the current report aims to follow a number of simpler and

easier-to-measure indicators of access to food. Given the strong and nearly universal pattern of the share of expenditure on food increasing as income declines, in sufficiently dire humanitarian crises, the measurement of poverty converges to the measurement of food access (e.g., Jensen and Miller 2010; Lain et al. 2022; etc.). Particular attention will be focused on measures of dietary diversity and food coping strategies, which are strongly correlated with monetary poverty and very sensitive to income and price shocks in a wide variety of settings (e.g., D'Souza and Jolliffe 2014; etc.). Furthermore, when available, the report will discuss changes in other welfare dimensions and access to essential services. But given the lack of a single and comprehensive source of data over time, this analysis will infer conditions on the ground over time by triangulating between a number of different measures and data sources.⁴

Using these nontraditional approaches, the analysis is broken up into several different sections. First, this report presents a conceptual framework that illustrate the ways that the conflict can impact households, markets, economic activity, and the humanitarian response; and the report also illustrates the ways in which economic activity resulting from the conflict might impact the duration of the conflict itself. Importantly, this framework illustrates why it is critically important to perform poverty assessments and thorough analytical work in fragile and conflict environments. Furthermore, given the difficult conditions on the ground, data scarcity, and the difficulty in precisely identifying all the ways that conflict affects the country and vice versa, this report rather focuses on the impacts of the conflict that have a measurably large impact on household well-being. In doing so, we illustrate that each and every mechanism outlined in the conceptual framework is critical to explaining the evolution of well-being in Yemen's conflict. However, this leaves many remaining questions about how and why well-being is changing for future work, many of which we raise in the analysis.

Second, this report illustrates the immediate impacts of the conflict on households, markets, and institutions. The analysis differentiates the immediate impacts of the conflict from the evolution of well-being as the ongoing

³ In 2022 webinar ([link](#)) at the London School of Hygiene and Tropical Medicine on food security systems in conflict, Steve Wiggins identified that the humanitarian response is usually valued in the millions of US\$ while the damage is often in the billions of US\$. Yemen is a case where the annual value of assistance delivered is in the billions of US\$ (e.g., OCHA 2022).

⁴ These sources include a nationally representative household survey from before the escalation of the conflict, humanitarian assessments during the conflict, high-frequency monitoring surveys, nationally representative surveys conducted by private firms, surveys of local governments, market surveys of key commodity prices, and surveys of enterprises. Additionally, the analysis will also be informed by a range of key informant interviews.

conflict continues. In particular, the analysis demonstrates that the decline in well-being and impact on markets and institutions were felt immediately following the escalation of the conflict in March 2015 and set off a humanitarian crisis. Although it is difficult to exactly isolate the mechanisms given the large changes to the economy following the escalation and before the first welfare assessments (e.g., World Bank 2022), the analysis investigates some of the potential mechanisms by focusing on how well-being immediately changed as Houthi forces began to capture the country in 2014 before the coalition joined the conflict.

Third, this report demonstrates that, following the immediate decline in well-being, the severity of the crisis depends on the number and type of many conflict-related shocks that continually impact the country. The analysis provides estimates of the impact on food access of the blockade of Yemen ports supplying Houthi-controlled regions, of living in close proximity to violence, and of the multiple currency crises that have struck the country and caused food prices to escalate out of control. Importantly, the analysis compares the relative impacts of each type of crisis and illustrates the particular importance of currency crises and rapidly rising food prices to the severity of the humanitarian crisis. However, despite these relatively robust estimates of some of the most serious shocks in the conflict, the results further illustrate that there is a very large amount of unexplained variation in poor food access and that there are many conflict-related and household-specific shocks that significantly impact well-being but are difficult to observe and precisely estimate.

Fourth, the report highlights the multidimensional nature of the humanitarian crisis and highlights the similarities and differences between the change in poor food access and the change in poor access to essential services. Poor access to food is primarily driven by the inability of households to earn a sufficient income to afford food that is largely available to be purchased in the market. However, poor access to other essential services, such as health and education, are driven by either the lack of sufficient income to afford each service⁵, or driven by problems with the availability of essential services that are required to live a healthy and productive life. Furthermore, the results

illustrate that, in addition to being impacted by the same shocks that affect access to food, access to essential services are also strongly impacted by other conflict-related and sector-specific shocks that affect the demand or supply of services, such as health epidemics and teacher strikes.

Fifth, the report highlights the evolution of well-being of a particularly vulnerable group- internally displaced households (IDPs)- and highlights the differences in well-being between IDPs and the rest of the population. Given difficulties of reaching IDPs, the monthly monitoring surveys analyzed here offer important insights by simply describing the scale of the forced displacement crisis in Yemen. However, the surveys further reached a large number of displaced households before they became displaced, and they further reached a large number of displaced households before they returned. This type of data is extremely rare and offers key insights on the causes and consequences of forced displacement.

Sixth, the report documents the extremely large humanitarian and development response and illustrates how critical that support is to a significant share of the population. In particular, there have been significant changes to the largest humanitarian form of assistance- in-kind food assistance- over the course of the conflict, and this allows us to demonstrate how large declines in the frequency of food assistance led to large and immediate declines in food access. Although more estimates of the importance of both food and other kinds of assistance are needed, these results highlight the critical role of the humanitarian and development response in helping the Yemeni population avert even more catastrophic outcomes.

Seventh, and lastly, the analysis will illustrate precisely how data collection in the country has become more difficult as the conflict has progressed and how that is obscuring the severity of the overall humanitarian situation and critical ways in which the conflict is intersecting with Yemenis' lives. Given these restrictions, we are increasingly being asked to place a large amount of trust in authorities that the restrictions they are placing on data collection and data access are not obscuring the true humanitarian situation on the ground. Although we

⁵ In the case of access to schooling, sending children to school costs money in terms of school supplies and gas necessary to drive students to school if the household lives sufficiently far away from school. Furthermore, the cost of sending children to school also includes the opportunity cost of potential foregone income that older children might have earned while working.

are unable to directly investigate the quality of the primary face-to-face assessments being performed, we do illustrate potential questions by comparing imperfect estimates of food access that are free from political interference to official IPC classifications, which incorporate data sources that are subject to potential political interference.

Furthermore, the discussion highlights the inability to get approval from authorities to ask direct questions about how Yemenis are participating in the conflict itself and about how Yemenis feel about the conflict in traditional survey methodologies. The analysis illustrates how non-traditional ways of collecting such sensitive information might sidestep some of the official restrictions and be an important source of information. **Overall, the discussion illustrates the need to better describe potential limitations of data, to further validate estimates of the overall humanitarian situation, and to incorporate more non-traditional data sources into existing data systems.**

Although each of these findings and discussions have important implications on their own, the collection of these results highlights two important issues. First and foremost, sharing data and jointly analyzing shared data

enriches the knowledge base of the entire humanitarian and development response. Much of the analysis described above was jointly conducted by the WFP and the World Bank and was only made possible using data collected by WFP. There is significant scope for even greater benefit by expanding collaboration to additional data sources and analytical agendas, and by expanding the collaboration to include other important humanitarian and development partners.

Second, just as it is important for individual analyses to triangulate between multiple data sources, the discussions highlighted in this report illustrate the need for performing more triangulation between analyses to draw more definitive findings on big-picture issues. Yemen is a truly unique context where each and every data source is likely critically flawed individually and is also a context where many strong conflict-related shocks are happening at any single point in time, and thus it is often difficult to definitively point to the impact of a single shock. Thus, a greater weight should be placed on findings that generalize across many data sources and many experiments, and all results should be placed in the broader context of the overall severity of the humanitarian crisis.

SECTION

2



Potential Ways in Which Well-being is Being Affected by the Conflict in Yemen

At a conceptual level, the conflict in Yemen is likely having a number of both direct and indirect impacts on households. Figure 1 details these potential impacts. First, the onset and continued fighting from the conflict has a direct impact on households and their ability to make a living. Lack of security and the inability to move freely between one's home and job (e.g., Tandon 2019), the death of household members (e.g., UN 2020), and other factors have the potential to directly impact the ability of a household to earn an income sufficient to afford a minimum standard of living and also impacts peoples' overall satisfaction aside from their monetary well-being.⁶ Importantly, the inability to feed, educate, and promote the health of Yemeni households will significantly erode human capital in the country and have long-term impacts on the type of society that might emerge from conflict (e.g., World Bank 2021).

Second, the conflict also potentially has strong and adverse impacts on markets, supply chains, and institutions. For example, the inability of customers to physically reach businesses and purchase goods and services (e.g., Tandon 2019); the increase in transportation costs for goods and services that have to cross the front lines of conflict and checkpoints or be routed around ongoing fighting (e.g.,

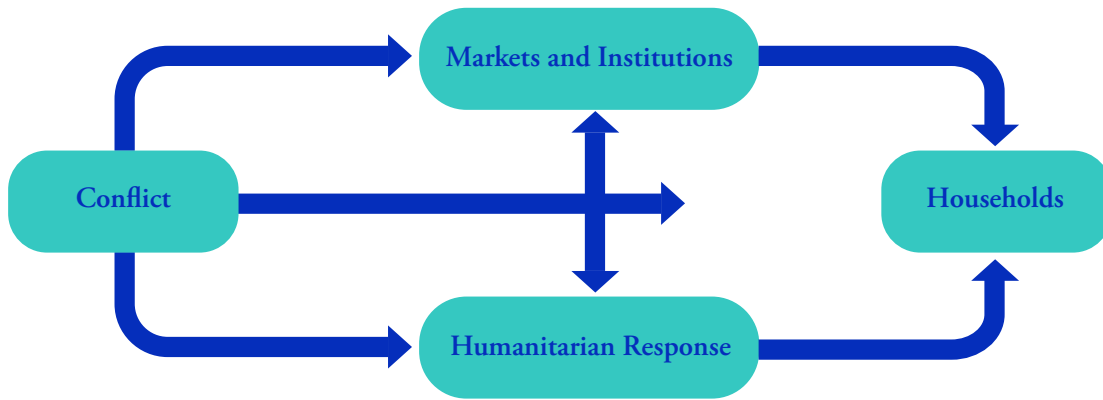
ACAPS 2020); the cessation of key government functions, some of which support all commercial transactions in the country and maintain relative price stability in the country, are potentially disrupted (e.g., Favari et al. 2021); and key social protection programs and government salaries might be impacted by the conflict and the inability to as effectively collect government revenue (e.g., World Bank 2022a). Importantly, all of these adverse impacts on markets and institutions further have indirect adverse consequences for households.

Third, the onset of conflict and the resulting humanitarian crisis spurred a humanitarian and development response. The response primarily targets emergency humanitarian assistance to households, which helps to stave off catastrophic outcomes amongst the population (e.g., OCHA 2022). However, the response also has impacts on markets and institutions. The large resulting flows of in-kind food assistance and other forms of support likely has impacts on agricultural markets and on transport networks in the country (e.g., Cunha et al. 2018; Egel et al. 2021); and a small share of the response is designed specifically to support either private sector actors or institutions, which helps maintain at least some vital capacities in the country (e.g., World Bank 2022a).

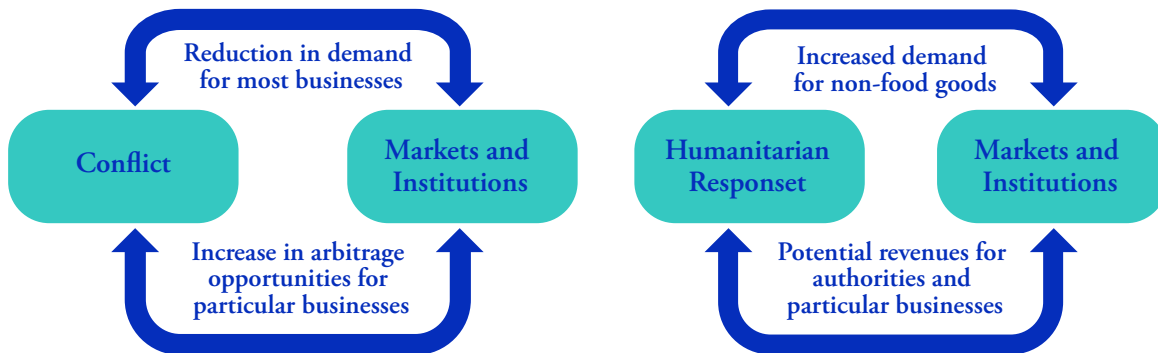
⁶ In other conflict contexts, underemployment and the inability of households to afford a minimum standard of living is often pervasive (e.g., Blattman and Miguel 2010).

Figure 1. Illustration of the Impacts of Conflict on Yemen

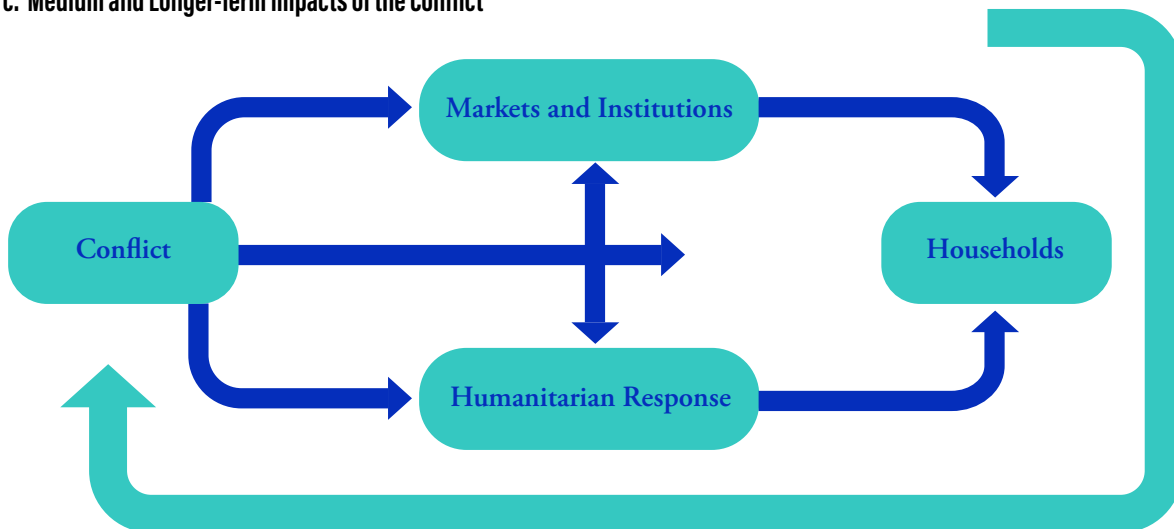
a. Immediate Impacts of the Conflict



b. Examples of Distributional Impacts of the Conflict



c. Medium and Longer-Term Impacts of the Conflict



However, for each of these potential adverse impacts of the conflict, it is important to emphasize that not each household, business, and institution is necessarily impacted in the same ways. Example of parties that have at one point benefitted from the conflict include reports of Houthi military commanders personally benefitting from taking control of key government services (e.g., Salisbury 2017); banks benefitting from currency arbitrage after receiving foreign currencies at preferential rates (e.g., Sana'a Center 2017); expanded demand for transport for people and goods that are unable to directly reach much of the regions controlled by the Houthis in the north (e.g., ACAPS 2020; etc.). Figure 1 further illustrates how each of the impacts that conflict has on markets and institutions, households, and the humanitarian response might itself vary amongst different segments of the population, economy, and institutions. Although the conflict has devastating impacts on the vast majority of actors that has resulted in a devastating humanitarian emergency (e.g., OCHA 2017), the identity of those potentially benefitting and the degree to which they might benefit are important issues to better understand and illustrate.

However, it is important to note that the impact of conflict significantly changes over time. The initial impacts on markets and institutions and on households can often be devastating, with the onset of conflict often being associated with widespread humanitarian disasters (e.g., World Bank 2017b). However, following the onset of conflict, the severity of the humanitarian disaster can be driven by many different factors. In Yemen, the population is regularly subjected to additional conflict-related shocks beyond the underemployment and institutional crises that often follow the onset of the conflict (e.g., Bruck and d'Errico 2019; etc.). For example, the population has been subjected to large changes in the frequency and type of violence, the cessation of regular payment of government salaries, restrictions on imports that vary in severity over time, severe macroeconomic crises, a number of different epidemics of communicable diseases, natural disasters causing widespread damage and shocks to agricultural production, the COVID-19 pandemic, rising global food prices, changes in global remittances, and so on (e.g., OCHA 2017; OCHA 2018; OCHA 2019; etc.).

Over the longer term though, it is important to note that the impacts of the conflict on all three channels- households, markets and institutions, and the humanitarian and development response- all have the potential to feed

back into the conflict itself. For example, the learning loss that has occurred will likely make it difficult for the next generation of Yemenis to find good jobs, which might impact individuals' preferences over whether and how to finally end the conflict (e.g., UNICEF 2021); a number of sources have found that a number of individuals, businesses, and other actors in the country have been profiting while the conflict has been ongoing (e.g., Egel et al. 2021), and these entities might be able to influence the conflict; and the humanitarian and development response itself, in other contexts, have been demonstrated to either exacerbate (e.g., Crost et al. 2014) or help stabilize conflicts (e.g., Berman et al. 2011; Nielsen et al. 2011), suggesting that the actual impact of the response depends on the manner in which the actual response is targeted and executed (e.g., Berman et al. 2013).

In the remaining sections, we are able to illustrate empirically that each and every mechanism outlined in Figure 1 has had a demonstrably large impact on household well-being and the humanitarian situation. Although we do not exhaustively describe each and every shock that has occurred as a result in the conflict, we pay particular attention to shocks that have a large observed impact on households and visible shocks, such as the violence from the conflict or the ongoing restrictions on imports. However, there are a lot of shocks that are difficult to precisely observe or that were not as sharply impacting households, and it is difficult to fully infer the impacts of these shocks on households. Thus, there is much analysis that is left to future work.

However, this overly simple framework illustrates the importance of tracking the evolution and determinants of well-being in conflict settings- both to properly inform the humanitarian and development response and to better understand the potential duration and resolution of the conflict itself. But given the many different pathways in which the conflict can affect markets and institutions, households, and the humanitarian response, and how each of these impacts can later feed back into the duration and severity of the conflict itself, one of the key challenges is to decompose the relative importance of each of the various mechanisms laid out in this section to the degree possible. Critically, these specific relationships can better inform a comprehensive operational response to try and best support the population and maintain human capital until the conflict finally comes to an end.

SECTION

3



Approach and Available Data

As described above, this report aims to empirically identify how each of these primary mechanisms have dramatic impacts on the humanitarian crisis and response. Previous reports and publications have addressed many of the specific challenges facing Yemen (e.g., OCHA 2017; ACAPS 2020; Tandon and Vishwanath 2020; Favari et al. 2021; ICG 2021; Tandon and Vishwanath 2021; etc.), and a number of bulletins and other information sources provide real-time updates of the situation on the ground (e.g., IPC 2017; TFPM 2017; WFP 2017; etc.). However, to our knowledge there is little comprehensive and empirically rigorous treatment of the evolution of well-being in the country, and how the changes in well-being relate to these different mechanisms.

In estimating how the conflict is impacting Yemen in detail, this report uses the conceptual framework as a guide. Specifically, the report will analyze in detail the changes at the start of the conflict separately from analyzing the changes as the conflict continued for years, analyze how multiple dimensions of welfare change, analyze potential distributional impacts of the conflict with particular attention paid to particularly vulnerable groups, and the potential impacts of the humanitarian response on maintaining household well-being. Furthermore, the report will illustrate an important potential way in which the initial impacts of the conflict might have potentially

fed back into the conflict itself- the potential incentive for parties of the conflict to manipulate the humanitarian response.

However, some of the impacts of the conflict are able to be established more precisely- particularly the immediate and longer-term impacts of conflict on markets and institutions, on households, and the direct impact of the humanitarian response on households. However, it is important to note that other issues about the ways in which the incentives of actors to the conflict, of market participants, and of households might change and feed back into the intensity and the duration of the conflict itself are much more difficult to precisely establish given the difficulty of collecting data about such sensitive issues.

As discussed in the introduction, the data and information sources to identify and analyze the evolution of well-being in Yemen throughout the entire conflict are very scarce. The Central Statistical Office of Yemen, the agency in the country in charge of producing national accounts and development indicators, has been unable to collect data necessary to update key welfare indicators since before the conflict escalated in 2015 (e.g., World Bank 2017a). The political divisions between the country and the ongoing and rapidly evolving violence occurring across much of the country prevents the agency from collecting reliable

national accounts, price, and development data to identify the needs of the population and inform policy choices and the humanitarian and development response (e.g., OCHA 2021).

Despite not being able to perform traditional data collection, Figure 2 illustrates that there is much more data being collected in Yemen at a high frequency than in many other conflicts of similar severity in the Middle East and North Africa region.⁷ In particular, these data sources include a multipurpose and nationally representative household survey conducted in the year that Houthi forces made advances throughout the country (e.g., Tandon 2019), three face-to-face emergency food security and nutrition assessments conducted after the conflict escalated (e.g., IPC 2017; IPC 2020; IPC 2022), monthly mobile phone surveys conducted every month since 2015 (e.g., WFP 2017; WFP 2019; WFP 2020; Tandon and Vishwanath 2020; Tandon and Vishwanath 2021; Favari et al. 2021), monthly price monitoring of key commodities and exchange rates (e.g., Favari et al. 2021); third party monitoring and administrative data from a wide variety of projects (e.g., Ghorpade and Ammar 2021), local government surveys, and key informant interviews of a wide range of the population, service providers, and other knowledgeable individuals that can shed light on the situation on the ground (e.g., Almoayad et al. 2020). Furthermore, a number of researchers and policymakers are relying on geospatial and social media data to measure changes in agricultural output (e.g., Conflict and Environment Observatory 2020), distances of population centers to geotagged facilities (e.g., Garber et al. 2020), assess physical damages by sector sustained during the conflict (e.g., World Bank 2020), and to analyze changes in social media use and statistics to better understand country-specific, regional, and global perspectives on the conflict (e.g., World Bank 2020).

Despite the wide range of data collection being done in Yemen, each type of data has important limitations. For example, face-to-face assessments have limited coverage in more conflict-affected regions and miss much of the variation that occurs in response to the frequent and strong shocks in the country (e.g., Favari et al. 2021); mobile

phone surveys have limited coverage amongst more rural and worse-off populations (e.g., Tandon and Vishwanath 2021); and key informant interviews are dependent on the knowledge and biases of the informants (e.g., Almoayad 2020). Thus, no single data source is likely to fully cover the entire population on its own.





In order to overcome some of these obstacles to performing traditional data collection and the limitations of the wide variety of non-traditional surveys, this work will utilize all available data sources, including both traditional and non-traditional sources, to triangulate information and estimate the well-being and needs of as much of the population as possible. For example, rather than only relying on either face-to-face or mobile phone surveys, we can better understand the needs of populations largely missed by these surveys by also performing surveys of local governments and community leaders, key informant interviews of a wide variety of firms, sector specialists and government officials, and face-to-face interviews performed as part of third party monitoring of humanitarian and development projects (e.g., Almoayad 2020). With all of this information combined, we can begin to understand how the drivers of growth and the humanitarian situation in the country have been evolving.

Most of the data systems in Yemen described above are focused primarily on food access, which allows for a detailed triangulation of poor food access over the course of the conflict. Given the wide availability of data, we are able to compare food access immediately prior to the escalation of the conflict in 2015 to nationally representative projections and estimates of food access immediately after and at many points during the conflict. Furthermore, using a biased sample of households with access to mobile phones and the willingness to respond to monthly food security surveys⁸, we can track the change in food access nationally and sub-nationally in response to the many conflict-related shocks that occur in Yemen to best describe the evolution of the humanitarian emergency. Lastly, we complement these assessments with voices of Yemenis themselves in describing the food security situation and the manners in which they are able to cope with the extremely difficult conditions on the ground.

⁷ World Bank (2017), WFP (2021)

⁸ See Appendix 1 for a description of the monthly WFP mobile phone survey and a discussion of how representative mobile phone surveys might be of the entire population.

Figure 2. Comparison of Data Sources in Yemen to Other Conflicts in the MENA Region

Yemen- Data Sources Following the Escalation of the Conflict Used in this Report			
 Nationally Representative Face-to-Face Assessments	 Face-to-Face Surveys of Portions of the country	 Mobile Phone Surveys	 Other Surveys and Types of Data
2016 Emergency Food Security and Nutrition Assessment	2021 Human Development Survey of Regions Controlled by the Internationally Recognized Government	Monthly WFP Monitoring Survey	Monthly WFP price collection of key commodities
2019 Emergency Food Security and Nutrition Assessment		Local Government Survey	Third Party Monitoring data from an array of projects
2021 Emergency Food Security and Nutrition Assessment		Key Informant Interviews- households, a wide array of service providers,	Geospatial and remote sensing data- agricultural productivity, distance to geotagged facilities, nightlights, building footprint
			Social Media Analytics- Analysis of Twitter Data
			Internet-Based Surveys of Individuals
Libya- Data Sources Used in a Similar Report			
None	World Bank- WFP Social Protection Assessment	Periodic WFP Monitoring Surveys	Ipsos Analysis of Geospatial Data on Availability and Access to Health Care
Syria- Data Sources Referenced in a Similar Report			
None	None	Quarterly WFP Food Security Monitoring	Geospatial and remote sensing data- nightlights

Notes: The reports in Libya referenced are an assessment of social protection performed jointly by WFP and the World Bank (World Bank 2020) and bulletins monitoring food security (e.g., WFP 2021). The report in Syria references is World Bank (2017b). However, following this report, there have been additional types of data collection that have been performed in Syria.

Although most of the data sources in Yemen are focused on food access, there are a number of reasons that food security might be a particularly important welfare dimension to track in the current setting. First, there is an ongoing food emergency in Yemen (e.g., IPC 2015; IPC 2017; IPC 2018; IPC 2020; IPC 2022), and inadequate food access has lifelong health and economic consequences (e.g., Martins et al. 2011, World Bank 2021; etc.). Thus, actively tracking inadequate food consumption and diet quality has an important and a clear interpretation in the current setting.

Second, although food access and monetary well-being are distinct concepts in general, the two concepts likely converge in the case of humanitarian emergencies. Monetary poverty is a multidimensional welfare measure, where households can choose to spend money on food consumption or other dimensions of well-being.⁹ Thus, it's possible to have poor food access and not be poor or vice versa. However, the existence of a large penalty on consuming below one's minimum daily energy requirement results in many dimensions of poor food access being concentrated amongst the monetarily poor (e.g., Jensen and Miller 2010; Lain et al. 2022). Given the growing empirical evidence for such a penalty (e.g., Lain et al. 2022), monetary poverty is likely to converge towards food access indicators in sufficiently poor settings where the vast majority of expenditure is likely devoted to food. Thus, the benefits of measuring monetary poverty relative to food access likely has significantly reduced relative to the pre-conflict period in Yemen given the extent of the humanitarian crisis.¹⁰

Third, even in the cases where a significant share of expenditure is devoted to non-food goods, particular measures of food access are strongly correlated with traditional measures of welfare. For example, measures of dietary diversity are strongly correlated with monetary poverty in a number of settings (e.g., Headey and Ecker 2013; Lain et al. 2022; etc.) and are strongly responsive to

strong income and price shocks (e.g., D'Souza and Jolliffe 2014; Tandon and Landes 2015; etc.). Furthermore, other conflict settings have demonstrated that changes in dietary diversity are much more strongly correlated with changes in monetary poverty than traditional correlates of poverty, such as household assets (e.g., Sharma and Wai-Poi 2019).¹¹ Thus, food access measures that are widely being tracked in Yemen both before and after the conflict likely also provide significant information on the monetary well-being of households who also spend significant resources on non-food goods.

And lastly, it is extremely difficult to measure monetary poverty in the current setting, suggesting that tracking food access measures is likely the best feasible well-being measure. Many of the pre-requisites to properly measure monetary poverty, such as relatively stable prices, the widespread availability of goods and services, the ability to properly value in-kind assistance, and the ability to collect long and cumbersome expenditure data across the entire country are all potentially lacking following the large impacts that the conflict has had on markets and institutions and the humanitarian response (e.g., Favari et al. 2021; OCHA 2021; etc.). Furthermore, the sheer number of conflict-related shocks that continually batter the population make any welfare measurement quickly dated (e.g., Favari et al. 2021), and monetary poverty is unable to be measured as quickly as some other basic welfare indicators, such as measures of food security and access to basic services.¹²

Importantly, the food emergency in Yemen is primarily being driven by poor access to food that is widely available to be purchased in the market. The most commonly used definition of food security includes four hierarchical dimensions- availability, access, utilization, and stability. Availability refers to the production and importing of food, which ensures that food is available to be purchased; access refers to the financial ability for households to purchase food available in the markets; utilization refers to

9 For example, a well-known finding in economics is that in response to inframarginal food assistance, households might choose to spend the additional savings on either food or other goods, and food access metrics might or might not improve (e.g., Behrman and Deolalikar 1989; etc.).

10 Prior to the conflict, when the national poverty rate was 49 percent, only 8 percent of the population was estimated as having a poor or borderline Food Consumption Score (FCS, measure of acute food insecurity). However, immediately following the onset of the conflict, real income declined by so much that approximately 65 percent of the population was estimated to having a poor or borderline FCS (e.g., EFSNA 2017).

11 A similar finding was presented in World Bank research from Afghanistan in trying to impute poverty between nationally representative surveys. The analysis was led by Nobuo Yoshido and conducted in 2019, but the results have not been publicly released.

12 For example, typical food security modules used in targeting much of the humanitarian food assistance are able to be collected in modules of under ten questions, such as the Food Consumption Score (e.g., WFP 2016), the Reduced Coping Strategies Index (WFP 2016), and the Food Insecurity Experience Scale (e.g., Ballard et al. 2013).

health outcomes and ensuring that individuals are healthy enough to live an active and full life; and stability refers to the stability of each dimension over time (e.g., Barrett 2010). Despite the existence of restrictions on imports and complications from the active conflict in Yemen, supply chains continue to work, and food continues to largely be available to purchase in Yemen, albeit at higher costs due to higher transportation costs (e.g., World Bank 2018; ACAPS 2020; etc.). Thus, throughout we use standard measures of food access, as opposed to measures of food availability, as the primary proxy for monetary well-being throughout.

As is best practice, the overall severity of the food emergency and changes in food access throughout the report are measured using more than one single standard measure of food access (e.g., Maxwell et al. 2014). Throughout the analysis we use the Food Consumption Score (FCS) and the Reduced Coping Strategies Index (rCSI) to define poor food access, using thresholds typically used to target emergency food assistance to denote poor access.¹³ Respectively, the indicators capture the weighted sum of the number of days that a household consumed a number of key food groups and the weighted sum of the number of days that households relied on negative food coping strategies in the past week. Importantly, each measure is correlated with undernourishment¹⁴ and undernutrition (e.g., Headey and Ecker 2013; Maxwell et al. 2014).¹⁵

But in addition to tracking measures of food access, we also track access to basic services as well to the degree that the existing data sources allow. Although most of the quantitative surveys being performed in Yemen are devoted to food security, there are a few sources reporting access to education, health care, electricity, water, and other municipal services. With these sources we further illustrate the multidimensionality of the crisis facing Yemeni households and how the conflict has resulted in poor access to nearly all basic services (e.g., WFP 2019). In each dimension, including in access to food, we differentiate between problems with the availability of food in markets and of basic services from the financial access to goods and services that are able to be purchased.

13 In Yemen, an FCS at or below 42 and an rCSI at or above 19 is typically used as the threshold for emergency food assistance.

14 Defined as consumption below the minimum daily energy requirement.

15 Defined as insufficient consumption of nutrients needed to maintain good health.

SECTION

4



The Change in Food Access Immediately Following the Start of the Conflict

Yemen was already one of the poorest countries in the MENA region even before the conflict escalated in March of 2015. The state-owned oil production and extractive sectors contributed to approximately three-quarters of GDP, and industries adjacent to oil production account for nearly all sources of growth in the country just prior to the conflict (e.g., World Bank 2015). However, the total amount of oil production in Yemen is small relative to other countries in the MENA region (e.g., IMF 2015), and revenues from the sector are largely not redistributed to the population. The rest of the private sector, which was largely dominated by politically connected firms, and the agriculture and related sectors were largely struggling (e.g., World Bank 2015).

However, just prior to the escalation in the conflict in March 2015, life in Yemen was getting even harder. Rapid rises in global commodity prices in 2008 and again in 2011 significantly reduced real income in the country given Yemen imported approximately 90 percent of its food prior to the conflict (e.g., WFP 2012). Additionally, the political uncertainty following the Arab Spring and the resignation of President Ali Abdullah Saleh in 2012 even worsened the climate for the small and struggling private sector (World Bank 2017a).

Given all these difficulties, Figure 3 demonstrates that households struggled both to earn a living and to afford food and basic services even before the conflict escalated. A non-trivial share of household heads did not have a job in the year before the conflict escalated, the vast majority of which were working age. Furthermore, of the heads that did have a job, the vast majority worked multiple jobs, many of which were less than full time and were held for less than one year.

However, there is one exception to the bleak job situation- the large number of government workers. The state-owned oil production- the largest contributor to the country's GDP- financed a complex system of patronage, and one of the ways the proceeds were spent was a high number of relatively well-paying government jobs (e.g., Egel 2013; World Bank 2015; etc.). Approximately 30 percent of the population lived in a household that received at least one government salary, with the share being 60 percent in the capital. Importantly, the salary earned from these jobs was significantly higher than the average salary for all other types of employment- particularly those working in agriculture or in other types of private sector employment (e.g., World Bank 2017). Furthermore, government jobs were far more stable, as individuals working in those jobs were more likely to be employed fulltime, had held the

job for longer, and were much more likely to have been performing the same work in the year prior to the survey.¹⁶

Aside from relying on mostly insufficient salaries and wages, households also received a combination of remittances and public support. Figure 3 demonstrates that approximately 27 percent of the population received remittances in the year before the survey, and the average per capita amount received was nearly 10 percent of the poverty line (about 13,000 YR); and approximately 45 percent of the population received at least one source of public assistance, and the average per capita amount received per household was approximately 3 percent of the poverty line (about 5000 YR). These other sources of financial support helped a large number of households maintain a minimum standard of living.

Despite the support from other households and the social safety net, households had a difficult time affording food and basic services immediately before the conflict escalated. Food insecurity was a significant problem across the entire country. Figure 3 demonstrates that approximately 10 percent of the population had poor or borderline Food Consumption Scores¹⁷, which is a threshold commonly used in targeting emergency food assistance. Furthermore, approximately 13 percent of the population reported that there was a time during which they did not have enough food in the week and had to resort to at least one common food coping strategy. Of this population relying on food coping strategies, approximately half heavily relied on adverse food coping strategies.^{18,19}

Further demonstrating the poor and deteriorating conditions, the national poverty rate had increased in the decade leading up to the escalation in the conflict. Figure 3 demonstrates that the poverty rate increased from 35 percent in 2005 to 49 percent, which helped cement Yemen's status as the poorest country in the Middle

East region (e.g., World Bank 2018b). Driven by the significantly higher poverty rates of households where no members were employed by the government, poverty was significantly higher in rural areas than in urban areas where the majority of government workers lived. However, even in urban areas, the poverty rate was nearly 25 percent.

However, from this already poor and worsening pre-conflict base, the escalation of the conflict in 2015 led to a dramatic worsening in Yemeni living standard and precipitated a humanitarian crisis. Although there is not one definitive source on well-being in the country following the escalation of the conflict in March of 2015, Figure 4 demonstrates how every single available data source in Yemen demonstrates a severe and immediate decline in well-being.

First, Figure 4 reports the increase in the share of the population experiencing acute food insecurity or worse as estimated by the Integrated Phase Classification (IPC) in 2014 and 2015. The share experiencing acute food insecurity increased from 27 percent of the population in 2014 to 48 percent by June 2015, only three months after the conflict escalated (IPC 2014; IPC 2015). These estimates are based on a combination of food access (e.g., Food Consumption Score, etc.) and nutrition indicators (e.g., wasting, etc.). The primary reasons cited for the increase in acute food insecurity were reduced access to health care and sanitation and widespread disruption of employment (IPC 2015).

Second, the first nationally representative face-to-face food security assessment, the Emergency Food Security and Nutrition Assessment (EFSNA) conducted at the end of 2016,²⁰ provided the most complete estimate of the severity of the food emergency. Figure 4 further reports the share of the population with poor or borderline food consumption, as measured by the Food Consumption Score

16 Although government jobs helped a significant share of the population avoid poverty, it has long been argued that government jobs were used as patronage to help the long-serving president, Ali Abdullah Saleh maintain power (e.g., Egel 2013; etc.). Furthermore, the conditions created by this system were likely related to the quick escalation of conflict following his resignation (e.g., BBC 2014).

17 This corresponds to a Food Consumption Score of less than or equal to 42.

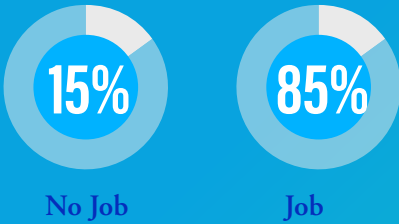
18 Although there is no universal threshold for the Reduced Food Coping Strategy Index, one potential threshold for a medium or low rCSI index value at or above 19 (e.g., Favari et al. 2021)

19 Although it is difficult to precisely estimate using typical household budget surveys given that minimum daily energy requirements are not directly observed, approximately 40 percent of the population consumed below their MDER and were undernourished. And given the heavy reliance on grains and little consumption of more nutrient-dense foods, an even higher share of the population had a number of different nutrient deficiencies (World Bank 2017a).

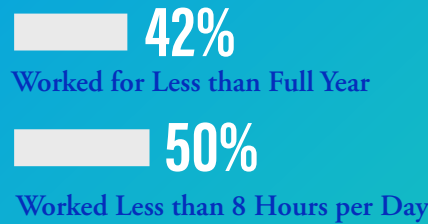
20 This was measured by the share of the sample with a Food Consumption Score (FCS) that was below thresholds commonly used by the World Food Programme as one of the indicators to target food assistance. Specifically, households with poor consumption have an FCS at or below 28; and households with borderline consumption have an FCS greater than 28 but at or below 42.

Figure 3. Employment and Welfare Before the Conflict Escalated

Share of Households by Employment Status



Characteristics of Main Job for Heads who Worked

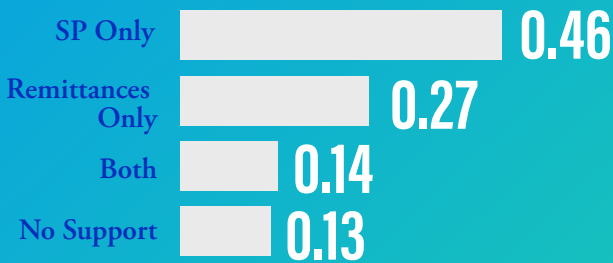


60% Wage Job

34% Household Enterprise

6% Other Non-Wage

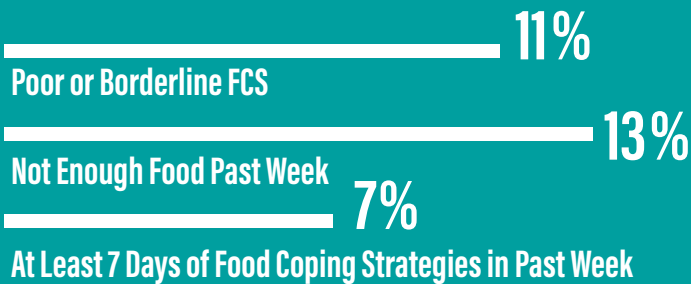
Share Receiving Any Support



Share Receiving Support by Working-Age of the Head and by Type of Support



Share of Population with Inadequate Access to Food, 2014



Share of the Population that is Poor, 2005-2014

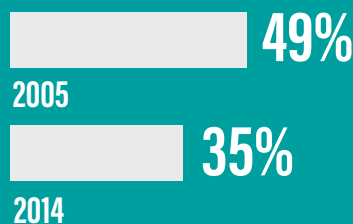
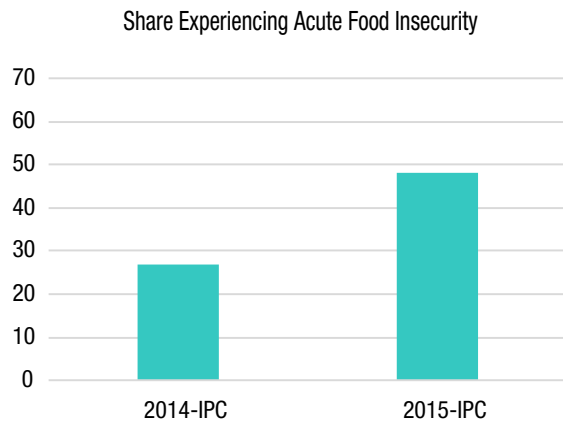
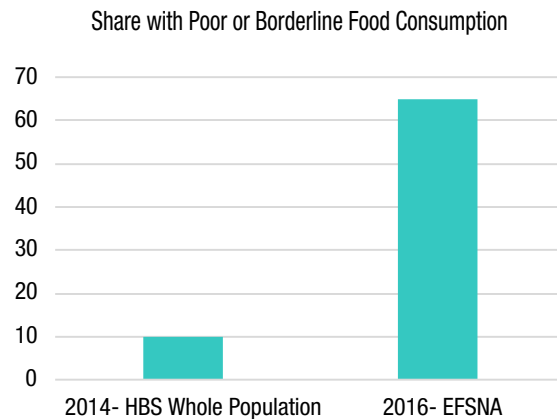


Figure 4. Immediate Decline in Food Access Following the Escalation of the Conflict

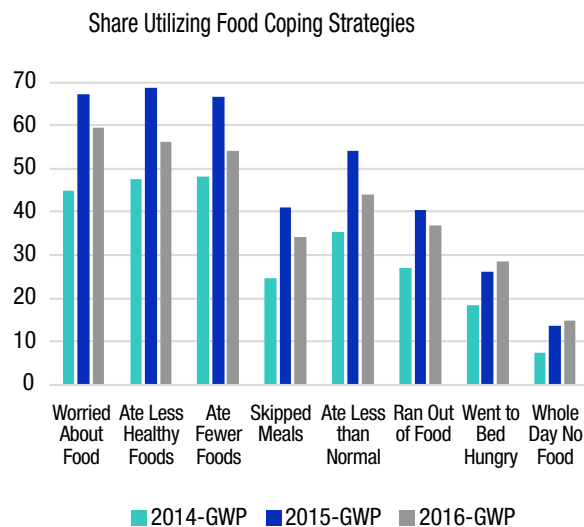
a. Integrated Phase Classification (IPC)



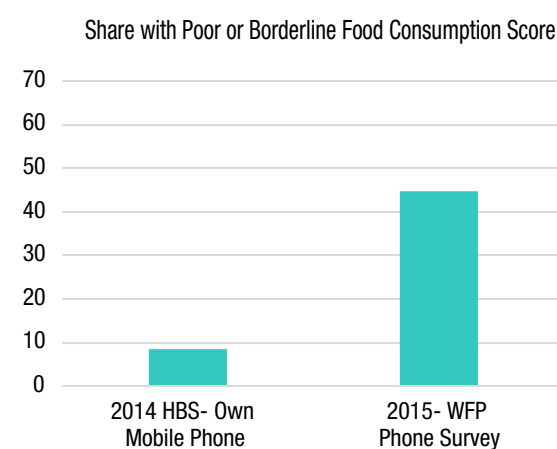
b. Emergency Food Security and Nutrition Assessment



c. Gallup World Poll



d. Monthly WFP Survey- August 2015



Notes: Each figure was either obtained via published reports or via authors' calculations in the cases where the microdata is available. For the IPC projections, the figures were taken from IPC (2014) and IPC (2015); for the Emergency Food Security and Nutrition Assessment, the 2016 number was taken from EFSNA (2017) and the 2014 HBS estimates were obtained via authors' calculations using that survey; for the Gallup World Poll, the results were taken from the authors' calculations using each annual survey; and for the Monthly WFP survey, the estimates were taken via authors' calculations using the August 2015 mVAM and 2014 HBS surveys.

(FCS), in both the EFSNA and in the 2014 Household Budget Survey.²¹ The EFSNA estimated that 65 percent of Yemenis had poor or borderline food consumption in 2016, a 55 percentage point increase relative to the share estimated in the 2014 HBS (FAO 2017; World Bank 2017a).

Third, the Gallup World Poll (GWP) corroborated this significant decline in food access. Gallup continued to perform their annual survey in Yemen both before and after the escalation in the conflict. Although the survey primarily focuses on the measurement of a number of subjective welfare indicators, the Food and Agriculture Organization

21 The 2014 estimates are derived from a longer food consumption module in the 2014 Household Budget Survey.

of the United Nations (FAO) inserted a short food security module used to estimate the Food Insecurity Experience Scale (FIES) beginning in 2014, and both the 2015 and 2016 surveys were conducted following the escalation of the conflict in March of 2015. Relative to 2014, the share of households relying on each of the eight negative coping strategies that make up the FIES was significantly higher in both 2015 and 2016. The immediate percentage increase between 2014 and 2015 in the share of the population relying on each coping strategy was between 38 and 85 percent, with the largest percentage increases in the most severe coping strategies.

Fourth, the WFP further corroborated the substantial decline in food access as well through additional forms of data collection. The WFP began performing monthly mobile phone monitoring in August 2015 of approximately 2400 households across the country. The survey was and continues to be conducted via random digit dialing, and thus is biased towards more urban and better-off households that have access to mobile phones.²² But Figure 4 further demonstrates that five months following the escalation of the conflict, there was a substantially higher share of this relatively biased sample with poor or borderline food consumption as defined by the Food Consumption Score than amongst the share of the population with a mobile phone in the 2014 Household Budget Survey.

Combined, a wide variety of sources suggest that there was a very large and immediate worsening of well-being that precipitated a humanitarian emergency. However, as described in the conceptual framework, this worsening was likely the result of direct and indirect impacts of the conflict, many of which are unobservable given the available data sources. However, we are able to identify a few of the channels through which the humanitarian emergency was started.

First, the onset of conflict led to an immediate and substantial drop in oil production (e.g., World Bank 2022), which prior to the conflict accounted for approximately 75 percent of GDP (e.g., World Bank 2015). This drop in oil production caused projections of GDP to immediately

plummet by up to 50 percent. Furthermore, given that the oil sector was largely state-owned (e.g., World Bank 2015), government revenues also plummeted.

Second, because of the drop in government revenues from oil production and the fracturing of institutions within Yemen, there was a dramatic drop in the payment of public sector employment in late 2016 (e.g., OCHA 2017). Although surveys demonstrate that public sector employees continue to receive some consistent payment in regions controlled by the internationally recognized government (IRG), those in regions controlled by the Houthis rarely receive any payment at all (e.g., World Bank 2022). Given that the majority of the population and government jobs are in regions controlled by the Houthis and given that the majority of good-paying jobs in the country were in the public sector (Figure 3), the decline in public sector payment likely had a very large impact on many households' ability to afford food and basic services.

Third, Coalition forces imposed restrictions on imports to Houthi-controlled regions immediately after the conflict escalated. The strength and target of these restrictions have changed over time. At times, there are substantial delays caused by inspections to verify that commercial and humanitarian shipments do not contain weapons; at other times, Coalition forces explicitly block fuel imports to Houthi held regions.²³ Although it is difficult to precisely gauge the intensity of this disruption to supply chains, reports have suggested that immediately following the escalation of the conflict, imports in Al Hudaydah- the port that supplies nearly the entirety of Houthi-controlled regions- were immediately reduced to 40 percent of pre-conflict levels.²⁴ The restrictions on imports are particularly harmful in Yemen since the country imported approximately 90 percent of its food prior to the conflict.²⁵

Fourth, there was a drop in agricultural productivity (Conflict and Environment Observatory 2020), which significantly impacted the well-being of a large share of the population given the large share of the population involved in agricultural production (e.g., World Bank 2017). However, given that estimates of the decline in

22 This monitoring survey is analyzed extensively in subsequent sections. See Appendix 1 for a detailed investigation into the representativeness of this survey.

23 Favari et al. (2021)

24 Gebrekidan and Saul (2017).

25 WFP (2012).

agricultural production were not nearly as large as the decline in oil production (e.g., Conflict and Environment Observatory 2020; World Bank 2022), the income losses to agricultural producers are likely small in comparison to the income losses suffered by those employed in the oil sector or public sector workers.

However, although these are undeniably pivotal factors negatively impacting well-being across the entire country, empirical evidence from Tandon (2019) suggests that these mechanisms for income losses and the precipitation of the humanitarian crisis miss significant elements. As Houthi forces captured the capital Sana'a in September of 2014, approximately six months before the conflict escalated, we are able to estimate the immediate impacts on well-being using microdata from the ongoing 2014 Household Budget Survey that was conducted over the course of the entire calendar year. By immediately linking the capture to the microdata, we are able to better identify the mechanisms by which household well-being was affected and how it might have had differential impacts across different types of households.

Because the Houthi forces were more interested in taking over the functions of the ministries of defense and finance, the Central Statistical Organization was able to continue to the survey uninterrupted (e.g., BBC 2014; World Bank 2017a). Furthermore, the households selected to be interviewed were randomized over space and time, with little evidence that the sampling was impacted by the capture (e.g., Tandon 2019). **Thus, one can use the 2014 Household Budget Survey to estimate how consumption, employment, and household behaviors changed in the three months following the capture until the end of 2014.**

Most importantly, this is prior to all the very large changes described above- **the large drop in oil production, the non-payment of many government salaries, the restrictions on imports, and the reduction in agricultural productivity.** Rather, the major mechanism by which the capture impacted households was through the Houthi takeover of government institutions in Sana'a, particularly the takeover of institutions in charge of security. There was evidence of Houthi forces targeting specific individuals for persecution (e.g., BBC 2014); there was a terrorist attack

in the city a few weeks following the capture (e.g., Salisbury 2014); and in the survey itself, there was evidence of a decline in the share of households that reported feeling very satisfied with security (e.g., Tandon 2019). However, it is important to emphasize that the decline in security was not due to ground battles or air strikes, which dramatically increased following the escalation of the conflict in March of 2015.

Even without the major violence and economic shocks and following the escalation of the conflict in March 2015, there was a large and immediate decline in well-being immediately after the capture of Sana'a. Figure 5 summarizes the evidence from Tandon (2019) and illustrates that by three months following the capture of the capital, the value of consumption of food declined substantially.²⁶ Relative to immediately prior to the conflict, consumption dropped by approximately 30 percent by three months following the capture; and this decline in consumption was not evident in the rest of Yemen at the same time. Importantly, as noted above, this is a large drop from an already-low base.

The timing of the substantial decline in well-being varied amongst the population. The most vulnerable households- those with less than a primary school education - had an immediate decline in consumption. However, the better educated households were initially able to maintain consumption for the first two months but had as large of a decrease as less-educated households by the end of the survey period. Importantly, government salaries continued to be paid during this time period, which, as demonstrated by Figure 3, was a source of income for the majority of households in the capital.

Figure 5 further illustrates that households were economically suffering following the capture of the capital. First, there was a substantial increase in the share of households that owned a marginal household enterprise, which increased from 27 percent immediately prior to the capture to 42 percent of households. Importantly, the average earnings from such enterprises decreased following the capture of the capital and are far below the poverty line, and the evidence is consistent with increased underemployment rather than households exploiting new opportunities (e.g., Tandon 2019). Second, there was an

26 The figure focuses on food consumption because the recall period is one week, as opposed to many other non-food goods which have recall periods up to one year and potentially could predate the capture of the capital (e.g., Tandon 2019).

increase in the share of households relying on loans, which increased from 41 percent of households to 55 percent of households by three months following the capture.

Lastly, there was also evidence of the capture having much broader impacts than just on expenditure and employment. In particular, there were strong gender-specific impacts, with the mobility of women being much worse affected than that of men. Figure 5 demonstrates that women were significantly less likely to be in charge of particular types of purchases where they were most often in control of prior to the capture (e.g., food purchases) and more likely to be in the household during the survey following the capture of the capital. In Sana'a, women had more control over food purchases than they did in the rest of the country, and following the capture, the share in control of those purchases declined to levels similar to the rest of the country (Tandon 2019).

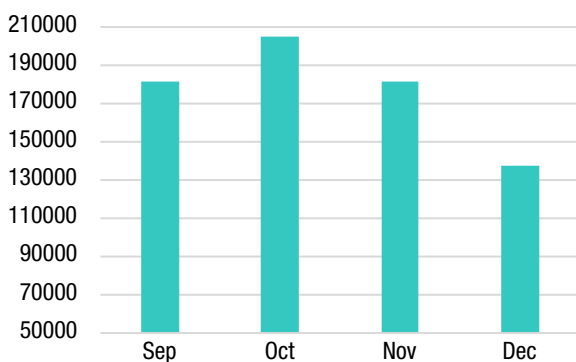
Although it is extremely difficult to understand how the humanitarian emergency spread from Sana'a to the rest of the country, these results suggest that at least one of the propagating factors is likely the change in control of institutions that occurred as the Houthis continued to capture more and more of the country as their forces advanced on Aden in the first few months of 2015 (e.g., Tandon 2019). Combined with further aggravating factors that began following the escalation of violence in March 2015, the depth of the humanitarian crisis likely continued to worsen and spread to the entire country.

For more details, see:

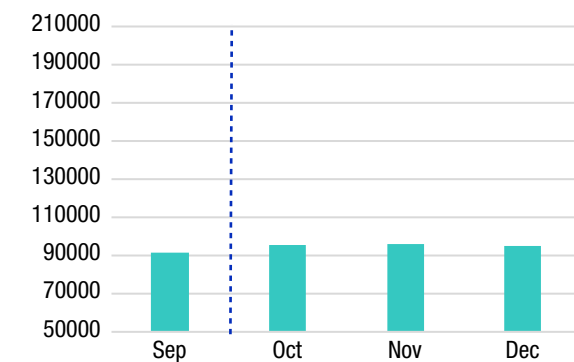
Tandon, S. 2019. "When Rebels Attack: Quantifying the Impacts of Capturing Territory from the Government of Yemen." *World Bank Economic Review* 33 (2), 328-352. [Link](#).

Figure 5. Change in Well-being Following the Capture of Sana'a by Houthi Forces

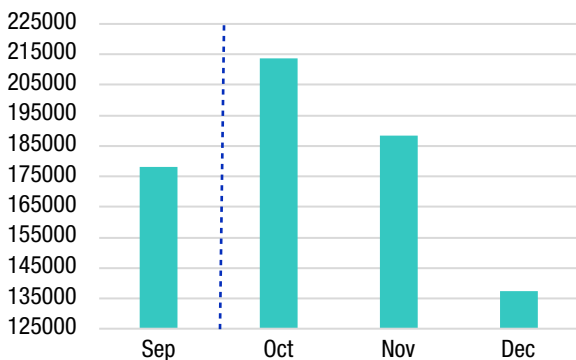
a. Expenditure on Food - Sana'a



b. Expenditure on Food - Rest of Yemen



c. Expenditure on Food in Sana'a - Head Finished Primary School



d. Expenditure on Food in Sana'a - Head Did Not Finish Primary School

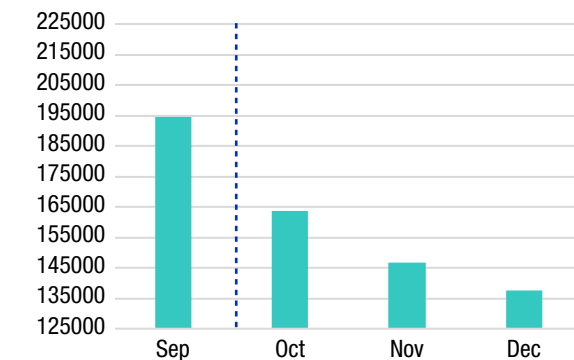
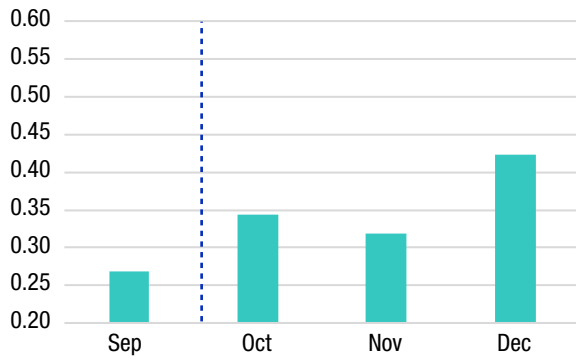
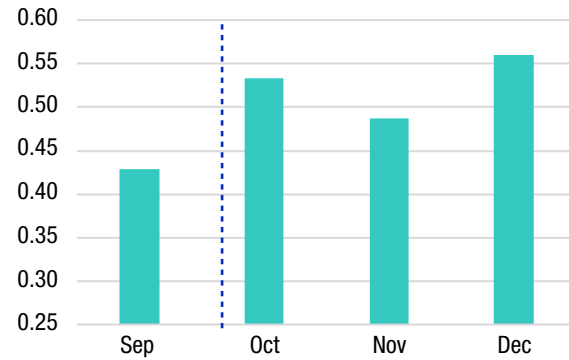


Figure 5. continued

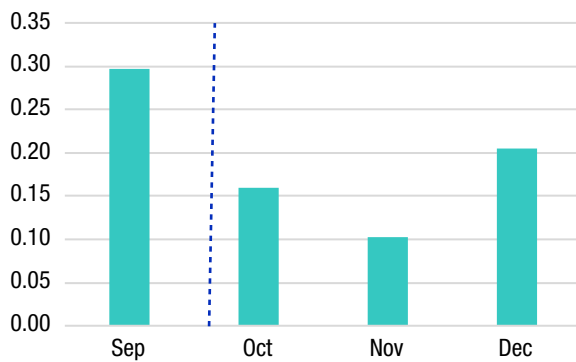
e. Share Owning a Household Enterprise- Sana'a



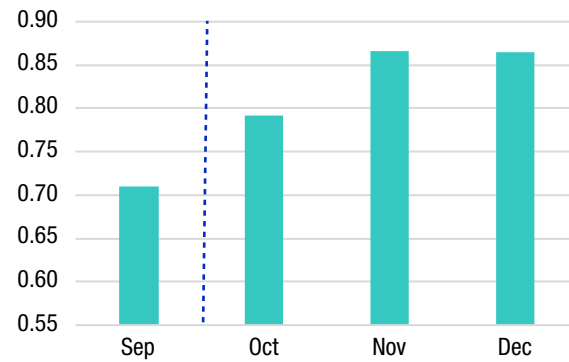
f. Share with a Loan - Sana'a



g. Share with Women Controlling Food Purchases



h. Share with Women Present for Interview



Notes: This figure reproduces key findings from Tandon (2019), which documents how well-being and other welfare dimensions changed each month following the capture of Sana'a by Houthi forces at the very end of September 2014. All figures are the authors' calculations using the 2014 Household Budget Survey.

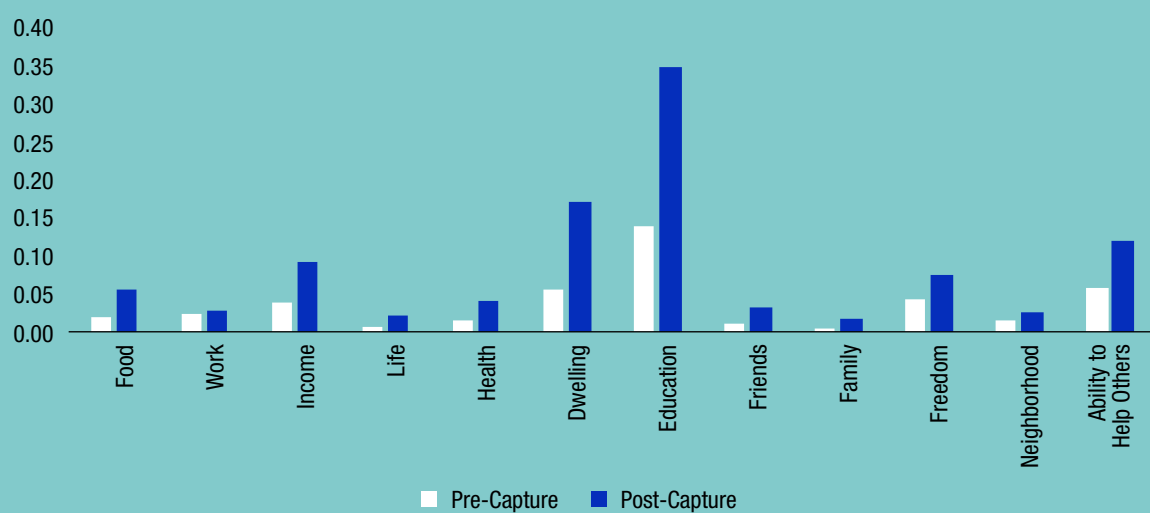
Box- Change in Subjective Welfare Following the Capture of the Capital

Subjective welfare measures, such as satisfaction with particular welfare dimensions, have become increasingly prevalent in the past decade. Importantly, subjective welfare metrics have advantages over more traditional measures of welfare such as monetary poverty (e.g., Ravallion 2013), and sharp changes in peoples' subjective perceptions of their welfare have been demonstrated to be particularly important to many instances of political change that have occurred across the world (e.g., Ianchovichina 2017; etc.). Furthermore, given their simplicity compared to more traditional consumption and employment-based metrics of deprivations, subjective metrics are often used to track changes in consumption and employment during times of crises.

Despite the importance of subjective welfare metrics and the greater ease in fielding subjective welfare modules during crises, there are well-known problems with using such measures. Most importantly, answers to subjective welfare questions depend on respondent-specific scales that are potentially not comparable across individuals, are potentially subject to frame-of-reference effects, and suffer from potential measurement error in ways that could differ from more traditional welfare metrics (e.g., Ravallion 2013). However, one of the common methods to sidestep these problems has been to analyze sharp changes in subjective well-being in response to large shocks (e.g., Coleman-Jensen et al. 2019; FAO 2020; United Nations 2020b; World Bank 2020b; Adjognon et al. 2021; Amare et al. 2021; etc.).

However, there is an important difficulty in interpreting changes in such measures in tumultuous circumstances. Specifically, crises can impact both the scale with which households report their subjective assessments and behaviors from which deprivations are traditionally inferred, and it is unclear how well subjective measures align with traditional welfare metrics in such a setting. Importantly, it is very difficult to identify instability in subjective scales with simple subjective welfare modules that currently are widely used in household surveys.²⁷

Figure B1. Change in Share of Population in Sana'a Satisfied in Each Welfare Dimension Following the Capture of Sana'a



²⁷ Specifically, given all the difficulties in interpreting subjective welfare metrics, subjective and objective welfare metrics might be poorly aligned even if the scales used in the subjective assessment were stable. In order to definitively demonstrate that subjective scales are unstable, one would need a situation where objective and subjective metrics move in the opposite direction. However, if subjective welfare modules asked specifically about the scales used to make assessments, then it might be able to identify changing scales even in less extreme circumstances.

The capture of Sana'a and the undeniably large and negative impacts the capture had on nearly every single traditional welfare metric offers important insights on the stability of subjective scales. Specifically, the 2014 Household Budget Survey included a comprehensive subjective welfare module, and Figure B1 demonstrates that, despite the strong decline in traditional measures of well-being, there was a strong increase in the share of household heads in Sana'a that were satisfied with each welfare dimension. The increase was large, with an average increase in 9 percentage points across all welfare dimensions, and importantly it included nearly identical increases in dimensions where welfare did (e.g., satisfaction with food consumption) and likely did not change (e.g., satisfaction with education).

Potential explanations of differences in the changes of subjective versus more traditional measures of welfare include the possibility of households having an increase in satisfaction following the fall of a largely unpopular government or with households possibly being happy that they were not victims of violence following the capture of the capital and re-evaluating what satisfaction meant to them. But regardless of the exact explanation, the results are consistent with scales used in making subjective assessments being unstable over time and are the first empirical estimates that illustrate the importance of what was a theoretical concern. This raises important concerns for empirical approaches that analyze the changes in subjective welfare metrics following shocks, particularly for popular food security measures that in part depend on subjective questions (e.g., FAO 2020). Furthermore, the results highlight the need for subjective welfare modules to try and better capture the scales used in subjective assessments to better understand how important the issue might be in less extreme circumstances and better interpret these important classes of welfare metrics.

For more details, see:

Tandon, S. 2022. "Are Subjective Questions on Welfare Appropriate During Crises? Evidence from the Onset of Conflict in Yemen." Policy Research Working Paper WPS10178, World Bank, Washington D.C. [Link](#).

SECTION

5



The Evolution of Well-being After the Beginning of the Humanitarian Crisis

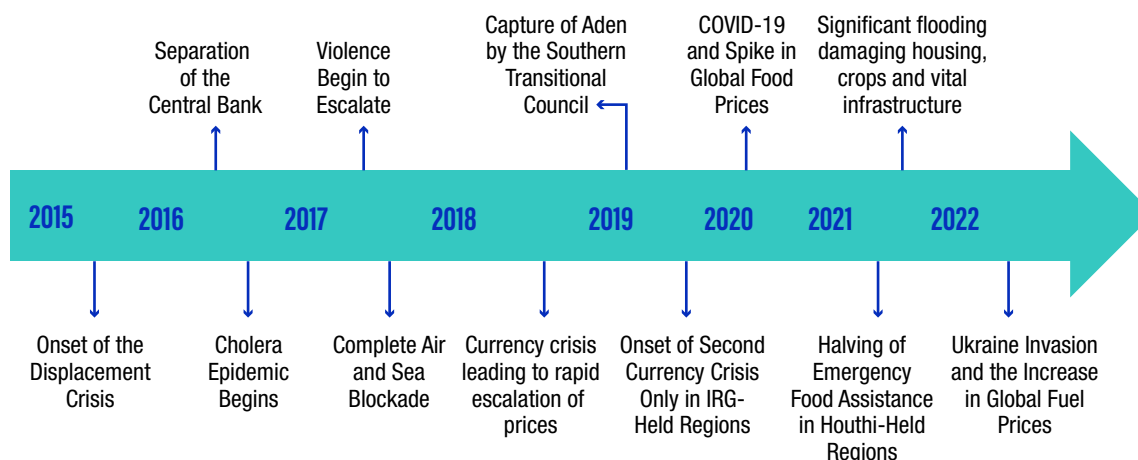
Following the escalation of the conflict and the resulting large humanitarian crisis described above, the suffering of the Yemeni population has been exacerbated by a very large number of conflict-related shocks and natural disasters. Figure 6 presents a timeline that describes a subset of these shocks. The list includes dramatic changes in violence, the takeover of territory and governance by new forces, numerous outbreaks of communicable diseases, largescale flooding, locust outbreaks, multiple macroeconomic crises, restrictions on imports that vary in severity, global price shocks, the COVID-19 pandemic, sudden declines in lifesaving humanitarian assistance, and so on (e.g., OCHA 2022). These shocks began immediately after the conflict escalated, with some of the shocks affecting the entire country, while others affect only portions of the country.

Although it is difficult to precisely gauge how these shocks affected the entire population given severe data scarcity, we are able to understand how these shocks impacted the population with access to mobile phones using high-frequency household surveys via random digit dialing mobile phone surveys.²⁸ Importantly, these surveys have been conducted monthly on a comparable sample over

nearly the entire course of the conflict and capture two widely used food security measures- the Food Consumption Score and the Reduced Coping Strategies Index- that can track food access and proxy for the monetary well-being of households. Furthermore, the survey captures additional household characteristics and the district of the respondent, which together can be used to help identify the exposure of individual households to the many conflict-related shocks that have occurred in the country.

Based on these data, we analyze the severity of the impact each of the major shocks had on food access- the worsening of the import restrictions, the impact of violence, and the impact of currency crises that cause food prices to spiral out of control. Consistent with the conceptual framework, each of these shocks had impacts on both markets, institutions, and households, which helps to further illustrate the importance of a wide variety of manners in which the conflict is adversely impacting households. Importantly, we are able to compare the impact of each of these shocks to better understand the degree to which the type and number of shocks occurring at any given time might be associated with particularly poor food security outcomes and a worsening of the overall humanitarian situation.

28 See Appendix 1 for a description of the survey.

Figure 6. Shocks Compounding the Humanitarian Emergency in Yemen

Notes: This figure illustrates a timeline of selected large shocks affecting the country following the escalation of the conflict in 2015.

Importantly, there are other significant shocks that evolved over time and did not necessarily have a strong immediate impact on households. For example, the break-up of the central bank introduced tremendous difficulties to completing commercial transactions and to banking in the country, and the impacts continued to evolve over time (e.g., ICG 2021). However, given the tumultuous environment, it is difficult to precisely link events that did not have a sharp and immediate impact precisely to household outcomes. Although the impact of some of the shocks that are highlighted here have implications for how some of these other shocks impacted households, the relative impact of many of these other shocks on markets and institutions and household well-being are remaining questions for future analysis.

a. The Impact of Tightening Import Restrictions on Poor Food Access

As described above, immediately after the escalation of the conflict in March of 2015, there were restrictions placed on imports, ostensibly to try and prevent weapons and other illicit materials to reach the Houthis. However, it is difficult to measure the severity of the import restrictions over time. For example, the series of inspections for ports not under control of the internationally recognized

government (IRG) is performed by the United Nations Verification and Inspection Mechanism (UNVIM)²⁹, and there can be substantial delays in importing food and vital goods into the country. Surveys of businesses and others illustrate that the amount of time to obtain clearance from UNVIM is non-trivial, and varies over time (e.g., SMEPS 2020). Furthermore, the series of inspections intermittently bans the import of fuel into key ports that supply much of the regions under Houthi control (e.g., Favari et al. 2021).

Although it is difficult to estimate the severity of the restrictions on imports over time to better understand its impacts on the Yemeni economy and household well-being, we can analyze sharp changes in the severity of the restrictions that we are able to observe. In particular, there was a complete air and sea blockade instituted in Yemen in November 2017 in response to a surprise missile strike in Riyadh by the Houthis (e.g., Human Rights Watch 2018). The complete air and sea blockade immediately worsened the restrictions that were primarily focused on ports supplying Houthi-held regions, and further extended import restrictions to the rest of the country. The complete blockade on the rest of the country lasted from November 6th to the 13th, when the blockade on the IRG-controlled regions were lifted; and the complete blockade on Houthi-held regions lasted until the 18th.

29 For example, see the website for the United Nations Verification and Inspection Mechanism (UNVIM).

Tandon and Vishwanath (2020) and Favari et al. (2021) thoroughly investigate the impacts of the complete air and sea blockade. Figure 7 summarizes the main findings from these analyses. First, there were only moderate overall impacts on food access. The share of households with a low or medium Reduced Food Coping Strategy Index (rCSI), a weighted sum of the number of days in the past week that the household has relied on negative food coping strategies, increased from 35 percent of households to 39 percent; and the share of households with a poor or borderline Food Consumption Score (FCS), a weighted sum of the number of days the household consumed particular food groups did not change.

However, figure 7 further demonstrates that the blockade affected not just access to food, but also access to a number of key services. The share of households that were not satisfied with water consumption, the share of households that relied on primitive electricity sources (e.g., candles, batteries, etc.), and the share of households with no municipal waste collection all increased significantly. Furthermore, the share of households that were deprived in three or four of the four total welfare dimensions captured in the November 2017 WFP survey increased from 20 percent of households to 25 percent.

The key mechanism by which household welfare was impacted was through the impact the blockade had on markets. Figure 7 demonstrates that immediately after the blockade began, there was a very large increase in fuel prices. Between October and November 2017, average fuel prices across the country increased by 37 percent. However, Figure 7 illustrates that there was little change in the price of food over the same time period. Importantly, this is one of the largest month-to-month spikes in fuel prices over the entire course of the conflict (e.g., Tandon and Vishwanath 2020; Favari et al. 2021).

People consume fuel differently than food, leading to differences in how fuel price spikes affect people across the welfare distribution. For example, at the time of the blockade, approximately one-quarter of Yemeni households used generators for their primary electricity source, and

this figure was highest for households with acceptable access to food³⁰; and households with poor food access might have already prioritized spending on food over all other spending, such as fuel for vehicles. Furthermore, in March 2021, better-off households were still more likely to have purchased fuel in the past month than worse-off households.³¹

Combined, these patterns suggest that large changes in fuel prices are more likely to affect better-off households. Some spending on fuel, such as for generators or to reach jobs and basic services, would be difficult to quickly adjust in the event of a large fuel price spike, and households using fuel would experience large short-term increases in the share of resources devoted to fuel. In such an event, these better-off households might have to adjust their food consumption to cope until they can pivot from fuel consumption over time.

Investigating the possibility that the little average impact of the blockade on food access might have significantly varied across different points of the welfare distribution, Figure 7 estimates the change in food access separately for worse-off and better-off households. Specifically, when estimating the change in responses following the imposition of the complete air and sea blockade, we can restrict the sample only to households that had previously responded to one of the monthly WFP surveys. Furthermore, we estimate the change separately for households that had either a poor or borderline FCS in their last survey before November 2017 and households that had an adequate FCS in the last pre-blockade survey.

Figure 7 demonstrates that better-off households had large declines in food access, while worse-off households were not adversely affected. Relatively better-off households had a decline in average FCS of 5 and an increase (worsening) of average rCSI of 3, which represent a worsening of 9 and 17 percent respectively.³² Alternatively, there was little change in the average FCS or rCSI of poorer households. These patterns are consistent with larger reliance better-off households have on fuel.

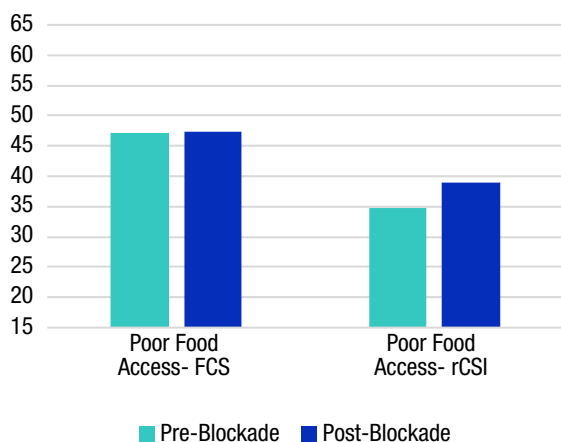
30 This figure was obtained from a special module inserted in the November 2017 mVAM survey. However, in surveys conducted since, the reliance on generators for electricity has declined.

31 Author's calculation from a pilot of a mobile phone survey conducted jointly by the WFP and the World Bank in June 2021.

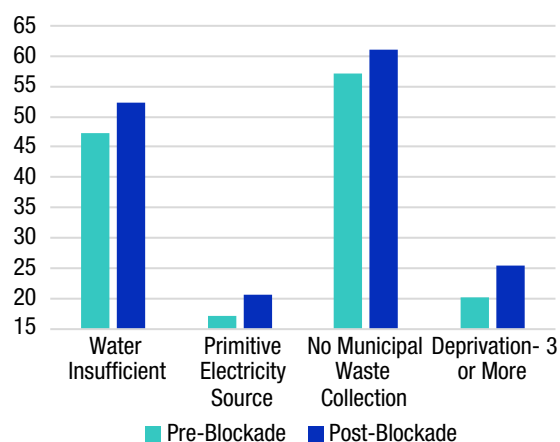
32 Although the majority of this report focuses on the share of households that have poor food access as opposed to average food access measures, this shock primarily only affected households with adequate food access. Thus, in this case, we report changes in average food access measures as opposed to changes in the share with poor food access.

Figure 7. Impact of the Complete Air and Sea Blockade

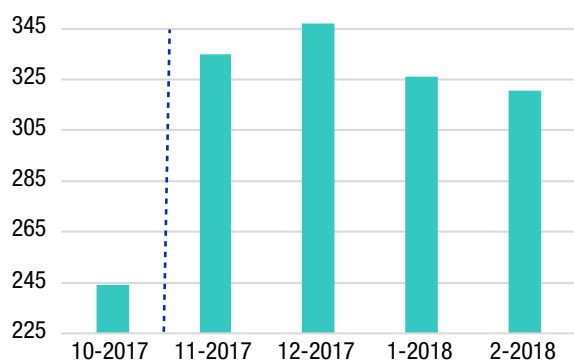
a. Share with Poor Food Access



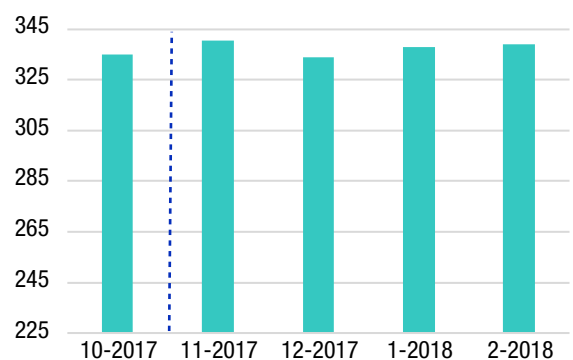
b. Share with Deprivations in Non-Food Dimensions



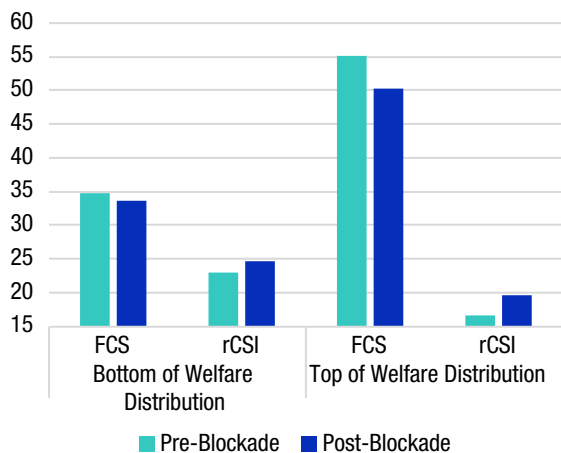
c. Average Price of Fuel



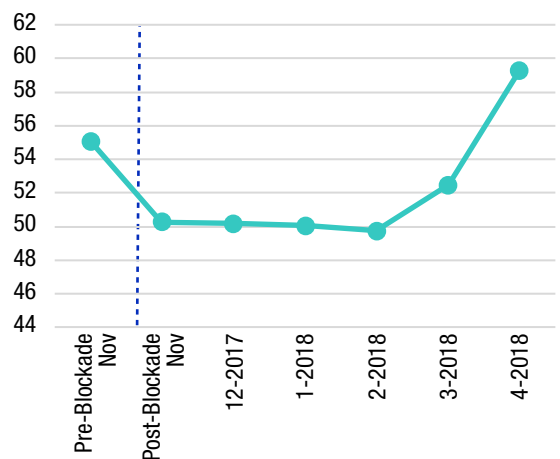
d. Average Price of Common Food Items



e. Average Food Access Measures by Pre-existing Welfare Status



f. Persistence of Food Security Impact on Better Off Households



Notes: This figure reproduces key findings from Tandon and Vishwanath (2020) and Favari et al. (2021), which documents how well-being and markets were impacted by the complete air and sea blockade implemented in November 2017. All figures are the authors' calculations using the monthly WFP mobile phone surveys.

Furthermore, the increase in fuel prices further explain the worsening of access to key services described in Figure 7. For example, fuel is needed for many basic services, such as municipal waste collection or water delivery, which can be restricted in the event of fuel shortages. Furthermore, households need fuel to access other basic services—such as health clinics and schools—particularly in regions far from large cities, and large increases in transport costs can harm access to services for worse-off households. Thus, although fuel price increases appear to cause only small declines in food access of struggling households, this only captures one of the many ways in which fuel prices might impact such households overall.

However, the results suggest that the most-affected households were able to adapt to the higher fuel prices at least partially over time. Figure 7 further demonstrates that within four months, average food access measures began to improve and exceed that of immediately before the complete air and sea blockade. However, this improvement occurred while fuel prices across the country remained at their post-blockade peak. One potential explanation is that households began substituting away from reliance on fuel in order to re-establish their pre-blockade food consumption. For example, households might have begun driving less and pivoted their primary energy source away from diesel generators. However, the exact manners in which households coped with higher food prices, and the impacts those coping strategies had on access to schooling and basic services, are mostly unobservable.

Overall, the impacts of complete air and sea blockade illustrate a number of key issues in how households and markets are impacted by the import restrictions in the country. In particular, import restrictions have had a disproportionate impact on the availability and price of fuel, as opposed to that of other commodities. Aside from this instance, there have been numerous instances in which fuel imports to Houthis-controlled regions have been blocked completely, which have led to fuel price spikes similar to the one during the 2017 complete air and sea blockade (e.g., Favari et al. 2021). However, although the import restrictions have led to an increase in transportation costs and contributed to steadily rising food prices since the conflict escalated, primarily by diverting imports to

different ports and trucking goods to Houthis-controlled regions, changes in the severity of import restrictions have likely not caused sharp changes in food prices (e.g., World Bank 2018; ACAPS 2020).

But there are many issues that are unable to be addressed by this specific event. First, the exact mechanism by which prices increase and remain high are unclear. Even after the complete blockade ended and fuel was able to be imported again, the price of fuel did not decline to pre-blockade levels and remained high. Importantly, this is in contrast to other times when the import restrictions have specifically prevented fuel imports from reaching Houthis-controlled regions, when fuel prices almost immediately declined once fuel was allowed to be imported again (e.g., Favari et al. 2021). Some have suggested that authorities in Houthis-controlled regions interfere in the fuel market by siphoning fuel for the war effort, manipulating prices, and taxing purchases (e.g., ICG 2021).³³ However, it is difficult to acquire direct evidence of the ways the Houthis might interfere in fuel markets, and more work needs to be done to fully illustrate all the ways import restrictions are impacting the country.

b. The Impact of the Currency Crises on Food Access

One of the largest shocks to impact the country since the escalation of the conflict has been repeated instances of rapid depreciation of the Yemeni Riyal. Figure 8 demonstrates that although the currency has been steadily depreciating over the entire course of the conflict, there are two episodes in which the currency depreciated very rapidly.

First, Figure 8 demonstrates that the currency depreciated by approximately 50 percent between June and October in 2018 before regaining most of its pre-crisis value. Second, following the split of the currency between regions controlled by the Houthis and in regions controlled by the internationally recognized government (IRG), the currency in IRG-controlled regions began depreciating rapidly in 2020 and 2021. Figure 8 demonstrates that the currency in IRG-controlled regions depreciated by 47

³³ Importantly, interference in fuel markets in Houthi-controlled regions could also affect prices in IRG-controlled regions. For example, ICG (2021) further details the possibility of private suppliers diverting fuel to Houthi-controlled regions to sell for higher prices until the prices in IRG-controlled regions increase.

percent between January 2020 and June 2021.³⁴ However, the currency continued to depreciate an additional 77 percent to its all-time low level of 1654 Yemeni Riyals per US\$ at the end of 2021 (e.g., WFP 2022).

Although the exact causes are difficult to precisely establish, the depreciating currency is likely linked to a number of factors, including weak fundamentals (e.g., IMF 2021), potential corruption (e.g., Sana'a Center 2021), and the monetization of the deficit (e.g., Favari et al. 2021). The lack of official reporting and proper oversight of the central bank's assets make it difficult to explicitly quantify the various problems (e.g., Sana'a Center 2021), but in the case of monetizing the deficit, it is likely that the entire fiscal deficit in 2020 (-9.6 percent of GDP; or US\$1.9 billion) was financed by monetization. Further illustrating the potential importance of both monetization and potential corruption draining foreign reserves, there have been sharp changes in the currency crisis following events to bolster foreign reserves. For example, in 2018, the announcement of a large deposit by the Kingdom of Saudi Arabia was immediately followed by a near return of the average market exchange rate to pre-crisis levels (e.g., World Bank 2020c); and announcements of replacing the leadership of the Central Bank of Yemen in Aden and the announcement of another large deposit of reserves from Gulf countries also were immediately followed by large declines in the market exchange rate (e.g., WFP 2022).

Regardless of exact causes and consequences of high inflation and the currency crisis, these factors contributed to large food price increases across the entire country in 2018 and in IRG-held regions beginning in 2020. Figure 8 demonstrates that between July and October 2018, average food prices increased by 62 percent and average fuel prices increased by 46 percent as the exchange rate rapidly depreciated; and food and fuel prices increased by as much as 56 and 65 percent respectively over the course of 2021 in IRG-controlled regions. Furthermore, food and fuel prices continued to increase over the course of 2021 and 2022 as the currency continued to depreciate over that time period (e.g., WFP 2022).

Although currency crises can affect a population beyond prices- for instance, by increasing income- it is unlikely that many Yemenis benefitted from rapid currency depreciation. Remittances from foreign countries (or from Houthi-held regions in the second currency crisis) increased in value as the riyal rapidly depreciated; and workers producing export goods might benefit due to relative price changes in foreign markets.³⁵ While these factors can compensate for higher food prices, the majority of Yemenis are underemployed or depend on fixed and intermittently-paid government salaries (e.g., OCHA 2019).³⁶ Furthermore, although many households receive remittances, household survey suggests it is not one of the most important income sources for the population (e.g., Favari et al. 2021).

Household surveys further demonstrated that households on average suffered significantly from the rising prices associated with the depreciating currency. Figure 8 further demonstrates that the share of households with a poor or borderline FCS and the share with a low or medium rCSI increased by 11 and 10 percentage points respectively between July and October of 2018, the month when the currency had reached its lowest value during the time period. Additionally, the share of households with a poor or borderline FCS and a low or medium rCSI increased by 7 percentage points each between January 2021 and February 2022. Given the lack of a significant change in the share with food access in response to only large fuel price rises during the complete air and sea blockade, it is likely that the factor driving the very large increase in the share with poor food access during these episodes were the rapidly rising food prices.

Importantly, the decline in food access during the rapid depreciation of the currency and rapid rises in food prices represents one of the largest and most robust declines in food access over the entire course of the conflict. This was especially true of the 2018 currency crisis that affected the entire country, as opposed to the currency crisis that only affected IRG-controlled regions, which have an estimated one-third of the entire population³⁷, beginning in 2020. Figure 8 demonstrates that there was only one instance in

³⁴ June 2021 is the last data for which we have publicly available exchange rate data.

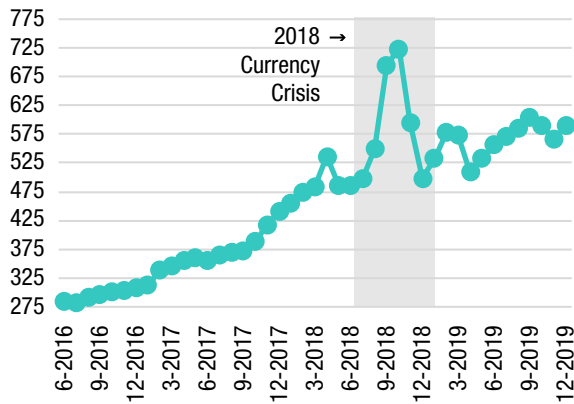
³⁵ See Chen (2010) for an example where a subset of workers benefitted from Indonesia's currency crisis in the late 1990's, and a subset were especially harmed.

³⁶ This is corroborated by the monthly mVAM survey, where the vast majority of households rely on non-agricultural income, such as fixed government payments.

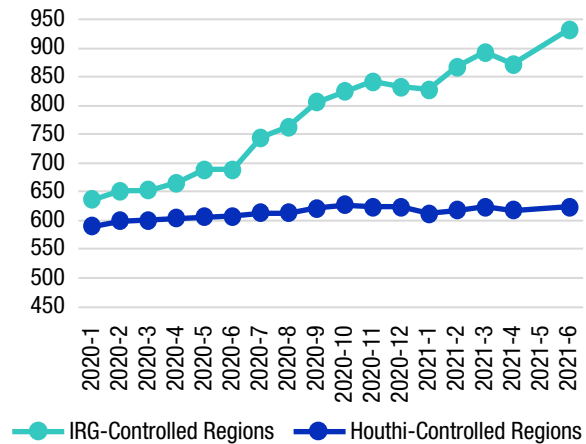
³⁷ Population estimates are obtained from official projections made by the Central Statistical Organization in 2017.

Figure 8. The Impact of Currency Crises on Food Access

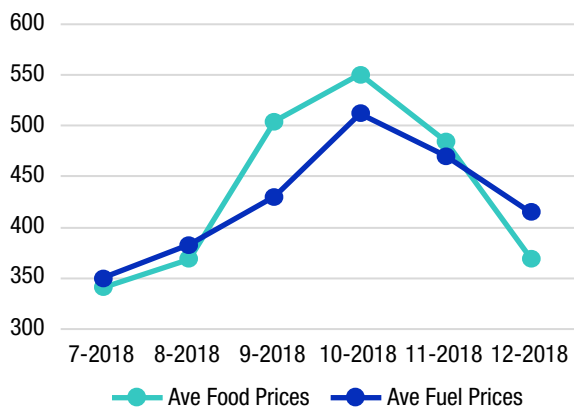
a. Evolution of Yemeni Riyal Before Currency Split



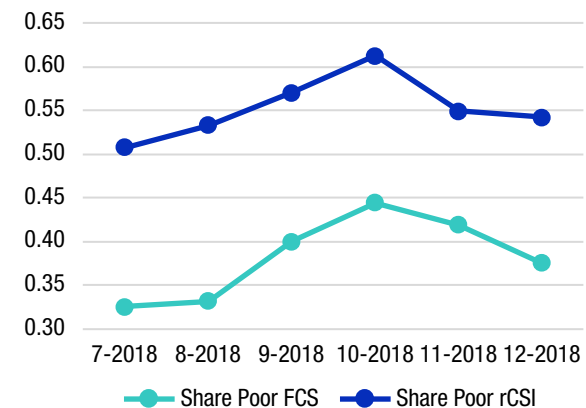
b. Evolution of Yemeni Riyal After Currency Split



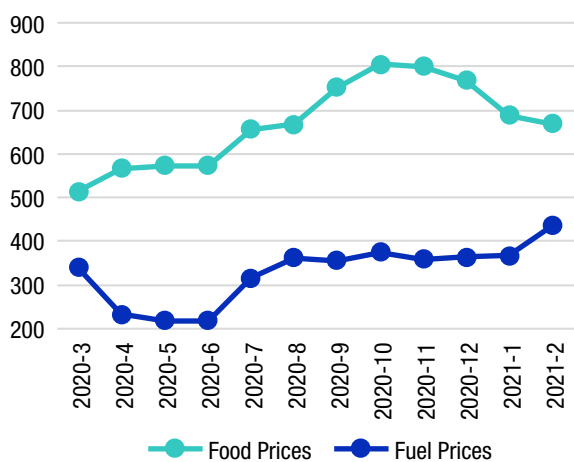
c. Impact of 2018 Currency Crisis on Prices



d. Impact of 2018 Currency Crisis on Food Access



e. Impact of 2020 Currency Crisis on Prices



f. Impact of 2020 Currency Crisis on Food Access

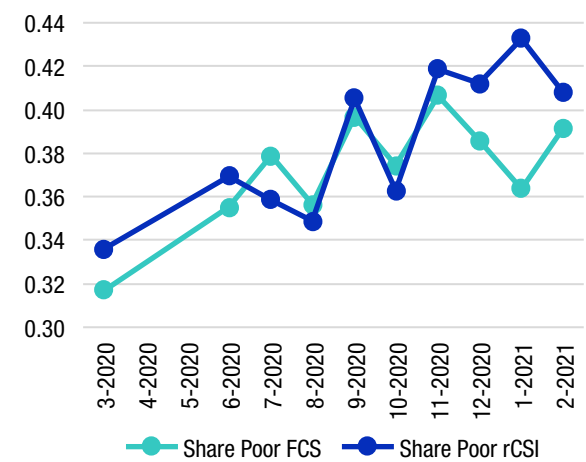
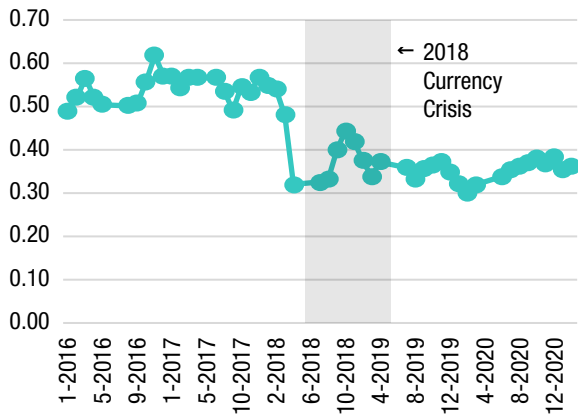
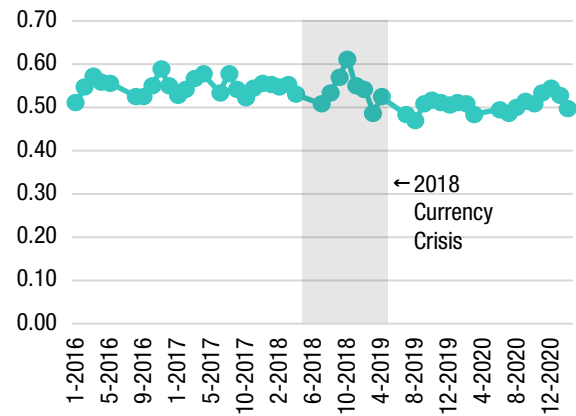


Figure 8. continued

g. Evolution of Poor Food Access Over the Entire Course of the Conflict- Share with Poor or Borderline Food Consumption Score



h. Evolution of Poor Food Access Over the Entire Course of the Conflict- Share with Low or Medium Reduced Food Coping Strategies Index



late 2016 had a similar change in the share of households with a poor or borderline FCS, which corresponded to the timing of when government salaries were significantly cut (Figure 3); and there was no change over the entire course of the conflict in the share with a low or medium rCSI that was comparable to the change during the 2018 currency crisis.

Thus, currency crises and rapidly rising food prices are likely one of the most important determinants in the severity of the humanitarian situation in Yemen following the start of the conflict. One of the reasons of that currency crises have such a large impact is that every single poor and vulnerable household is affected by rising food prices. Alternatively, income shocks from COVID-19, rising fuel prices, and a number of other types of conflict-related shocks often tend to have stronger food security impacts on slightly better-off households.

Importantly, the decline in food access during food price spikes is compounding the pervasive crisis in employment and income over the entire course of the conflict, which is resulting in increased reliance on negative household coping strategies. Repeated price spikes that reduce real income occur in an environment where the conflict has already exacerbated an employment crisis and caused widespread income losses. Thus, households have an even more difficult time coping with shocks than in less precarious settings, and households likely are forced

to engage in a number of extreme and harmful coping strategies. To meet basic needs, households have exhausted what little savings they might have, sold productive assets, forgone medical care, kept children out of school to help support the household, and reduced spending on all but the most critical needs. These coping strategies are in addition to the reduction in the quantity and quality of food they consume, as implied by the worsening FCS and rCSI reported.

However, given the critical importance of high food prices to the food security and humanitarian situation, these results identify another trend that is likely worsening household well-being. In addition to periods of rapidly rising food prices, there have been steadily rising food prices over the entire course of the conflict due to a variety of potential factors. First, as described above, there was a substantial increase in food prices at the onset of the conflict (e.g., Tandon 2019). Second, the continued steady depreciation of the currency apart from the currency crises illustrated in Figure 8 is also likely translating into steadily increasing food prices over the entire course of the conflict (e.g., ACAPS 2020). Third, the rises in global food prices between 2020 and 2022 that coincided with the COVID-19 pandemic, the war in Ukraine, and many other significant global events likely contribute to further increases in food prices in Yemen (e.g., Favari et al. 2021; United Nations 2022; FAO 2022; etc.). And lastly, given the significant increase in transport costs due to import restrictions diverting

imports to ports farther away from regions controlled by the Houthis, the possibility of taxation of goods crossing into Houthi-controlled territories, and rises in fuel prices further likely leads to increases in food prices for much of the population. These steady but more moderate increases in food prices have likely been putting significant pressure on the most food-insecure and vulnerable households, and more work needs to be done to estimate the impact of these steadier increases in food prices.

c. The Impact of Living in Close Proximity to Violence on Food Access

Since the conflict escalated in March 2015, violence has surged across the country. Initially, the capture of much of the country by the Houthis leading up to March 2015 was accomplished quickly, as most of the army did not resist the advances (e.g., BBC 2014). However, following Houthi advances as they tried to capture the president in Aden, a coalition of nine Middle Eastern countries began airstrikes on Houthi positions to push back their advances. Ever since, violence from air strikes, ground battles along the front lines separating regions controlled by the Houthis in Sana'a and the internationally recognized government, and violence from other groups in the south of the country (e.g., Southern Transitional Council, Al Qaeda in the Arabian Peninsula, etc.) have had innumerable impacts on the entire country. Estimates at the end of 2020 suggest violence has directly resulted in the deaths of over 100,000 individuals, including tens of thousands of civilians (e.g., United Nations 2020).

Given the large scale of the violence, one natural question to investigate is the degree to which living in close proximity to violence impacts household well-being. Although the onset of violence in the country unleashed a humanitarian disaster in Yemen, it is less clear whether the humanitarian disaster is worse in regions where there is more violence. However, as thoroughly described in Almoayad et al. (2020) and Tandon and Vishwanath (2020), **poor food access and other welfare deprivations do not appear to be worse for households that live in close proximity of violence.** Each analysis uses a number of different approaches to demonstrate that there is little relationship with living in close proximity to violence and poor measures of well-being, and this evidence is summarized in Figure 9.

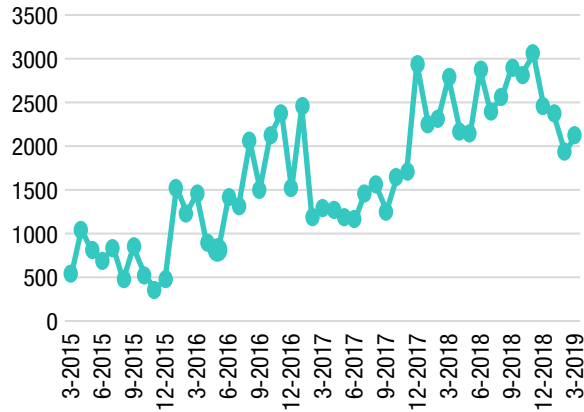
First, there is little relationship between the timing of when violence is worst at the national level and the share of households with poor food access. Figure 9 demonstrates that violence began escalating in March of 2015 and continued to increase in severity through the beginning of 2017, dropped in severity during 2017, and then surged again in 2018 and beyond. However, the share of households with poor food access as measured by the monthly WFP household survey did not follow this pattern. The highest share of households with poor food access were actually at a time when violence was at one of its lowest points immediately after the conflict escalated; the largest improvement in food access, as measured by the FCS, occurred in early 2018 just as the number of fatalities was rising precipitously; and each of the major jumps in food access occurred at times that are likely attributable to other causes (e.g., 2018 currency crisis, etc.).

Second, the geographic location of where violence was the worst over the course of the conflict are not the regions in which food access was the worst. Figure 9 demonstrates that there was a substantial amount of variation across governorates in violence, ranging between as few as 10 and over 17,000. However, there was much less variation in the share of households with poor food access. Importantly, governorates with very little violence over the course of the conflict have indistinguishable food access outcomes from many governorates with a very large amount of violence.

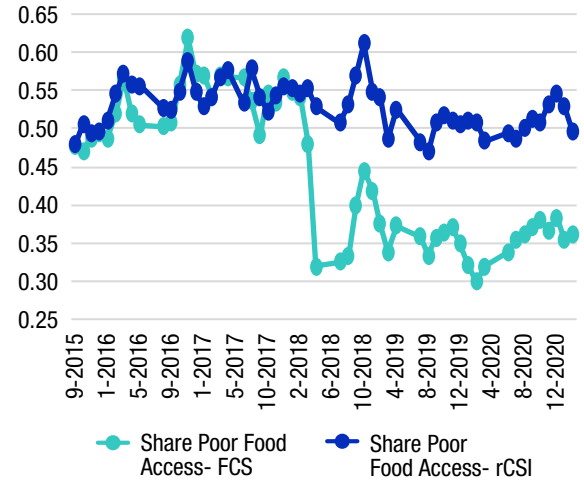
This lack of relationship between the timing and location of violence survives a number of robustness checks. Tandon and Vishwanath (2020) demonstrates that there continues to be little relationship between proximity to violence and poor food access when analyzing the change in response to contemporaneous violence, when separately analyzing the impacts of different types of violence (e.g., airstrikes, ground battles, and other types of violence), when separately analyzing the impacts of violence in certain locations (e.g., Houthi versus IRG-controlled regions, etc.), when analyzing the impacts of lagged or future violence, and when taking into account the potentially mitigating impact of the large amounts of food assistance being delivered in the country. Furthermore, Almoayad et al. (2020) further illustrates that violent incidents themselves do not appear to be affecting who is able to respond to mobile phone surveys. All analysis suggests that there is not a robust relationship between being in close proximity to violence and food access.

Figure 9. The Relationship Between Being in Close Proximity to Violence and Poor Food Access

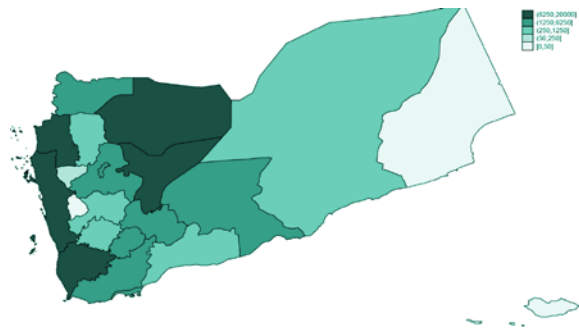
a. Number of Fatalities by Month



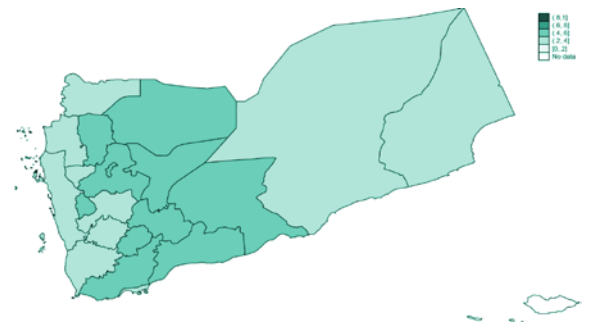
b. Share of Households with Poor/Borderline FCS



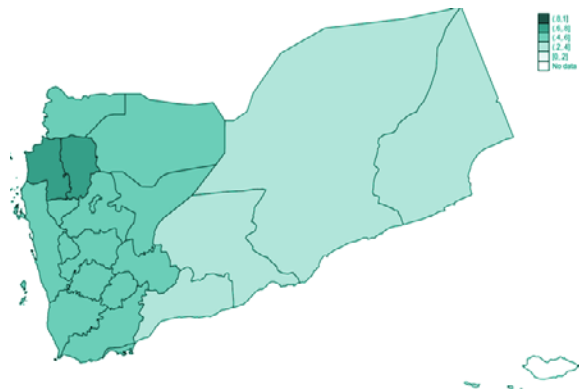
c. Total Number of Violent Incidents by Governorate



d. Share of Households with Poor/Borderline FCS by Governorate- February 2021



e. Share of Households with Low/Medium rCSI by Governorate- February 2021



f. Change in Share with Poor/Borderline FCS – Capture of Al Jawf

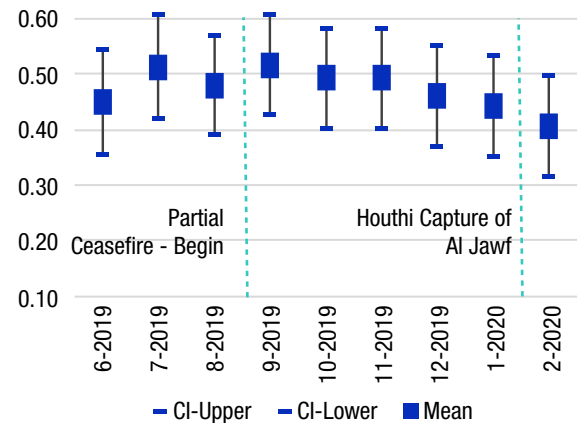
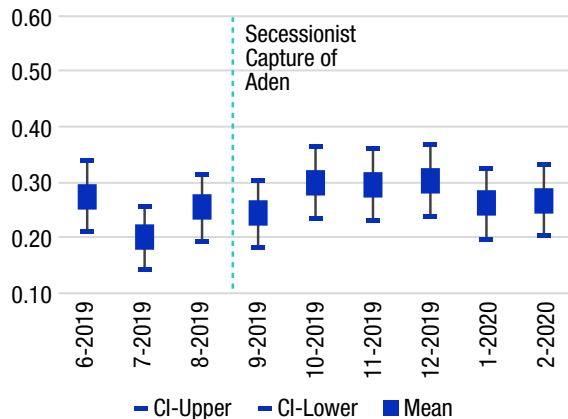
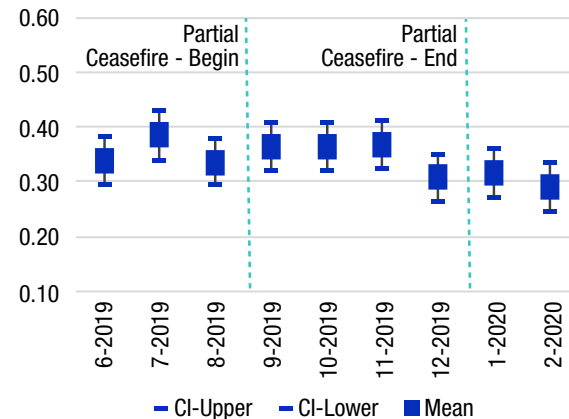


Figure 9. continued

g. Change in Share with Poor/Borderline FCS- STC Capture of Aden



h. Change in Share with Poor/Borderline FCS- Partial Cease Fire



Furthermore, Figure 9 further illustrates that there is little relationship between food access and sharp changes in violence. By focusing on sudden and unexpected changes in violence, one can help to more precisely link any change in food access to violence as opposed to other factors that might have either contributed to ongoing violence or to unrelated factors happening at the same time. Over the course of the conflict, there have been a number of sudden changes in the intensity of violence. Figure 9 analyzes three such events- the partial cease fire announced by the Houthis in mid-2019 that lasted for approximately four months, the capture of Aden by the Southern Transitional Council (STC), and the capture of Al Jawf by Houthi forces. In each of these instances there was a sudden change in the severity of violence (two in the case of the cease fire- the start and end), and two of the three involved the capture of territory by new forces. However, Figure 9 demonstrates that there was little to no change in food access in response to these large changes in violence.

Although Figure 9 focuses on the impact living in close proximity to violence might have on food access, all the results further extend to a number of other important welfare dimensions. Almoayad et al. (2020) demonstrates that all the above patterns similarly have little-to-no relationship with the share of households that have at least one school-aged child that did not attend school in the past month, the share of households that had to skip needed medical care in the past month, employment characteristics of respondents, primary income source for

households, whether a household is forcibly displaced, and whether a household is hosting a forcibly displaced household.

Although the lack of a relationship between the proximity to violence and household well-being might seem surprising, these results are consistent with findings from other conflict settings (e.g., D’Souza and Jolliffe 2013; Martin-Shields and Stojetz 2019; etc.). In the case of Yemen, there are likely two primary reasons why we are unable to detect as large a relationship as one might expect. First, as illustrated by the conceptual framework above, the conflict has many direct impacts on households and many indirect impacts on households through markets, institutions, and the humanitarian response. Some of these indirect impacts, such as the decline in regular government salaries and the recurring macroeconomic crises, have very strong impacts on households and affect the entire country, and not just the location of where violence is occurring. The fact that we see nearly identical food access in places of significant violence and in places with little violence is consistent with these other indirect impacts of the conflict having larger impacts on food access than living in close proximity to violence.

Second, as illustrated with the impacts of the complete air and sea blockade, some violent incidents significantly impact supply chains and worsen food access in regions far in distance from where the actual violence took place. These strong violent events help to obscure the link between

proximity to violence and poor food access. Although it is difficult to identify how many such incidents are taking place, even just a few such events can make it difficult to uncover any relationship.

However, there is an important caveat to the above analyses. The evidence presented here, and in Almoayad et al. (2020) and Tandon and Vishwanath (2020), largely relies on mobile phone surveys which miss significant portions of the population. In particular, these data sources are biased towards slightly better off and more urban populations. Although there is a variety of evidence suggesting that upwards of half the population likely have access to mobile phones and might be represented by these types of surveys (e.g., Almoayad et al. 2020; Tandon and Vishwanath 2020; etc.), **it is important to note that food access of underrepresented and missing populations from this analysis might be more strongly impacted by living in close proximity to violence.** Further, it is not possible to identify experience of violent events at a level lower than the district, and this analysis could miss out on some of the more localized and direct impacts of the conflict. More work is needed to fully uncover the impact on these underrepresented populations.

d. Summary of the Impact of Shocks on Poor Food Access

The impacts of the above shocks highlight a number of important patterns in how the well-being of households has evolved during the conflict. **First, the severity of the humanitarian crisis is strongly affected by the types of shocks that are striking the Yemeni population at any given time.** The two times in which the humanitarian situation deteriorated most rapidly was during times of rapidly rising food prices. The sharpest increase in poor food access at any point during the conflict (using either the FCS or rCSI) was during the 2018 currency crisis. Furthermore, the current share of households with poor food access in IRG-controlled regions where the currency began rapidly depreciating in 2020 are approaching the levels observed during the 2018 currency crisis (e.g., Favari et al. 2021; WFP 2022). Both of these patterns are further corroborated in the national food security projections and assessments that have occurred as well (e.g., IPC 2018; IPC 2022).

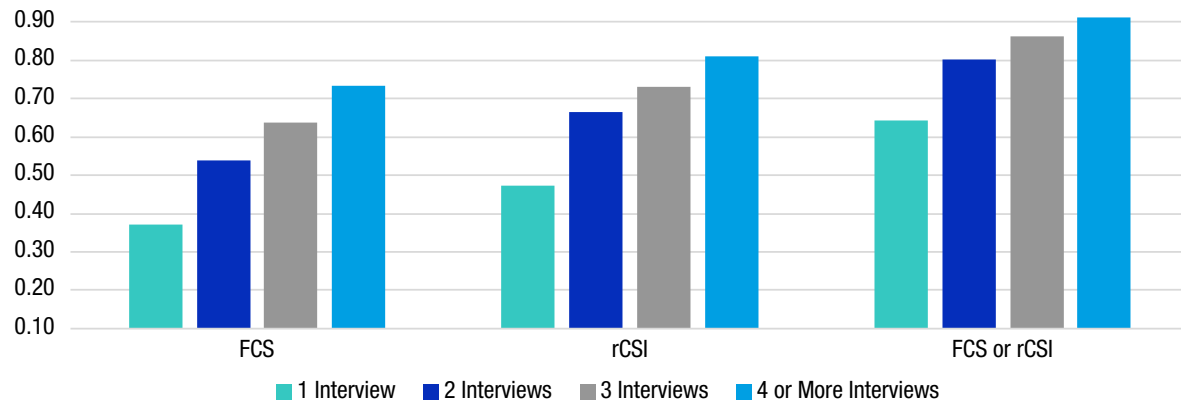
Second, given the sheer number of shocks that have been occurring in Yemen in the past eight years of conflict, the humanitarian situation can significantly deteriorate in instances where a large number of shocks overlap. For example, at the same time the currency crisis began battering IRG-controlled regions, the COVID-19 pandemic wreaked havoc on health systems and household income, global food prices began to rise to highs not seen for decades, humanitarian assistance was significantly cut in Houthi-controlled regions, there was an increase in violence in the conflict and an assault on Marib, there were intermittent restrictions on fuel imports in Houthi-controlled regions, and there were a number of strong natural disasters (e.g., Favari et al. 2021). Given the large number of shocks that overlapped, there was a substantial worsening of food access even in Houthi-controlled regions even though they were not affected by the currency crisis beginning in 2020 (e.g., Favari et al. 2021; WFP 2022).

Third, the results further illustrate the need to pay particular attention to shocks that have a disproportionate impact on the poorest and most vulnerable households. The results above demonstrate that although all shocks are potentially important, shocks that tend to have a larger impact on better-off households tend not to have as dire of an impact on the humanitarian situation. For example, there was not a large increase in the share of households with poor food access in response to the complete air and sea blockade in 2017; and the negative impacts the COVID-19 pandemic had on the income of households that already had an income source similarly did not cause an immediate increase in the share of households with poor food access (e.g., Favari et al. 2021). **Three shocks that might be particularly salient for poor and vulnerable households are those that increase food prices, those that threaten the humanitarian assistance that is well-targeted to the worst-off households, and shocks that have a disproportionate impact on regions that already are facing the worst of the humanitarian crisis (e.g., IPC 5 districts, etc.).**

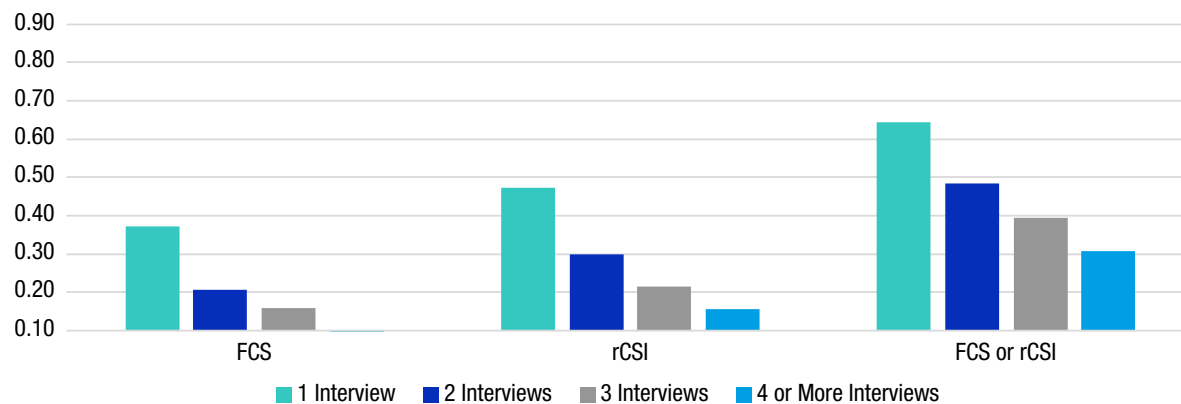
However, there is a significant caveat to these results. We are only able to precisely measure the impact of large and sudden shocks, and the estimates are more precise during times when shocks occur in isolation as opposed to more tumultuous times. This precludes thorough analyses of many potentially critical issues affecting welfare that are more difficult to measure. For example, the impact that

Figure 10. Share of Households with Poor Food Access by Number of Interviews

10a. Share of Households With Poor Food Access in at Least One Interview



10b. Share of Households With Poor Food Access in All Interviews



import restrictions are having on rising food prices is not something we are able to precisely quantify; and fully differentiating between all the shocks occurring between 2020 and 2022 is also difficult, although not impossible.

Illustrating the degree of volatility facing households and how much we are not able to observe given the data and information systems that exist, Figure 10 reports the share of households in the monthly WFP survey between March 2019 and February 2022 that have poor food access by the number of surveys to which they respond. For households that responded to only one survey during this time period, approximately 37 percent of households have a poor or borderline Food Consumption Score (FCS), 47 percent of households have a low or medium Reduced Coping Strategy Index (rCSI), and 64 percent

of households have poor food access when using either the FCS or the rCSI. These figures are very similar to the monthly figures reported in the WFP survey (e.g., WFP 2019).

However, these figures understate the share of households that are at risk of facing poor food access at some point over the year given the many shocks impacting individual households, regions, and the entire country. As households begin to answer more surveys, the share that has poor food access in at least one of their surveys sharply increases. By four or more surveys, the share with poor food access the FCS approximately doubles, the share with poor food access using the rCSI increases by 34 percentage points, and nearly the entire sample (91 percent) of households have poor food access using at least one of the two measures.

Given that these surveys oversample from better-off and more urban populations, there are likely few households that are immune from the food emergency in Yemen.

Given the volatility in the food security situation illustrated above, it is important to continue to monitor the food security situation at a high frequency to better understand the many shocks that are impacting the Yemeni population and how to best support the Yemeni population. Furthermore, expanding high-frequency food security monitoring amongst the worst-off population without access to mobile phones and better covering more rural and remote regions would further help to illustrate how generalizable the above patterns might be and whether there are significant changes in food access that are being missed amongst these populations.

For more details, see:

Tandon, S. and T. Vishwanath. 2020. The Evolution of Poor Food Access Over the Course of the Conflict in Yemen. *World Development* 130, 104922. [Link](#).

Almoayad, S., E. Favari, S. Halabi, S. Krishnaswamy, A. Music, and S. Tandon. 2020. "Active Conflict and Access to Education: Evidence from a Series of Conflict-Related Shocks in Yemen." Policy Research Working Paper WPS9330, World Food Programme and World Bank. [Link](#).

Favari, E., M. Geiger, S. Krishnaswamy, and S. Tandon. 2021. "The 2020 Food Security Crisis in Yemen." Report, World Food Programme and World Bank. [Link](#).

SECTION

6



Multidimensionality of the crisis

Although much of welfare analysis in Yemen focuses on changes in food access (e.g., OCHA 2021; IPC 2022), the conflict in Yemen has had similarly devastating impacts on a wide variety of welfare dimensions and access to basic services. Similar to food security, access to basic services is determined by both the availability of services and the ability to afford those services if they are available. Availability and access to food and key services are hierarchical, where a service not being available necessarily implies that households do not have access (e.g., Barrett 2010). However, it is possible for a number of households to not be able to access services that are available in the market or made available by local governments. Potential reasons for this include a lack of financial resources to afford the services and discrimination against individual households or groups.

This section aims to describe the share of households that have access to a number of basic services and to further identify potential factors that worsen access over time. Although the vast majority of data sources in Yemen are focused on food access, we are able to leverage a number of sources to identify some preliminary findings on access to basic services. First, we utilize a number of household surveys to better understand access to basic services. In the monthly household WFP monitoring surveys,

there have been modules on access to other basic services included periodically. These include access to health care, education, electricity, water, and municipal services.

Second, we also utilize surveys of local governments to better understand access to services for the majority of the population and the availability of a wider range of key services than is covered in household surveys.³⁸ Between May and November 2019, we surveyed members of district councils across Yemen about the capacity of local governments and access to key services. The surveys reached 230 of the 333 district councils- which represent approximately 80 percent of the population.³⁹ The survey captures information on both the availability and access to a number of additional essential services, including electricity, water, internet, credit, police, postal services, judicial systems, and transportation.

And lastly, similar to the analysis of food access, we analyze how large shocks impacted households' access to essential services. For a more limited set of services, including access to health care and access to education, the WFP monitoring survey has tracked access to basic services every month over the course of two years. Furthermore, given that the WFP survey reaches some of the same households over time, we can further identify the consistency with

38 See Appendix 2 for a description of this survey.

39 See Appendix 2 for a map of districts covered by the district council survey.

which individual households have access to basic services over time.

Similar to the significant worsening of food access, a large share of the population does not have adequate access to a wide range of essential and basic services, with many of the deprivations overlapping in individual households. Figure 11 demonstrates that, in a module added to the monthly WFP monitoring survey in November 2017, 51 percent of households reported to have insufficient access to water, 77 percent reported to have insufficient access to electricity, and 59 percent reported to lack municipal garbage collection from their house.

Importantly, each of these deprivations overlapped with poor access to food, with a large share of households experiencing multiple deprivations. Figure 11 demonstrates that one-quarter of households lacked adequate access to all food and the three basic services captured at the same time; and only four percent of households experienced adequate access to food and all basic services captured.

The decline in access to basic services extends far beyond utilities and municipal services. Figure 11 further reports the share of households lacking adequate access to health care, adequate access to education, and reports the share of households that are currently displaced or are hosting displaced individuals in March 2019. Approximately 35 percent of households that required medical care were not able to receive sufficient health care; 18 percent of households had at least one school-aged child who did not attend school in the past thirty days; and 33 percent of households were either currently displaced or hosted displaced individuals in the past thirty days. Although the share of households with poor access to these critical services are less than those lacking sufficient access to utilities, the sizeable share is important given the lifetime consequences from lack of consistent access to health care and education. (e.g., World Bank 2021). Furthermore, these deprivations significantly overlapped in individual households, further suggesting that households are suffering from multiple deprivations in access to food and basic services at the same time.

Access to a wider range of utilities and municipal services are further described in local government surveys, where members of local governments were asked about the access of the majority of the population to basic services

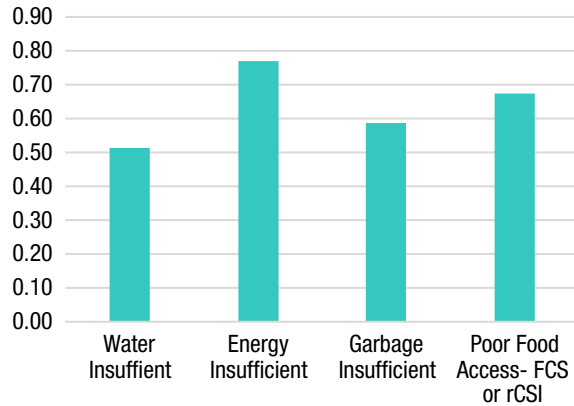
and also about the functioning of services that are typically provided by local governments. Similar to the results from the module added to the November 2017 WFP survey, Figure 11 demonstrates that solar power is the most commonly used energy by the population in 71 percent of districts surveyed; and the majority of the population does not have access to water piped into their house in 73 percent of districts surveyed. Furthermore, the figure demonstrates that internet service is unavailable for the majority of the population in 83 percent of the districts surveyed.

However, the local government surveys illustrate that there are a number of services that continue to function and be widely available. Over three-quarters of the population is reported to have access to mobile phones in 69 percent of districts surveyed, which helps to validate some of the extensive remote data collection being done via mobile phones in the country. Furthermore, in the vast majority of districts surveyed, a number of other local services continue to function, including the police, courts, prisons, and postal service. Similar to reports of businesses continuing to operate despite the extremely difficult conditions (e.g., ACAPS 2020; World Bank 2022; etc.), local governments continue to operate, and many municipal services continue to be available.

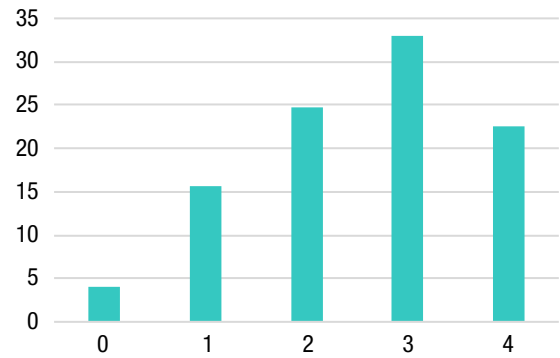
Importantly, Figure 12 allows us to better understand the reasons households are not able to access a number of critical basic services. First, unlike poor access to food which appears to be primarily a problem of households being able to afford food in the market that is available for sale, poor access to a number of basic services is heavily affected by poor availability of services necessary to lead a healthy and active life. Figure 12 presents a map of supply-side problems facing primary schools and health care centers in each district surveyed in the local government survey. In the case of education, the most serious problems that are most often cited are lack of teacher salaries, which results in the lack of qualified teachers in schools, and lack of school materials; and in the case of health centers, the most serious problems that are most often cited are lack of medicine or medical equipment and lack of doctors. In the case of education, there is a clear regional pattern to the problems, with lack of teacher payment being prominent in Houthi-controlled regions and the lack of materials being prominent in IRG-controlled regions. However, in the case of health centers, there is no clear pattern across Houthi and IRG-controlled regions.

Figure 11. Access to Basic Services

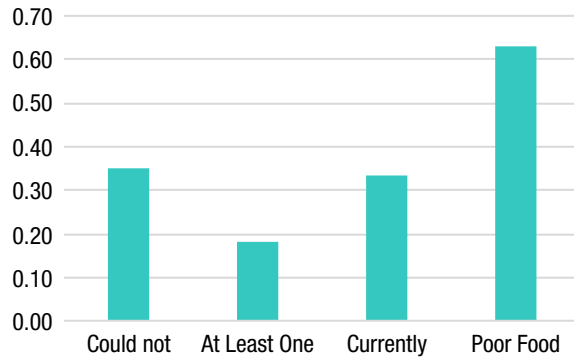
a. Share of Households with Poor Access to Food and Basic Services- November 2017



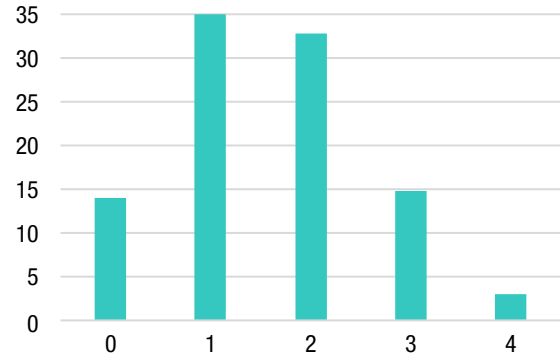
b. Share of Households by Number of Deprivations- November 2017



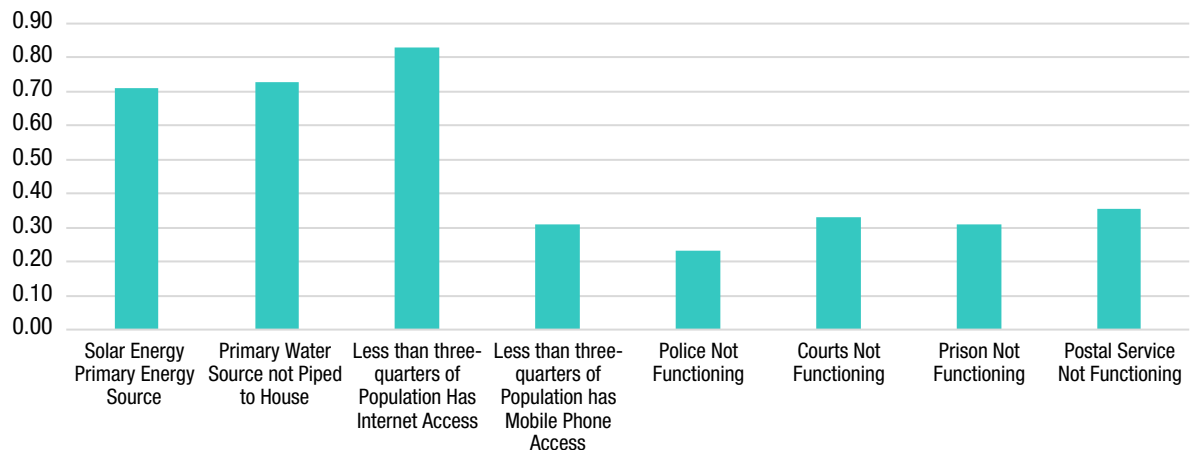
c. Share of Households with Poor Access to Food and Basic Services- March 2019



d. Share of Households by Number of Deprivations- November 2019



e. Share of Districts with Poor Availability or Access to Basic Services



Although availability of high-quality education and health care is clearly an issue in Yemen, there also are major difficulties in the ability of households to afford to send their children to school and afford the medical care that is available in health centers. Following the start of the COVID-19 pandemic in April 2020, the monthly WFP monitoring survey began inquiring about the reason households were not able to receive needed medical care during the survey period. At the start of the pandemic, approximately three-quarters of households who skipped needed medical care cited the inability to afford the needed care as the primary reason.

Importantly, this was even before the worst of the currency crisis in IRG-controlled regions, global food price rises, and cuts in humanitarian assistance in Houthi-controlled regions (e.g., Favari et al. 2021). **As the food security crisis that began in 2020 continued to worsen, the share of households citing the inability to afford medical care as the primary reason for not receiving care increased from this already high level.** By the end of 2020 and the beginning of 2021, approximately 86 percent of households skipping needed medical care cited lack of financial means as the primary reason.

Although quantitative surveys do not exist that illustrate similar inability to pay for other basic services, other types of evidence suggests that poor financial access is a key constraint for access to a wide variety of basic services. For example, in a wide range of key informant interviews with principals, teachers, local and governorate officials responsible for education, and households, one of the primary reasons that some children had poor attendance in school was the need for older children to help work and support the household; and the inability of households to afford fuel to drive children to school was a key constraint for some children to attend school regularly (e.g., Almoayad et al. 2020). Combined with the evidence on food security, the inability to afford the basic services that are made available in the market or provided by government is an important constraint on household well-being.

Potentially a result of poor financial access to critical services, Figure 12 demonstrates that the stability of access to basic services in Yemen is quite poor and is

understated by the monthly figures of households with poor access to services at any specific point in time. As discussed in the section above, the WFP mobile phone survey reaches some households only once and reaches other households potentially a number of times. Similar to the food access results presented in Figure 10, the share of households that reported poor access to either education or to needed health care in at least one of their surveys significantly increased with the number of times they were interviewed.⁴⁰ This is consistent with many households temporarily withdrawing children from school when faced with constant economic shocks, and also consistent with nearly all households balancing medical needs with the cost of medical care and only seeking care for sufficiently serious conditions. Regardless of the exact reason, similar to the food access results described in Figure 10, there is a widespread inability to consistently access critical services.

Furthermore, since we are able to track access to health care and access to education over time, we are able to identify some of the potential factors that worsen access over time. The WFP mobile phone survey only included modules on access to these services in March 2019, which is after some of the larger and more extreme shocks to households' ability to financially afford available food and services. However, it is likely that those same shocks that reduced food access likely also reduced access to key services. The increase in the share reporting that inability to pay for health care was the primary reason for skipping needed care as the food security crisis continued to get worse in Yemen is consistent with this possibility.

However, in addition to shocks to the ability to afford food and basic services, there are other important shocks that affect access to basic services. First, rapid spread of communicable diseases, which has happened a number of times over the course of the entire conflict (e.g., OCHA 2019), is a strong determinant of poor access to health care. Although the WFP mobile phone survey did not capture access to medical care during previous spikes in disease prevalence, the emergence of the COVID-19 pandemic significantly increased the share of households that skipped needed medical care. Figure 12 demonstrates that in the first months of the pandemic, the share of households that skipped needed medical care increased from 26 percent

⁴⁰ The education results only include households interviewed between March 2019 and February 2020, less the months during the summer when school is not in session (July, August, and the first half of September), to avoid including times when the pandemic closed all schools in the country. The health results include all households interviewed between March 2019 and February 2021.

of households to 47 percent, with the vast majority of households suggesting that the inability to pay for care was the primary reason. Importantly, as demonstrated above, there was not nearly as large and immediate an increase in the share of households with poor food access immediately after the start of the COVID-19 pandemic.

Additionally, similar to the institutional declines causing the repeated currency crises and worsening the food emergency, institutional declines associated with the conflict can significantly impact the availability (and thus access) of key services. Figure 12 further summarizes the impact such institutional declines can have on access to education and summarizes the evidence presented in Almoayad et al. (2020).

The distrust of the IRG, insufficient salaries for teachers, and overall poor conditions in schools led to a sudden and voluntary teacher strike in regions controlled by the IRG beginning in January 2020, immediately before the closure of schools due to the COVID-19 pandemic. The strike was directly in response to factors that have been caused by the conflict and have impacted the entire country to a differing degree, but the strike was not directly related to any specific violent event. Importantly, the event is further entwined with the conflict as it has been reported that southern secessionists had been exploiting these frustrations to help incite the strike.⁴¹ The duration of the strike was longer than many of the other shocks experienced during the conflict, including many rapid escalations of violence.

Following the strike, there was a more than doubling of households in IRG-held areas that had school-aged children not attending school. Overall, the strike caused attendance to go from better than Houthi-controlled regions to significantly worse in a matter of 2 months and represents one of the largest changes in access to schooling over the course of the entire conflict. Over the same time period, there was no change in access to school in Houthi-controlled regions, where teachers were not on strike and schools remained open. The episode, as well as the shocks affecting access to other services, further illustrate how shocks aside from those affecting livelihoods and the ability for households to afford basic goods and services further disrupt human capital development in an already perilous situation and add to the volatile conditions on the ground.

Combined, these results highlight how the crisis in Yemen has led to strong declines in nearly all dimensions of welfare. Some of the causes of the worsening food security situation have similar impacts on welfare in other dimensions, but there are important causes of declines in other dimensions that are significantly different from those that cause declines in food security. Much more detailed work on the type of services that are not available across the country, and also on the types of services that households might skip in order to save money for food and other necessities versus the types of services that they are less likely to skip, would be very helpful to inform the ongoing projects in the country. Importantly, many teams are doing precisely this kind of detailed investigation, including for example, the Education and Health teams at the World Bank, which will also inform the analytical agenda as well.

For more details, see:

Almoayad, S., E. Favari, S. Halabi, S. Krishnaswamy, A. Music, and S. Tandon. 2020. "Active Conflict and Access to Education: Evidence from a Series of Conflict-Related Shocks in Yemen." Policy Research Working Paper WPS9330, World Food Programme and World Bank. [Link](#).

Almoayad, S., E. Favari, S. Halabi, S. Krishnaswamy, A. Music, and S. Tandon. 2020. "Using Remote and Non-Traditional Data Collection to Better Understand the Current State of Education in Yemen." Report, World Food Programme and World Bank. [Link](#).

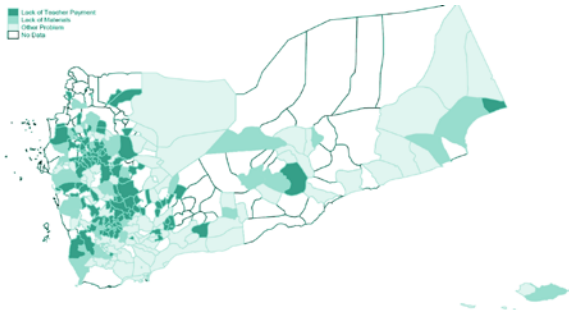
Favari, E., M. Geiger, S. Krishnaswamy, and S. Tandon. 2021. "The 2020 Food Security Crisis in Yemen." Report, World Food Programme and World Bank. [Link](#).

Aghajanian, A., S. Almoayad, M. Benzidia, E. Favari, K. Garber, R. Hasan, T. Hasumi, L. Horezeanu, S. Krishnaswamy, M. Ranzani, and S. Tandon. 2022. "Estimating Access to Health Care in Yemen Utilizing Household and Facility-Level Data." Report, World Food Programme and World Bank.

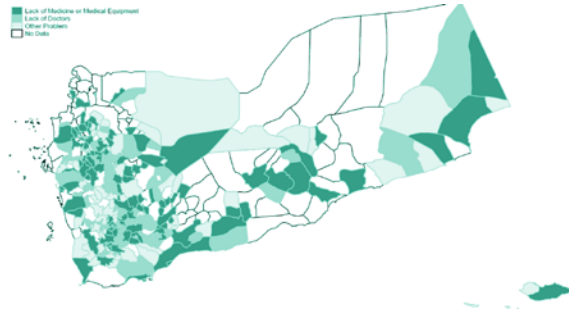
41 For example, see <http://aden-tm.net/NDetails.aspx?contid=110777>.

Figure 12. Drivers of Poor Access to Basic Services

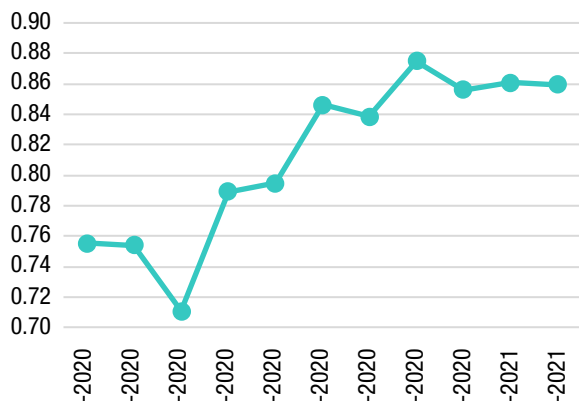
a. Problems with Availability of Education



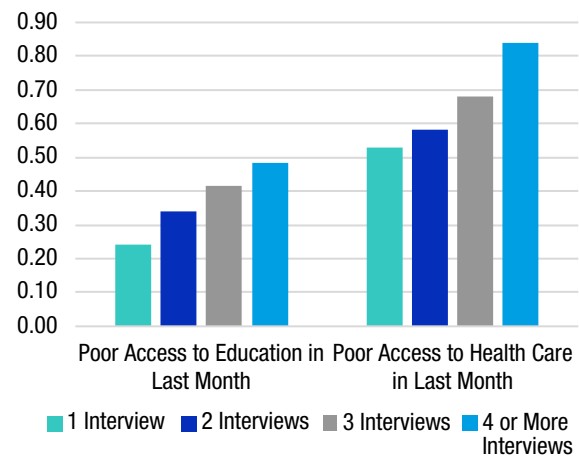
b. Problems with Availability of Health Care



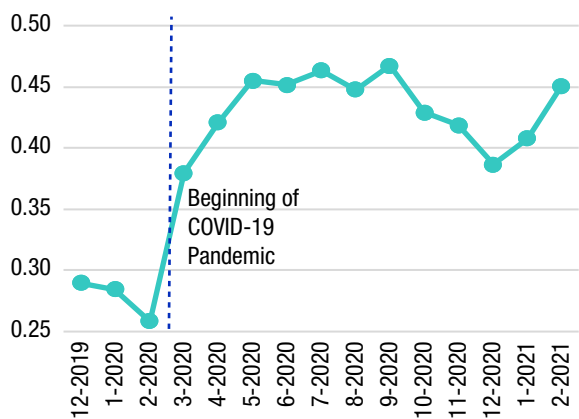
c. Lack of Affordability- Access to Health Care



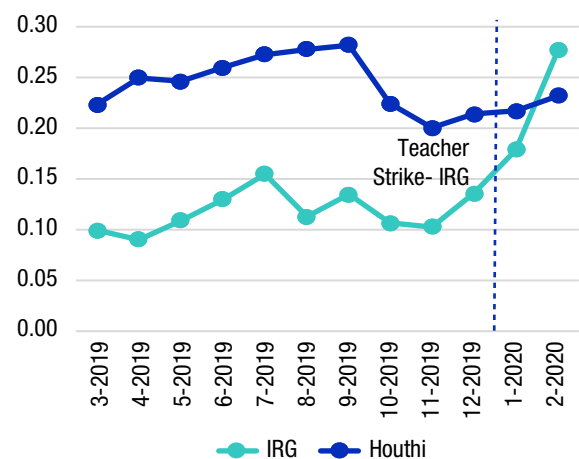
d. Share with Poor Access to Basic Services in at Least One Survey



e. Share of Districts with Poor Availability or Access to Basic Services



f. Increase in Poor Access to Education- Teacher Strike in IRG-Controlled Regions



SECTION

7



The Evolution of Well-being Amongst Disadvantaged Groups- Forcibly Displaced Households

In addition to analyzing trends in well-being of the entire population, it is important to highlight important sources of heterogeneity amongst the population. As the humanitarian crisis has enveloped the entire country, an ongoing forced displacement crisis in Yemen has caused significant suffering amongst a large subset of the population beyond what is experienced by the average household. Internally displaced households in Yemen experience some of the largest deprivations in food security, access to housing, and access to key services (e.g., OCHA 2019; TFPM 2019; Almoayad et al. 2020; etc.).

Although all data sources suggest that the forced displacement crisis began immediately after the conflict escalated in March 2015, there is little agreement on the size of the crisis. Official estimates suggest that approximately 10 percent of the population became displaced in the months after the conflict escalated in March 2015, with a constant flow of new displacements and returnees that were roughly equal over time ever since (e.g., TFPM 2016; OCHA 2019). However, other sources suggest that potentially upwards of 25 percent of the population might be displaced (e.g., World Bank 2017b; etc.).

The difference between the estimates might be due to differences in survey methodologies, where the official

estimates are based on key informant interviews at the sub-district level, and other methodologies are based on household surveys. Or the differences could be driven by differences in how households and key informants are defining forced displacement. However, regardless of the exact reason for the difference, **all methodologies suggest that the initial surge in forced displacement was large, and that since then households are both becoming newly displaced, and others are returning to their region of origin each month (e.g., World Bank 2017b; D'Souza et al. 2021; etc.).**

Aside from not having a thorough understanding of the size of the forced displacement crisis, there is also an incomplete understanding of the causes and consequences of the forced displacement. For example, much of the reporting on forcibly displaced populations in Yemen and elsewhere in the world focuses on the pivotal role of living in close proximity to violence has on displacement crises (e.g., TFPM 2019; OCHA 2019; World Bank 2017; etc.). However, there is little explanation why some households choose to remain in their homes and others flee from similar levels of violence; there is little understanding of the degree to which the deteriorating humanitarian situation plays in forced displacement; and there is little understanding of whether the average deprivations faced by displaced

households are the consequences of displacement itself as opposed other potential explanations.⁴² The answers to these questions are critical to better understanding the needs of displaced households and the degree to which resources should be focused on host versus forcibly displaced populations.

Although Yemen is a very data deprived context, the types of data collected in Yemen combined with the volatile displacement and conflict situations provide a unique opportunity to shed light on these and related issues. Each month of the phone survey conducted by the WFP includes households that have never been reached before, and also includes households that have answered previous surveys. Furthermore, each survey between September 2015 and December 2018 includes a brief displacement module on whether the household is currently displaced, and if so, the governorate and month-year in which the displacement occurred.

This simple displacement module in a high-frequency survey yields very important information on the scale, causes, and consequences of the displacement crisis in Yemen. Favari et al. (2021), D'Souza et al. (2022a), and D'Souza et al. (2022b) explore these findings in details, and this section summarizes the key findings from each of these articles. This section first reports a number of summary statistics that describe the size and timing of the crisis using the WFP monthly survey. In some cases, this helps to corroborate some of the official reporting, but in other cases, offers additional data points on the crisis that might conflict with official sources. Second, to the degree that these data allow, this section also summarizes the findings reported in the articles mentioned above on potential causes and consequences of the forced displacement crisis in Yemen.

a. Summary Statistics of the Forced Displacement Crisis in Yemen

Figure 13 presents a number of summary statistics that help to better describe and contextualize the forced displacement crisis in Yemen. Consistent with the higher estimates of displacement by some non-official figures (e.g., WFP 2017b), Figure 13 demonstrates that the share of households in the monthly WFP survey that report to be currently displaced varies between 29 and 41 percent, which is significantly higher than is reported in official statistics.⁴³ Again, this difference could stem from a variety of reasons, including households and key informants interviewed by the Task Force on Population Movement (TFPM) having different interpretations as to what it means to be currently displaced, or the key informants used in official statistics might be better covering populations that are missed by mobile phone surveys. However, the very large share of households that report to be currently displaced in the WFP monthly monitoring survey further illustrates the large magnitude of the forced displacement crisis in Yemen.

Figure 13 further demonstrates that an even larger share has experienced displacement at a single point in time over the course of the conflict. A total of 18,082 households had been interviewed once during the time the WFP survey included the full displacement module.⁴⁴ Of those households, approximately 45 percent had reported to be currently displaced in at least one of the WFP surveys. Although the majority of those households had only been displaced one time, nearly 10 percent of all households surveyed had been displaced more than one time.

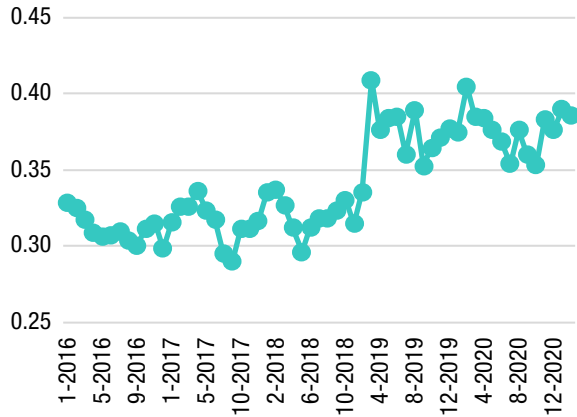
⁴² For example, it is possible that violence is more prevalent in regions in which poorer households live; or it is possible that in response to violence, poorer households have less to lose by becoming displaced than other households with immobile assets and houses, and are more likely to become displaced in response to violence felt by all households. Each of these patterns would potentially result in average differences between displaced households and non-displaced households in pre-displacement well-being, suggesting that the comparison of post-displacement well-being is difficult to interpret.

⁴³ The displacement figures reported in Figures 13 and 14 are unweighted. All monthly food access statistics in this report are weighted so as to match the displacement figures reported by TFPM and IOM. Although this weighting had significant impacts on the share of households that were currently displaced, it only had moderate impacts on the share of households that had poor food access. However, all the food access results highlighted in this report are identical if unweighted estimates are used.

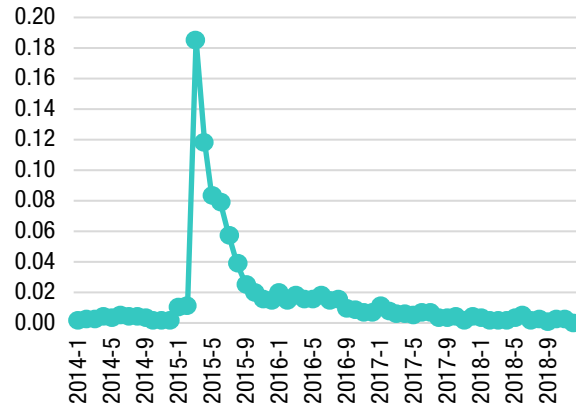
⁴⁴ The module was included in the survey between August 2015 and December 2018. Following December 2018, respondents were asked if they were currently displaced, but not the timing and location of the displacement if they responded affirmatively.

Figure 13. Summary Statistics of the Forced Displacement Crisis

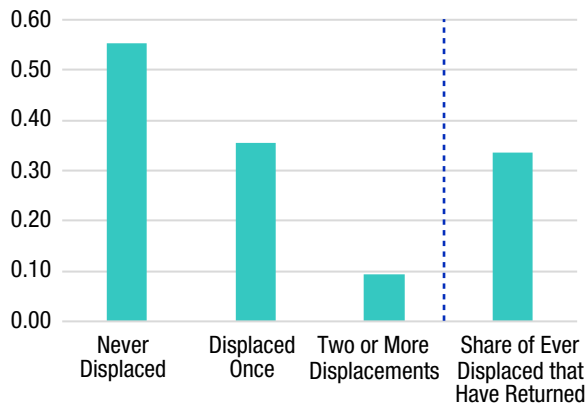
a. Share of Sample that is Displaced by Month of Survey



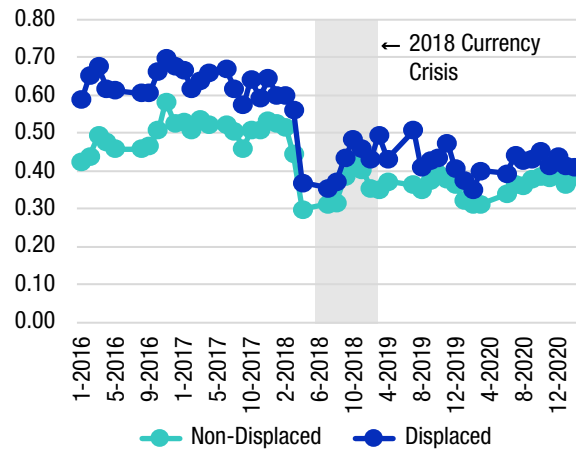
b. Share of Sample Currently Displaced by Month



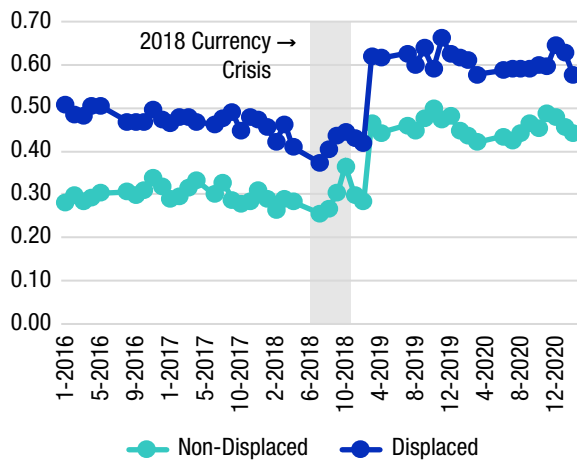
c. Share of Sample by Displacement History through December 2018



d. Share of Households with Poor or Borderline Food Consumption Score



e. Share of Households with Low or Medium Reduced Coping Strategy Index



f. Share of Households that Skipped Needed Medical Care in Past Month

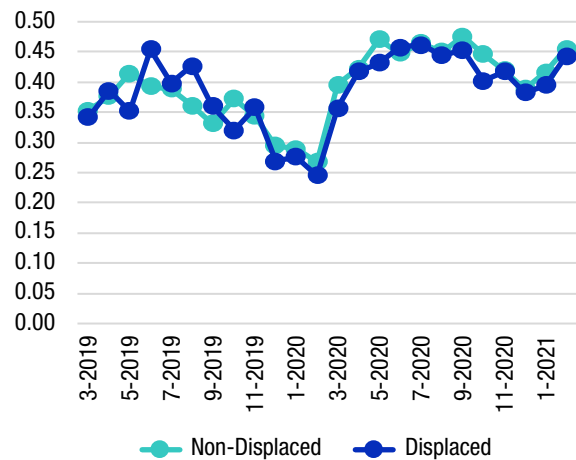
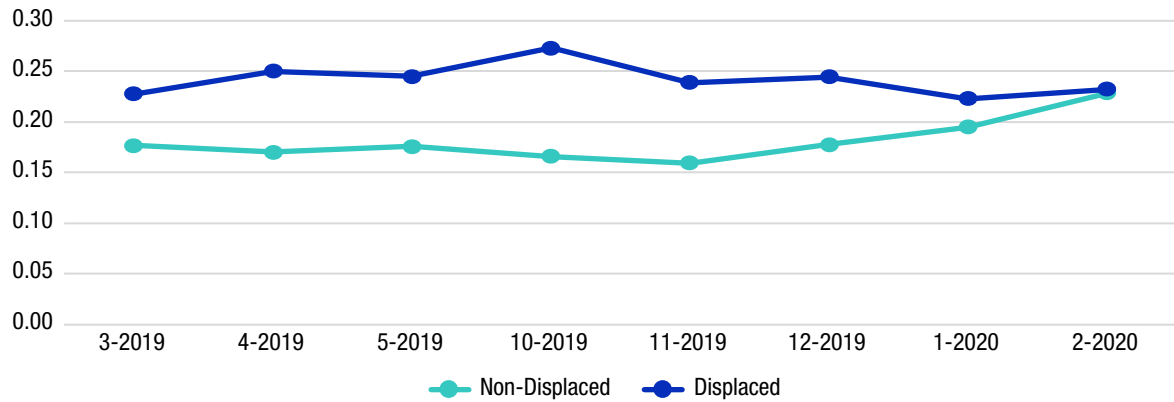


Figure 13. continued

g. Share of Households Without All Children Attending School in Past Month



One of the reasons that the share reporting to be currently displaced in any individual survey is less than the share of the total sample that had been displaced at any point during the survey is that a significant share of households that had become forcibly displaced at one point no longer report to being displaced. Figure 13 reports that approximately 34 percent of households that have been displaced at least once have returned and no longer claim to be currently displaced.

Although the WFP survey suggests a higher share of households are displaced, the survey corroborates the timing of the crisis reported in official figures (e.g., TFPM 2016). Figure 13 illustrates that of the 8088 households that have been displaced in at least one survey between September 2015 and December 2018, the majority of those households were displaced between March and July of 2015. Of those months, approximately 19 percent of displaced households reported the timing of their displacement as March 2015, which is the month that accounts for the largest share of displacements. However, there is a relatively stable and low share of households that report their first displacement each month following the escalation of the conflict.

Furthermore, the WFP survey further corroborates the reports of key informants and other survey modalities and illustrates that the share of displaced households that have poor food access is significantly higher than that of

non-displaced households. Using common thresholds for the Food Consumption Score and the Reduced Coping Strategies Index to denote poor food access, we compare the share of displaced households that has poor food access is higher than that of non-displaced households in every single monthly survey conducted between September 2015 and February 2021.⁴⁵ The magnitude of the difference is large, with the share of displaced households having poor food access using the FCS being 9 percentage points higher than non-displaced households on average, and 16 percentage points higher when using the rCSI. Both the size of the difference and the consistency over time makes this one of the most robust empirical findings in the entire WFP mobile phone survey.

But Figure 13 also highlights another important way in which food access of displaced households has evolved. Although displaced households have significantly worse food access, all of the major shocks that have impacted households seem to identically impact displaced and non-displaced households. For example, in response to the 2018 currency crisis, there was a nearly identically sized worsening in both the average FCS and rCSI of displaced and non-displaced households. The nearly identical impact is surprising. In many contexts, displaced households have often already exhausted their coping strategies in response to displacement, such as selling off assets, relying on cheaper and less health foods, and reducing food consumption (e.g., World Bank 2017b; etc.). Thus, when

45 Even though the full displacement module was removed the survey in 2019, the survey still asked if the household was currently displaced in the survey going forward.

faced with a shock, displaced households often are less able to cope and have a larger decline in well-being than non-displaced households. However, Yemen is a context where non-displaced households have been battered by numerous shocks as well (Figure 6), and the change in food access in response to strong shocks is similar between displaced and non-displaced households.

However, the poorer access to food for displaced households does not necessarily translate to poorer access to all basic services and welfare dimensions. Figure 13 reports the share of households that needed medical care and were unable to receive that care in the past month and the share of households where not all school-aged children attended school in the past month, and reports the estimates separately by displacement status. **Poor access to health care is nearly identical between displaced and non-displaced households.**

Alternatively, there was a higher share of displaced households where not all children attended school in the past month. The figure only reports the share for months during which school is in session, and prior to the closure of all schools during the COVID-19 pandemic. On average, the monthly share of displaced households without all children attending school was 6 percentage points higher than that of non-displaced households. However, the share was as high as 11 percent in October 2019, and the share for displaced and non-displaced households converged following the start of the teacher strike in IRG-controlled regions in early 2020, which suggests that some of the later convergence might not have persisted once the strike ended. Importantly, these school access figures are corroborated by other sources, where it has been reported that there have been reports of overcrowded schools and problems with availability of schooling for all students in regions with high shares of IDPs (e.g., Almoayad et al. 2020a). **Combined, these figures suggest that IDPs face worse deprivations in many, but not all, critical welfare dimensions.**

b. The Relationship Between Forced Displacement and Violence in Yemen

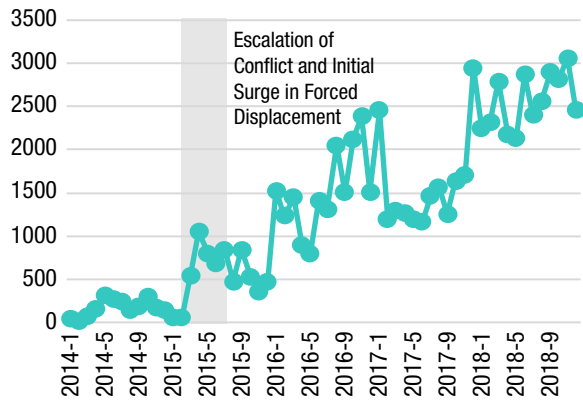
The WFP monthly monitoring survey has another important component that offers powerful insights about the displacement crisis in Yemen. Aside from providing a retrospective look at the displacement crisis in Yemen, the survey also reaches a substantial number of households that were not displaced when they were initially reached but had become displaced at some point by the last survey to which they responded (e.g., D'Souza et al. 2022a; D'Souza et al. 2022b). This allows us to better understand both how violence and food access was trending leading up to and following displacement, which can help identify potential causes and consequences of the displacement crisis. Importantly, this type of data- particularly the food access data leading up to displacement- is something that is very rare to collect in the midst of a forced displacement crisis.⁴⁶

First, we illustrate the pivotal role of violence in the forced displacement crisis in Yemen. In addition to the onset of conflict being associated with many forced displacement crises (e.g., World Bank 2017b), there is a large amount of empirical evidence demonstrating that displacement is strongly associated with households living in close proximity to violence (e.g., Stanley 1987; Engel and Ibanez 2007; Williams 2008; Lozano-Garcia et al. 2010; Bohra-Mishra and Massey 2011; Adhikari 2013; etc.). However, displacement decisions are complex, and the decisions of whether and when to become displaced are both affected by the type, the frequency, and the timing of violence (e.g., World Bank 2017b). We summarize evidence from D'Souza et al. (2022b) that further illustrates some of these complexities and better contextualizes the escalating forced displacement crisis across the world (e.g., World Bank 2017a).

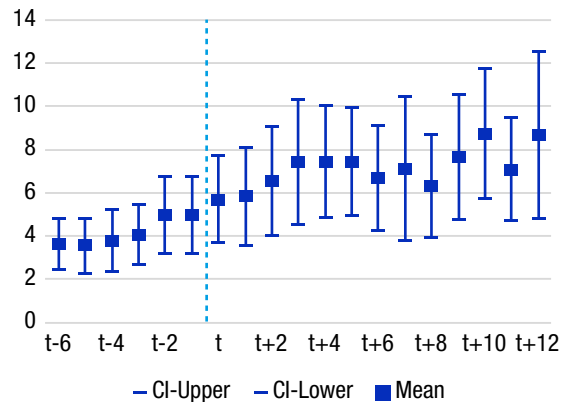
46 For example, Beaman et al. (2022) had to use remote sensing data to attach estimates of welfare data and economic activity to displacement decisions rather than use the well-being of individual households.

Figure 14. Causes of Forced Displacement

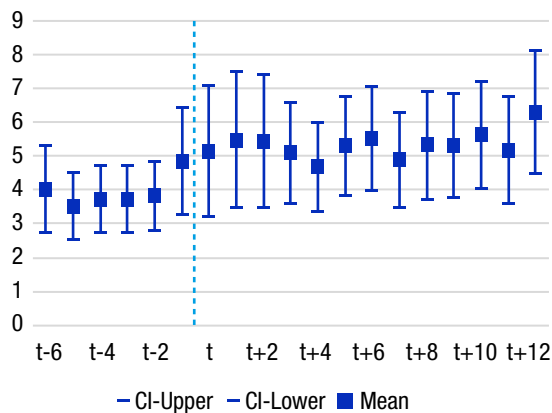
a. Number of Conflict Fatalities by Month



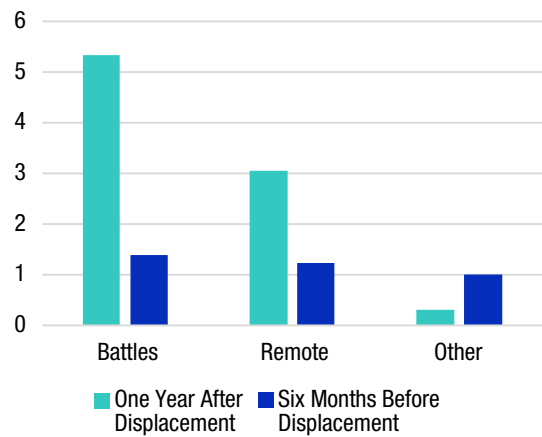
b. Number of Fatalities at the Time of Displacement - Displaced Households



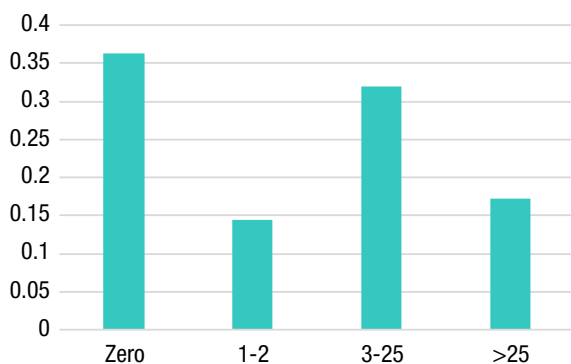
c. Number of Fatalities at the Time of the Most Recent Survey- Non-Displaced Households



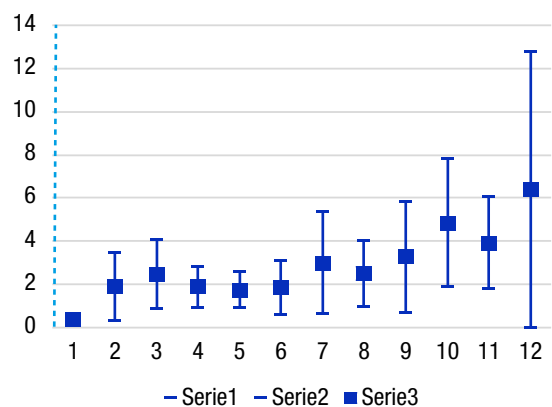
d. Differences Across Types of Violence at the Time of Displacement- Displaced Households



e. Share of Total Displaced Sample by Total Number of Violent Incidents in the Month of Displacement and the 6 Months Before



f. Violence Following Displacement for Those Who Fleed Before Any Violence Took Place



Combined, the data illustrate that violence is pivotal to forced displacement in Yemen, but the relationship might not be as strong as one might expect due to some of the complexities mentioned above. First, Figure 14 illustrates that violence in Yemen's conflict was far from its peak at the time during which the largest number of Yemenis were fleeing their homes. As illustrated in Figure 13 and in official figures (e.g., TFPM 2019), the largest increases in displacement occurred between March and July of 2015. However, Figure 14 illustrates that the number of conflict fatalities continued to increase over the course of the conflict and had approximately tripled by the end of 2018, which was a time where the number of new displacements was roughly equal to the number of returnees.

Second, for households that became displaced following the initial surge, the amount of violence that occurred was not much larger than that of households that chose not to become displaced. Specifically, Figure 14 illustrates that violence was increasing each month leading up to and for the year following displacement. By twelve months following displacement, there were 8.7 average fatalities in the district the household lived in prior to displacement, representing a more than doubling of monthly fatalities six months before displacement.

However, violence was increasing across the country during this time period, and some of this increase was also experienced by non-displaced households. Figure 14 also reports the average monthly fatalities in the months leading up to and following the most recent survey of households that never became displaced. Similar to displaced households, violence was increasing during this time period. Although the increase was lower than that of households that became displaced by 12 months following displacement, households that never became displaced also lived in districts with a significant amount of violence.

There are a number of potential explanations for why violence was not larger on average in districts from which displaced households fled relative to districts where households that never became displaced lived. One possibility is that district boundaries are relatively large, and despite there being violence in the district, households that did not become displaced might have lived

far from the violence that was occurring in the district. Another possibility is that not all households choose to become displaced due to violence from the conflict, and some households are fleeing the humanitarian situation associated with the conflict.

However, neither of these explanations fully explain the lack of a stronger relationship between violence and forced displacement. Figure 14 empirically presents evidence for two alternative explanations that help explain why displaced households did not on average experience much more violence relative to non-displaced households. First, not all types of violence surge equally around displacement. Figure 14 demonstrates that displacement was especially associated with surges in ground battles, which tended to be associated with more future violence and capture of territory by rival forces (e.g., D'Souza et al. 2022). When restricting violence to ground battles, the surge in violence at the time of displacement and the difference in violence experienced between displaced and non-displaced households both is starker.

Second, there is evidence that households have significantly different tolerance of violence, with some households becoming displaced before any violence actually occurs and others living through substantial amounts of violence and still not becoming displaced. Despite the average surge in violence beginning before displacement, Figure 14 illustrates that 36 percent of displaced households became displaced before a single violent incident occurs. However, immediately following the displacement of these households, there was a very large surge in violence in the 12 months following displacement which is larger than the total average surge reported for all displaced and non-displaced households in Figure 14. Thus, many of these households were potentially fleeing an expected increase in violence before it actually started.⁴⁷

As described in D'Souza et al. (2022b), these results demonstrate there is a great deal of variation in when and how violence forces displacement, which is consistent with qualitative and descriptive evidence on the complexity of displacement decisions (e.g., Verwimp and Maystadt 2015; World Bank 2017a; etc.). In Yemen, these complexities have resulted in a forcibly displaced

⁴⁷ Importantly, D'Souza et al. (2022b) illustrates that households that fled before violence began had indistinguishable food access measures from those that fled significant violence. This finding is inconsistent with other potential explanations for displacement aside from violence, where for example, households fleeing before violence began might have been fleeing the humanitarian situation.

population with largely two different pre-displacement experiences during the time period under analysis. Approximately half the population fled regions of little-to-no violence before they had the chance to become victims of violence themselves, while the other half fled regions of significant violence.

Furthermore, the results from D'Souza et al. (2022b) suggest that the complexities in the displacement decision are important factors to consider when trying to infer the potential size and needs of forcibly displaced populations. It is quite difficult to estimate the size of the displaced population in fragile and conflict settings (e.g., TFPM 2016; World Bank 2017b), and often times estimates might rely on key informant interviews and other indirect methods. However, these results suggest that it might be difficult to try and infer the size and identity of the population indirectly by the level of violence in aggregate or inferences made by individuals without more information about risk tolerances of the population and the type of violence. Additionally, the large differences in pre-displacement experiences of forcibly displaced households suggest significant heterogeneity in services needed to support forcibly displaced populations. For example, it might be the case that psychological support is more critical for a subset of displaced households that actually experienced violence, as opposed to the potentially large share of households that became displaced before any violence occurred.

c. Consequences of Forced Displacement

Lastly, as mentioned above, the monthly WFP survey can help illustrate the consequences of displacement. A better understanding of the consequences of displacement are pivotal to understanding the needs of displaced households and ensuring IDPs are adequately supported. Although displaced households on average have significantly worse food access than non-displaced households over the entire course of the conflict, it is unclear whether this is the lasting consequence of forced displacement itself or if households that have poorer food access are more likely to become displaced in the first place. Better understanding of this question might more fully answer the degree to which forced displacement might be driven by the humanitarian situation as opposed to living in close proximity to violence.

Figure 15 summarizes evidence from D'Souza et al. (2022a) and illustrates how food access evolved leading up to and immediately following displacement. There are three important patterns illustrated in the evolution of food access in these figures. **First, food access is very stable leading up to displacement, and one can rule out the possibility of even moderate declines in food access before households became displaced.** This suggests that the households that are becoming displaced due to the humanitarian situation or looking for better opportunities are not doing so in response to a sharp change in well-being on average.

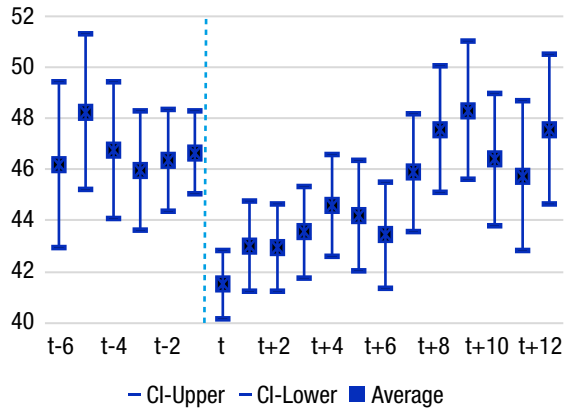
Second, there is a sharp decline in food access in the month of displacement that lasts for up to three or four months following displacement. In the month of displacement, average the average FCS worsened by 11 percent and the average rCSI worsened by 17 percent. Importantly, these are large declines from an already very low base. For example, the average FCS in the month of displacement is below 42, which is a threshold that is often used as the eligibility for emergency food assistance; and the average rCSI is close to 19, which is similarly a threshold for emergency assistance.

And lastly, there is a relatively quick rebound in food access for displaced households. By four months following displacement, food access is statistically indistinguishable from the month before displacement. And monthly food access measures are better than prior to displacement by one year following displacement and one can statistically rule out even small declines in food access relative to pre-displacement levels.

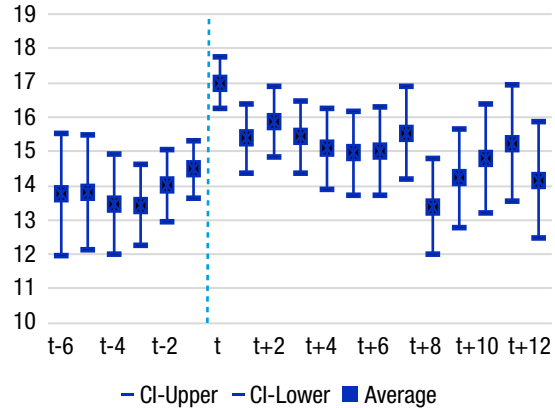
Importantly, estimates of the impact of displacement on food access and estimates of the quick recovery are robust to a number of concerns. First, it is important to verify that that displacement itself is not interfering with access to mobile phones and the ability to respond to the survey. Specifically, if households that had large and persistent declines in food access started dropping out of the survey following displacement, the recovery of average food access could actually just be driven by a change in the households that are responding to the survey rather than a recovery to pre-displacement levels. And second, in order for these results to represent the entire displaced population, it is important to verify that households that were reached prior to displacement in the WFP survey are no different

Figure 15. Consequences of Forced Displacement

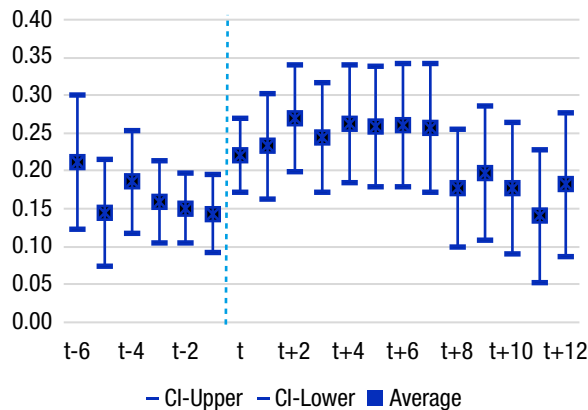
a. Food Consumption Score Leading up to and Following Displacement (higher is better food access)



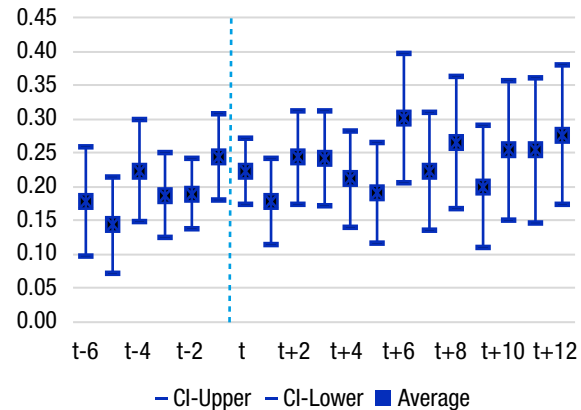
b. Reduced Coping Strategy Index Leading up to and Following Displacement (higher is worse food access)



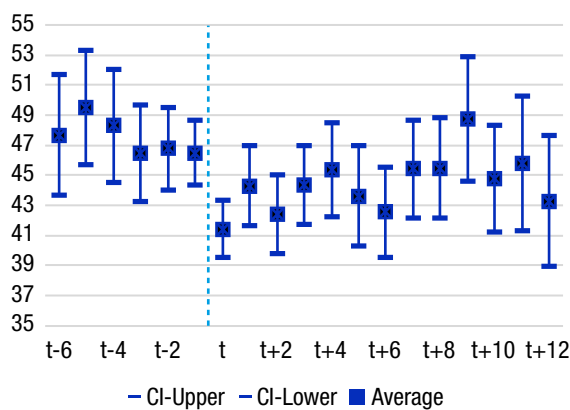
c. Likelihood of Receiving Food Assistance- Poor Food Access Prior to Displacement



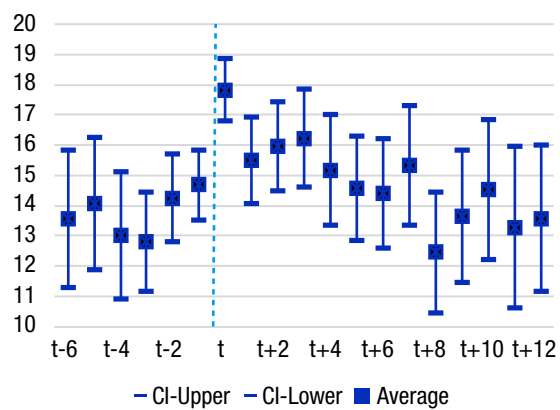
d. Likelihood of Receiving Food Assistance- Adequate Food Access Prior to Displacement



e. Food Consumption Score Leading up to and Following Displacement - Households that Never Received Food Assistance Following Displacement (higher is better food access)



f. Reduced Coping Strategy Index Leading up to and Following Displacement - Households that Never Received Food Assistance Following Displacement (higher is worse food access)



than other displaced households that were not reached before they became displaced. D'Souza et al. (2022a) explores these possibilities in detail and demonstrates that household well-being prior to displacement is uncorrelated with the likelihood of responding to post-displacement surveys and there is little difference between the displaced households analyzed here and the entire displaced sample.

The quick rebound of food access to pre-displacement levels suggests that the lower food access of displaced households in Figure 13 is being driven by the fact that displaced households tended to have worse food access than the average household in Yemen prior to displacement. Examples of how pre-displacement well-being could influence the displacement decision include some portion of households choosing to become displaced due to the humanitarian situation instead of living in close proximity to violence; households that have less assets, particularly those who do not own their home, have less to lose by moving when violence does occur near their homes; and violence might be more concentrated and impact poorer regions more so than others. More investigation is needed to fully understand exactly why those with poorer than average food access are more likely to become displaced.

Figure 15 further summarizes results from D'Souza et al. (2022) and demonstrates the importance of food assistance to the quick rebound in food access of displaced households. For households that had food access below thresholds typically used for emergency food assistance in Yemen prior to the month of displacement⁴⁸, there was a significant increase in the likelihood of receiving food assistance. The likelihood continued to remain higher than immediately before displacement for almost the entire year following displacement on average. However, for households that had food access above thresholds typically used in targeting food assistance, there was no increase in food assistance.

Combined, as described in D'Souza et al. (2022a), these results suggest that humanitarian assistance played a critical role in the rapid recovery of food access for a subset of households. However, Figure 15 demonstrates that the baseline food access patterns leading up to and following displacement are identical for the roughly half of displaced households in our sample that did not receive food assistance

in either the month of displacement or for in any month in the year after. Thus, the resilience of these households is driven by other factors, such as being able to effectively rely on their own networks to find income sources and recover. The fact that a significant share of displaced households can recover quickly without receiving increased assistance suggests a larger amount of resilience amongst forcibly displaced households in Yemen than is typically assumed in other forced displacement crises (e.g., World Bank 2017a; Tanner et al. 2021), and further corroborates a growing number of reports in Yemen that households are potentially more resilient than has been reported given extensive data deprivation (e.g., Vuylsteke 2021).

d. Summary of Well-being of Forcibly Displaced Households and an Illustrating of Key Information Gaps Going Forward

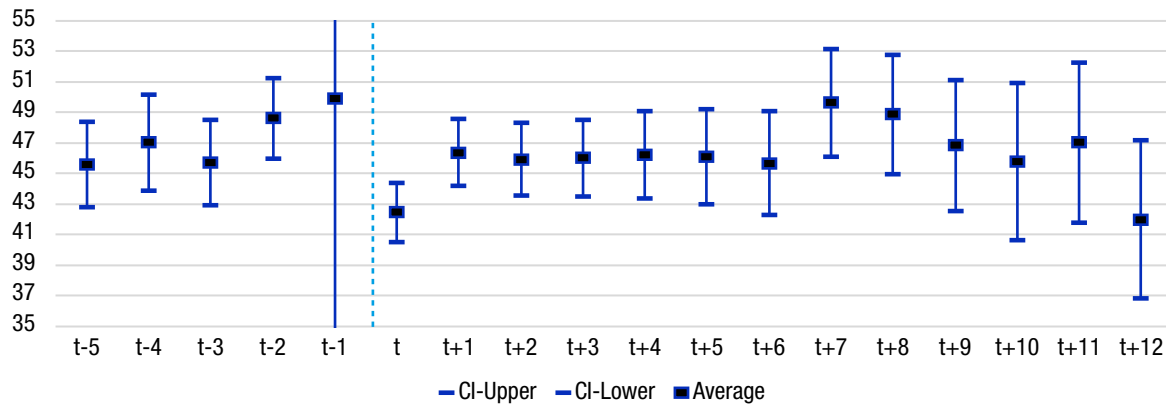
These results corroborate the large scale of the forced displacement crisis and further illustrate the importance of highlighting the plight of disadvantaged groups within Yemen's broader humanitarian emergency. The results illustrate the violence is important to displacement, but the actual decision to become displaced is complex, and violence impacts households differently. Furthermore, the results demonstrate a surprising amount of resilience of displaced households, in part due to well-targeted humanitarian assistance, and in part due to unexplained factors.

But much of the analysis presented above focuses only on the time surrounding displacement and on the currently displaced households. In part this is due to the ongoing nature of the crisis and the new displacements that continually happen over the course of the conflict. Given this focus, there is less known about the decision to return to one's home following displacement and how the displacement crisis might eventually come to be resolved. Unresolved issues include the share of displaced households that might eventually return home and the potential struggles those households might face relative to both households that remain displaced and households that never became displaced.

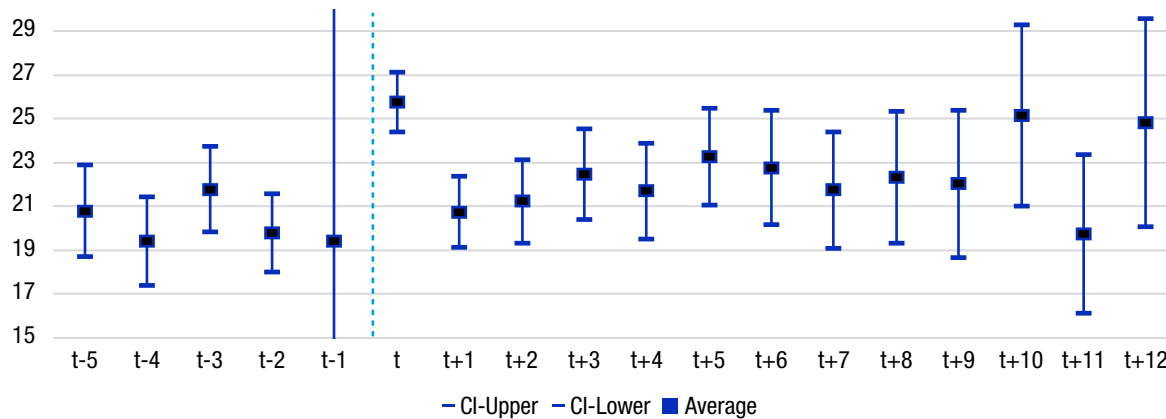
48 FCS at or below 42 or rCSI at or above 19.

Figure 16. Food Access Leading up to and Following Return

a. Food Consumption Score (Lower is Worse)



b. Reduced Coping Strategy Index (Higher is Worse)



However, there is a growing number of returnees in Yemen’s forced displacement crisis that can illustrate the factors that might influence households to return and further illustrate the challenges they might face upon returning. As reported in Figure 13, the WFP survey captures approximately 2721 households that were displaced at one time but report to not being displaced in later WFP monthly surveys. By capturing food access leading up to and following possible returns, we are able to highlight the conditions under which displacement potentially ends for households thus far in the conflict and the challenges that they face.

Figure 16 reports average food access measures of returning households that responded to at least one survey in the 5

months before they stopped reporting to being displaced and at least one survey in the year following after. Just as is the case with food access following displacement, there is a very large decline in food access in the month of their return. These results are consistent with households actually moving back to their homes as opposed to simply making their displacement permanent. Furthermore, these patterns suggest that when households do return from displacement, they likely will undergo yet another strong and adverse shock to food access.

However, unlike the case with displacement, food access is increasing leading up to the return. Similar to a recent finding that evidence about Syrian refugees who returned to their homes (e.g., Beaman et al. 2022), Figure 16

illustrates that the average FCS and rCSI are improving in the three months leading up to the return, and further illustrates that the average of both measures is less than the months immediately before the return for nearly every post-return month.⁴⁹ At the very least, this illustrates that the motivation for returning is not only related to violence in either their original homes or in the region of their displacement. One possibility is that households that intend to return to their homes need to become well-off enough to afford to migrate back home. However, future work will need to more fully address these and related issues.

Much more work needs to be done to understand the needs of displaced households more fully and to better understand how the displacement crisis might end. For example, the above results almost exclusively analyze violence and food security outcomes. However, current data sources do not allow an investigation into the impact displacement has on other essential services, where a growing amount of work is suggesting that displacement and the large number of displaced households that move to particular cities and regions is having a large impact on overcrowding of schools and other key facilities (e.g., Alamoayad et al. 2020). Furthermore, more expansive surveys of displaced households about why they became displaced, how they have fared since displacement, and whether and when they plan on returning all could help inform the humanitarian and development response. However, future work on these and related issues will have to wait for more complete surveys of displaced and host populations.

For more details, see:

D'Souza, A., E. Favari, S. Krishnaswamy, and S. Tandon. 2022. "How Does Violence Force Displacement in Active Conflict? Evidence from Yemen." Policy Research Working Paper WPS10177, World Food Programme and World Bank. [Link](#).

D'Souza, A., E. Favari, S. Krishnaswamy, and S. Tandon. 2022. "Consequences of Forced Displacement: Evidence from Yemen." Policy Research Working Paper WPS10176, World Food Programme and World Bank. [Link](#).

49 Although the confidence intervals for some of the months are large and overlap (particularly in the month before return), we can reject the hypothesis that all pre-return months are equal at conventional significance levels.

SECTION

8



The Humanitarian Response

In the face of tremendous needs in Yemen and the ongoing food and humanitarian emergency in the past eight years, there has been an unprecedented humanitarian response. In a recent assessment of food emergencies across the world in fragile and conflict settings, it was found that the size of the humanitarian response is often an order of magnitude below the cost of meeting the humanitarian needs (e.g., Wiggins et al. 2021). However, in Yemen, although the scale of the need is also high, the dollar value of the humanitarian response at its peak was just under US\$4 billion (e.g., OCHA 2021). The single largest component of the humanitarian response is in-kind food assistance and cash transfers led by the WFP, which supported 13 million people and accounted for roughly half of the total needs in the country in 2021 (e.g., OCHA 2021).

Part of the reason the humanitarian response in Yemen has been so large relative to other humanitarian emergencies has been the emphasis that the United Nations has placed on the crisis. In 2017, the UN announced 20 million people across four countries, including Yemen, were at risk of starvation (U.N. 2017). Additionally, as mentioned in the Introduction, the UN has been calling Yemen the worst humanitarian emergency in the world

for years (e.g., UN 2019). Lastly, there have a number of instances of individual UN agencies pleading for additional funding to avoid catastrophe at various points through the conflict (e.g., WFP 2018; UNICEF 2020; WFP 2020; etc.).

Regardless of the reason for the size of the response, the emergency support provided by the humanitarian and development community has provided an important lifeline to struggling households. But despite the size of the response and the detailed annual reports on both the humanitarian needs and the humanitarian response, the details of the targeting and who receives assistance are often not reported at a high frequency. For example, prior to 2018, the humanitarian assessments provided estimates of the number of people targeted by humanitarian assistance (e.g., OCHA 2017). However, in the 2018 assessment, it was reported that not all targeted individuals receive assistance and that approximately 85 percent of intended beneficiaries actually received assistance in that year (e.g., OCHA 2018). Furthermore, the annual aggregate figures have little information about the frequency, composition, and targeting of assistance (e.g., OCHA 2016; OCHA 2017).⁵⁰

⁵⁰ Illustrating the difficulty in getting information on the various emergency projects ongoing in Yemen, a recent assessment collected governorate-level data for 2020 on targeting (e.g., Ghorpade and Ammar 2021). However, in order to get the data for the exercise, the authors had to appeal to donors of the programs.

However, the monthly WFP monitoring survey provides very useful descriptions of the extent of food assistance in the country, where it is targeted, and how it is changing over time. Furthermore, the survey helps to compare food access and well-being of those receiving humanitarian assistance to those that do not, which is something that cannot be inferred from administrative data and aggregate assistance figures. Lastly, the high-frequency of the monthly WFP monitoring survey allows one to estimate the change in food access in response to large changes in assistance and provide an estimate of the efficacy of the humanitarian response.

a. Summary Statistics of the Humanitarian Response

Summary statistics of the humanitarian response are presented in Figure 17. **Figure 17 corroborates the aggregate administrative data from the humanitarian response and demonstrates a significant share of households are receiving humanitarian assistance.** When asked whether households have received food assistance in the past month, between 22 and 51 percent of households responded affirmatively. Importantly, the figure is highest between 2017 and 2019, when the humanitarian response was the largest, and the share begins to decline as the funding for the humanitarian response begins to decrease (e.g., OCHA 2022).

However, even though the share of households that received food assistance in the past month is as low as 22 percent, that does not mean that other households are not receiving food assistance. The WFP survey further asks whether the household received food assistance in the past 3 months and if they ever received food assistance. Figure 17 reports the average monthly figures between March 2019 and February 2021. The average share that received food assistance in the past month over this time period is 34 percent, but the figure increases to 65 and 80 percent for households that have received food assistance in the past three months and at some point ever, respectively. Thus, the share of the population receiving food assistance at some point during each year is much higher than some monthly figures indicate.

Given so many different forms of food assistance and humanitarian assistance are being provided, the WFP survey further inquires about the modality of the assistance households received. Figure 17 illustrates that the vast majority of assistance is received in-kind. The month-to-month average between March 2019 and February 2021 of food assistance that is in-kind is nearly 70 percent, with vouchers making up approximately one-quarter of food assistance received on average. Furthermore, nearly all food assistance being provided in the country is being provided by WFP, with only a monthly average of just over 5 percent of households primarily receiving food assistance from an organization other than WFP.

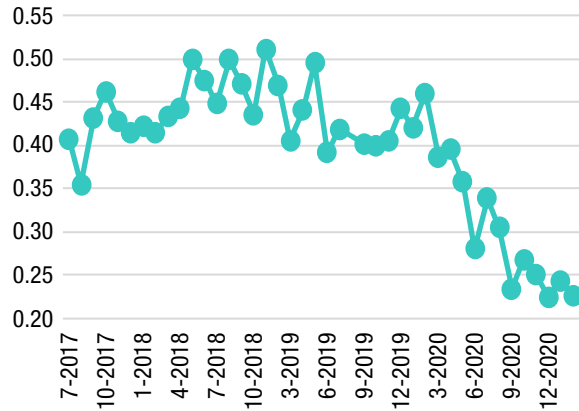
The monthly WFP survey can further provide information on targeting of food assistance as well. Up until December 2018, the Integrated Food Security Phase Classification for Yemen, which provides the official estimates of the share of households in acute food insecurity, estimated the classification at the governorate level (e.g., IPC 2017). Between July 2017 and December 2018, Figure 17 presents the average monthly share of households in each IPC phase. **The results suggest that a significantly higher share of households in worse IPC phases receive food assistance.** In the worst IPC phase recorded during the 2017 IPC (Emergency), over 50 percent of households received food assistance in the past month.⁵¹

However, focusing on only food assistance understates the degree to which households in Yemen depend on humanitarian assistance. Beginning in April 2020, the monthly WFP survey further inquired about whether each household received any humanitarian assistance in the past three months, which includes food assistance. Approximately 80 percent of households claimed each month to have received assistance in the past 3 months over the course of survey, which is even higher than the 65 percent of households on average that reported to receiving food assistance in the past three months. And these types of questions likely do not even capture the assistance being provided to facilities in Yemen that provide basic services, such as health care, which also make up a significant portion of the overall humanitarian response (e.g., World Bank 2022b). **Combined, these results further illustrate that nearly all households in Yemen are depending, at least in part, on the large overall humanitarian response.**

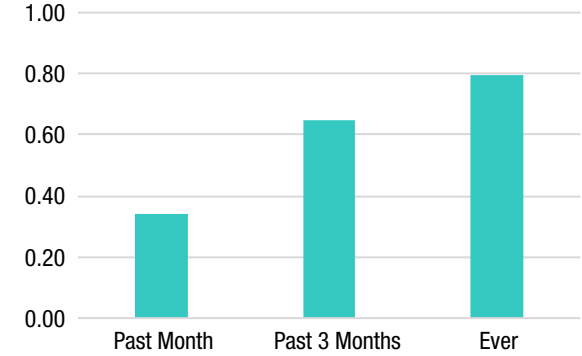
51 Beginning in 2018, the IPC began to be conducted at the district level. Although it is possible to perform the district-level analysis similar to the governorate-level analysis above, it is more difficult to infer the IPC classifications from the graphical depiction given in the official IPC announcements.

Figure 17. Description of Food Assistance in Monthly WFP Monitoring Survey

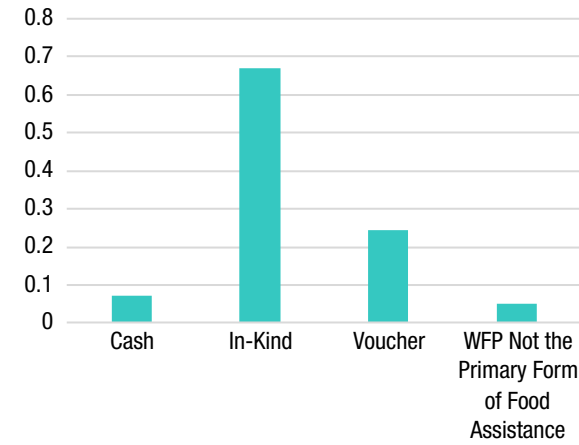
a. Share Receiving Food Assistance by Month



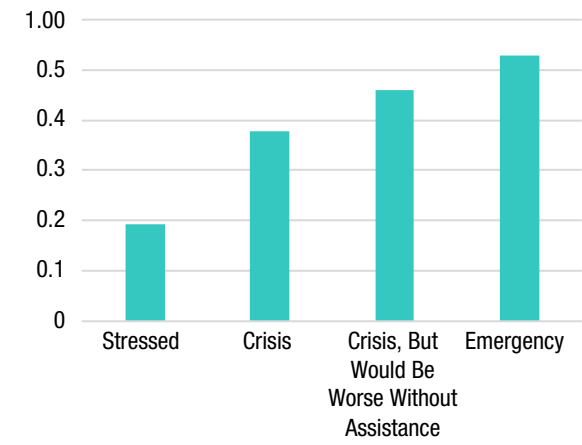
b. Average Monthly Share Receiving Food Assistance by Time Horizon, March 2019 – February 2021



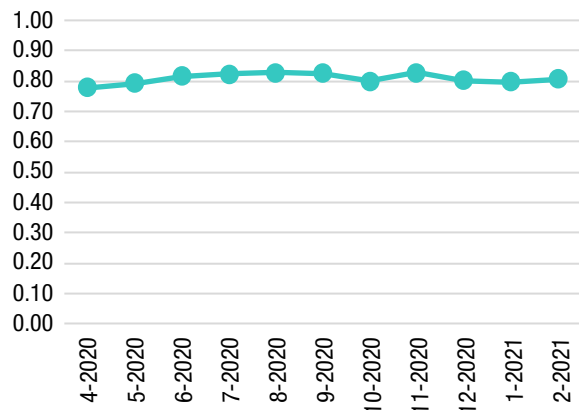
c. Primary Form of Assistance of those that Ever Received Assistance, March 2019 – February 2021



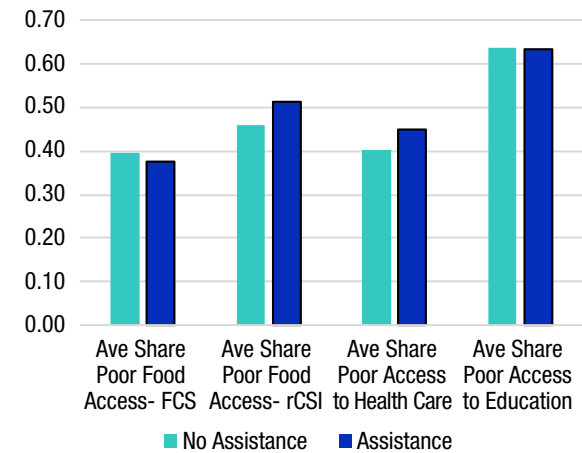
d. Average Monthly Share Receiving Assistance by IPC Region, July 2017 – December 2018



e. Share Receiving Any Kind of Humanitarian Assistance in Past 3 Months, April 2020 – February 2021



f. Share of Households with Poor Food Access or Access to Basic Services by Assistance Status



But despite the very large share of households continually receiving some sort of humanitarian assistance, the approximately 20 percent who do not regularly receive assistance have nearly identical needs on average. Figure 17 further reports the share of households with poor food access, poor access to health care, and poor access to education separately for those having received assistance in the past three months and those who have not. Combined, these results further illustrate that even those who are unable to directly benefit from the response still have immense humanitarian needs.

b. Impacts of WFP Food Assistance on Food Access

In addition to describing the humanitarian response, the monthly WFP survey allows for a more detailed investigation of the impact of the largest component of humanitarian assistance- WFP food assistance. Over the course of the conflict there have been times of rapid change to the provision of food assistance. In times with few other shocks, one can estimate the impact of food assistance by analyzing the impact these changes have on food access.

Figure 18 reports the average change in the value of the overall humanitarian response as reported by OCHA. Although it is difficult to ascertain exactly how much is attributable to food assistance alone, the share is reported to be roughly 50 percent of the total in each year (e.g., OCHA 2015-2022).⁵² Thus, there were large increases in the value of food assistance every year between 2015 and 2019, followed by large decreases in the value of assistance.

Despite two large changes in food assistance over the course of the conflict, it is much more straightforward to estimate the impact of the decline in food assistance beginning in 2020. First, although there were large increases in the value of food assistance between 2016 and 2019, it is unclear exactly how these increases were targeted across the entire population. Only certain regions might have had an increase in the share receiving food assistance, or there might have been changes to the frequency or values of benefits that could be unobservable to the food assistance question in the monthly WFP survey.

However, in 2020, the exact change to food assistance is better known. The reduction in food assistance was targeted at regions controlled by the Houthis in Sana'a and was composed of a halving of the frequency with which households received their benefits (e.g., Favari et al. 2021). Furthermore, Figure 18 further shows that there was not a large change in humanitarian needs, but the decline was most likely attributable to a decline in donor support. The lack of a significant change in needs is corroborated by the monthly reporting of the share of households with poor food access (Figure 9). With more precise information on changes in targeting for reasons that do not have to do with changes in the needs of the population, we are able to more precisely estimate the impact that the change in assistance had on poor food access.

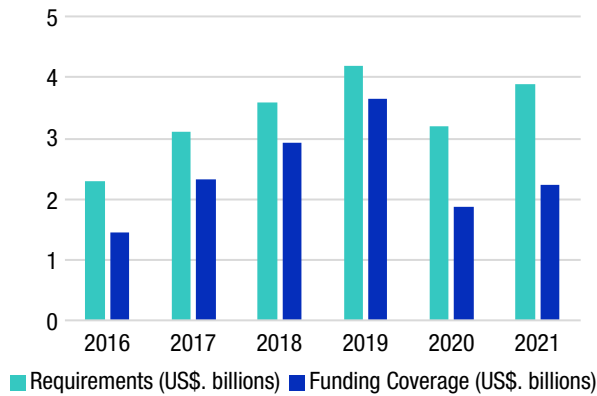
Second, we are better able to estimate the impact the decline in food assistance had on food access in 2020 than the increase in food assistance between 2016 and 2019 because of the many other shocks occurring between 2016 and 2019. Given all of these other events, it is difficult to separate the impact an increase in assistance had from, for example, the large negative impact that the cessation of regular government salaries likely had on the population in 2016. In fact, the increase in food assistance might be one of the reasons that there was not a much larger increase in poor food access in response to the lack of regular government salaries (see Figure 9). Furthermore, once some of these shocks began to subside at the end of 2017, the large increases in food assistance might have accounted for the large improvement in the FCS in early 2018 relative to earlier points in the conflict (e.g., Tandon and Vishwanath 2021).

However, in the places where food assistance significantly declined in 2020, there were fewer shocks occurring that had a large impact on food access, which again allows us to estimate the impact of changes in food assistance more precisely. The two largest shocks occurring at the time when food assistance declined in Houthi-controlled regions were increases in food and fuel prices due to increases in global commodity prices, and intermittent blockages of fuel imports (Favari et al. 2021). However, the increases in food prices were relatively minor compared to previous currency crisis and similar to ongoing month-to-month changes over the course of the conflict (e.g.,

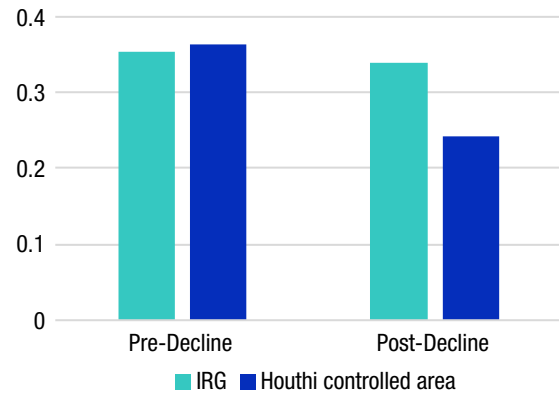
52 One of the reasons it is difficult to ascertain how much is attributable to food assistance alone is that the food security cluster began providing agricultural livelihood support in addition to the food assistance that had been ongoing for years. In the annual reporting by the Humanitarian Response Plan, these two types of assistance began to be summed together (e.g., OCHA 2018).

Figure 18. Change in Food Access in Response to a Decline in Food Assistance

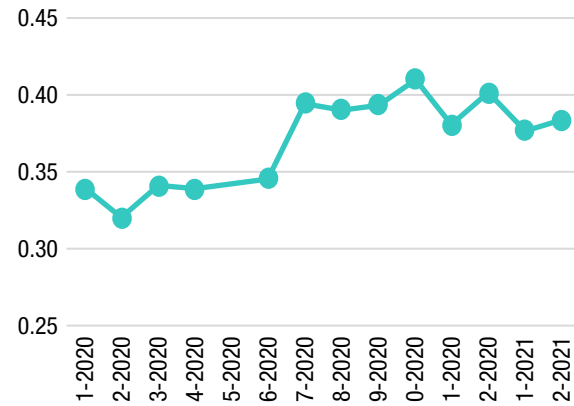
a. Change in Value of Humanitarian Needs and Value of Response- Admin Data



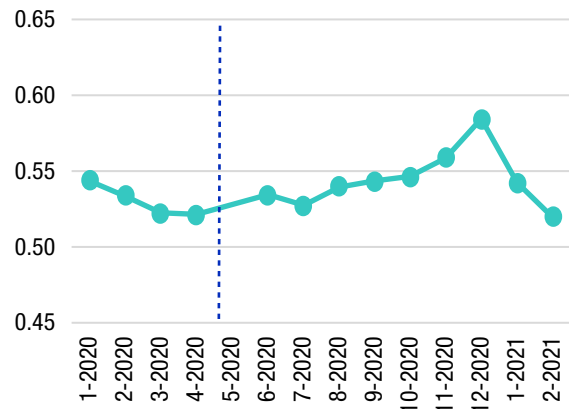
b. Change in Share Receiving Food Assistance- WFP Survey



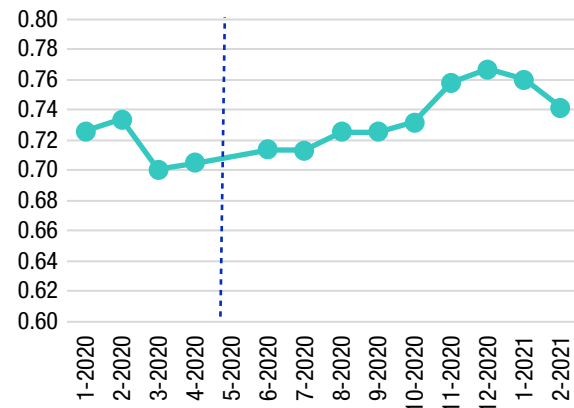
c. Change in Share with Poor Food Access- Food Consumption Score



d. Change in Share with Poor Access- Reduced Coping Strategy Index



e. Change in Share with Poor Food Access- Modified Reduced Coping Strategy Index



f. Change in Average Reduced Coping Strategy Index (Higher is Worse Food Access)

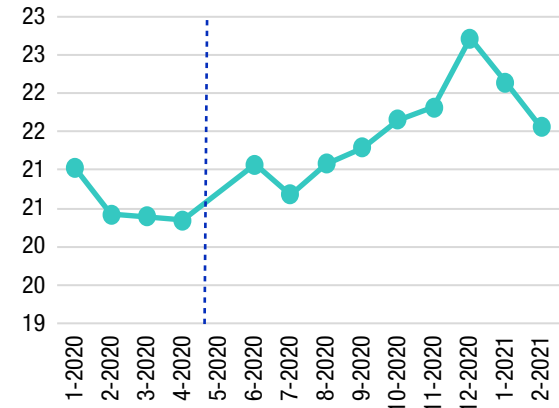
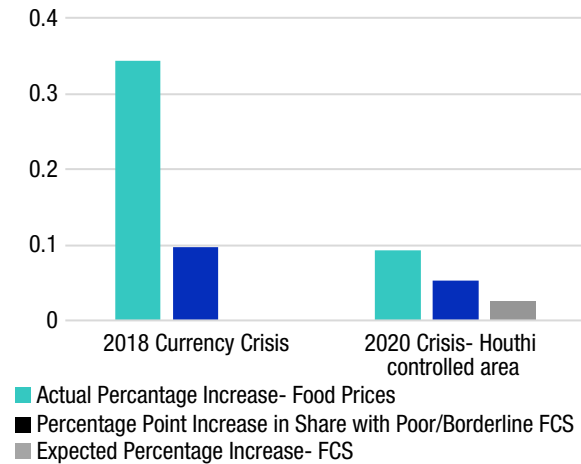


Figure 18. continued

g. Change in Food Access Predicted by Rise in Food Prices Alone



ACAPS 2020); and fuel price spikes tend to have larger impacts on less vulnerable populations who are less at risk of poor food access.⁵³

Figure 18 presents estimates of the decline in food access in response to the halving of food assistance beginning in April 2020. Importantly, the decline in the share receiving food assistance in the last month significantly drops in Houthi-controlled regions following April 2020. Prior to the change, the share receiving food assistance was similar in Houthi and IRG-controlled regions. However, following the change in targeting, the share in IRG-controlled regions remained similar while the share in Houthi-controlled regions dropped by 12 percentage points, which represents a drop of 33 percent.

After the change in food assistance, the share with poor food access in Houthi-controlled regions significantly increased. Figure 18 demonstrates that the share with a

poor or borderline Food Consumption Score increased from an average of 33 percent prior to the change to an average of 39 percent following the decline in food assistance. The decline was almost immediate, with the share with poor food access reaching 39 percent within two months following the decline in assistance; the decline was persistent, with the share with poor food access being higher in every single month following the decline in food assistance relative to the months before; and the decline was large, with the average monthly increase from 33 to 39 percent representing a 15 percent worsening on average.

Similarly, Figure 18 demonstrates that there was a significant decline in poor food access as measured by a low or medium Reduced Coping Strategy Index. Even though the change with poor food access using the rCSI was not as large and as persistent as the change using the FCS, there was still a worsening of food access. Furthermore, when adjusting the index to put zero weight on questions that are more difficult to interpret in the Yemeni context⁵⁴, the increase in the share with poor food access is similar to that of the FCS.⁵⁵ And lastly, Figure 18 also demonstrates that the average (unmodified) rCSI also significantly worsened (increased) following the decline in food assistance.

Lastly, it is important to note that the decline in food access in response to the decline in food assistance is robust to important concerns. As mentioned above, global food prices began to rise shortly after the decline in food assistance occurred in Houthi-controlled regions. In a country where imports accounted for 90 percent of food consumption even prior to the conflict (e.g., World Bank 2017a), the increase in global food prices caused food prices across all of Yemen to increase (e.g., Favari et al. 2021). However, as illustrated above, Yemen has undergone periods of rapid food price increases at multiple times during the course of the conflict, and one can estimate how

53 Although the COVID-19 pandemic had income shocks on many countries, in Yemen these tended to be less severe given the lack of many households to earn an income even before the pandemic began. In many countries, there was a large decline in well-being at the start of the pandemic, but this did not happen in Yemen. It was only after other shocks occurred, some potentially related to the COVID-19 pandemic (e.g., decline in food assistance due to global declines in humanitarian donations, etc.), that poor food access began to increase substantially. Furthermore, the monthly WFP survey itself demonstrates that at the time that poor food access began to accelerate, many of the difficulties in reaching jobs, etc. had already begun to ease (e.g., Favari et al. 2021).

54 The rCSI includes questions on coping strategies of relying on less expensive foods and borrowing to purchase food. In most contexts, these tend to be unambiguously negative coping strategies associated with poor food access. However, in Yemen, where neither food nor credit markets are functioning properly, they might be more difficult to interpret. For example, when food prices have escalated so much and so rapidly since the start of the conflict (e.g., ACAPS 2020), some might not believe cheaper food is an option available to them; and credit markets actually operating and allowing people to borrow to purchase food might actually be a positive development in Yemen as opposed being unambiguously associated with poor food access.

55 Specifically, the modified rCSI puts zero weight on relying on less expensive foods and borrowing to purchase food, which allows the index to vary between 0 and 42 instead of between 0 and 56. Furthermore, rather than use the cut-off of 19 or greater to denote poor food access, the figure uses 11, which represents the same share of the maximum modified index value as 19 does of the unmodified index.

large of an expected impact the observed increase in food prices might be expected to have on poor food access based on these historical precedents.

This estimate is presented in Figure 18, and it demonstrates that the decline in food access is much larger than would be expected by the relatively small (compared to past currency crises) food price increases that did occur during the same time period. Average food prices increased by only 9 percent during the time period of the most rapid increase in food prices during this time period. In previous currency crises, poor food access as measured by the FCS increased by 0.28 percentage points in response to each single percent increase in food prices, which would correspond to an expected increase in the share with poor food access of approximately 2.5 percentage points. This is roughly half of the actual increase in the share with poor food access that actually occurred over the same time period, which suggests that rising food prices likely do not fully account for the decline in food access measured here.⁵⁶

Additionally, although the decline in assistance began shortly after the COVID-19 pandemic began, it is unlikely that the decline in food access is being driven by the pandemic. First, there was little immediate change in food access in March in Houthi-controlled regions and in the first few months of the pandemic in IRG-controlled regions, which was the time that the income shocks were strongest in the country (e.g., WFP 2020b). Second, the declines in food access that were occurring in IRG-held regions at the same time as the COVID-19 pandemic are exactly what would be expected by food prices alone, with likely little contribution from income shocks during the pandemic (e.g., Favari et al. 2021). And lastly, similar to the impact of rapid fuel price spikes, the income shocks that happened during the pandemic primarily affected households that had a job and were better off than the majority of the population. Thus, although income shocks from the pandemic likely had a large impact on food access of better-off households, it is not surprising that income shocks from the pandemic had more limited impacts on the share of households with poor enough food access that they would qualify for emergency humanitarian assistance.

Combined, the results suggest that a large decline in food assistance has a significant and immediate negative impact on food access. The sensitivity of poor food access to food assistance is not surprising, given that targeting focuses on the households with the worst food access and those vulnerable to having poor food access. Similar to the importance of rising food prices, declines in food assistance impacts those who can least afford to lose an important form of support.

c. Important Remaining Questions About the Humanitarian and Development Response

Although the analysis above helps to summarize and quantify the impacts of an important form of humanitarian assistance, there are four important issues that are unable to be addressed with the current data sources. First, how large of a toll will the recent drops in humanitarian assistance (see Figure 18) due to donor fatigue have on the humanitarian situation in Yemen? We were able to analyze a portion of this change beginning in 2020. However, we were unable to estimate the impact on other forms of emergency assistance given data scarcity, and these other changes could also amount to significant harm. Additionally, the decline could begin to accelerate, causing larger and more widespread cuts to all existing humanitarian programs. The changes analyzed here might extrapolate poorly to more extreme circumstances.

Second, one of the key criticisms of the humanitarian response over the past eight years of the conflict has been that it has sustained life but done little to try and build resilience to the conflict and lessen dependence on emergency assistance. Humanitarian and development partners have begun developing a plan to try and rectify this, most recently described in the World Bank's Country Engagement Note as the Continuum of Support (e.g., World Bank 2022b). The key idea is to provide a range of support to the most at-risk households to enable them to live productive lives, as opposed to make sure that they have enough food to eat in any given month. Depending on the household and region, these bundled

⁵⁶ These figures on food prices average all food items that are available monthly since 2016 with equal weights in the WFP global food price database- wheat, potatoes, tomatoes, oil, kidney beans, sugar, and onions. The results are similar when weighting food items by their share in the average diet. For more details, see Favari et al. (2021).

forms of assistance can include emergency humanitarian assistance, better access to health care, income-generating opportunities, and to improve key basic services, such as sanitation. The success of this approach, or others, could be pivotal to improving the humanitarian emergency in Yemen, particularly in light of significant donor fatigue and cuts to humanitarian support for the country.

Third, it is difficult for evaluations of the humanitarian response in Yemen to fully incorporate all the wide-ranging impacts the humanitarian response might be having on the country. For example, the large humanitarian and development response in the country generates substantial demand for economic services from the private sector. Examples include reliance on the private sector to distribute food assistance across the country (e.g., WFP 2015); and the use of banks to distribute large cash transfers programs and the need of local survey firms to perform monitoring and evaluation for the many humanitarian and development programs currently operating in the country (e.g., UNICEF 2020b). Additionally, the humanitarian response also relies on a large number of local staff in the country in addition to the international staff based in Sana'a (e.g., OCHA 2021).

The increased reliance on the private sector to deliver such a large array of emergency assistance, especially when coupled with such a large reduction in other economic activity, has likely had strong impacts on the Yemeni economy. Although it is unclear how much of the value of the humanitarian response is spent in Yemen, with much of the in-kind assistance potentially procured outside of Yemen and with large overhead expenses to run a likely costly humanitarian hub in a conflict zone, the increased demand for goods and services likely supports a number of Yemeni businesses and households. In other settings, a significant foreign presence in a humanitarian emergency has led to significant welfare gains amongst both businesses and the population (e.g., Afghanistan Ministry of the Economy and World Bank 2017). Further analysis of these impacts and other indirect effects of the large humanitarian response would help to fully characterize the overall impacts of the humanitarian response.

And lastly, it is difficult to evaluate the efficacy of many of the other projects currently operating in Yemen aside from emergency food assistance. One of the key reasons is that there are significant limitations being placed on the monitoring of projects.⁵⁷ Although the limitations on monitoring vary from project to project, there are often strict limitations on sharing beneficiary information beyond the implementing partners on the ground in Yemen (usually UN agencies), limitations on sharing the raw third party monitoring data beyond the implementing partners, approval is needed for questionnaires for all third party monitoring, and there are strict limitations on using beneficiary information for independent monitoring and for analyzing the efficacy of programs.⁵⁸

In this environment, in order to properly evaluate the impact of other projects, it is necessary to repeat the analysis illustrated above with WFP in-kind food assistance. Specifically, one would need to independently identify a large number of randomly chosen recipients of each program through remote survey modalities, such as phone surveys. Once reached, summary statistics from a simple survey instrument can provide useful information about the how well the targeting of the program is being carried out and can further potentially identify other implementation problems that might not have been identified in third party monitoring. And lastly, one can track the change in key welfare measures, such as access to food, in response to changes in the targeting and implementation of projects.

Such an approach could potentially work with large programs that reach a large number of beneficiaries across the country. Examples include the Emergency Crisis Response Project (ECRP) jointly run by U.N. Agencies and the World Bank, where previous random digit dialing surveys conducted by the Poverty & Equity team found that approximately 18 percent of respondents actually were recipients of the Cash Transfers program as part of the ECRP; and a similar approach can be followed with the Emergency Health and Nutrition Project (EHNP) jointly run by U.N. Agencies and the World Bank, where one can ask exactly where households might have received

57 For a full description of these difficulties, see Section 9.

58 Information obtained through detailed conversations with both the Task Team Leaders for the Emergency Crisis Response Program led by the Social Protection & Jobs Global Practice of the World Bank and the Emergency Health and Nutrition Project co-led by the Health Global Practice of the World Bank.

medical care and try to match that to lists of health centers supported by the project.

Large changes to projects over time could be evaluated in repeated survey rounds and identify both potential implementation issues and ultimate impacts on household outcomes. Alternatively, if some of the projects large enough to be evaluated were included in the Continuum of Support, we could begin to ask households if they received additional bundled benefits in targeted regions and compare household outcomes of recipients of the bundles to households in regions that were not targeted in the program.

Although these databases of participants in other large assistance programs do not currently exist outside of the beneficiary data that is not able to be shared, the Poverty & Equity team is beginning to create such databases in new household surveys that we are fielding. Beginning to monitor beneficiaries in the ways described above has two benefits. First, it would allow a truly independent monitor of the third-party monitoring that is being done of existing projects. Second, such analyses could help to prioritize scarce aid dollars in Yemen's conflict, which is becoming even more critical given the declining levels of assistance for the conflict in Yemen.

For more details, see:

Favari, E., M. Geiger, S. Krishnaswamy, and S. Tandon. 2021. "The 2020 Food Security Crisis in Yemen." Report, World Food Programme and World Bank. [Link](#).

Tandon, S. and T. Vishwanath. 2021. "How Well is Humanitarian Assistance Targeted? Evidence from the Announcement of a Food Emergency in Yemen." *Food Policy* 102, 102071. [Link](#).

SECTION

9



Difficulties in Data Collection and the Resulting Questions About the Humanitarian Situation

Throughout this report, we have documented how conditions dramatically deteriorated following the start of the conflict, and further tried to illustrate the types of shock that push the humanitarian situation closer to catastrophe. However, some of the limitations that have been placed on data collection are potentially obstructing our ability to precisely estimate how far the humanitarian situation has deteriorated, understand how exactly households are experiencing the conflict, and understand the efficacy of the humanitarian and development response.

In this section we highlight how these limitations on data collection are potentially impacting our understanding of the situation on the ground. However, it is important to stress that we are only raising questions that are impossible to fully answer as long as the limitations on data collection continue. But these are questions that are beginning to be increasingly asked of the humanitarian response (e.g., Vuylsteke 2021), and it is important to recognize how these issues could be very important to improving the humanitarian and development response in the country.

a. Significant Limitations on Face-to-Face Surveys

We first highlight how potential interference from authorities in face-to-face data collection, and the high weight placed on face-to-face assessments, might be obstructing our overall understanding of the humanitarian situation. As discussed in Section 3 above, collecting data in Yemen is very difficult. Thus, it is likely the case that no single form of data collection is ideal, and that it is important to triangulate between the variety of different surveys that are being conducted through many different modalities. However, in the course of triangulating, it is possible to place different weights on different data sources and get very different assessments of the humanitarian situation.

The most important description of the overall humanitarian situation is arguably the periodic official report produced by the Integrated Food Security Phase Classification (IPC) Technical Working Group, which,

among other things, produces the official UN estimates of the share of the population experiencing acute food insecurity or worse (e.g., IPC 2022). The official report summarizes the results of an exercise where a number of organizations jointly analyze all data sources on food access, livelihoods, and nutrition currently available in Yemen (e.g., IPC 2022).⁵⁹ In that exercise, the IPC technical Working Group has to weigh the importance of different data sources in different regions to ultimately identify each region on the IPC scale describing the severity of the food emergency.

The actual data and the details of the discussion are not released along with the report (e.g., IPC 2022)⁶⁰. However, some description of the data used is available. Prior to the 2017 IPC, the Technical Working Group had to release an IPC classification without a single face-to-face food security assessment that tried to be nationally representative following the onset of the conflict (e.g., IPC 2016). However, beginning in 2017, the IPC process was able to utilize face-to-face assessments conducted in 2016, 2019, and in 2021 as a primary input to each IPC round (e.g., IPC 2017; IPC 2018; IPC 2020; IPC 2022). But importantly, in every IPC process, all data sources, including face-to-face assessments (when available), mobile phone surveys, market surveys, key informant interviews, and all other data sources are considered.

However, in the course of the reporting of the share of the population facing acute food insecurity, there has been a substantial change to the limitations placed on data collection. Following the initial face-to-face food security assessment that began in November 2016 and before the next face-to-face assessment conducted in late 2019, the Houthis began placing significant restrictions on all data collection in Houthi-controlled regions, which accounts for at least two-thirds of the population according to population figures reported by the Central Statistical Organization of Yemen.⁶¹

Although the exact conditions placed on data collection vary from survey to survey and organization to organization, the recent household survey that the Social Fund for

Development tried to conduct with technical assistance from the World Bank included the following conditions⁶²:

- Official approval from the Houthis authorities before the survey could be fielded
- Restrictions about where and when enumerators can visit certain areas
- Time limitations on how long enumerators can spend in the household
- Additional individuals identified by the Houthis needed to accompany enumerators on interviews
- Not allowing tablets and other mobile devices to be used in the course of collecting data that can be used to help verify data quality
- Approval of all questionnaires to be fielded
- Mandating that the survey be conducted through the Central Statistical Organization of Yemen, whose chairperson is appointed by the Houthis
- Data needed to be shared with the Houthis
- Limitations on sharing the data with others

Furthermore, the conditions that were being placed on the survey changed over time and involved negotiations over the course of years. Despite years of negotiating, the team ultimately decided to abandon the household survey in Houthi-controlled regions (Aghajanian and Ghorpade 2022).

Although we cannot know the exact conditions under which the critical face-to-face food security assessments are being implemented, there is some suggestive evidence that they also face stringent conditions from authorities. First, no face-to-face assessment has publicly or privately (to our knowledge) shared summary statistics from the raw data since the 2016 assessment, which shared both national and governorate-level estimates of all key variables and was the last survey to be conducted before the stringent conditions on data collection began (e.g., FAO 2017). Rather, the assessments are being used as a critical input to the IPC process, and the ultimate IPC classification has been shared publicly as opposed to summary statistics from the face-to-face assessments.⁶³ And second, one of the unofficial reasons that the Houthis places such restrictive conditions on third

59 In other settings, mortality data is also analyzed. But in Yemen, there is no reliable mortality data available (e.g., IPC 2022).

60 The summary statistics from the 2016 Emergency Food Security and Nutrition Assessment were publicly released (e.g., FAO 2017).

61 Authors' calculation using the 2017 population projection produced by the Central Statistical Organization of Yemen.

62 For details, see Aghajanian and Ghorpade (2022).

63 For example, in one-on-one meetings with donors who funded the face-to-face assessments, the authors have been told that only the summary statistics from IRG-controlled regions have been shared from the 2019 face-to-face food security assessment.

party monitoring for some of the larger projects operating across the country is that they do not want the results to be used for evaluating the overall humanitarian situation.⁶⁴ It is troubling that authorities are likely concerned about results that could potentially validate some of the large face-to-face food security assessments and is further suggestive of significant limitations on those assessments.

The stringent conditions under which the surveys are being conducted raise two extremely important issues when it comes to data quality. First, recent innovations in household surveys have demonstrated that stringent supervision and implementation of household surveys is critical to ensuring high quality (e.g., Palaniswamy and Vishwanath 2019). However, the type of supervision that is necessary is impossible given both the ongoing conflict and the permissions needed to be granted and limited mobility of enumerators and supervisors (if allowed at all).⁶⁵

However, even more important than supervision of the data collection is that the group that is dictating terms to the survey teams potentially might benefit from the outcome of the surveys under negotiation. For example, some have suggested that individuals from the Houthis that are in charge of humanitarian operations have been profiteering from the response, and they might individually have an interest to direct assistance to one region over another or increase the overall amount of assistance (e.g., Salisbury 2018); the more humanitarian assistance that reaches Houthi-controlled regions help support struggling households and might help limit the pain being caused by the ongoing conflict and antagonism directed at the Houthis and other groups involved in the fighting; and some have demonstrated that the Houthis taxes goods and shipments crossing their line of control (e.g., International Crisis Group 2021), and it could be possible that increased amounts of assistance help to increase the opportunities for revenue that is necessary to fund the war effort. Supporting the possibility that the Houthis potentially views the humanitarian response as a potential revenue source, the Houthis threatened to levy a 2 percent tax on

all humanitarian assistance in the country before stepping back from the demand (e.g., BBC 2020).

These potential incentives associated with the outcome of critical face-to-face incentives are important because each of the conditions that were placed on the SFD-led survey described above can interfere with the sampling of the survey and bias the outcome. And following the 2016 Emergency Food Security and Nutrition Assessment, the Houthis might have learned how important that single survey was in dictating how much total assistance was provided and where it was targeted. For example, Figure 18 above demonstrated that the outcome of the 2017 IPC was highly correlated with where food assistance was primarily targeted, and the 2016 EFSNA was likely the single most critical component of that IPC report (e.g., IPC 2017). And the survey was likely brought up in the negotiation of the targeting for multiple projects beginning in 2017 and later.⁶⁶

Importantly, without being able to conduct a survey with no conditions attached, there is no way to know whether the conditions being dictated by the Houthis in Yemen are impacting the sampling and the outcome of the survey.⁶⁷ But the possibility alone warrants thorough investigation given the number of settings in which governments and households learn about the targeting of social assistance programs and then try to influence the outcome (e.g., Camacho and Conover 2011).

The IPC Technical Working Group is aware of these concerns as well and do validate face-to-face surveys that are potentially subject to political interference with those surveys that are out of the control of the Houthis. Figure 19 illustrates how the trends in the official IPC assessments correspond to the trends in the monthly WFP mobile phone survey that is conducted out of a call center in Jordan and not subject to conditions by the Houthis (e.g., WFP 2019). There is an improvement in food in both the WFP mobile phone survey and in the IPC access between 2017 and 2020, which is the latest years for which we can compare the food access estimates.

64 This was privately shared with the Poverty & Equity team by an implementing partner of one of the projects currently operating in Yemen.

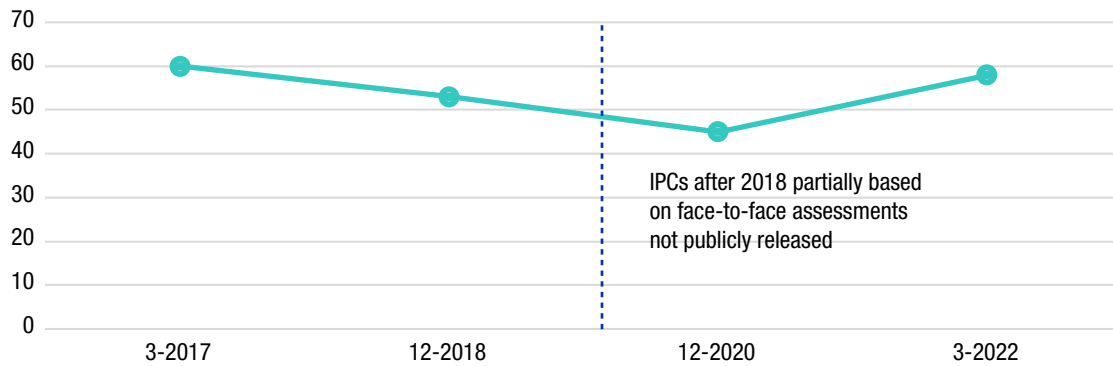
65 The Houthis are not the only group that limit access to survey teams. For example, it is often necessary to consult with militias and local leaders for access to regions that are not fully in control of the IRG in regions outside the direct control of the Houthis (e.g., EFSNA 2017).

66 For example, the Agriculture Livelihoods project jointly implemented by the World Bank and FAO used the 2017 IPC to target governorates, and the 2017 IPC critically relied on 2016 Emergency Food Security and Nutrition Assessment.

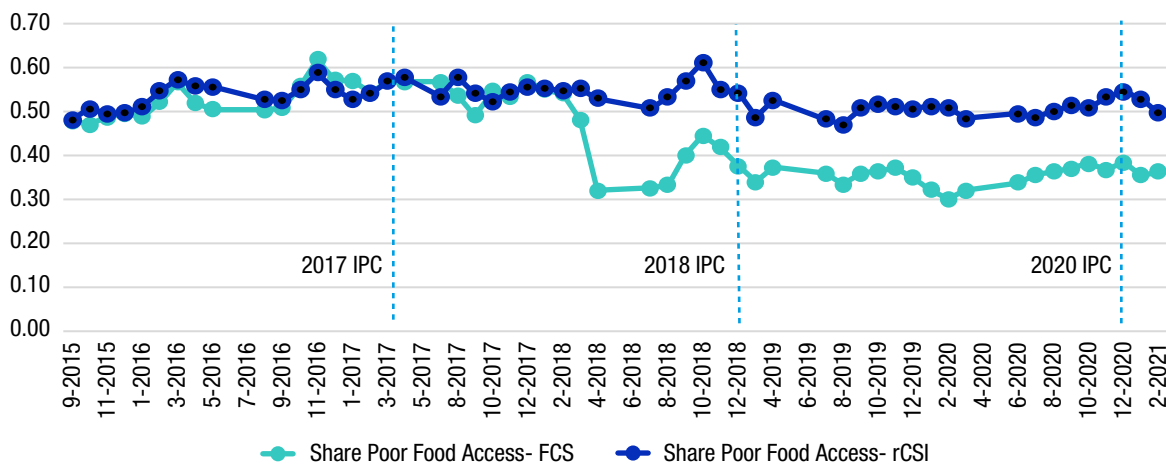
67 The Houthis often assert that individuals and organizations collecting data and information might potentially be spying as the primary reason for limits on surveys and worse (e.g., Nasser 2020). However, the Houthis were worried about spying before the 2016 EFSNA was completed with limited interference, and the limitations on surveys only began to be implemented after the Houthis would have seen how influential these face-to-face assessments are in determining humanitarian assistance.

Figure 19. Changes in Food Access by Source

a. Share of Population Experiencing Acute Food Insecurity (IPC 3 or worse)



b. Share of Households with Poor Food access- WFP Mobile Phone Survey



However, beginning with the 2020 IPC, the IPC Technical Working Group was forced to undertake the unenviable task of determining the actual share of households that are experiencing acute food insecurity or worse and how large of a decline happened since the 2017 IPC using face-to-face assessments that might have been subject to stringent conditions. Should the committee depend more so on the face-to-face assessment that might be biased? Make an adjustment to the mobile phone survey to account for the population that does not have access to mobile phones? Or should the committee do a combination of the two?

Interestingly, in 2017, when the face-to-face assessment was likely subject to little political interference, Figure 19 demonstrates that the share of the population with poor food access in the WFP mobile phone survey was similar

to the share experiencing acute food insecurity in the IPC (based on the face-to-face assessment). However, in later years, as the share of the WFP mobile phone survey with a poor or borderline FCS dropped to half of what they were in late 2016, the IPC figures were significantly above those reported in the mobile phone surveys. These results suggest that the face-to-face assessments and other information sources likely did not show as large of an improvement as the mobile phone surveys.

Unfortunately, it is difficult to precisely estimate the share of the population with poor food access in the current circumstance. And this, along with the divergence in the improvement in food access between mobile phone surveys and the IPC, are a couple of the reasons that some are questioning whether the humanitarian situation is as bad as

it is sometimes reported in humanitarian needs assessments and official UN announcements (e.g., Vuylsteke 2021).

But the discussion here illustrates that, given the current circumstances in Yemen, the humanitarian and development response could use more than reports of the key findings from data collection and analysis. In addition, it would be very helpful if all humanitarian assessments also included a detailed description of the data sources, conditions placed on data collection, supporting documentation and evidence for key conclusions, and should include adequate caveats and limitations of analyses. Without these additional pieces of information, it is very difficult to fully understand the overall humanitarian situation and potential limitations of estimates of the severity of the humanitarian crisis.

b. Significant Limitations on Questionnaires and Potential Solutions to Gather Sensitive Information

In addition to interfering in the actual sampling of surveys, the explicit and implicit limitations on the content of surveys is also limiting our knowledge of events on the ground. In particular, there has been little information collected on the way that Yemenis themselves are engaged in the conflict, feel about the conflict, and the country that Yemenis would most like to see emerge from the conflict (e.g., World Bank 2022). These topics are critical to better understand all of the many ways the conflict has impacted life in Yemen beyond more traditional welfare measures, such as trauma and the factors affecting the decision of households and individuals to engage in the conflict itself. Furthermore, these issues are critical to better understand how and when the conflict might end, and what the Yemeni population themselves might be willing to give up in order for the conflict to finally end.

There are two primary reasons these topics have not been addressed. First, the Houthis need to approve

all questionnaires and they will likely not approve a questionnaire that engages on issues too closely related to the conflict itself.⁶⁸ Second, and more importantly, Houthi forces have demonstrated since the very beginning of the conflict that they target enemies and adversaries—real and perceived—for their opinions that are contrary to the interests of the Houthis (e.g., Human Rights Watch 2016; BBC 2020; etc.). Given this environment, many people are likely hesitant to respond to particularly sensitive questions about the conflict, particularly if their opinion of the Houthis is relatively poor and they live in Houthi-controlled regions. And even if they do respond to the survey questions, they might not answer completely truthfully.⁶⁹

Given the critical importance of better understanding many conflict-related issues, we discuss potential solutions to sidestep some of these difficulties. We discuss in detail a pilot of one potential survey modality - novel internet-based surveys. We first investigate the validity of the modality relative to other survey modalities that are more widely used, and then we summarize the findings from the pilot on sensitive conflict-related topic. Lastly, as is the case with all data collection in Yemen, we discuss the need to utilize additional modalities to fully understand how the conflict is intersecting with the lives of the Yemeni population.

Using Novel Internet-Based Surveys to Address Information Gaps

In order to collect extremely complex information from Yemeni households, we need to utilize survey methodologies that are completely remote and offer anonymity for respondents. We have experimented with one such survey in Yemen of anonymous internet users. Tandon and Vishwanath (2022) investigates surveys using Random Domain Intercept Technology (RDIT), which invites internet users who reach wrong or dated web pages to complete a short and anonymous survey. Rather than responding to a live enumerator who has your contact information in a mobile phone or face-to-face interview, these surveys do not capture any identifying information

⁶⁸ As we will discuss later in this section, the Yemen Poverty & Equity team of the World Bank faced pushback on some of the questions related to the conflict, likely in part because of hesitance of survey firms to seeking approval of the questions by the Houthis.

⁶⁹ There are other potential reasons that respondents might not be willing to answer questions about the conflict truthfully. For example, fully truthful answers might be obscured by social desirability bias, where individuals might not like to admit support for groups that have been accused of human rights abuses (e.g., Fisher 1993).

about users. In such a setting, it is possible that respondents worry less about the social desirability of their answers or retribution for their opinions.

This section summarizes the results presented in Tandon and Vishwanath (2022). In this section, we highlight how different the respondents to internet-based surveys are from the overall population and from other survey modalities, and we further highlight the degree to which respondents express more accurate opinions in the internet-based surveys relative to other survey modalities that provide less anonymity. We do this by first performing the internet survey described above where we vary the sensitivity of the questions, with some questions asking about demographic characteristics and the humanitarian situation, and other questions asking about the conflict itself and who they hold mostly responsible. And second, we perform a mobile phone survey using random digit dialing that fields nearly the entire questionnaire from the internet-based survey.

The experience trying to field the same questionnaire in the mobile phone survey as the internet-based survey illustrates the need for novel survey modalities in a country like Yemen. Many of the questions that we had originally drafted for the two surveys were unable to be fielded in the mobile phone survey because they were too sensitive. These included questions about support for terrorist organizations and militias and who was most responsible for the escalation of the conflict. The two questions that we could insert in the mobile phone survey that were potentially sensitive include a question about whether violence in pursuit of a noble cause could ever be moral (potential social desirability bias), and if an individual had witnessed an episode of conflict violence, they were questioned about which group they held most responsible for the incident they had witnessed (social desirability bias and potential retribution by parties to the conflict).

The results from Tandon and Vishwanath (2022) are summarized in Figure 20 below and demonstrate that internet-based surveys could be an effective way to capture very sensitive information about peoples' involvement in and feelings about the conflict. The internet surveys are biased in the ways that one would expect relative to both the overall population and relative to respondents of the mobile phone survey. Figure 20 demonstrates that the

respondents to the internet survey were better educated than the general population and respondents of mobile phone surveys, and Figure 20 demonstrates that respondents to the internet-based survey tended to struggle less financially than respondents of the mobile phone surveys. Thus, any analysis needs to account for the over-representation of better-off households, either through proper caveating the findings or potentially through placing more weight on under-represented population in their responses.

Importantly, Figure 20 further demonstrates that the results are consistent with the internet-based surveys offering more anonymity to individuals to express opinions that might not be socially acceptable or potentially dangerous to express in more public settings. First, respondents are offered one question at a time before they receive the next question by selecting a response. If respondents were worried about their anonymity, they might be more likely to drop out when receiving a sensitive question.

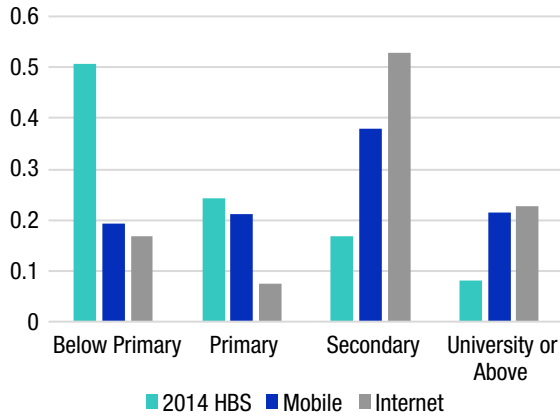
However, Figure 20 presents the share of the sample that drops out after being given a question and demonstrates that there is not a very large spike in drop offs at sensitive questions. Some sensitive questions (e.g., violence being justified) have lower attrition rates than what are likely non-sensitive questions (e.g., subjective income assessment); and although other sensitive questions have the largest attrition rates following the start of the survey (e.g., support for terrorist groups and who started the conflict), the attrition rates are only slightly above relatively benign questions.

Furthermore, Figure 20 breaks up the attrition rate by region in which the household lives and demonstrates that the attrition rate is identical at every question between Houthi and IRG-controlled regions. Given substantial differences in the sensitivity of the same questions between the regions due to the potentially larger threat posed by the Houthis (e.g., Human Rights Watch 2016; BBC 2020), the similarity between the attrition rates at all questions further suggests that other factors are potentially more important to explaining attrition rates than the sensitivity of the question, such as survey fatigue.

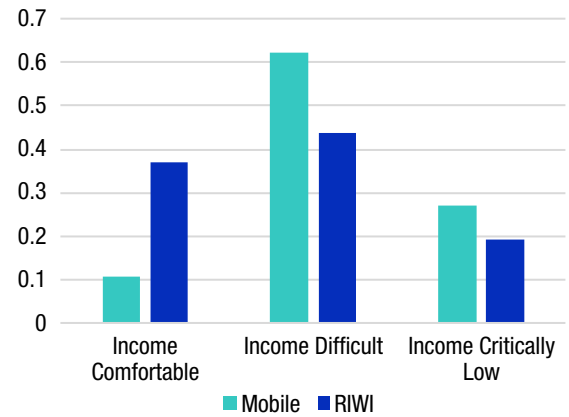
Second, for the sensitive questions that were able to be fielded in both the internet and mobile phone survey, Figure 20 demonstrates that individuals were more likely to choose the sensitive response in the internet survey

Figure 20. Comparisons of Internet-Based Surveys to Other Survey Modalities

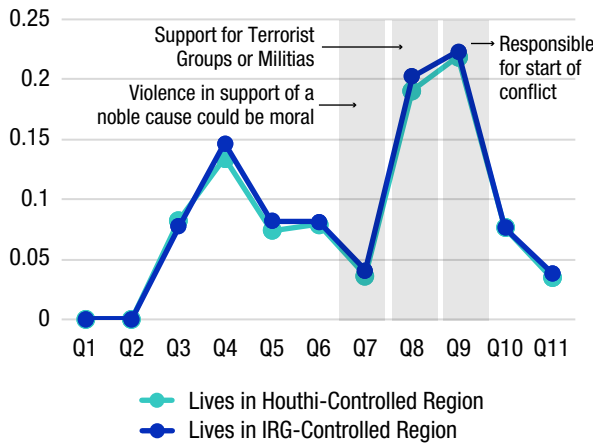
a. Highest Education Attained by Survey Modality



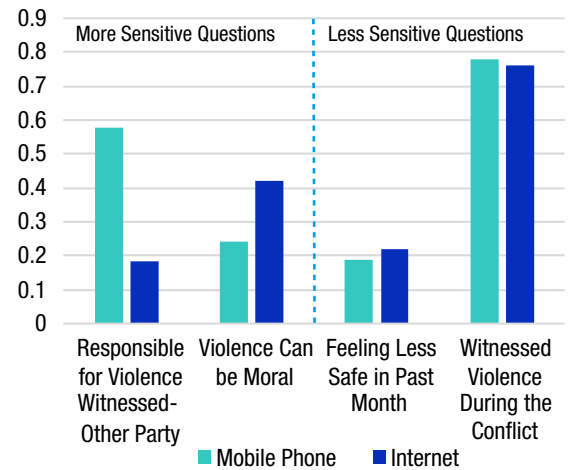
b. Share of Sample by Subjective Income Assessments



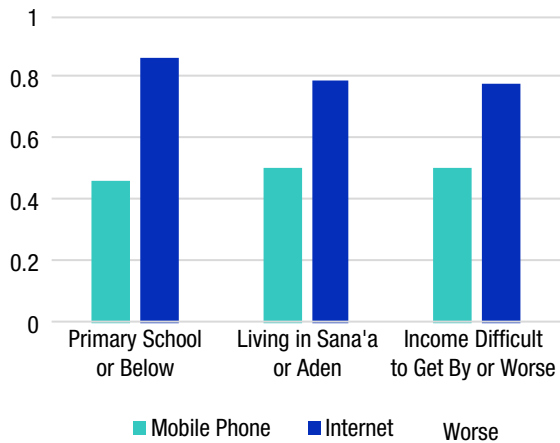
c. Share of Remaining Respondents that Drop Out by Question



d. Comparison Between Modalities for More and Less Sensitive Questions



e. Share Attributing Violence to Authorities Controlling the Territory in Which They Live



than in the mobile phone survey, regardless of whether the sensitivity is due to social desirability bias or potential retribution for political viewpoints. When asked who was most responsible for violent events the respondent had witnessed, approximately half of the mobile phone respondents were unwilling to actually name a party to the conflict, which could potentially be sensitive. However, the vast majority of respondents in the internet survey named individual parties. Similarly, when asked whether violence to pursue a noble cause could ever be morally justified, the share that answered affirmatively was twice as high in the internet-based survey (44 percent) than in the mobile phone survey.

These very large differences in choosing the potentially dangerous or the less socially acceptable option between the internet and mobile phone surveys stands in stark contrast to the differences in less sensitive questions. Figure 20 further illustrates that the answers to less sensitive questions about the conflict in the internet and mobile phone surveys were much more similar- the share that had witnessed violence during the war and the share feeling less safe in the past month. The average absolute difference between modalities for the more sensitive questions was 24 percentage points, as compared to the average absolute difference of 2.3 percentage points for the less sensitive questions.

Additionally, further illustrating that the difference in the sensitive questions between the survey modalities is not being driven by differences in the composition of the sample, the results are identical when restricting the sample of both surveys to more similar populations. Specifically, Figure 20 demonstrates that the much higher willingness to admit the sensitive option in the internet survey remains the same when restricting the sample in both the mobile phone and internet survey to those whose income were similar, only to households in Amanat al Asimah to account for a potentially more urban bias in the internet survey, and only to households with education at or below primary school.

As discussed in Tandon and Vishwanath (2022), these results are consistent with individuals being freer to share more sensitive information in novel internet surveys that afford a greater degree of anonymity than more traditional survey methodologies. Aside from being able to potentially offer a better forum for respondents to more

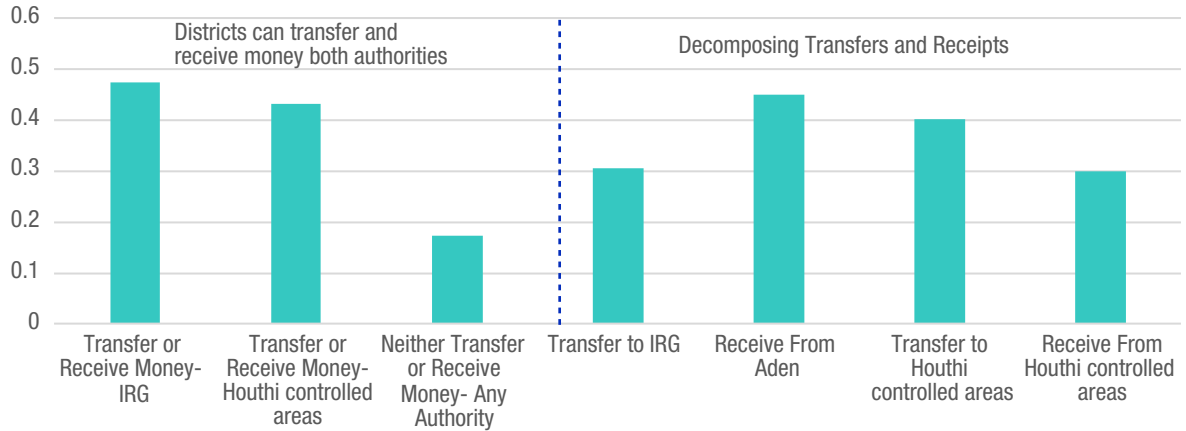
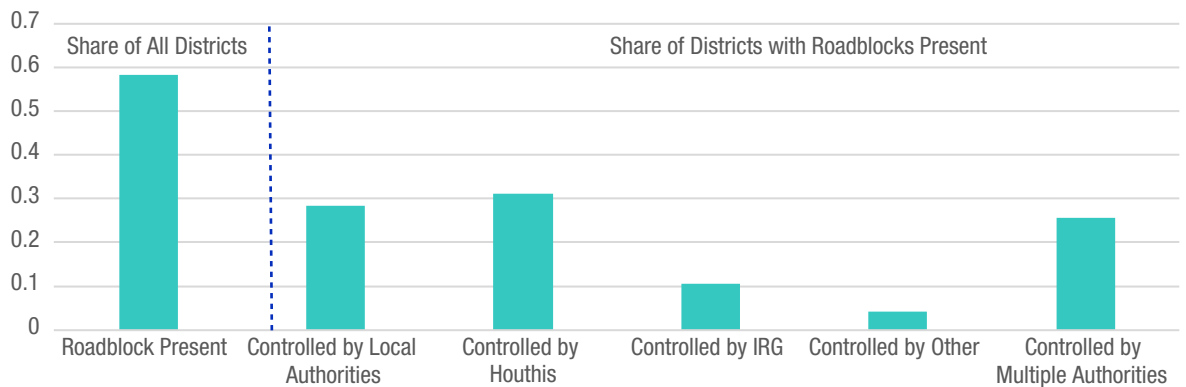
truthfully express their opinions, in the case of Yemen, the internet-based survey is one of the very few forums where it is possible to even ask some pieces of sensitive information that cannot be fielded in more traditional modalities. Importantly, the surveys potentially offer an alternative to the indirect methods of collecting sensitive information, such as list experiments (e.g., Glynn 2013), endorsement experiments (e.g., Blair et al. 2013; Lyall et al. 2013; Fair et al. 2016), and randomized response design (e.g., Blair et al. 2015), none of which are particularly accurate in capturing sensitive information (e.g., Rosenfield et al. 2015). These results are further consistent with a handful of other results demonstrating that anonymous internet-based surveys are better able to collect sensitive information from respondents, where for example, RDIT surveys were successful at predicting the vote shares of the candidates in the 2016 U.S. presidential election (e.g., RIWI 2016).

Additionally, the similarity in non-sensitive questions between internet and mobile phone surveys further bolsters the validity of these novel types of surveys. Aside from the advantage of increased anonymity, these surveys are also cheaper than competing methodologies, are quicker to implement and field, and are also able to be implemented easier in a range of contexts to which we are physically unable to travel. Thus, when properly interpreted to account for the differences in the sample that are more likely to use the internet, there is potential to use these types of surveys more broadly than just in conflict or when inquiring about sensitive information.

More Fully Addressing Data Gaps on Conflict-Related Information

Overall, with the promising validation of some of the key benefits of internet-based surveys which grant more anonymity than traditional survey modalities, internet surveys and related survey modalities are likely an important source of information to fully understand how the conflict is impacting Yemenis. **However, as with all analysis in Yemen, no data source is perfect, and all analysis should triangulate between a wide variety of sources to arrive at the best possible understanding of conditions on the ground.**

Two additional data collection methods might potentially be useful in capturing such sensitive information. First,

Figure 21. Summary of Sensitive Conflict-Related Issues in Local Government Assessments**a. Revenue Sharing Between Local Governments and Authorities****b. Presence and Control of Roadblocks**

as has been discussed above, the Poverty & Equity team from the world bank has performed quantitative surveys of local governments. In those surveys, we have asked about important conflict-related information, such as municipal revenue sharing with each of the two major authorities in the country and the presence of roadblocks and the groups controlling them. The results of these questions can help to better map out lines of control between the two authorities, helps to shed light in part on how some of the war effort is funded, and can further illustrates the ways in which control of territory is impacting Yemenis. The results are highlighted in Figure 21 and illustrate a wide range of both revenue sharing between districts and both the Houthi controlled areas and IRG, as well as the large number of roadblocks interrupting daily life being operated by a wide variety of participants to the conflict.

However, these types of surveys could potentially be used for much more than just these two questions. Questions could address impacts of the conflict on populations that do not have access to the internet or mobile phones to complement information obtained through other survey modalities and could better address the way that institutions might be involved in the conflict. Furthermore, the surveys could be targeted at a wide range of knowledgeable respondents beyond local governments, such as important businesses and community activists.

Furthermore, in addition to quantitative surveys of knowledgeable and influential individuals across the country, key informant interviews about a wide range of conflict-related issues could be effective at gathering more conflict-related information. In other settings, key

informant interviews have extensively covered such issues when investigating the state of education in Yemen (e.g., Almoayad et al. 2020) and when investigating the state of the economy and economic activity (e.g., World Bank 2022). In the case of sensitive information that cannot be officially collected in more traditional modalities, key informant interviews delving deeper into topics identified in non-traditional internet-based and other quantitative surveys becomes even more important.

Combined, the most straightforward way to collect critical but sensitive information related to the conflict is through a variety of non-traditional surveys. Additional and exhaustive internet-based surveys can help to validate some of the preliminary patterns described above in Figure 20, illustrate how these things might have changed over time, and delve much deeper in how people feel about and participate in the conflict. Furthermore, a variety of key informant surveys and interviews can further corroborate some of these findings, highlight important nuances that might be difficult to capture in quantitative surveys, and to investigate whether the patterns might generalize to populations less represented by internet and mobile phone surveys. However, regardless of exactly how data gaps on sensitive information surrounding the conflict are filled, it is critical to humanitarian and development response to better understand how Yemenis honestly feel without the filter of authorities and social acceptability.

For more details, see:

Tandon, S. and T. Vishwanath. 2022. “Capturing Sensitive Information from Difficult-to-Reach Populations: Evidence from Novel Internet-Based Surveys in Yemen.” Policy Research Working Paper WPS10179, World Bank. [Link](#).

SECTION

10



Conclusion and Key Implications

This report has tried to summarize what we know about how and why well-being has changed throughout the conflict. Great attention has been paid to food security for both its critical importance in the current humanitarian situation, and its ability to proxy for more standard well-being measures like monetary poverty in a variety of settings. However, to the degree that data allows, we also investigated how and why well-being changed in multiple welfare dimensions, and we also highlighted how the needs of a particularly disadvantaged group- internally displaced households- changed as the conflict evolved. Lastly, the analysis focuses on difficulties in data collection that limit our ability to fully understand the overall humanitarian situation in the country and also critical ways in which the conflict affects the Yemeni population.

There are many implications of each of the primary findings highlighted in this report, all of which are discussed in detail in the working papers and publications on which this work is based. However, in synthesizing all of the available information as we have above, there are two primary implications that are larger than any individual analysis.

First and foremost, sharing data and jointly analyzing shared data enriches the knowledge base of the entire

humanitarian and development response. Although the report describes data that spans official nationally representative household surveys used for national accounts and poverty measurement, mobile phone surveys, face-to-face food security assessments, market surveys, local government surveys, novel internet-based surveys, and key informant interviews, **much of the analysis focuses on monthly mobile phone surveys performed by the WFP for the purpose of updating food security targeting.**

But as illustrated above, the surveys have provided **critical information far beyond just-in-time food security monitoring.** The high-frequency of the survey allows a much more thorough understanding of which shocks are particularly harmful to well-being in an environment where every shock is often portrayed as equally devastating (e.g., OCHA 2021); adding simple modules on other welfare dimensions helped us to better understand how access to essential services are impacted by shocks to affordability, shocks to availability, and by shocks that are specific to each sector; simple displacement modules turned out to track displaced households in a way that has never been done before to our knowledge; and we were able to demonstrate the degree to which the humanitarian response is critically supporting the population by providing an estimate of how much food access declines when the frequency of food assistance is cut in half.

Many of these critical findings were jointly discovered by WFP and the World Bank while analyzing a subset of the data collected by WFP. Expanding the joint analysis beyond the monthly WFP monitoring survey and further expanding the list of collaborators, especially from a diverse set of backgrounds and needs, might even yield additional benefits. Such joint efforts ensure that data that is very expensive to collect in terms of both money and time, is utilized to the fullest extent to better serve the Yemeni population.

Furthermore, there are other very important data sources being collected and used by a number of organizations that could yield significant benefits to the entire humanitarian and development response. A number of face-to-face assessments beyond the food security assessments described here have been conducted in the past year (e.g., IOM, SFD, etc.) that could provide critically important information to agencies deciding where and how to allocate scarce resources. Additionally, an array of administrative data for large humanitarian projects, such as those used in the Emergency Crisis Response Project jointly being implemented by U.N. agencies and the World Bank, could help inform each and every project being implemented in Yemen; and data used in monitoring and evaluation being conducted separately for many projects, often by the same firms in Yemen, could be jointly analyzed to offer insights that might be greater than any individual M&E report.

Beyond sharing data that has been or continues to be collected, better coordinating data collection across agencies could result in improved efficiency by reducing duplication and freeing up resources to collect data on underexplored issues. For example, in the many face-to-face assessments that have already happened or that are planned to be fielded in the near future, the number of surveys needed could potentially be reduced if organizations collaborated on the survey instrument and shared the resulting data.

There are certain restrictions that prevent the sharing across organizations for some of these data sources, particularly the administrative and monitoring and evaluation data; and there are limitations to the degree that organizations can collaborate on data collection. **However, more of an effort to share data and coordinate data collection could further results in a significantly improved humanitarian and development response.**

But in addition to demonstrating the importance of data sharing and coordination, the collection of findings described above highlights a second key finding. **Just as it is important for individual analyses to triangulate between multiple data sources, the analysis above highlights the need for performing more triangulation between analyses to draw more definitive findings on bigger-picture issues.**

Yemen is a truly unique context where each data source is likely critically flawed individually and is also a context where many strong conflict-related shocks are happening at any single point in time, and thus it is often difficult to definitively point to the impact of a single shock. Thus, a greater weight should be placed on findings that generalize across many data sources and many experiments to ensure that neither data issues or other contemporaneous shocks are obscuring the true impact of particular events.

For example, through the many shocks that continually repeat themselves in Yemen, we are getting a better idea of which shocks tend to have particularly important impacts on the severity of the humanitarian situation. The repeated instances of spiking food prices leading to rapidly declining food access, over both periods with very few other conflict-related shocks and over periods with many other conflict-related shocks, points to the critical importance of food prices to the humanitarian situation; and the repeated instances where surges in conflict violence seem to have limited impacts on food access suggest more careful analyses of influential acts of violence might be needed.

However, in addition to triangulating between multiple analyses of the impacts of individual types of shocks, **these findings should further be triangulated with other findings on the great uncertainty in the overall severity of the humanitarian situation.** For example, the 2018 currency crisis caused a surge in the share of households with poor or borderline Food Consumption Scores in the monthly WFP survey. But what is less highlighted is that the share of overall households with poor food access as measured by the FCS at the peak of the 2018 currency crisis was still 20 percentage points lower than the peak in the WFP survey approximately two years prior and just after the significant decline in government salaries; and that the share of households with a low or medium Reduced Coping Strategy Index at the peak of the 2018 crisis is similar to the share two years before at the same time the FCS peaked.

Importantly, when interpreting each of these findings within the broader uncertainty on the humanitarian situation, it would help the analytical agenda focus more attention on first-order issues that most need attention.

It is far from an either-or proposition, but in the context of the food security crisis that began in 2020, much of the analytical works focused on reigning in food prices by looking at supply chains, the private sector, and so forth (e.g., ACAPS 2020; etc.). Each of these are critically important issues. However, there was relatively little attention on trying to better place the severity of the crisis relative to other points in the conflict. Although the 2022 IPC put an official estimate on the share of households that were experiencing acute food insecurity, there was

little transparency on all of the many issues that might obstruct a good estimate in Houthi-controlled regions and investigation of how to try and arrive at a more precise estimate given those conditions (IPC 2022).

By double and triple-checking individual findings and interpreting them in a broader context, the analytical agenda can help offer more guidance to operational teams that are in critical need of how to prioritize and target scarce resources. As mentioned many times throughout the report, as donor funds for the crisis in Yemen might continue to dry up as the conflict has almost reached its eighth year, it is becoming increasingly important to more effectively use the resources that are available.

References:

- ACAPS. 2020. "Yemen Food Supply Chain." Report, ACAPS, Amman, Jordan.
- ACLED. 2022. "Research Hub: War in Yemen." Report, Armed Conflict Location Event Database, <https://acleddata.com/research-hub-war-in-yemen/>.
- Adhikari, P. 2013. "Conflict-Induced Displacement: Understanding the Causes of Flight." *American Journal of Political Science* 57, 82-89.
- Adjognon, G., J. Bloem, and A. Sanhoh. 2021. "The Coronavirus Pandemic and Food Security: Evidence from Mali." *Food Policy* 101, 102050.
- Afghanistan Ministry of the Economy and World Bank. 2017. "Afghanistan Poverty Status Update: Progress at Risk." Report, Afghanistan Ministry of the Economy and World Bank, <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/667181493794491292/afghanistan-poverty-status-update-progress-at-risk>
- Aghajanian, A., S. Almoayad, M. Benzidia, E. Favari, K. Garber, R. Hasan, T. Hasumi, L. Horezeanu, S. Krishnaswamy, M. Ranzani, and S. Tandon. 2022. "Estimating Access to Health Care in Yemen Utilizing Household and Facility-Level Data." Report, World Food Programme and World Bank.
- Aghajanian, A and Y. Ghorpade. 2022. "Yemen Human Development Survey- Report." Report, World Bank.
- Almoayad, S., E. Favari, S. Halabi, S. Krishnaswamy, A. Music, and S. Tandon. 2020. "Using Remote and Non-Traditional Data Collection to Better Understand the Current State of Education in Yemen." Report, World Food Programme and World Bank. <https://reliefweb.int/report/yemen/education-yemen-utilizing-remote-and-non-traditional-data-collection-better-understand>.
- Almoayad, S., E. Favari, S. Halabi, S. Krishnaswamy, A. Music, and S. Tandon. 2020b. "Active Conflict and Access to Education: Evidence from a Series of Conflict-Related Shocks in Yemen." Policy Research Working Paper WPS9330, World Food Programme and World Bank.
- Amare, M., K. Abay, L. Tiberti, and J. Chamberlin. 2021. "COVID-19 and Food Security: Panel Data Evidence from Nigeria." *Food Policy* 101, 102099.
- BBC. 2014. "How Yemen's Capital Sana'a Was Seized by Houthi Rebels." Report, BBC, <https://www.bbc.com/news/world-29380668>.
- BBC. 2020. <https://www.bbc.com/news/world-middle-east-51502992>
- Ballard, T., A. Kepple, and C. Cafiero. 2013. "The Food Insecurity Experience Scale: Developing a Global Standard for Monitoring Hunger Worldwide." Technical Paper, Food and Agriculture Organization of the United Nations, Rome.
- Barrett, C. 2010. "Measuring Food Insecurity." *Science* 327 (5967), 825-828.
- Beaman, L., H. Onder, and S. Onder. 2022. "When do Refugees Return Home? Evidence from Syrian Displacement in Mashreq." *Journal of Development Economics* 102802.
- Behrman, J. and A. Deolalikar. 1989. "Is Variety the Spice of Life? Implications for Calorie Intake." *Review of Economics and Statistics* 71 (4), 666-672.
- Berman, E., J. Felter, J. Shapiro, and E. Troland. 2013. "Modest, Secure, and Informed: Successful Development in Conflict Zones." *American Economic Review* 103 (3), 512-517.
- Berman, E., J. Shapiro, and J. Felter. 2011. "Can Hearts and Minds Be Bought? The Economics of Counterinsurgency in Iraq." *Journal of Political Economy* 119 (4), 766-819.
- Blair, G., C. Fair, N. Malhotra, and J. Shapiro. 2013. "Poverty and Support for Militant Politics: Evidence from Pakistan." *American Journal of Political Science* 57, 30-48.
- Blair, G., K. Imai, and Y. Zhou. 2015. "Design and Analysis of Randomized Response Technique." *Journal of American Statistical Association*, 110 (511), 1304-1319.
- Blattman, C. and E. Miguel. 2010. "Civil War." *Journal of Economic Literature* 48 (1), 3-57.
- Bohra-Mishra, P., and D. Massey. 2011. "Individual Decisions to Migrate During Civil Conflict." *Demography* 48 (2), 401-424.
- Camacho, A. and E. Conover. 2011. "Manipulation of Social Program Eligibility." *American Economic Journal: Economic Policy* 3 (2), 41-65.

- Chen, D. 2010. "Club Goods and Group Identity: Evidence from the Islamic Resurgence During the Indonesian Financial Crisis." *Journal of Political Economy* 118 (2), 300-354.
- Coleman-Jensen, A., M. Rabbitt, C. Gregory, and A. Singh. 2019. "Household Food Security in the United States in 2018." Economic Research Report 270, United States Department of Agriculture, Washington, D.C.
- Conflict and Environment Observatory. 2020. "Yemen's Agriculture is in Distress." Report, Hebden Bridge, West Yorks, UK. <https://ceobs.org/yemens-agriculture-in-distress/>.
- Crost, B., J. Felter, and P. Johnston. 2014. "Aid Under Fire: Development Projects and Civil Conflict." *American Economic Review* 104 (6), 1833-1856.
- Cunha, J., G. De Giorgi, and S. Jayachandran. 2018. "The Price Effects of Cash Versus In-Kind Transfers." Review of Economic Studies 86 (1), 240-281.
- D'Souza, A., E. Favari, S. Krishnaswamy, and S. Tandon. 2022. "How Does Violence Force Displacement in Active Conflict? Evidence from Yemen." Policy Research Working Paper WPS10177, World Food Programme and World Bank.
- D'Souza, A., E. Favari, S. Krishnaswamy, and S. Tandon. 2022. "Consequences of Forced Displacement: Evidence from Yemen." Policy Research Working Paper WPS10176, World Food Programme and World Bank.
- D'Souza, A., and D. Jolliffe. 2013. "Conflict, food price shocks, and food insecurity: The experience of Afghan households." *Food Policy* 42 (2013), 32-47.
- D'Souza, A. and D. Jolliffe. 2014. "Food Insecurity in Vulnerable Populations: Coping with Food Price Shocks in Afghanistan." *American Journal of Agricultural Economics* 96 (3), 790-812.
- Egel, D. 2013. "Tribal Heterogeneity and the Allocation of Publicly Provided Goods: Evidence from Yemen." *Journal of Development Economics* 101, 228-232.
- Egel, D., T. Johnston, A Rhoades, and E. Robinson 2021. "Building an Enduring Peace in Yemen- Lessons from Five Years of Rand Research." Report, The Rand Corporation, https://www.rand.org/pubs/research_reports/RRA733-1.html.
- Engel, S., and A. M. Ibanez. 2007. "Displacement Due to Violence in Columbia: A Household-Level Analysis." *Economic Development and Cultural Change* 55 (2), 335-365.
- Glynn, A. 2013. "What Can We Learn with Statistical Truth Serum? Design and Analysis of the List Experiment." *Public Opinion Quarterly* 77, 159-172.
- The Guardian. 2020. "Classifying Houthis as Terrorists Will Worsen Famine, Trump Warned." Report, <https://www.theguardian.com/world/2020/dec/13/classifying-houthis-as-terrorists-will-worsen-famine-in-yemen-trump-is-warned>.
- FAO. 2017. "Emergency Food and Nutrition Security Assessment." Report, Food and Agriculture Organization of the United Nations, Rome, Italy.
- FAO. 2020. "Using the Food Insecurity Experience Scale to Measure the Impact of COVID-19." Report, FAO, Rome. <http://www.fao.org/3/ca9205en/ca9205en.pdf>.
- FAO. 2021. "The World Can Still Contain the Impact on Global Food Security With the Right Policies." Press Release, FAO, Rome, <https://www.fao.org/newsroom/detail/ukraine-crisis-the-world-can-still-contain-the-impact-on-global-food-security-with-the-right-policies-fao-director-general-says/en>.
- Fair, C., R. Littman, N. Malhotra, and J. Shapiro. 2018. "Relative Poverty, Perceived Violence, and Support for Militant Politics: Evidence from Pakistan." *Political Science Research and Methods* 6 (1), 57-81.
- Favari, E., M. Geiger, S. Krishnaswamy, and S. Tandon. 2021. "The 2020 Food Security Crisis in Yemen." Report, World Food Programme and World Bank. <https://thedocs.worldbank.org/en/doc/70c4a9845ac4bc5f5a857cbb943054de-0280012022/original/Food-Security-Crisis.pdf>
- Fisher, R. 1993. "Social Desirability Bias and the Validity of Indirect Questioning." *Journal of Consumer Research* 20 (2), 303-315.
- Garber, K. C. Fox, M. Abdalla, A. Tatem, N. Qirbi, L. Lloyd-Braff, K. Al-Shabi, K. Ongwae, M. Dyson, and K. Hassen. 2020. "Estimating Access to Health Care in Yemen, a Complex Humanitarian Emergency Setting: A Descriptive Applied Geospatial Analysis." *The Lancet Global Health* 8 (11), E1435-E1443.

- Gebrekidan, S., and J. Saul. 2017. "In Blocking Arms to Yemen, Saudi Arabia Squeezes a Starving Population." Report, Reuters, Djibouti, <https://www.reuters.com/investigates/special-report/yemen-saudi-blockade/>.
- Ghorpade, Y. and A. Ammar. 2021. "Social Protection at the Humanitarian-Development Nexus- Lessons from Yemen. Social Protection & Jobs Discussion Paper No. 2104, World Bank.
- Headey, D. and O. Ecker. 2013. "Rethinking the Measurement of Food Security: From First Principles to Best Practice." *Food Security* 5, 327-343.
- Human Rights Watch. 2018. "Yemen: Coalition Blockade Imperils Civilians." Report, Human Rights Watch, Beirut, Lebanon, <https://www.hrw.org/news/2017/12/07/yemen-coalition-blockade-imperils-civilians>.
- Ianchovichina, E. 2017. "Subjective Well-Being Dynamics." MENA Development Report, The World Bank, Washington, D.C.
- ICG. 2017. "Brokering a Ceasefire in Yemen's Economic Conflict." Report, International Crisis Group, New York. <https://www.crisisgroup.org/middle-east-north-africa/gulf-and-arabian-peninsula/yemen/231-brokering-ceasefire-yemens-economic-conflict>.
- IMF. 2021. "Yemen- Country Data." Report, IMF, Washington D.C. <https://www.imf.org/en/Countries/YEM#countrydata>.
- IPC. 2015. "IPC Indicative Acute Food Insecurity Situation Overview in Yemen- June 2015." Integrated Food Security Phase Classification. Report, Food Security Cluster, Humanitarian Response, Yemen.
- IPC. 2017. "IPC Map of Yemen: March – July, 2017." Integrated Food Security Phase Classification. Report, Food Security Cluster, Humanitarian Response, Yemen.
- IPC. 2018. "IPC Map of Yemen: December 2018 – January 2019." Integrated Food Security Phase Classification Report, Food Security Cluster, Humanitarian Response, Yemen.
- IPC. 2020. "Acute Food Insecurity Situation October – December 2020 and Projection for January – June 2021." Integrated Food Insecurity Phase Classification Report, Food Security Cluster, Humanitarian Response, Yemen.
- IPC 2022. "Acute Food Insecurity Situation January – May 2022 and Projection for June – December 2022. Integrated Food Insecurity Phase Classification Report, Food Security Cluster, Humanitarian Response, Yemen.
- Jensen, R. and N. Miller. 2010. "A Revealed Preference Approach to Measuring Hunger and Undernutrition." National Bureau of Economic Research Working Paper 16555.
- Lain, J., S. Tandon, and T. Vishwanath. 2022. "Should the Food Insecurity Experience Scale Crowd Out Other Food Security Measures? Evidence from Nigeria." World Bank Policy Research Working Paper WPS10141, World Bank, Washington, D.C.
- Lozano-Garcia, N., G. Piras, A.M. Ibanez, and G. Hewings. 2010. "The Journey to Safety: Conflict-Driven Migration Flows in Columbia." *International Regional Science Review* 33 (2), 157-180.
- Martin-Shields, C., and W. Stojetz. 2019. "Food Security and Conflict: Empirical Challenges and Future Opportunities for Research and Policy Making on Food Security and Conflict." *World Development* 119, 150-164.
- Lyall, J., G. Blair, and K. Imai. 2013. "Explaining Support for Combatants during Wartime: A Survey Experiment in Afghanistan." *American Political Science Review* 107, 679-705.
- Martins, V., T. Florencio, L. Grillo, M. Franco, P. Martins, A. Clemente, C. Santos, M. Vieira, and A. Sawaya. 2011. "Long-Lasting Effects of Undernutrition." *International Journal of Environmental Research and Public Health* 8 (6), 1817-1846.
- Nasser, A. 2020. "In Yemen, Journalism Can be a Capital Offense." Report, Al Jazeera, <https://www.aljazeera.com/opinions/2020/12/10/in-yemen-journalism-can-be-a-capital-offense>.
- Maxwell, D., B. Vaitla, and J. Coates. 2014. "How do Indicators of Household Food Insecurity Measure Up? An Empirical Comparison from Ethiopia." *Food Policy* 47, 107-116.
- OCHA. 2016. "Yemen: 2017 Humanitarian Needs Overview." Report, United Nations Office for the Coordination of Humanitarian Affairs, Sana'a, Yemen.

- OCHA. 2017. Yemen: 2018 Humanitarian Needs Overview. Report, United Nations Office for the Coordination of Humanitarian Affairs, Sana'a, Yemen.
- OCHA. 2019. "Yemen: 2019 Humanitarian Response Plan." Report, United Nations Office for the Coordination of Humanitarian Affairs, Sana'a, Yemen.
- OCHA. 2021. "Humanitarian Needs Overview- 2021." Report, Sana'a, Yemen. https://reliefweb.int/sites/reliefweb.int/files/resources/Yemen_HNO_2021_Final.pdf
- OCHA. 2022. "Humanitarian Needs Response Plan. Report, Sana'a, Yemen. <https://hum-insight.info/plan/1077>.
- Palaniswamy, N. and T. Vishwanath. 2019. "Do Household Surveys Face a Non-Response Crisis? Not Necessarily, According to Recent Experience in Jordan." Blog, World Bank, <https://blogs.worldbank.org/opendata/do-household-surveys-face-non-response-crisis-not-necessarily-according-recent-experience-jordan>.
- RIWI. 2016. "Predicting the Vote Share in the 2016 Presidential Election." Report, RIWI, https://riwi.com/wp-content/uploads/2016/12/2016USElection_PredictionMethodology_FINALvforSite.pdf.
- Ravallion, M. 2013. "Poor, or Just Feeling Poor? On Using Subjective Data in Measuring Poverty." World Bank Policy Research Working Paper 5968, The World Bank, Washington, D.C.
- Rosenfeld, B., K. Imai, and J. Shapiro. 2015. "An Empirical Validation Study of Popular Survey Methodologies for Sensitive Questions." *American Journal of Political Science* 60 (3), 783-802.
- SMEPS. 2020. "Yemen Business Climate Survey Report 2020: Impact of Conflict and COVID-19 on Private Sector Activity." Report, Small and Medium Enterprise Promotion Service, Social Welfare Fund, Sana'a, Yemen. https://smeps.org.ye/upfiles/posts/SMEPS_File_17-12-2020-8842.pdf.
- Salisbury, P. 2014. "Yemen Suicide Attack Kills Dozens." Report, The Guardian, <https://www.theguardian.com/world/2014/oct/09/yemen-suicide-attack-kills-20>.
- Salisbury, P. 2017. "Yemen's War Profiteers Are Potential Spoilers of the Peace Process." Report, Sana'a Center for Strategic Studies, Sana'a, Yemen.
- Sana'a Center. 2017. "How Currency Arbitrage Has Reduced the Funds Available to Address the Crisis." Report, Sana'a Center for Strategic Studies, Sana'a, Yemen.
- Sharma, D. and M. Wai-Poi. 2019. "Arrested Development: Conflict, Displacement, and Welfare in Iraq." Report, World Bank, <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/914571554209012533/arrested-development-conflict-displacement-and-welfare-in-iraq>.
- TFPM. 2016. "Press Release." Task Force for Population Movement, Sana'a, Yemen, <https://reliefweb.int/sites/reliefweb.int/files/resources/Press%20Release%20UNHCR%20IOM%2019.08.16%20Yemen%20Displacement%20Report%20Arabic.pdf>.
- TFPM. 2017. "Yemen: TFPM – 14th Report." Report, IOM and UNHCR, Sana'a, Yemen, <https://reliefweb.int/report/yemen/yemen-task-force-population-movement-tfpm-14th-report-may-2017-enar>.
- TFPM. 2019. "Yemen: Task Force for Population Movement, 17th Report." Report, Task Force for Population Movement, Sana'a, Yemen, <https://reliefweb.int/report/yemen/yemen-task-force-population-movement-tfpm-17th-report-august-2018>.
- Tandon, S. 2019. "When Rebels Attack: Quantifying the Impacts of Capturing Territory from the Government of Yemen." *World Bank Economic Review* 33 (2), 328-352.
- Tandon, S. 2022. "Are Subjective Questions on Welfare Appropriate During Crises? Evidence from the Onset of Conflict in Yemen. Policy Research Working Paper WPS10178, World Bank, Washington D.C.
- Tandon, S. and M. Landes. 2015. "Coping Strategies in Response to the Global Food Price Crisis: Evidence from India." Economic Research Report 189793, Economic Research Service, USDA.
- Tandon, S. and T. Vishwanath. 2020. "The Evolution of Poor Food Access Over the Course of the Conflict in Yemen." *World Development* 130, 104922.
- Tandon, S., and T. Vishwanath. 2021. "How Well is Humanitarian Assistance Targeted? Evidence from the Announcement of Famine-Like Conditions in Yemen." *Food Policy* 102, 102071.

- Tandon, S. and T. Vishwanath. 2022. "Capturing Sensitive Information from Difficult-to-Reach Populations: Evidence from Internet-Based Surveys in Yemen." World Bank Policy Research Working Paper WPS10179, World Bank.
- Tanner, J., H. Muger, D. Tabasso, Maja Lazic, and B. Gillsater. 2021. "Answering the Call: Forcibly Displaced During the Pandemic." JDC Paper Series on Forced Displacement No. 2, World Bank-UNHCR Joint Data Center on Forced Displacement. https://www.jointdatacenter.org/wp-content/uploads/2021/08/ANSWERING-THE-CALL_-FDP-paper-series-2_final.pdf.
- Tilman, B. and M. d'Errico. 2019. "Food Security and Violent Conflict." *World Development* 117, 167-171.
- UNICEF. 2020. "Yemen Sees Return to Alarming Levels of Food Insecurity." Press Release, UNICEF, New York, USA.
- UNICEF. 2020b. "Yemen Emergency Crisis Response Project Fifth Additional Financing." Report, New York. https://www.unicef.org/yemen/media/4591/file/Yemen%20ECRP_AF5_Social%20Impact%20Assessment.pdf
- UNICEF. 2021. "Education Disrupted: Impact of the Conflict on Children's Education in Yemen." Report, UNICEF. <https://www.unicef.org/yemen/media/5546/file/EDUCATION%20DISRUPTED%20Report.pdf>.
- United Nations. 2017. "Amid Humanitarian Funding Gap, 20 Million People across Africa, Yemen at Risk of Starvation, Emergency Relief Chief Warns Security Council." Press Release, United Nations, New York, USA.
- United Nations. 2019. "Humanitarian Crisis in Yemen Remains the Worst in the World, warns UN." Report, United Nations News.
- United Nations. 2020. "UN humanitarian office puts Yemen war dead at 233,000, mostly from 'indirect causes.'" Report, United Nations News, <https://news.un.org/en/story/2020/12/1078972>.
- United Nations. 2020b. "The Impact of COVID-19 on Food Security and Nutrition." Policy Brief, United Nations, Geneva. <https://www.tralac.org/documents/resources/covid-19/3813-the-impact-of-covid-19-on-food-security-and-nutrition-un-policy-brief-june-2020/file.html>.
- United Nations. 2022. "Global Food Prices Rose Sharply in 2021." Report, UN News, the United Nations, <https://news.un.org/en/story/2022/01/1109212>.
- Verwimp, P., and J. Maystadt. 2015. "Forced Displacement and Refugees in Sub-Saharan Africa: An Economic Inquiry." World Bank Policy Research Working Paper 7517, World Bank, Washington, D.C.
- Vuylsteke, S. 2021. "When Aid Goes Awry: How the International Humanitarian Response is Failing Yemen." Report, the Sana'a Center, Sana'a, Yemen. <https://sanaacenter.org/reports/humanitarian-aid>.
- WFP. 2012. "The State of Food Security and Nutrition in Yemen, 2012." Comprehensive Food Security Survey, World Food Programme, Rome, Italy.
- World Food Programme. 2015. "Logistics & Emergency Telecommunications Augmentation and Coordination to Support Humanitarian Operations in Yemen." Standard Project Report, Sana'a, Yemen. <https://docs.wfp.org/api/documents/29c48b562f67467db38cd0ea3eaabd2/download/>
- WFP. 2016. "Comprehensive Food Security and Vulnerability Analysis: the Gambia." Report, WFP, https://documents.wfp.org/stellent/groups/public/documents/ena/wfp290335.pdf?_ga=1.160870718.229849155.1477335736.
- WFP. 2017. "Yemen mVAM Bulletin, March 2017." Report, World Food Programme, Cairo, Egypt, https://vam.wfp.org/sites/mvam_monitoring/yemen.html.
- WFP. 2018. "World Food Programme Chief Appeals for Peace in Yemen as Agency Plans Major Scale-Up of Food Aid." News Release, World Food Programme, Rome, Italy.
- WFP. 2019. "Yemen mVAM Bulletin, March 2019." Report, World Food Programme, Cairo, Egypt, https://vam.wfp.org/sites/mvam_monitoring/yemen.html.
- WFP. 2020. "World Food Programme Chief Warns of Looming Famine as Yemen Faces Countdown to Catastrophe." News Release, World Food Programme, Rome, Italy.
- WFP. 2020b. "Yemen mVAM Bulletin, December 2020." Report, World Food Programme, Cairo, Egypt, https://vam.wfp.org/sites/mvam_monitoring/yemen.html.

- WFP. 2022. “Yemen Food Security Update.” Report, World Food Programme, Sana’a, Yemen, <https://reliefweb.int/report/yemen/wfp-yemen-food-security-update-february-2022>.
- Wiggins, S., S. Levine, M. Allen, M. Elsamahi, V. Krishnan, I. Mosel, and N. Patel. 2021. “Livelihoods and Markets in Protracted Conflict: A Review of Evidence and Practice.” SPARC Knowledge Report, Supporting Pastoralism and Agriculture in Recurrent and Protracted Crises (SPARC). <https://www.sparc-knowledge.org/node/51/printable/pdf>.
- Williams, N. 2008. “Betting on Life and Livelihoods: The Role of Employment and Assets in the Decision to Migrate during Armed Conflict.” Population Studies Center Research Report 09-679, University of Michigan, Ann Arbor, Michigan.
- World Bank. 2015. “Republic of Yemen: Unlocking the Potential for Economic Growth. Country Economic Memorandum, Washington, D.C. <https://openknowledge.worldbank.org/handle/10986/23660>.
- World Bank. 2017a. “Yemen Poverty Notes.” Report, Washington, D.C. <https://www.worldbank.org/en/country/yemen/publication/yemen-poverty-notes-june-2017>.
- World Bank. 2017b. “Forcibly Displaced: Toward a Development Approach Supporting Refugees, the Internally Displaced, and their Hosts.” Report, World Bank, Washington, DC. <https://openknowledge.worldbank.org/handle/10986/25016> License: CC BY 3.0 IGO.
- World Bank. 2018. “Securing Imports of Essential Food Commodities to Yemen.” Report, World Bank, Washington, D.C., USA.
- World Bank. 2018b. “Poverty and Shared Prosperity 2018: Piecing the Puzzle Together.” Report, World Bank, <https://www.worldbank.org/en/publication/poverty-and-shared-prosperity-2018>.
- World Bank. 2020. “Updated Dynamic Needs Assessment for Yemen.” Report, Washington, D.C. <https://www.worldbank.org/en/country/yemen/brief/updated-dynamic-needs-assessment-for-yemen>.
- World Bank. 2020b. “High-Frequency Mobile Phone Surveys of Households to Assess the Impacts of COVID-19 (Vol. 5): Overview of the Questionnaire Template.” Report, World Bank, Washington, D.C. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/908001588697965879/overview-of-the-questionnaire-template>.
- World Bank. 2020c. “Macro-Poverty Outlook- The Republic of Yemen.” Report, World Bank, Washington, D.C., USA.
- World Bank. 2020d. “COVID-19: Remittance Flows to Shrink 14 Percent by 2021.” Press Release 2021/054/SPJ, World Bank, Washington, D.C., USA.
- World Bank. 2021. “Human Capital Umbrella Program Annual Report 2021.” Report, World Bank, Washington, D.C. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/661211647840768360/human-capital-umbrella-program-annual-report-2021>.
- World Bank. 2022. “Glimmers of Hope During Dark Times- Country Economic Memorandum for the Republic of Yemen.” Country Economic Memorandum, World Bank.
- World Bank. 2022b. “Country Engagement Note for the Republic of Yemen.” Country Engagement Note, World Bank, <https://documents1.worldbank.org/curated/en/351911650316441159/pdf/Yemen-Country-Engagement-Note-for-the-Period-FY22-FY23.pdf>.

Appendix 1. The Monthly WFP Food Security Monitoring Survey

This report extensively utilizes the WFP monthly mobile phone survey conducted since the early months of the conflict. On average, the survey reaches approximately 4,200 households from all governorates of Yemen, except the island of Socotra.⁷⁰ The survey takes about 15 minutes to complete. Roughly 80 percent of the sample each month have previously responded to a monthly survey, and each of these households was originally reached through random digit dialing. About 20 percent of the sample of each month have never previously responded to one of the monthly surveys, and the households are also identified by random digit dialing.

The survey collects information on access to food and other basic services. In particular, the Food Consumption Score and the Reduced Coping Strategy Index are constructed for each household in each month. The survey also includes information on access to schooling, access to healthcare, livelihoods, and a module on the COVID-19 impacts. These indicators make up a multidimensional welfare measure tracked by the WFP and the World Bank between 2019 and early 2021.⁷¹

However, there are a number of caveats regarding mobile phone surveys. First, the surveys only cover households and regions with access to mobile phones. Although, this is the majority of the country, this survey cannot reach a subset of regions and households, likely with very poor access to food.^{72,73}

In addition to the issue of how mobile phone access has changed since the beginning of the conflict, there is the possibility that sample selection (i.e., non-random, non-response) could be affecting the generalizability of estimates. For example, random digit dialing phone surveys over-predict the amount of civic engagement due to differences in who is most likely to respond to a phone survey (Abraham et al. 2009). However, despite the potential difficulty, the monthly mobile phone survey is capturing trends corroborated by other sources and other population-level estimates.⁷⁴

70 The survey reached approximately 2400 households each month prior to April 2020, at which time the sample was increased to approximately 4200 per month.

71 The sample is stratified at the governorate level and weighted by the population of each governorate beginning in 2020. Prior to 2020, estimates were weighted by the share of the population that is displaced as reported by IOM and the number of mobile phones a household owns.

72 Although we are unable to estimate the share of households that do not have access to mobile phones, a more technical paper compares the number of mobile phones owned by households in the WFP mobile phone survey to the number of mobile phones owned by households in the last nationally-representative estimates in 2014 (2014 Household Budget Survey). In that comparison, it is demonstrated that in many governorates, the number of cell phones owned has largely not changed; however, in a number of governorates, the number of mobile phones has declined due to the significant migration of the population (e.g., TFPM 2017), the significant worsening of living standards in the country (e.g., OCHA 2019), and the six years that have passed since the last estimate (Almoayad et al. 2020).

73 We are also unable to document how mobile phone reception might be changing during this time as well. Although much of the country continues to have reception, there are places in which reception is severely limited (e.g., Sa'ada), and there have been reports of cell phone reception being limited at times in places with usually reliable cell phone networks (e.g., OCHA 2019).

74 For example, see Almoayad et al. (2020b).

Appendix 2. Quantitative Surveys of Local Governments

The report summarizes information obtained from surveys of local governments. Between May and November 2019, we surveyed members of district councils across Yemen about the capacity of local governments and access to key services. The surveys reached 230 of the 333 district councils- which represent approximately 80 percent of the

population. The survey includes questions about access to basic services of the majority of the population, availability of a wide variety of critical services with much more details provided about supply-side problems with primary schools and health centers, questions about public finance, and questions about roadblocks.

