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QUANTIFYING THE IMPACTS OF CAPTURING TERRITORY FROM THE GOVERNMENT IN THE REPUBLIC OF YEMEN

Sharad Tandon

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ABSTRACT

This paper estimates the welfare change arising from the capture of the Republic of Yemen`s capital in 2014, using a multi-themed household survey conducted as the capital was captured. Despite the little violence in this setting, the increase in fragility resulted in a large decline in household welfare driven by both a decline in income and an increase in food prices. Beyond traditional welfare metrics, women were affected by the fragility more so than men, where there was a nearly universal drop in women's decision-making ability that did not differ based on a woman's bargaining position in the household. Furthermore, this decline in decision making was immediate, and did not continue to worsen in the months towards the end of the period when household welfare dropped the most. Lastly, the tumultuous setting had implications for individuals' ability to report their subjective welfare in accordance with their unambiguous decline in traditional welfare metrics.

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QUANTIFYING THE IMPACTS OF CAPTURING TERRITORY FROM THE GOVERNMENT IN THE REPUBLIC OF YEMEN

By Sharad Tandon*

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*The World Bank, 1818 H St. NW, Washington, D.C. 20420, USA, standon3@worldbank.org, +1-202-458-4043. I would like to thank Anna D'Souza, Benu Bidani, Ruth Hill, Sailesh Tiwari, and Tara Vishwanath for comments on ealier drafts. I would also like to thank audience members at the World Bank. All remaining errors are attributable to the author. The views expressed here are those of the authors and may not be attributed to the World Bank.

1. Introduction

Fragile and conflict settings are becoming increasingly important to poverty reduction, where the share of the world's poor living in fragile settings is expected to increase from 17 percent in 2017 to approximately 60 percent by 2030.[1] However, in some regions, conflict is already the primary driver of extreme poverty. In the Middle East and North Africa, there have been civil wars in Iraq, Libya, the Syrian Arab Republic, and the Republic of Yemen in the past decade that have profoundly affected welfare in each of these countries. The civil war in Syria has also affected the welfare of neighboring states- Lebanon and Jordan in particular- through a surge in refugees, a decline in security, and a worsening economic situation (e.g., Krishnan et al. 2017). Additionally, there has been a surge in terrorist activity since 2011 in the region in general, but the surge has disproportionately affected Iraq and Syria (e.g., Institute for Economics and Peace 2017). Of the entire Middle East and North Africa region, approximately 25 percent of the population has been exposed to these violent or disruptive shocks, and it is critical to better understand how welfare has changed amongst these populations.[2]

There are numerous articles investigating the consequences of violent conflict on economic outcomes. For example, the severity of conflict, usually measured in the number of fatalities in a region, has been shown to be negatively correlated with firm performance (e.g., Abadie and Gardeazaba 2003; Guidolin and La Ferrara 2007; Klapper et al. 2013; Singh 2013, Amodio and Di Maio 2017, etc.), aggregate economic activity (e.g., Alesina et al. 1996; Eckstein and Tsiddon 2004; Chen et al. 2008; and Cerra and Saxena 2008), and a few individual economic outcomes such as employment and income (e.g., Collier and Duponchel 2013, Ksoll et al. 2015).[3] Given the significant impacts of violent conflicts on economic activity, there has been a significant emphasis placed on job creation in fragile settings, where a number of development agencies, governments, and researchers have experimented with how to support livelihood in these settings (e.g., Blattman and Ralston 2015).

However, there are many issues that could benefit from further analysis. First, there are significant differences in the form and shape of conflicts that could be missed by measures of severity of conflicts- especially ones that focus on deaths alone. For example, of the four recent civil wars in the Middle East and North Africa, the nature of violence differs between the conflicts. Figure 1 presents estimates of average number of deaths per year during the height of each conflict, and further separates deaths by civilian versus non-civilian status. Syria and Iraq had the highest number of deaths, but the nature of the deaths were significantly different. The number of civilians killed in Iraq far outnumbers non-civilian deaths, whereas it is the opposite in Syria.

Additionally, the Republic of Yemen is a clear outlier in the small number of deaths- both civilian and non-civilian. However, the effects on Yemenis have still been dire through other means- the violence has eroded peoples earnings and contributed to the unreliable payment of public sector employees, and intermittent blockades on Yemeni ports have prevented fuel, medical supplies, and food from reaching an at-times desperate population (World Bank 2017). Thus, it is important to better understand how welfare evolves in many more types of fragile settings, including those where traditional measures of violence would indicate a low severity.

In addition to analyzing a wider range of fragile situations, it could be beneficial to to address a

[1] See (accessed March 2018): http://www.worldbank.org/en/topic/fragilityconflictviolence/overview.

[2] The share represents the sum of the populations of Iraq, Jordan, Lebanon, Libya, the Syrian Arab Republic, and the Republic of Yemen, all divided by the sum of the population of all countries in the Middle East and North Africa Region. Populations were obtained from the World Development Indicators for 2016.

[3] For a survey of the literature investigating further consequences of conflict (particluarly civil war) in the longer term, see Blattman and Miguel (2010).

wider range of household and intra-household issues more fully that have not been able to be addressed given the scarcity of data in conflict settings. Many articles are forced to rely on data sources aside from household surveys collected during conflict- such as businesses reporting after the conflict about their economic activity during the conflict (e.g., Amodiao and Di Maio 2017) and also peoples' recollection of their experiences during conflict after the situation allows the possiblity of fielding household surveys (e.g., Blattman and Annan 2010). Although these data sources have yielded many valuable insights, they could leave gaps in how households might have coped with conflict shocks and there could be biases in people's recollection of many details in such turbulent circumstances long after they have occurred.

This paper addresses some of these issues by investigating the consequences of the unexpected, quick, and mostly non-violent capture of the Republic of Yemen's capital, Sana'a, by Houthi forces in September of 2014. This setting is unique, where the capture was very quick and accomplished with little violence.[4] The non-government forces placed the president under house arrest and immediately took control of key government agencies- including those responsible for defense and finance. However, because there was little violence, and because there was little concern for many of the less prominent government agencies, the Central Statistics Office was able to complete an ongoing multi-themed household survey as planned for the remaining three months of the year. This setting allows one to analyze the degree to which the welfare and employment of households were affected by the capture, the ways in which households might have coped, and the potential different impacts the capture might have had on different household members.[5]

Given less violence than is typically associated with conflicts, one might expect there to be few impacts of the capture of the Yemeni capital relative to other conflict settings. However, the capture and the change in the rule of law did result in a decline in safety and an increase in uncertainty that potentially had an impact on people's ability to go out and seek a living and acquire goods and services necessary for a minimum standard of living. For example, although the violence in this setting had mostly ceased after the capture of Sana'a, there were reports of arbitrary detentions of civilians by Houthi forces and instances of targeted violence[6], and there was an increase in terrorist events.[7] Both of these factors might have made it more difficult for people to leave their households. In addition to the decline in safety leading to a disruption in economic activity, the prices of fresh food items and fuel significantly increased following the capture of the city (figure 2). These price changes are consistent with disruptions in supply chains, and previous research has demonstrated that high food prices were already a significant impediment to consumption even prior to the capture of the capital (e.g., WFP 2011; World Bank 2017).

The decline in safety is further corroborated by the ongoing household survey that was being conducted as the capital was captured. The survey included a subjective welfare module, which separately asked the head of the household and their spouse whether they were satisfied with security.

[4]The city was captured after a 4-day siege that was mostly centered around a military base in the northern part of the city, and abruptly ended when the internationally-recognized government ceded control of the city. See (accessed July 2017): http://www.bbc.com/news/world-29380668.

[5]Only in March, 2015, as the non-government forces marched past the capital and attempted to overtake the southern part of the country, did a coalition of Gulf states begin airstrikes to reinstate the internationally-recognized government (see (accessed July 2017): http://www.bbc.com/news/world-middle-east-29319423). Although the escalation of the conflict in 2015 and beyond also deserves analysis, the unique opportunity of exploiting the ongoing household survey was not available during that time period and the data available is consistent with data scarcity present in other conflict settings.

[6]See (accessed July 2017): https://www.hrw.org/news/2017/01/12/yemen-no-accountability-war-crimes.

[7]See (accessed July 2017): https://www.theguardian.com/world/2014/oct/09/yemen-suicide-attack-kills-20.

Following the capture of the capital, there was a significant decline in the share of households where either a household head or spouse reported to be very satisfied with security that was not observed in the rest of the country.[8] Importantly, this decline in safety might have had a worse impact on women than men, where not a single woman interviewed following the capture of the city (out of 235 total) reported to be very satisfied with security, whereas women were able to report being satisfied with other aspects of their life.

Although the household survey continued in the following the capture of the capital, the identification strategy requires the sampling of households to not dramatically change following the capture. The sampling design was such that respondents were randomized over space and time, and there should be no differences in the households surveyed in the months before and the months after the capture of the capital if the survey was conducted as planned (World Bank 2017). However, enumerators might have both consciously and unconsciously avoided more dangerous areas, which might have affected the representativeness of the sample.

Despite this potential challenge, there is little evidence that sampling was affected dramatically. The sampling was reported to have been carried out as planned- all enumeration areas and initial households to interview were selected approximately a year before the city was captured, none of the enumeration areas were replaced, and there were no reports of difficulties in completing the survey in the final quarter. Also, there is little difference in relatively fixed household characteristics between households surveyed prior to the capture to those surveyed after, corroborating the reports of the sampling not being dramatically affected.[9]

Given this setting, this paper highlights three key findings. First, despite less violence than typically seen in other conflict settings, there was a nearly immediate decline in household expenditure, wages, and food consumption, that was driven by larger and more robust declines as the length of the occupation progressed. By the third month following the capture, expenditure in Sana'a was approaching the level in the rest of the Republic of Yemen, which traditionally is much poorer than the capital (World Bank 2017). However, only relatively better off households were able to initially maintain their consumption, whereas households with worse socio-economic characteristics observed an immediate decline in expenditure.

However, in addition to the decline in household welfare, there is evidence that women fared particularly poorly in this setting. The capture of the city had adverse consequences on nearly all measures of women's empowerment reported in the survey, where women had less control over nearly all measures of spending, and this control was transferred to primarily the male household head. The decline in control over food expenditure was especially pronounced, which was also one of the areas of spending where women in Sana'a had the most control prior to the capture of the city. This decline in

[8] Prior to the capture, approximately 11.6% of households had either a head or a spouse report to be very satisfied with security; following the capture of the capital, only 1.0% of households had a head or spouse report to be very satisfied with security.

[9] Specifically, a wide variety of household characteristics are reported by month, as well as the average pre-capture means of each of the variables. Figure 3 demonstrates that the 95 percent confidence interval of each monthly estimate contains the pre-capture mean of the variable in the vast majority of instances. Of all the 95 percent confidence intervals reported (180), the pre-capture mean is contained in 96.1 percent of them (173). Importantly, of those confidence intervals that do not contain the pre-capture mean, the distance from the bound of the interval to the pre-capture mean is very small; there is no evidence that any particular variables had a large proportion of monthly confidence intervals that did not contain the pre-capture mean (the maximum for any variable is 2 of the 12 monthly confidence intervals not containing the pre-capture mean); there is little evidence that the post-capture months of October-December were contributing the majority of the instances where the pre-capture means were outside of the confidence intervals (2 of the 7 total instances were from those months); and there is little evidence that the confidence intervals were uniformly larger following the capture of the capital.

decision making is consistent with women being less able to leave the household than men due to safety concerns, where the decline in decision making was immediate and did not get worse as household expenditure significantly declined in the later months of the occupation.

This decline in reported ability to make decisions was also corroborated by observable actions. In particular, there was a significantly larger share of women who were in the household and able to answer the women's decision-making module following the capture, which is consistent with women being less able to leave the household following the capture of the city. Importantly, there is no pattern suggesting that women with better bargaining positions or women from better-off households fared better than other women, suggesting that the decline was nearly universal. Furthermore, in specifications investigating changes in employment of women, there was slight evidence of a small decline in employment, which is further consistent with women being less able to leave the household than men.

Lastly, this setting also had implications for the validity of subjective measures of welfare. The 2014 household survey in the Republic of Yemen asked both household heads and their spouses about their satisfaction with a number of dimensions of welfare (e.g., food, income, etc.). Despite the nearly universal decline in nearly all dimensions of household welfare documented above- especially in diet and wages- households failed to report less satisfaction in each welfare dimension. Rather, households reported *more satisfaction* in food consumption, while one can reject the hypothesis that there was a large and negative change in satisfaction with employment and satisfaction with income. Thus, not only were the subjective welfare measures unable to uncover the decline in more traditional reported measures of welfare (e.g., employment, wages, consumption), they estimated the incorrect sign of the welfare change in the case of food consumption. This finding is consistent with a model in which non-consumption factors, such as safety or confidence in the Houthi forces, become more salient to household satisfaction than consumption.[10]

These results are robust to two important concerns. First, one might be worried about the possibility that the poor economic conditions might have led to the capture of the city by the Houthi forces, and the above patterns are capturing this pre-existing trend (e.g., Miguel et al. 2004). However, the Houthi capture of the Republic of Yemen's capital city is a setting in which this concern is minimized. First, none of the independent variables of interest- household welfare, women's decision-making, and subjective satisfaction- were trending in the months prior to the capture of Sana'a. Only after the capital was captured did these measures begin to change. Second, some have suggested that the capture of the city could have been facilitated by powerful politicians rather than the will of the population in response to economic conditions. Although the Houthis took advantage protests in September[11], their success seems more related to the fact that the majority of the army loyal to the former president did not resist the assault.[12] This is corroborated by the fact that the Houthis fought and lost numerous wars to the government over the prior decade, but only once the army did not resist their advances were they able to achieve more success.[13]

Second, as is likely consistent with other conflict settings, the time immediately prior to the conflict

[10]This pattern could also be explained by households lying to the enumerators out of fear of the Houthi forces. However, this explanation is not consistent with the fact that household reported significantly less satisfaction with safety, which was one of the primary responsibilities of the Houthis after the capture. However, regardless of the exact cause, the measures were not changing in similar ways of more traditional welfare measures.

[11]See Al Jazeera (Accessed July 2017): http://america.aljazeera.com/articles/2014/9/25/houthi-yemen-takeover.html.

[12]See (accessed July 2017): http://www.reuters.com/article/us-yemen-security-saleh-idUSKBN0MM1MV20150326)

[13]See (accessed July 2017): http://www.aljazeera.com/news/middleeast/2014/08/yemen-houthis-hadi-protests-201482132719818986.html.

was turbulent. In particular, the government temporarily removed a large fuel subsidy for the month of August that not only supported direct consumers of fuel, but also supported the transport of goods across the country and the use of fuel as an intermediate input of production.[14] However, this temporary removal of the fuel subsidy did not appear to be driving the results. First, there was little-to-no immediate impact on all the measures of household and intrahousehold welfare analyzed here for that month, where these outcomes only changed following the capture of Sana'a. Second, the subsidy removal was targeted at the entire country and not just Sana'a, whereas all the results analyzed here show a pattern of a clear change in Sana'a coupled with little change in the rest of the country.

There are three primary contributions of these results. First, this paper demonstrates that the non-violent capture of territory from an internationally-recognized government can lead to a significant decline in welfare across a number of dimensions. Although previous settings have demonstrated that the severity of violence is correlated with economic activity (e.g., Abadie and Gardeazaba 2003; Guidolin and La Ferrara 2007; Klapper et al. 2013; Singh 2013, Amodio and Di Maio 2017, etc.), these findings demonstrate that even households and regions not undergoing significant violence have a marked decline in welfare during volatile times. Furthermore, this setting allows a more thorough investigation of household welfare and coping strategies than previously possible given the collection of a multi-themed household survey during the capture of Sana'a.

Second, the decline in women's decision-making demonstrates an important way in which conflict might impact individuals within the household differently. Many news organizations and humanitarian agencies report that, due to economic necessity, women become more involved in decision making and economic activity during the conflict, but then revert back to the pre-conflict baseline once the conflict ends. For example, news reports in the Republic of Yemen following the escalation of conflict in 2015 suggest that women are being forced to take a more active role in household decisions and income generation as the humanitarian situation became more dire.[15] However, to my knowledge there has been little corroboration of these results.[16] These results, along with the fact that there has been little change in the small labor force participation of women in general in the Republic of Yemen either during the capture of Sana'a or over the course of the more violent conflict between 2015 and 2016 (e.g., Gallup World Poll), contrast with the narrative of more responsibilities for women during conflict.

And lastly, these results suggest that subjective measures of welfare might not be suitable in such tumultuous circumstances, and that individuals might have significant biases in recounting their experiences during conflict in surveys conducted well after the end of conflicts. Subjective levels of welfare have been demonstrated to have large fluctuations when respondents are prompted with vignettes in non-tumultuous settings, but the correlates of welfare were largely similar regardless of prompting (e.g., Ravallion et al. 2016). However, the present case demonstrates that particular measures of subjective welfare might even be trending in the opposite direction of more traditional measures in settings where non-consumption factors might become more important.

This is unfortunate given that the benefits of collecting such measures- their timely nature and low

[14] The removal of the fuel subsidy was unpopular, where protests against the policy change formed in Sana'a, and the government immediately reinstated the fuel subsidy by the end of the month.

[15] For an example from the Republic of Yemen following the escalation in conflict in 2015, see http://www.aljazeera.com/news/2015/12/yemen-widows-weakest-victim-war-151215061011411.html. However, these reports do not suggest that women are necessarily treated better, but rather that their responsibilities have increased.

[16] Mkutu (2008) demonstrates that an increase in widow-led households necessarily led to more participation of women in Uganda in a pastoral setting.

cost- are particularly important in fragile situations. For example, in many fragile contexts, surveys often ask about household coping strategies that include implicit reference points that could be in flux in such contexts.[17] Additionally, the Living Standards Measurement Surveys at the World Bank have been implementing conflict modules asking individuals to recall their experiences during conflict, many times years after a conflict.[18] However, if individuals' satisfaction can be shown to be at odds with actual household behavior and consumption, it is possible that there might be significant biases in what individuals might recollect in response to conflict. More evidence regarding the validity of such survey modules could significantly help welfare monitoring in fragile contexts.

This paper is structured as follows. Section 2 describes the context and various manners in which the capture of territory from the government might affect household welfare in non-violent settings; Section 3 describes the data; Section 4 describes the empirical strategy; Section 5 presents estimates of the decline in welfare following the capture of the city; Section 6 presents estimates of the decline in women's empowerment; Section 7 presents estimates of the change in subjective measures of welfare; and Section 8 concludes.

2. The Capture of Sana'a and the Potential Decline in Welfare

Following the capture of Sana'a, there are a number of manners in which welfare might have been affected. First, the supply chains providing goods and services to the capital city were likely disrupted. Prior to the conflict, the Republic of Yemen relied on international sources for the vast majority of its consumption, where approximately 90 percent of its food was imported from abroad (e.g., World Bank 2017). Imports to the capital city primarily came through a port in Al Hudaydah, and were then transported by truck to the capital city.[19] Given the difficulty and uncertainty of transporting food and other goods across new checkpoints where safety and access were not guaranteed likely made it more difficult for goods to reach the capital city.

There is evidence that this indeed was a significant problem in Sana'a following the capture of the city. Utilizing average prices collected at markets in the city by the World Food Programme (WFP) each month for 14 food items and commodities, there was a significant increase in the price of a number of goods following the capture of the city. In particular, figure 2 demonstrates that fresh food items and fuel, all of which are imported on a regular basis from abroad, had large price increases in the months following the capture of the city that was not evident over the same time period in the two years prior to the capture of the city.

Thus, in response to the capture of the city, households had to deal with a significant adverse price shock. Price rises have a significant impact on household welfare and a variety of coping strategies might be employed (Barrett 2002). Empirically, a number of contexts have demonstrated that household welfare significantly declines in the face of an adverse food price shock, where households reduce diet quality (e.g., D'Souza and Jolliffe 2012; D'Souza and Joliffe 2014), and potentially sell a limited share of productive assets (e.g., Fafchamps et al. 1998). Based on these other contexts, households in Sana'a might also be forced to adopt a number of these coping strategies. However, the coping strategies in this circumstance might be substantially different. For example, households might find it difficult to sell productive assets given the overall poor condition of economic activity;

[17] Examples include whether households at less than they thought they should (FAO Food Insecurity Experience Scale), and whether households consumed less preferred foods (World Food Program Coping Strategies Index).

[18] See (accessed March 2018) http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTLSMS/0,,conten SitePK:3358997,00.html.

[19] See FAOs summary of food imports in the Republic of Yemen at (accessed July 2017): http://www.fao.org/giews/countrybrief/country.jsp?code=YEM.

or, for example, it might be difficult for households to seek secondary employment opportunities given the security situation.

In addition to the adverse price shock, there are other potential mechanisms by which household welfare might be affected. The uncertainty introduced by the lack of protection and the authority of a new force likely significantly impacted economic activity and investment. As discussed in the Introduction, news reports suggest that safety was negatively impacted[20], which likely affected household members' ability to leave their households and seek employment opportunities. And even of those who did venture out to seek work, the lack of economic activity likely further impacted their employment opportunities. However, it is important to note that the government promised to continue to pay government salaries during this time period, which was a major source of employment in the capital city at the time of its capture.[21] Thus, many of the most severe income impacts might have been temporarily avoided, and the resulting estimates are an underestimate in the case that the government is not in a position to continue to provide a livelihood to a large share of households.[22]

Thus, at exactly the time that prices of necessary goods and services were rising, households likely had a decline in household income. A vast literature across a multitude of contexts has investigated the potential welfare impacts of adverse income shocks across a number of dimensions. For example, it has been shown that adverse income shocks adversely affect the quality of food consumption but not overall calorie consumption (e.g., Block et al. 2004; Brinkman et al. 2009), can reduce school attendance amongst school-aged children (e.g., Edmonds et al. 2009; etc.), and potentially force households to sell a limited share of productive assets and reduce possible future income generation (e.g., Fafchamps et al. 1998). But similar to coping with an adverse price shock, the set of available coping strategies might be limited in this circumstance.

Importantly, these shocks- both the potential tightening of household budgets and the decline in safety- might have significantly different effects on women in the household than men. For example, increasing the constraints on households tends to lead to an excess burden being placed on vulnerable members of the household in a variety of settings (e.g., Rose 1999; Khanna et al. 2003; Miguel 2005; D'Souza and Tandon forthcoming; etc.), which could place an excess burden on women in the Republic of Yemeni households given the country is typically ranked as having one of the highest (if not the highest) gender gaps in the world (e.g., World Economic Forum 2017). Furthermore, the increase in prices might similarly force households to substitute more home-produced goods and services for market-produced goods and services, which would most likely place a higher time burden on household women (e.g., World Development Report 2012). Additionally, the decline in safety might make it more difficult for women to leave the household and lead productive lives than men. In particular, women's movement and freedom are reported to be significantly curtailed in the country due to safety and family concerns (e.g., World Bank 2012), suggesting that they might even be less free to leave the household and make decisions following the introduction of conflict.

However, it is important to note that the effects of these shocks on women are empirically ambiguous. The decline in household resources might sufficiently burden households that women are forced to take up income generating possibilities and other responsibilities that they were unable to do so before the conflict. Many news organizations and humanitarian agencies report that women are forced to take on more responsibilities, both inside and outside the household, in response to conflict. For

[20]See (accessed July 2017): https://www.hrw.org/news/2016/11/17/yemen-abusive-detention-rife-under-houthis.

[21]See (accessed July 2017): http://www.reuters.com/article/us-yemen-security-salaries-idUSKBN15A1WW.

[22]This eventually happened in the Republic of Yemen in September of 2016 when the government started to pay employees infrequently.

example, news reports in the Republic of Yemen following the escalation of conflict in 2015 suggest that women are being forced to take a more active role in household decisions and income generation as the humanitarian situation became more dire.[23] Alternatively, an increase in widow-led households in more violent conflicts could also lead to higher labor force participation and empowerment for women. However, the current setting is one in which there was little violence and no observed increase in the share of widow-led households.

3. Data

The 2014 Household Budget Survey (HBS) conducted by the Central Statistics Office of the Republic of Yemen with support from the World Bank was in progress as the Houthi forces captured the city of Sana'a. The survey's primary purpose was to update the official poverty rate in the Republic of Yemen, which had not been updated since 2005. Given the little violence in the capture of the capital city, the survey was administered before, during, and after the capture of the city. However, given the sampling design, the survey is able to be used to identify how households were affected by the capture. First, the sampling design was such that respondents were randomized over space and time, and there should be no differences in the households surveyed in the months before and the months after the capture of the capital if the survey was conducted as planned (World Bank 2017).[24] Second, the survey is representative at the governorate/capital city level.

The 2014 HBS included a complete set of modules, including standard information on household consumption, employment, education, health, etc. that allow a thorough investigation of many dimensions of household welfare. However, especially useful to the current context, the survey includes a thorough module on women's empowerment in the household and a module on subjective welfare. These modules allow an investigation of intra-household dynamics and an investigation of the appropriateness of subjective welfare measures in such tumultuous circumstances.

Households in Sana'a were far better off than the rest of the country. Poverty in Sana'a was approximately one-quarter of the rate in the rest of the country, and all other measures of welfare were similarly better in the capital city. Additionally, women were significantly more empowered in the capital city than in the rest of the country, but subjective welfare was approximately equal across all regions of the country.

Another advantage of the 2014 HBS is that there was a nearly identical 2005 HBS that allows one to investigate whether changes in welfare were potentially due to seasonal factors, or due to a country-wide shock as opposed to the capture of Sana'a. In particular, the 2005 data allow an investigation of the difference-in-difference estimate of welfare in Sana'a following the capture of the city. Additionally, the data further allow us to investigate the triple difference as well, where the difference-in-difference estimate in the city of Sana'a is compared to the difference-in-difference in the rest of the country. However, the women's empowerment and subjective welfare modules were not implemented in the 2005 survey, and specifications analyzing those welfare measures can only analyze the difference in Sana'a following the capture of the city in 2014, and compare that difference to the change in the rest

[23] For an example from the Republic of Yemen following the escalation in conflict in 2015, see http://www.aljazeera.com/news/2015/12/yemen-widows-weakest-victim-war-151215061011411.html. However, these reports do not suggest that women are necessarily treated better, but rather that their responsibilities have increased.

[24] Roughly equal numbers of households were surveyed in each month, where 78 households were surved in October, 80 households were surveyed in November, and 77 households were surveyed in December. A total of 235 households were surveyed after the capture of Sana'a was complete and 269 households were surveyed in the 3 non-Ramadan months leading up to the capture. However, the responses to the women's decision-making module were missing for one of the households in the pre-period, leaving one less observation in those specifications than the others. However, all results are robust to dropping that household from all specifications.

of the country.

Although the household survey continued following the capture of the capital, the identification strategy requires the sampling of households to not dramatically change following the capture. Importantly, given the little amount of violence, the survey was reported to have been carried out as planned. All enumeration areas and initial households to interview were selected approximately a year before the city was captured, none of the enumeration areas were replaced, and there were no reports of difficulties in completing the survey in the final quarter.

Despite these reports of little trouble, it is always possible that enumerators consciously or unconsciously avoided more dangerous areas when replacing households. However, investigating the possibility, there does not appear to be any evidence that households surveyed before the capture were significantly different in observable characteristics that are unable to adjust to the conflict. Table 1 presents observable characteristics of households surveyed in the third and fourth quarter of 2014. Households surveyed in the third quarter all began their surveys prior to the capture, and households surveyed in the fourth quarter all began their surveys after the city had been captured. Consistent with the capture having little effect on the sampling, column (3) demonstrates that there is little difference between difficult-to-adjust characteristics following the capture of Sana'a.[25]

However, it is also possible that sampling changes might have been more observable as conflict progressed, and then sampling quickly reverted to the planned sampling procedure when violence was reduced. However, figures 3a-3c demonstrate that this does not appear to be the case. Specifically, a wide variety of household characteristics are reported by month, as well as the average pre-capture means of each of the variables.

Figures 3a-3c demonstrate that the 95 percent confidence interval of each monthly estimate of each difficult-to-adjust control variable contains the pre-capture mean of the variable in the vast majority of instances. Of all the 95 percent confidence intervals reported (180), the pre-capture mean is contained in 96.1 percent of them (173). Importantly, of those confidence intervals that do not contain the pre-capture mean, the distance from the bound of the interval to the pre-capture mean is very small; there is no evidence that any particular variables had a large proportion of monthly confidence intervals that did not contain the pre-capture mean (the maximum for any variable is 2 of the 12 monthly confidence intervals not containing the pre-capture mean); there is no evidence that the post-capture months of October-December were contributing the majority of the instances where the pre-capture means were outside of the confidence intervals (2 of the 7 total instances were from those months); and there is little evidence that the confidence intervals were uniformly larger following the capture of the capital.

However, there is an important data issue to highlight that might affect estimating the impact of capturing Sana'a. Ramadan occurred primarily in July in 2014, and this might bias expenditure during the pre-period given that consumption patterns are significantly different during Ramadan (e.g., Jolliffe and Serajuddin 2015).[26] Thus, in specifications that use only the 2014 survey, all households surveyed during Ramadan are excluded from the sample, and the baseline specification uses the three non-Ramadan months prior to the capture of the capital as the pre-period to compare against the three post-capture months of the survey. However, in specifications that compare the 2014 survey to the 2005 survey, households surveyed during July (Ramadan in 2014) or October (Ramadan in 2005)

[25] The households surveyed in the third quarter include those that were surveyed during Ramadan.

[26] In a number of contexts, it has been demonstrated that food consumption is actually higher during Ramadan and other religious festivals despite fasting during daylight hours given the number of feasts, etc. that occur. This is corroborated in the case of the Republic of Yemen (e.g., World Bank 2017).

in either survey were excluded. However, it is important to note that the estimates are qualitatively identical when all interviewed households are included.

4. Empirical Strategy

Based on this setting, this paper utilizes a number of empirical strategies to investigate the effects of the capture of Sana'a on household welfare, women's empowerment, and subjective metrics of well-being. In the baseline empirical strategy, this paper investigates how adjustable outcomes in Sana'a changed in response to the capture of the capital, and compares this change in Sana'a to a number of other regions and time periods. Figure 4 plots average annual household expenditure by month of the survey, and presents an outline of the empirical strategy (along with the lack of change in non-adjustable outcomes in figures 3a-3c).[27] Expenditure in Sana'a was maintained in October of 2014 on average, but by November and December, there was a sharp decline in expenditure such that there was little difference in expenditure between the city of Sana'a and the rest of the Republic of Yemen despite the poverty rate being approximately four times less in the city of Sana'a. Importantly, over the same time period, there was little change in expenditure in the rest of the Republic of Yemen, and there was little change in expenditure in Sana'a in the 2005 survey.

Formalizing this empirical strategy, this paper first estimates the change in household oucomes over the course of the occupation in the following specification:

$$Outcome_i = \Sigma_{j=1}^{3}[\beta_j Post\_Month\_j_i] + \gamma X_i + \epsilon_i \tag{1}$$

where i refers to household, $Post\_Month\_j$ are indicators equaling one if the household was interviewed during the j'th month following the occupation[28], and X is a vector of individual control variables.[29] The baseline estimates restrict the households in specification (1) to households from the city of Sana'a, and also restricts the sample to households surveyed in the three non-Ramadan months prior to the capture and the three months following the capture of the city that the survey continued. Standard errors are clustered at the PSU level, and observations are weighted to make the estimates representative of the population.[30] The coefficients of interest are β_j, which represent the the percentage point change in a variety of outcomes following the capture of the city relative to the three months before the capture.[31]

This paper further compares the simple change in Sana'a to the change in the rest of the Republic of Yemen to determine whether the simple change might be capturing factors that affected the entire

[27] The measure of expenditure is the same as used to construct the national poverty estimates, and is restricted to items for which household expenditure can be reliably estimated for all households. This omits expenditure on durable goods, for which households only purchase intermittently.

[28] Specifically, $Post\_Month\_1$, $Post\_Month\_2$, and $Post\_Month\_3$ respectively are indicators equaling one if the household was surveyed in October, November, and December.

[29] Control variables include an indicator for whether the household head is married, the household head ever attended school, an indicator if the household head was a smoker, an indicator if the household head chews Qat, the years of schooling of the household head, an indicator whether the household has a child, an indicator if the household's dwelling is make of cut stone, an indicator equaling one if the walls if the household's dwelling were made of other material, an indicator equaling one if the household's roof that was made of reinforced concrete, an indicator equaling one if the household's roof was made of wood and concrete, an indicator equaling one if the household's roof was made of mud, an indicator if the household's floor was made of concrete, an indicator equaling one if the household's floor was made of tile, and an indicator equaling one if the household had a flush toilet.

[30] All results discussed throughout the paper are robust to the exclusion of weights.

[31] Although the baseline specification is restricted to balance the number of pre and post-months and to use the pre-months that are closest in time to the capture of the city, Apendix 2 demonstrates that the results are qualitatively identical regardless of which months are used to construct the pre-period.

country as opposed to the capture of Sana'a. Specifically, this paper also estimates the following difference-in-difference specification:

$$(2) \qquad Outcome_{ir} = \Sigma_{j=1}^{3}[\beta_j Post\_Month\_j_{ir} * Capital_{ir}] + \alpha Y_{ir} + \gamma X_{ir} + \upsilon_{ir}$$

where all variables are defined as above, r denotes region, $Capital$ denotes an indicator equal to one if the household is from the city of Sana'a, and Y includes all lower-order terms ($Post\_Conflict$ and $Capital$).[32] The sample in specification (2) is expanded to include households surveyed in the rest of the Republic of Yemen during the same time period, and the specifications report the larger of standard errors clustered at the governorate/capital city level or PSU level.[33] Again, β_j is the coefficient of interest and denotes how much more outcomes changed in the city of Sana'a than in the rest of the Republic of Yemen.

In addition to the double difference investigated in specification (2), this paper further reports a difference-in-difference specification comparing the change in Sana'a in 2014 to the change in Sana'a in 2005. Although a lot of turbulent events happened between 2005 and 2014, including a political revolution toppling the former president, the specification can further demonstrate that the changes in household outcomes are not driven by seasonal factors in Sana'a that affect households in the fourth quarter of the year. Specifically, the paper estimates the following specification:

$$(3) \qquad Outcome_{it} = \Sigma_{j=1}^{2}[\beta_j Post\_Month\_j_{ir} * Post\_Survey_{it}] + \alpha Y_{it} + \gamma X_{it} + \upsilon_{it}$$

where all variables are defined as above, t refers to time, $Post\_Survey$ denotes an indicator equaling one if the household was interviewed in the 2014 survey and equal to zero of the household was interviewed in the 2005 survey, and Y denotes a vector of lower-order terms ($Post\_Conflict$ and $Post\_Survey$).[34] The sample is restricted to households surveyed in Sana'a, but includes all households from both the 2014 and 2005 surveys.[35] Again, β_j is the coefficient of interest and in this specification denotes how many more percentage points household outcomes increased in 2014 than in 2005. However, since the women's empowerment module and the subjective welfare module were not included in the 2005 survey, only a subset of total outcomes can utilize specification (3).

Lastly, this paper also investigates specifications that simultaneously control for seasonal and country-wide effects. In particular, the following specification is also estimated:

$$(4) \qquad Outcome_{irt} = \Sigma_{j=1}^{2}[\beta_j Post\_Month\_j_{ir} * Post\_Survey_{irt} * Capital_{irt}] + \alpha Y_{irt} + \gamma X_{irt} + \phi_{irt}$$

where all variables are as defined above, and Y includes all lower-order terms.[36] Again, the coefficient of interest is β_j, which denotes how many more percentage points larger the difference-in-difference estimate was in Sana'a than the difference-in-difference estimate in the rest of the Republic of Yemen.

[32] The control variables are the same as above, but now an indicator for whether the household resided in an urban area is also included in specifications that compare the city of Sana'a to other regions.

[33] There are 22 clusters when clustering at the governorate and capital city level.

[34] This specification only investigates two post-conflict months because October, one of the post-conflict months, was Ramadan in 2005.

[35] Standard errors are clustered at the PSU level.

[36] This includes every possible second-order term and each of the individual components of the third-order term.

This specification includes households from all of the Republic of Yemen in all time periods. Additionally, the larger of standard errors clustered at the PSU level and the governorate/capital city level are reported, and observations are weighted to make them representative of the population.

Given the long time period between the 2005 and 2014 surveys and the numerous events that happened between- political transition and food price shock- this paper focuses on estimates from specification (2) that compare the change in household outcomes in the city of Sana'a to the rest of the Republic of Yemen using only data from the 2014 survey. However, estimates of the double and triple difference utilizing the 2005 survey are presented, and all results discussed in the text are robust to using either of those estimation strategies for outcomes that are captured in both the 2014 and 2005 surveys.

5. Decline in Welfare Following the Capture of the Capital

As demonstrated in Figure 4, there was a dramatic decline in household welfare following the capture of the capital that was primarily driven by larger and more robust decreases as the occupation lasted longer. Table 2 presents estimates of how annual per capita expenditure changed following the capture. Estimates of specification (1) are presented in columns (1)-(2). Column (1) presents the simple percentage change; and column (2) adds control variables to absorb unobserved heterogeneity and increase the precision of the estimates.

In either specification, expenditure following the capture of the city is less than in the three months leading up to the capture. However, the change for households surveyed in October and November are lower in magnitude and less precisely estimated than the change for households surveyed in December. In the most complete specification, households surveyed in December had an expenditure that was 37.7 percent lower than the average expenditure in the months leading up to the capture of the city, and one can reject the hypothesis that the three post-conflict coefficients jointly equaled zero at standard levels of significance (p-value of 0.007).

Estimates of specification (2) are presented in column (3) of table 3. The estimates demonstrate a qualitatively similar pattern as the estimates in columns (1)-(2). Importantly, given the lack of any change in expenditure in the rest of the Republic of Yemen during the same time period, the estimates from specification (2) are very similar to the estimates from specification (1), where households surveyed in December had 41.5 percent lower expenditure than households surveyed in the months leading up to the capture. Thus, the baseline estimates do not appear to be capturing a shock that is common to the entire country.

Furthermore, there is very little evidence that the drop in expenditure was due to seasonal factors present in the city of Sana'a. When comparing the drop in expenditure in the capital in 2014 to the change over the same time period in 2005, the results are qualitatively identical to columns (1)-(3). Expenditure in December was 37.5 percent lower than expenditure in the months before the capture. Similarly, column (4) presents estimates of specification (4), and demonstrates that the difference-in-difference in Sana'a was much larger than the difference-in-difference in the rest of the Republic of Yemen, and this change was driven by a larger and more precise estimate in December.

However, it is important to verify that these changes in expenditure are being driven by the capture of Sana'a, and not uncovering a pre-existing change in expenditure. Thus, column (5) of table 2 reports estimates of a specification similar to specification (2). Rather than interacting the conflict indicator with the indicators for post-conflict months, the specification interacts the capital indicator with indicators equal to one if the household was surveyed in the months leading up to the capture

of Sana'a, and restricts the households in the sample to those surveyed in the three months prior to the capture.[37,38] In this specification, the coefficient on the difference-in-difference estimates denotes by how much larger the change in expenditure was in the period leading up to the capture of Sana'a than earlier in the year.

Estimates of this falsification test are presented in column (5) of table 2. The magnitude of the estimate is smaller than the change found in November and December, and one cannot reject the hypothesis that expenditure was not trending differently in 2014 than in 2005 prior to the capture of the city. Furthermore, column (6) re-estimates the baseline specification, but includes terms capturing differential pre-trends in expenditure. However, the baseline result of a large change in December is unchanged, one still cannot reject the hypothesis that expenditure was not trending prior to the capture of Sana'a, and we can reject the hypothesis that the change in December equaled the change in the pre-conflict months at traditional significance levels (p-value= 0.015).

Table 3 further investigates the difference-in-difference estimate of the expenditure change in Sana'a following the capture of the city, as well as another potential mechanisms and coping strategies. Columns (1) and (2) re-estimate specification (2), but use the natural logarithm of food and non-food expenditure as the dependent variables respectively. Estimates from both specifications are qualitatively identical to the baseline estimates, where there was a large decline that was primarily driven by larger and more precisely estimate declines in expenditure as the occupation progressed.

This finding is especially striking given the fact that figure 2 demonstrated that the price of fresh foods increased, suggesting that the decline in food consumption might be even more severe than suggested by expenditure. Columns (3) and (4) investigate this possibility by re-estimating the baseline specification, but using daily per capita calorie and protein consumption as the dependent variables. Both specifications demonstrate a qualitatively identical pattern where both calories consumed and diet quality had large and more precisely estimated declines in December. The decline in calorie consumption is consistent with a severe income shock, where oftentimes during negative income or price shocks individuals are able to smooth overall calorie consumption by sacrificing diet quality (e.g., D'Souza and Jolliffe 2014).

This paper further explores a potential mechanism driving this decline in expenditure. Investigating the potential employment impacts of the capture of the city, column (5) re-estimates the baseline specification but utilizes total household income from wages as the dependent variable. The pattern in wages is also qualitatively identical to the baseline pattern, where there was a large decline in wages driven by larger and more precisely estimated declines as the occupation progressed. Interestingly, the magnitude of the decline in wages, expenditure, and diet quality are all very similar.

In addition to investigating causes of the decline in welfare, this paper also investigates potential coping strategies. First, this paper finds evidence that households significantly increased their borrowing. Column (6) re-estimates the baseline specification, but uses an indicator for whether the household had a loan as the dependent variable.[39] Households significantly increased their borrowing following the capture of the city. However, unlike the rest of the patterns analyzed in table 3, there were not large differences in the borrowing patterns in the months immediately after the capture, and the last month of the survey after the occupation had progressed for three months. These results suggest that one of the reasons some of the households might have been able to maintain their

[37] The added month indicators are included in the lower-order terms.

[38] The results are robust to using any month prior to the capture of Sana'a as the time period to demarcate the pre-preiod.

[39] Results are qualitatively similar when utilizing the total amount borrowed as well.

consumption in the month after the capture is through borrowing money.

However, there is further evidence that some households were able to weather the initial months of the capture better than others. Specifically, when estimating the effects of the capture separately for different socio-economic groups as measured by factors that are not adjustable in response to the capture, this paper demonstrates significant differences in the response. Column (7) demonstrates that households where the head did not finish primary school- households which were likely less well off than others- observed an immediate decline in expenditure that was similar in magnitude and precision to those in the months after the occupation had progressed.

Alternatively, column (8) demonstrates a qualitatively identical pattern to the baseline specification. Households where the head did finish primary school were able to initially maintain their expenditure in October, but the estimates flipped signs and the magnitudes significantly increased during November and December. In this specifcation, one can reject the hypothesis that the change in October was equal to the decline in December at conventional levels of significance (p-value=0.061). However, in the case of less well off households in column (7), the declines in October and December were indistinguishable (p-value=0.967).[40,41]

Importantly, estimates in columns (6)-(8) suggest that relatively advantaged households- those that are able to access credit markets and have higher value assets- are able to better cope with the capture of the capital. Thus, at least initially, the capture likely exacerbated pre-existing inequalities that were already prevalent in the country and the region (e.g., Krishnan et al. 2016). However, the shock was sufficiently disruptive that, even within a matter of months, very few households were able to maintain their consumption.

6. Women's Empowerment

One of the advantages of this setting is the thoroughness of the 2014 HBS survey, which allows one to investigate the changes to a number of intra-household dynamics. As discussed above, the 2014 HBS also included a very thorough investigation of women‘s empowerment. The Republic of Yemen had large inequities in opportunities within the household based on gender prior to the capture of Sana‘a (e.g., Krishnan et al. 2016), and it is important to understand whether those with fewer opportunities and resources within the household were forced to bear a significantly larger burden of shocks as has been shown in other contexts (e.g., Rose 1999; Khanna et al. 2003; Miguel 2005; D'Souza and Tandon forthcoming; etc.).

In particular, the survey inquired about the control women had over a number of different types of assets and spending in the household. However, this module was included only in the 2014 survey, and thus one cannot investigate the difference-in-difference comparing the 2014 change to the 2005 change. Thus, this paper analyzes the simple difference in women‘s empowerment in Sana‘a and compares this difference to the rest of the Republic of Yemen.

Specifically, this section re-estimates specification (2), but uses an indicator equaling one if the spouse or the head of women-headed households made the decision to make a number of different types of purchases alone. Table 4 presents estimates of the women‘s empowerment specifications. Each cell represents an estimate of either the change in empowerment following the capture of Sana‘a or the difference-in-difference in Sana‘a relative to the rest of the Republic of Yemen. Columns (1)

[40] All other available socio-economic indicators that are not themselves able to adjust to the capture yield qualitatively similar results. Specifically, all the indicators of dwelling quality, or other cut-offs for education, all yield similar results where previously advantaged households are able to maintain their consumption.

[41] The results are identical when estimating a model with a triple interaction ($Advantaged * Post\_Month * Capital$).

and (2) present estimates of the simple difference following the capture of Sanaa (β from specification 1). Column (1) restricts the sample to households from the city of Sanaa; and column (2) restricts the sample to households from the rest of the Republic of Yemen. Column (3) reports estimates of the difference-in-difference following the capture of Sana'a (β from specification 4). Each row utilizes a different measure of women's empowerment as the dependent variable.

Table 4 demonstrates that there was a dramatic reduction in women's empowerment in one of the three types of spending that women actually had a significant role in making decisions. Specifically, row (1) of table 4 demonstrates there was a very large reduction in the share of women that made decisions about food purchases in Sana'a, that did not occur in the rest of the Republic of Yemen. The most complete specification in column (3) demonstrates that there was a 15.4 percentage point decline in the share of women who made decisions about food purchases.

This change represents over three-quarters of the women who were making decisions regarding food purchases prior to the capture, and the share of women who controlled food purchases in the city of Sana'a approached and even dropped below levels seen in the rest of the Republic of Yemen. This fact is even more striking given the relative lack of power women had in food purchase decisions in the rest of the Republic of Yemen.

The other two areas where women had significant control over purchases were clothing for women and children. The estimates suggest that there was a decline in the control over those purchases as well, but the estimates are not as precisely estimated. However, one potential reason for the lower precision might have been the frequency with which those purchases have to be made. Food has to be purchased at relatively frequent intervals, whereas if women were not able to leave the household during a tumultuous period, the purchase of women's and children clothing could be delayed. Thus, households might not have yet grappled with who would make purchases in othe dimensions that required less frequent purchasing.

Similarly, the estimates in table 4 demonstrate that the estimated change in control over expenditures was negative for nearly all dimensions (elderly care is the only exception). Although the estimates are not as precisely estimated as the change in control over food spending, nearly one-third of the difference-in-difference estimates in column (3) are statistically significant at conventional levels.

Table 5 investigates this change in women's decision making more thoroughly. First, columns (1)-(2) investigate who might actually be taking over for women in the control of food purchases. Column (1) demonstrates that there is a significant increase in men having control over the food purchasing decision. Tellingly, the magnitude of the coefficient is roughly equal to the magnitude of the estimate in the first row and third column of table 4. On the other hand, column (2) demonstrates that there appears to be very little change in other adult members taking over food purchases in the household. Thus, the change in women's decision making in the household appears to be transferred to the male head.

Alternatively, one might be concerned exactly what the question about decision making is capturing. Women's control over spending decisions and empowerment in general could be difficult to capture in simple survey instrument, and the responses might not align well with actual behaviors. However, column (3) presents evidence demonstrating that there did appear to be a change in behavior that was consistent with the change in responses. Specifically, the women's decision-making module was supposed to be administered to the most senior woman (whether head, spouse, or otherwise), but in the case that either the spouse was not there or the head would not allow the spouse to answer,

other household members could respond to the module.[42,43]

Following the capture of the city, not only was there a substantial reported transfer of decision making authority from women to men, there was also a significant increase in the share of women who responded to the module. This is broadly consistent with women being more likely to be in the household and less able to move about freely following the capture of the city. Following the capture of the city, the increase in the share of women who answered the module was 12 percent larger in Sana'a than in the rest of the Republic of Yemen.[44] Thus, it does not appear that the change in decision making reported in table 4 is only describing a change in peoples' attitudes with little change in behavior.

Additionally, there are significant differences between the change in women's decision making and the change in welfare described in Section 5. Specifically, column (4) estimates the changes in decision making but allows the effect to differ by month of the occupation. Unlike the welfare estimates presented in tables 2 and 3, there is an immediate drop in women's decision making following the capture, and very few households had women continue to control food purchases. This decline is relatively consistent throughout the entire occupation period analyzed, where one cannot reject the hypothesis that the change relative to the months prior to the occupation was identical in each month (p-value 0.458).

Furthermore, there was little difference in the change based on women's bargaining power inside the household. Using assets owned exclusively by the spouse as a proxy of bargaining power, columns (5) and (6) re-estimate specification (2) but restricts the sample to the approximately 45 percent of the households where the spouse owns gold and the rest of households where spouse does not own gold. The estimates are qualitatively identical, which both types of households demonstrating similar declines in the share of women who controlled food purchases.[45]

Similarly, the socio-economic status of households also did not seem to matter to the response. Columns (7) and (8) re-estimate specification (2), but restrict the sample to those in which the head finished and did not finish primary school respectively. In contrast to the welfare results presented in table 3, there was little difference in the change in women's decision making between the two types of households.

All of these results suggest that the decline in women's decision-making in households in Sana'a following the capture of Sana'a was nearly universal, and did not depend on either the status of the household or the women in the household. Given the two potential causes of the change in women's decision making- a worsening of household resources and a decline in safety- these patterns are mostly consistent with the decline in women's decision making being driven by a decline in safety. The change was immediate and did not seem to change as households' budgets got significantly worse in November and December. Furthermore, there was minimal amounts of variation based household characteristics and the standing of the spouse in the household. All of these factors similarly point to the initial decline in safety as opposed to the evolving nature of household budgets.

Alternatively, table 6 investigates how women's employment changed as the conflict progressed.

[42]Men were allowed to sit in on the module if they required it, and this was indicated in the survey. However, there was little difference in the answers between women who answered alone and those that answered in the presence of a man.

[43]Spouses answered for the vast majority of the households, where approximately 81 percent of households had a woman respond to the module prior to the capture.

[44]The baseline estimates described in table 4 are qualitatively identical if the sample is restricted to only households in which the women answered the module, and also qualitatively identical if women answered the module not in the presence of a man.

[45]Gold was the only asset that spouses owned in non-negligible numbers.

As described in the Introduction, a number of news agencies and humanitarian agencies report that women actually have to increase their employment and income generation in times of conflict due to increased need. However, in every potential specification investigated so far, there is no evidence that women actually increased employment. In the baseline specification in column (3), the estimate is actually negative, and the confidence interval is relatively small. Thus, the estimate precludes a large increase in employment as the city was captured, and certainly demonstrates that the potential increase in employment at the bounds of the confidence interval was significantly less than the share of women who lost their ability to make decisions about food purchases in tables 4 and 5. Furthermore, the estimates broken up by month in column (4) suggest that that employment could actually have declined following the capture, which is roughly consistent with women not being able to leave the household as freely as before the conflict.

Lastly, figure 5 demonstrates that this lack of increase in employment might not be an artifact of the lack of violent conflict and lack of extreme deprivation experienced in some other conflicts in the world. Specifically, using data from the Gallup World Poll, which randomizes between male and female respondents over the age of 15, there is little evidence that employment significantly increased in the Republic of Yemen as the conflict significantly escalated.[46]

7. The Response of Subjective Welfare

A. Salience and Subjective Welfare

Subjective welfare measures have become increasingly popular in the past decade, where global reporting and progress towards some of the Sustainable Development Goals can be tracked using subjective welfare measures (e.g., food security). One reason for this surge in popularity is the low cost to collect subjective welfare measures and the speed with which these surveys can be conducted. For example, the Food and Agriculture Organization (FAO) was able to insert a food consumption module in the Gallup World Poll to construct a subjective welfare measure of food access at a cost of just over $8,000 per country, and the entire survey took 2 weeks to collect in each country (Ballard et al. 2013).

The benefits of subjective welfare measures are particularly important in fragile countries, where primary data collection is difficult and the need for up-to-the-date information is vital. One example of the need for timely data was the need to track food availability in a number of fragile countries that were faced with the threat of famine during 2017.[47] However, given the dramatic changes that are taking place in fragile countries, there exists the possibility that people's frames, references, and interpretation of survey questions that underlie many subjective welfare measures might not be stable.

Prior research has conflicting conclusions regarding the suitability of subjective welfare measures. Some researchers suggest that they are too difficult to properly interpret in any context (e.g., Bertrand and Mullainathan 2001), which is bolstered by the lack of alignment between subjective measures of food security and more traditional measures such as undernourishment obtained from the same respondents (e.g., Maxwell et al. 2014). Alternatively, others find that there exist biases in the reporting of subjective welfare measures that affects the level of the estimates, but there is evidence that these biases have limited impacts on the correlates of welfare in a number of contexts (e.g., Ravallion et al. 2016).

[46] This is also evident in a regression framework.

[47] See Al Jazeera (Accessed April 2017): http://www.aljazeera.com/news/2017/03/famine-united-nations-170310234132946.html.

The 2014 HBS included a module of subjective satisfaction with a number facets of individuals‘ lives. Investigating how well these subjective measures might capture trends in traditional measures of welfare (e.g., expenditure, diet choice, etc.), this paper presents a simple framework of how individuals report experiences that incorporates salience. Households with homothetic preferences choose a consumption bundle (C) based on prices p and wealth w. Following the choice of consumption bundle, it is assumed that individuals are asked a simple "yes" or "no" question regarding whether they are satisfied with their consumption.

However, it is further assumed that non-consumption factors can affect this satisfaction, and that in particular, the salience of these factors is allowed to vary relative to consumption factors. In this framework, salience refers to the degree to which an individual might weight the non-consumption factor relative to consumption in their decision. Specifically, an individual responds that she is satisfied with consumption if the following decision rule is positive:

$$D_i = (1 - \sigma) * g_i(Ci) + \sigma * S_i + \theta_i$$

where g_i denotes a function by which individuals compare their consumption to their ideal consumption bundle, and it is assumed that higher consumption leads to individuals being closer to their ideal consumption at a diminishing rate (e.g., $g' > 0$, $g'' < 0$ for consumption below their ideal bundle). However, it is assumed that consumption factors are explicitly compared to non-consumption factors S_i, which capture all factors that would make it more likely an individual would report being satisfied for any level of consumption (e.g., $S \geq 0$).[48] Importantly, the salience of non-consumption factors S are allowed to vary relative to consumption factors through weights denoted by σ (bounded between zero and one), where higher values of σ imply a higher salience for S. The interpretation of changes in σ are such that people are re-evaluating what satisfaction might mean.

Lastly, θ represents unexpected events that might affect an individual‘s reporting of satisfaction (e.g., current events, individuals‘ moods at the time of the decision, etc.). It is further assumed that θ is drawn from a common distribution function F_θ, where the unexpected component has a mean of zero and larger unexpected swings affecting reporting are less likely than smaller ones.[49] Given the unexpected component θ_i, the probability that individual i will respond affirmatively that they are satisfied with their consumption and how that probability changes as consumption increases can be expressed as[50]:

$$\phi = 1 - F_\theta[-E(D_i)]$$
$$\frac{\delta\phi}{\delta C_i} = (1 - \sigma) * f_\theta[(-E(D_i)] * g_i'(C_i)$$

Given the assumptions outlined above, it follows that $\frac{\delta\phi}{\delta C_i} \geq 0$.

This simple framework nests the case where no non-consumption factors can affect the reporting of satisfaction with consumption ($\sigma = 0$). In this case, increasing consumption increases the probability of an individual reporting to be satisfied with consumption. However, an individual that consumes close to their ideal consumption might still report being unsatisfied with their consumption depending on the size of the unexpected swing, such as a deviation from an individual‘s expected mood, that

[48] One example of information that could be contained in S is perceptions of safety of individual i, which might make somebody care less about consuming below their ideal consumption.

[49] Specifically, the density f_θ is increasing over the interval $(-\infty, 0)$ and decreasing over the interval $(0, \infty)$.

[50] The inequality follows from the assumption that $\sigma \in [0, 1]$ and the assumption that $g' > 0$ for consumption below one‘s ideal consumption bundle.

affects their reporting. Similarly, there exists a chance that an individual who even consumes less than their perceived minimum threshold might report being satisfied with their consumption. Furthermore, increasing the variance of the unexpected swings makes it more likely for these reversals to occur for individuals who had consumption very close to, or very far below, their ideal consumption.

However, in the case where non-consumption factors explicitly factor in the reporting of satisfaction ($\sigma > 0$), it follows that the salience of non-consumption factors affects the sensitivity of the probability of reporting satisfaction with consumption. In the limiting case of only non-consumption factors affecting reporting ($\sigma = 1$), the link between consumption and the probability of reporting satisfaction is obscured entirely, and increasing consumption does not change the probability of reporting satisfaction. However, for cases in which $0 < \sigma < 1$, it follows that:

$$\frac{\delta^2\phi}{\delta C_i \delta\sigma} = -f'_\theta[-E(D_i)] * (1-\sigma) * g'_i(C_i) * \frac{\delta E(D_i)}{\delta\sigma} + f_\theta[-E(D_i)] * [-g'_i(C_i)]$$

One can show under certain assumptions that $\frac{\delta^2\phi}{\delta C_i \delta\sigma} < 0$[51], which suggests that the more salient non-consumption factors are relative to consumption, the less sensitive the probability of reporting satisfaction is to increasing consumption. Based on this inequality, it follows that as non-consumption factors become more salient, there exists a sufficiently high salience σ such that actual consumption relative to perceived thresholds has little effect on reporting. In such a case, subjective measures of welfare might not significantly change even if there is a decline in actual consumption.

However, this overly simple framework has assumed that changes in σ and changes in consumption are independent of each other. But there exists the possibility that the onset of a large event could cause both σ and C to co-move in opposite directions. In such a case, non-consumption factors would be weighted more at exactly the time that consumption and welfare might be changing, and one could find that subjective welfare measures move in exactly the *opposite* direction of traditional consumption-based measures. The capture of Sana'a by Houthi forces is one such potential case, where the capture of the city caused consumption and welfare to decline. But it is possible that the importance of safety increased at the same time, and that change in weighting might have made individuals more satisfied with their situation by not having suffered violence despite the decrease in consumption.

One can see this through the following:

$$\frac{\delta\phi}{\delta V} = f_\theta[-E(D_i)] * [\frac{\delta\sigma}{\delta V} * g(C_i) + (1-\sigma) * g'(C_i) * \frac{\delta C_i}{\delta V} + \frac{\delta\sigma}{\delta V} * S_i]$$

where V is the likelihood that the individual will face violence in subsequent periods following the capture of Sana'a. If an increase in the likelihood an individual faces violence actually causes causes safety to become more salient (e.g., $\frac{\delta\sigma}{\delta V} > 0$), then such a change combined with Section 5 demonstrating that consumption declined (e.g., $\frac{\delta C}{\delta V} < 0$) could actually result in a case where an individual has a higher probability of reporting to be satisfied with consumption despite the decline in actual consumption (i.e., $\frac{\delta\phi}{\delta V} > 0$).[52]

[51] Specifically, without specifying the distribution function F_θ, one can note that the first expression of $\frac{\delta^2\phi}{\delta C_i \delta\sigma}$ is potentially positive, while the second expression is always negative. However, the first expression is decreasing in size as σ rises since all components of the expression are bounded as σ rises. Thus, for a sufficiently high $\bar{\sigma}$, the magnitude of the second expression, which does not go to zero as σ rises, will outweigh the magnitude of the first expression and the inequality will follow. Alternatively, one can assume specific distributions for θ, such as the Uniform Distribution, for which the derivative of the pdf is zero. In such a case, the first expression is zero, and the inequality follows for all values of $\sigma \in [0, 1]$.

[52] One can see this for households that would in expectation report being unsatisfied with consumption when only

B. Empirical Results

The 2014 HBS asked both the household head and the head‘s spouse whether they were very satisfied, somewhat satisfied, not very satisfied, or not at all satisfied with a number of dimensions of the households welfare. The dimensions that refer to physical welfare included whether the household was satisfied with their food consumption, income, job, dwelling, health, and security.[53] However, similar to the women‘s empowerment module, the subjective welfare module was only included in the 2014 survey. Thus, this section re-estimates the specifications analyzing women‘s empowerment by looking at how satisfaction changed following the capture of Sana‘a, and compares this estimate to how satisfaction changed in the rest of the Republic of Yemen.

Table 7 presents estimates of the subjective welfare specifications. Each cell represents an estimate of either the change in subjective welfare following the capture of Sana‘a or the difference-in-difference in Sana‘a relative to the rest of the Republic of Yemen. Column (1) reports specifications where the head and spouse report to be "not at all satisfied," and the satisfaction level is increasing for each additional column. Columns (1)-(5) restrict the sample to households from the city of Sanaa; and column (6) restricts the sample to households from the rest of the Republic of Yemen. Column (7) reports estimates of the difference-in-difference following the capture of Sana‘a (β from specification 2). Each row utilizes satisfaction with a different dimension of subjective welfare as the dependent variable.

The results in table 7 demonstrate a pattern that is seemingly at odds with the change in other consumption-based welfare measures described above. Rather than demonstrating a decline in satisfaction in many dimensions of welfare, the estimates of extreme dissatisfaction were actually negative for all dimensions aside from security. Although one cannot reject the hypothesis that dissatisfaction was not equal to zero, the 95 percent confidence interval bounds the effect such that one can reject the hypothesis that there was a large increase in dissatisfaction. Similarly, column (4) demonstrates a significant increase in extreme satisfaction with food consumption, and the 95 percent confidence intervals for the other dimensions precludes a large decline. This is despite the fact observable measures of food consumption and wages sharply dropped following the capture of Sana'a.

Based on the pattern evident in columns (1)-(4), columns (5)-(7) investigate whether the share of households that were either "very satisfied" or "fairly satisfied" changed following the capture. Column (5) demonstrates the pattern in Sana'a is similar to the pattern presented in columns (1)-(4). However, column (6) demonstrates there appears to be no large change in satisfaction outside of Sana‘a. The magnitude of the coefficients are much smaller, vary in sign, and one cannot reject the hypothesis that there was no change in satisfaction in any of the dimensions. Column (7) further investigates the difference-in-difference comparing the change in satisfaction in Sana‘a to the change in the rest of the Republic of Yemen. All estimates aside from security are positive, implying that the increases in satisfaction were larger in Sana‘a than in the rest of the Republic of Yemen.

One explanation for these results is that in tumultuous times, households reassess their determination of what it means to be satisfied with particular facets of their life as other facets of their life

consumption factors are weighted in the decision (i.e., $g(C_i) < 0$) and maintain their safety (i.e., $S_i > 0$). In such a case, the first and third term of the bracketed expression on the RHS of $\frac{\delta\phi}{\delta V}$ are positive, while the middle term is negative. However, for a sufficiently large change in salience ($\frac{\delta\sigma}{\delta V}$) relative to the change in consumption ($\frac{\delta C_i}{\delta V}$), the positive terms will outweigh the negative term, and the likelihood of reporting satisfaction will have increased in response to the shock despite the drop in consumption.

[53] There are also questions about whether individuals were satisfied with a number of social aspects of their life, such as friends, etc.

become more salient (e.g., safety). However, another possibility is that households were not truthfully reporting their subjective welfare fearing retribution from a government-sponsored survey. Although it is impossible to rule out this hypothesis, there is little evidence for this interpretation. The primary role that the Houthi forces took over from the government was security, and that would be the dimension that individuals would have the most incentive to falsely claim things were just as good as before. However, respondents reported a sharp drop in security. Furthermore, The Central Statistics Office was independent of the Houthi forces and took great care to remain politically neutral even as the conflict progressed. However, regardless of the cause of the biases, these results demonstrate that subjective welfare measures can directly contradict more traditional welfare measures, and that there are many potential reasons that subjective welfare measures might be too difficult to interpret in such tumultuous circumstances.

8. Conclusion

This paper demonstrates that in response to a relatively non-violent capture of a city, welfare measures immediately declined, a number of coping strategies were employed, there were changes to intra-household dynamics, and the changes to subjective measures of welfare substantially differed from observed household behavior and choices. These findings are evident even though this setting lacked a number of aggravating factors that are generally present in longer and more violent conflicts, such as worse disruptions to supply chains (e.g., port blockades) and worse shocks to economic activity. Thus, these estimates might generalize some of the previous estimates of violent conflict to less violent conflicts.

However, there are a number of questions unanswered by the current context. First, these are all short-term changes, and it is unclear what might happen in the long term. For example, the coping strategies uncovered in this setting, such as loans, might eventually become unavailable and the level of deprivation might significantly worsen; more sustained conflict might lead to more deprivation and cause women to be more rather than less engaged in household decision making out of necessity; and it is unclear how households might adapt after the cessation of conflict to avoid long-term adverse impacts of coping strategies (e.g., the speed with which households can improve diets and acquire basic health services following the conflict, etc.).

Second, as is the case in all conflicts, the times surrounding the empirical investigation in this setting were tumultuous. There were protests, there was a quickly reversed removal of fuel subsidies prior to the capture of Sanaʻa, and there was lingering political uncertainty from the political transition that occurred in 2012. Thus, it is possible that the results described here might be context-specific, and it is possible that other countries might not experience similar shocks from the capture of territory from the internationally recognized government. However, the robustness of the empirical findings suggests that it is unlikely that any of these other factors are driving the results.

Third, it is important to emphasize that it is difficult to generalize the results from this setting to present-day situation. As noted before, the conflict is more violent now than at the time of the 2014 HBS, there are substantial impediments to importing food, fuel, and medical equipment that were not present during the capture of Sanaʻa, and the escalation of the conflict has been going on for more than two years. Thus, it is likely that the challenges currently presented to households are likely to be substantially different from those described in Sanaʻa in 2014, which could result in a different set of coping strategies (e.g., internal displacement) or place a different burden on disadvantaged household members.

Additionally, this paper investigates households' subjective assessment of their satisfaction rather than a more complete battery of experiential questions. Thus, it is difficult to gauge whether people could self-report their specific experiences with deprivation in accordance with more traditional measures (e.g., undernourishment) if they were asked specific questions without implicit reference points (e.g., inquiring about the number of meals people ate). Although other contexts have shown that experiential food security indicators that are unlikely to be misinterpreted still do not align well with measures of undernourishment based on household consumption (e.g., Maxwell et al. 2014), it is possible that more specific experiential indicators might respond to adverse shocks in similar ways as more traditional measures of welfare.

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Table 1. Differences between Control Variables in the Third and Fourth Quarters

	Sampled in Third Quarter	Sampled in Fourth Quarter	Difference (Quarter 4 - Quarter 3)
Household Size	8.855	7.877	-0.978
	[0.673]	[0.345]	[0.752]
Household Head Married	0.899	0.878	-0.021
	[0.021]	[0.033]	[0.039]
Household is Urban	1.000	1.000	-
	[0.000]	[0.000]	-
Head Attended School	0.696	0.748	0.052
	[0.051]	[0.043]	[0.066]
Head a Smoker	0.384	0.378	-0.006
	[0.051]	[0.041]	[0.065]
Head Chews Qat	0.829	0.825	-0.004
	[0.031]	[0.036]	[0.047]
Years of Schooling- Head	7.936	9.184	1.248
	[0.630]	[0.612]	[0.873]
Household Has a Child	0.958	0.983	0.025
	[0.018]	[0.007]	[0.019]
Walls Made of Cut Stone	0.306	0.227	-0.079
	[0.060]	[0.046]	[0.075]
Walls Made of Other Stone	0.509	0.645	0.136*
	[0.062]	[0.048]	[0.077]
Roof Made of Reinforced Concrete	0.562	0.540	-0.023
	[0.075]	[0.058]	[0.094]
Roof Made of Wood and Concrete	0.268	0.283	0.015
	[0.064]	[0.056]	[0.085]
Roof Made of Mud	0.170	0.177	0.007
	[0.049]	[0.055]	[0.073]
Floor Made of Concrete	0.232	0.297	0.065
	[0.046]	[0.051]	[0.068]
Floor Made of Tile	0.627	0.623	-0.004
	[0.066]	[0.058]	[0.087]
Household has a Flush Toilet	0.309	0.225	-0.084
	[0.052]	[0.045]	[0.068]

Notes: This table reports the average characteristics of surveyed households in the third and fourth quarter in the city of Sana'a in 2014 respectively in columns (1) and (2), and further reports that simple difference in column (3). The survey was designed such that the households surveyed such that there should be no differences between households between months of the survey, and thus if the samplings was done according to plan, the two estimates should be similar. There were 266 households surveyed in quarter 3 and 231 households surveyed in quarter 4. Estimates are weighted so as to be representative of the population, and standard errors are clustered at the PSU level. The statistical significance of the difference is reported for column (3). *** denotes statistical significance at the 1 percent level; ** denotes significance at the five percent level; and * denotes significance at the 10 percent level.

Table 2. Expenditure Changes in Response to the Capture

	Dependent Variable:						
	ln(Expenditure)						
	Single Difference		Double Difference 1: How Much Larger Effects were in Sana'a Relative to the Rest of Yemen- 2014	Double Difference 2: How Much Larger Effects were in Sana'a in 2014 than in 2005	Triple Difference	Including Pre-Conflict Trends	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post-Capture Months							
Effect of Capture in October	-0.083	-0.069	-0.097	-	-	-	-0.063
	[0.191]	[0.187]	[0.233]	-	-	-	[0.275]
Effect of Capture in November	-0.223	-0.203	-0.265	-0.131	-0.299	-	-0.232
	[0.159]	[0.142]	[0.174]	[0.161]	[0.221]	-	[0.228]
Effect of Capture in December	-0.403***	-0.374***	-0.428***	-0.375**	-0.462**	-	-0.394*
	[0.133]	[0.107]	[0.152]	[0.148]	[0.215]	-	[0.211]
Pre-Capture Months							
Trend in August	-	-	-	-	-	0.159	0.159
	-	-	-	-	-	[0.246]	[0.244]
Trend in September	-	-	-	-	-	-0.075	-0.039
	-	-	-	-	-	[0.252]	[0.254]
Control Variables	N	Y	Y	Y	Y	Y	Y
Includes 2005 households	N	N	N	Y	Y	N	N
Excludes Households surveyed after the capture	N	N	N	N	N	Y	N
Includes Rest of Yemen	N	N	Y	N	Y	Y	Y
P-value of Test of Coefficients on all Post-Capture Effects Equaling Zero	0.026**	0.006***	0.039**	0.039**	0.088*	0.626	0.217
P-value of Test of Coefficients on Pre-Trend Months Equaling December Coefficient	-	-	-	-	-	-	0.014**
Observations	504	504	4317	2207	9097	2189	4317

Notes: This table estimates the change in expenditure following the capture of the Yemeni capital by rebels. Columns (1) and (2) include only households from Sana'a surveyed in 2014, and estimates the change in expenditure by month of capture; column (3) includes households from the rest of Yemen, and the estimates represent by how much more expenditure changed in Sana'a than the rest of Yemen in 2014; column (4) restricts the sample to households surveyed in Sana'a in 2014 and 2005, and the estimates represent by how much more expenditure changed in Sana'a in 2014 than in 2005; column (5) includes all households surveyed in 2014 and 2005, and the estimates how much larger the difference-in-difference in expenditure was in Sana'a than in the rest of Yemen; column (6) restricts the sample to households surveyed in all of Yemen in 2014 but restricts the sample to those surveyed before the capture to estimate the change in expenditure in the months leading up to the capture relative to the baseline month; and column (7) re-estimates the difference-in-difference specificaiton in column (3), but includes the pre-capture trends. All specifications exclude households surveyed during the month of Ramadan- July in 2014 and October in 2005. For specifciations comparing 2014 to 2005, households surveyed in both months were excluded from all surveys. All specifications include all lower-order terms and control variables. Control variables include all variables reported in Table 1 except for household size (the dependent variable is per-capita). Standard errors clustered at the PSU level are reported in parentheses in columns (1)-(2) and in column (4); columns (3) and columns (5)-(7) report the larger of standard errors clustered at the PSU level or clustered at the governorate level; all estimates are weighted so as to be representative of the entire population. *** denotes statistical significance at the 1 percent level; ** denotes significance at the five percent level; and * denotes significance at the 10 percent level.

Table 3. Changes in Other Measures of Welfare and Coping Strategies

	Dependent Variable:							
	ln (Food Expenditure)	ln (Non-Food Expenditure)	ln (Daily Household Calorie Consumption)	ln(Daily Household Protein Consumption)	ln (Household Income)	Indicator for whether Household had Loan	ln (Per Capita Daily Expenditure)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-Capture Months								
Effect of Capture in October	0.010	-0.104	0.215	0.024	-0.012	0.138	-0.459*	0.127
	[0.216]	[0.235]	[0.224]	[0.221]	[0.147]	[0.104]	[0.242]	[0.277]
Effect of Capture in November	-0.118	-0.278	0.141	-0.197	-0.202	-0.002	-0.418**	-0.247
	[0.177]	[0.176]	[0.165]	[0.244]	[0.138]	[0.089]	[0.176]	[0.197]
Effect of Capture in December	-0.381**	-0.433***	-0.346**	-0.349**	-0.334**	0.174**	-0.533***	-0.393**
	[0.148]	[0.157]	[0.173]	[0.160]	[0.162]	[0.075]	[0.187]	[0.163]
Restrict Households to Those Where Household Head Did Not Finish Primary School	N	N	N	N	N	N	Y	N
Restrict Households to Those Where Household Head Finished Primary School	N	N	N	N	N	N	N	Y
P-value of Test of Coefficients on Joint Significance of Higher-Order Terms	0.060*	0.046**	0.147	0.130	0.062*	0.067*	0.025**	0.062*
P-value of Test of Coefficients on October and December Higher-Order Terms Being Equal	0.130	0.353	0.288	0.237	0.026**	0.135	0.760	0.065*
Observations	4317	4317	4317	4317	2209	4317	1636	2581

Notes: This table estimates the change in welfare and coping strategies following the capture of the Yemeni capital by rebels. Columns (1)-(6) utilize different measures of welfare and coping strategies, and columns (7) and (8) estimate the change in expenditure for households of different socioeconomic status (whether household head finished primary school) separately. All specifications exclude households surveyed during the month of Ramadan (July). All specifications include all lower-order terms and control variables. Control variables include all variables reported in Table 1. The larger of standard errors clustered at the PSU level or clustered at the governorate level are reported in parentheses; all estimates are weighted so as to be representative of the entire population. *** denotes statistical significance at the 1 percent level; ** denotes significance at the five percent level; and * denotes significance at the 10 percent level.

Table 4. Changes in Women's Decision Making in Response to the Capture

	Coeffeicient on Conflict Indicator for Households in Sana'a Only	Coeffeicient on Conflict Indicator for Households in the Rest of Yemen	Coefficient Yielding How much larger the change in Sana'a was than the Rest of Yemen
Dependent Variable:	(1)	(2)	(3)
Women Responsible for Purchase of Food	-0.136***	0.021	-0.154***
	[0.042]	[0.022]	[0.055]
Women Responsible for Purchase of Heads Clothes	-0.012	0.007	-0.021
	[0.019]	[0.015]	[0.026]
Women Responsible for Purchase of Womens' Clothes	-0.074	0.007	-0.067
	[0.082]	[0.034]	[0.089]
Women Responsible for Purchase of Childrens' Clothes	-0.041	0.006	-0.039
	[0.041]	[0.022]	[0.049]
Women Responsible for Purchase of Medicine for Spouse	-0.036	0.014**	-0.048*
	[0.024]	[0.007]	[0.025]
Women Responsible for Purchase of Medicine for Other Adult Women	-0.016	-0.000	-0.019
	[0.020]	[0.006]	[0.020]
Women Responsible for Purchase of Medicine for Children	-0.031	0.002	-0.036*
	[0.019]	[0.008]	[0.021]
Women Responsible for Expnediture on Son's Marriage	-0.016	0.001	-0.018*
	[0.010]	[0.003]	[0.011]
Women Responsible for Expnediture on Daughter's Marriage	-0.013	0.005	-0.019
	[0.010]	[0.004]	[0.012]
Women Responsible for Expenditure on Boys' Education	-0.011	-0.000	-0.014
	[0.008]	[0.009]	[0.014]
Women Responsible for Expenditure on Girls' Education	-0.019	0.001	-0.022
	[0.012]	[0.009]	[0.015]
Women Responsible for Expenditure on Elderly Care	0.005	-0.008	0.014
	[0.028]	[0.023]	[0.041]
Women Responsible for Taking on Debt	-0.004	-0.002	-0.006
	[0.019]	[0.007]	[0.020]
Observations	503	3,789	4,292

Notes: This table estimates how women's decision-making ability changed following the capture of Sana'a. Each cell reports coefficients from a separate regression. Column (1) reports the simple difference in the share of households where women were responsible for the decision described in each row; column (2) reports the same specification but restricts the sample to the rest of Yemen; and column (3) presents estimates by how much larger the change was in the city of Sana'a than in the rest of Yemen. The difference-in-difference specifcation in column (3) includes all lower-order terms, and all specificaitons include control variables. Control variables include all variables reported in Table 1. Specifications in column (1) report standard errors clustered at the PSU level in parentheses; and columns (2)-(3) report the larger standard error from either a specifcaiton clustering the standard errors at the PSU level or clustering the standard errors at the governorate level. Estimates are weighted so as to be representative of the entire population. *** denotes statistical significance at the 1 percent level; ** denotes significance at the five percent level; and * denotes significance at the 10 percent level.

Table 5. A Closer Examination of Decision Making in the Household

	Dependent Variable:							
	Indicator if Head is Involved in the Food Purchase Decision	Indicator if Neither Spouse nor Head are Involved	Indicator if Spouse Answered Decision-Making Module	Indicator if Woman Responsible for Food Purchases				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-Conflict Indicator*Sana'a Indicator	0.167**	-0.013	0.120***	-	-0.182*	-0.131**	-0.132**	-0.173**
	[0.069]	[0.042]	[0.043]	-	[0.093]	[0.051]	[0.059]	[0.072]
Effect of Capture in October	-	-	-	-0.163**	-	-	-	-
	-	-	-	[0.074]	-	-	-	-
Effect of Capture in November	-	-	-	-0.196***	-	-	-	-
	-	-	-	[0.065]	-	-	-	-
Effect of Capture in December	-	-	-	-0.101	-	-	-	-
	-	-	-	[0.067]	-	-	-	-
Restrict Sample to Those Where Spouse Owned Gold	N	N	N	N	Y	N	N	N
Restrict Sample to Those Where Spouse Did Not Own Gold	N	N	N	N	N	Y	N	N
Restrict Sample to those where Head Did Complete Primary School	N	N	N	N	N	N	Y	N
Restrict Sample to those where Head Did Not Complete Primary School	N	N	N	N	N	N	N	Y
P-value of Test of Coefficients on Joint Significance of Higher-Order Terms	-	-	-	0.019**	-	-	-	-
P-value of Test of Coefficients on October and December Higher-Order Terms Being Equal	-	-	-	0.368	-	-	-	-
Observations	4292	4292	4292	4292	1000	3292	2668	1624

Notes: This table investiages a number of different specifications better describing the change in women's decision making following the capture of Sana'a. Each coefficient represents how much larger the change in the dependent variable was in Sana'a than the rest of Yemen in 2014. Column (1) utilizes an indicator equaling one if the household head was involved in the food purchase decision; column (2) utilizes an indicator equaling one if niether the head nor the spouse is involved in the decision to purchase food; column (3) utilizes an indicator equaling one if the spouse (or head if the household head was a women) responded to the decision-making module; and columns (4)-(9) utilize an indicator if the spouse (or head if the household head was a woman) was in charge of the decision to purchase food. Columns (1)-(4) include the whole sample, while columns (5)-(8) restrict households based on measures of women's bargaining power and socioeconomic status. All specifications exclude households surveyed during the month of Ramadan (July). All specifications include all lower-order terms and control variables. Control variables include all variables reported in Table 1. The larger of standard errors clustered at the PSU level or clustered at the governorate level are reported in parentheses; all estimates are weighted so as to be representative of the entire population. *** denotes statistical significance at the 1 percent level; ** denotes significance at the five percent level; and * denotes significance at the 10 percent level.

Table 6. Changes in Women's Employment in Response to the Capture

	Dependent Variable: Indicator Equaling One if Spouse is Employed							
	Restrict Sample to Sana'a	Restrict Sample to Rest of Yemen	Difference-in-Difference (col (1)-col (2))	Estimate Change by Month	Restrict Sample to Women who Own Gold	Restrict Sample to Women who Do Not Own Gold	Restrict Sample to Women in Households where Head Completed Primary School	Restrict Sample to Women in Households where Head Did Not Complet Primary School
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-Conflict Indicator	-0.005	0.005	0.005	-	0.002	0.007	-0.000	0.010
	[0.028]	[0.006]	[0.006]	-	[0.012]	[0.007]	[0.009]	[0.007]
Post-Conflict Indicator*Sana'a Indicator	-	-	-0.014	-	0.043	-0.037	-0.020	0.013
	-	-	[0.029]	-	[0.048]	[0.034]	[0.039]	[0.020]
Effect of Capture in October	-	-	-	-0.049*	-	-	-	-
	-	-	-	[0.030]	-	-	-	-
Effect of Capture in November	-	-	-	0.054	-	-	-	-
	-	-	-	[0.051]	-	-	-	-
Effect of Capture in December	-	-	-	-0.048*	-	-	-	-
	-	-	-	[0.026]	-	-	-	-
P-value of Test of Coefficients on Joint Significance of Higher-Order Terms	-	-	-	0.055*	-	-	-	-
P-value of Test of Coefficients on October and December Higher-Order Terms Being Equal	-	-	-	0.984	-	-	-	-
Observations	504	3,813	4,317	4,317	1,000	3,317	2,681	1,636

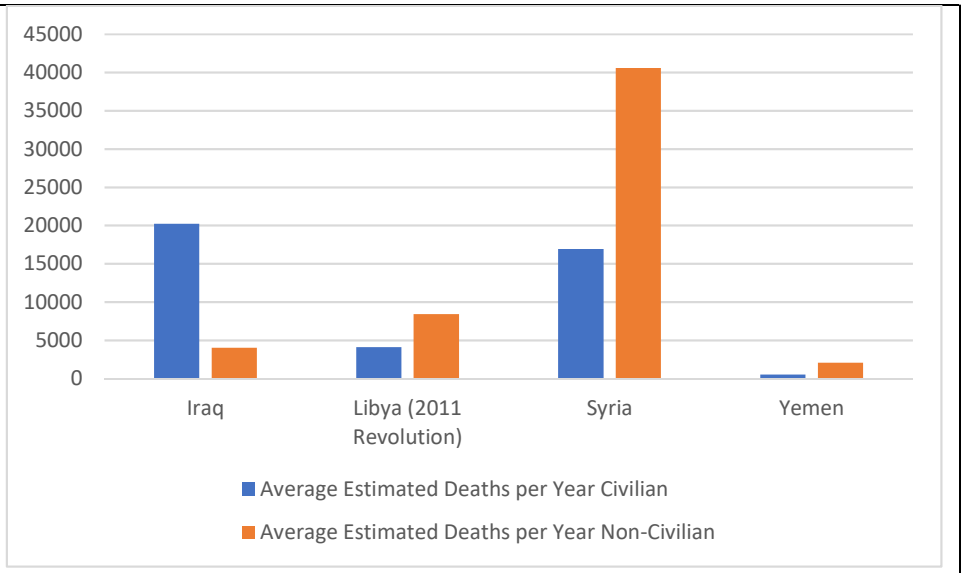
Notes: This table investiages a number of different specifications describing the change in women's employment following the capture of Sana'a. Columns (1) and (2) estimate a simple change in employment following the capture of Sana'a in the city of Sana'a and the rest of Yemen respectively. Columns (3)-(8) estimate how much larger the change in women's employment was in Sana'a than the rest of Yemen in 2014. Columns (1)-(4) utilze the entire sample, and columns (5)-(8) restrict households based on measures of women's bargaining power and socioeconomic status. All specifications exclude households surveyed during the month of Ramadan (July). All specifications include all lower-order terms and control variables. Control variables include all variables reported in Table 1. The larger of standard errors clustered at the PSU level or clustered at the governorate level are reported in parentheses; all estimates are weighted so as to be representative of the entire population. *** denotes statistical significance at the 1 percent level; ** denotes significance at the five percent level; and * denotes significance at the 10 percent level.

Table 7. Changes in Satisfaction Following the Capture

	Increase in Share "Not At All Satisfied"	Increase in Share "Not Very Satisfied"	Increase in Share "Fairly Satisfied"	Increase in Share "Very Satisfied"	Increase in Share Either "Very Satisfied" or "Fairly Satisfied"		How much Larger the Increase in Share Reporting any Satisfaction was in Sana'a than Rest of Yemen
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Security	-0.080	0.030	0.032	-0.073***	-0.125	0.037	-0.178
	[0.079]	[0.077]	[0.078]	[0.024]	[0.094]	[0.040]	[0.112]
Food	-0.099	-0.009	0.060*	0.026**	0.067*	-0.027	0.094*
	[0.063]	[0.056]	[0.034]	[0.013]	[0.036]	[0.036]	[0.052]
Income	-0.022	-0.085	0.066	0.031	0.121**	0.017	0.089
	[0.043]	[0.057]	[0.047]	[0.033]	[0.055]	[0.040]	[0.075]
Work	-0.036	0.024	0.025	0.001	0.043	-0.012	0.048
	[0.051]	[0.058]	[0.049]	[0.020]	[0.055]	[0.037]	[0.069]
Health	0.001	-0.029	0.026	0.019	0.033	-0.017	0.052
	[0.072]	[0.062]	[0.030]	[0.015]	[0.039]	[0.026]	[0.045]
Dwelling	-0.127**	0.003	0.041	0.040	0.093	-0.036	0.114
	[0.053]	[0.065]	[0.060]	[0.034]	[0.064]	[0.035]	[0.075]
Restrict the Sample to the city of Sana'a	Y	Y	Y	Y	Y	N	N
Restrict the Sample to the rest of Yemen	N	N	N	N	N	Y	N
Observations in each of the regressions reported in the column	504	504	504	504	504	3813	4317

Notes: This table estimates how peoples' self-reported satisfaction with a number of dimensions of welfare changed following the capture of Sana'a. Each cell represents a coefficient of a separate regression of an indicator equaling one if either the head or the head's spouse reported a particular type of satisfaction with a particular dimension on an indicator equaling one if the household was interviewed following the capture of Sana'a. Column (1) reports the change in the share of households that were "not at all satisfied"; column (2) reports the change in share of households that were "not very satisfied"; column (3) reports the change in the share of households that were "fairly satisfied"; and column (4) reports the change in the share of households that were "very satisfied." Columns (5)-(7) report the change in the share of households that were either "very satisfied" or "fairly satisfied." Columns (1)-(5) restrict the sample to households from Sana'a, and report the simple increase in the share of households that had a particular level of satisfaction. Column (6) re-estimates the same specification, but restricts the sample to households surveyed in the rest of Yemen. Column (7) reports estimates of how much larger the increase in satisfication was in Sana'a than the rest of Yemen. All specifications include control variables, and column (7) includes lower-order terms. Control variables include all variables reported in Table 1. Columns (1)-(5) report standard errors clustered at the PSU level in parentheses; and columns (6)-(7) reports the larger of standard errors clustered at the PSU level and standard errors clustered at the governorate level. All estimates are weighted so as to be representative of the entire population. *** denotes statistical significance at the 1 percent level; ** denotes significance at the five percent level; and * denotes significance at the 10 percent level.

Figure 1. Average Deaths per Year in Recent Middle East Conflicts



Notes: The figures for Iraq were obtained from Iraq Body Count, and only include the casualty figures for 2014; the figures for Libya were obtained from United Nations High Commissioner for Human Rights and the Libyan government; the figures for Syria were obtained from the Syrian Observatory for Human Rights; and the figures for Yemen were obtained from the United Nations High Commissioner for Human Rights.

Figure 2. Changes in Commodity Prices in Sana'a Following the Capture

Figure 2a. Commodity Prices in Sana'a in 2014

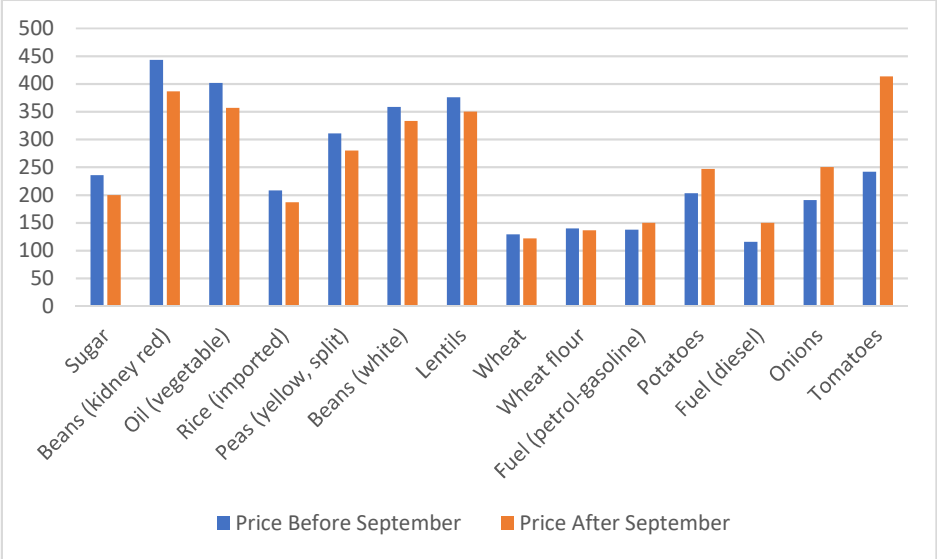
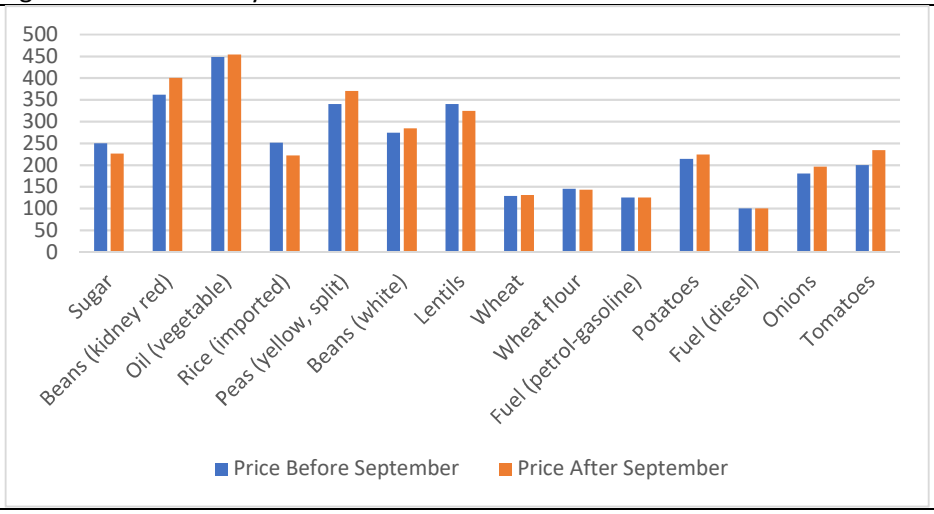


Figure 2b. Commodity Prices in Sana'a in 2012-2013

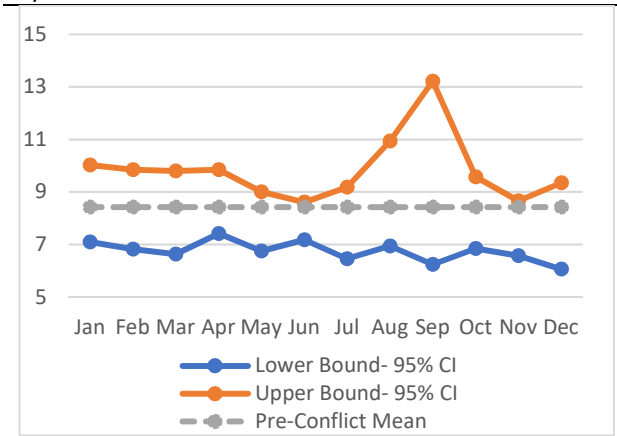


Notes: These figures shows average commodity prices in Sana'a markets in 2014, and the average for the two years prior to the capture of the capital. These figures were obtained from the monthly database maintained by the World Food Programme.

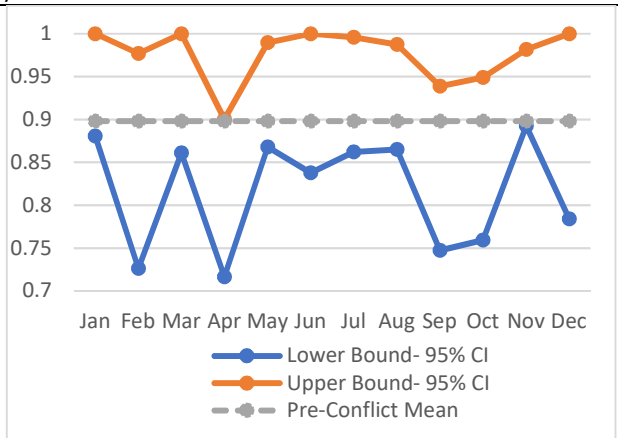
Figure 3. Monthly Confidence Intervals of Control Variables

Figure 3a- Summary Statistics by Month

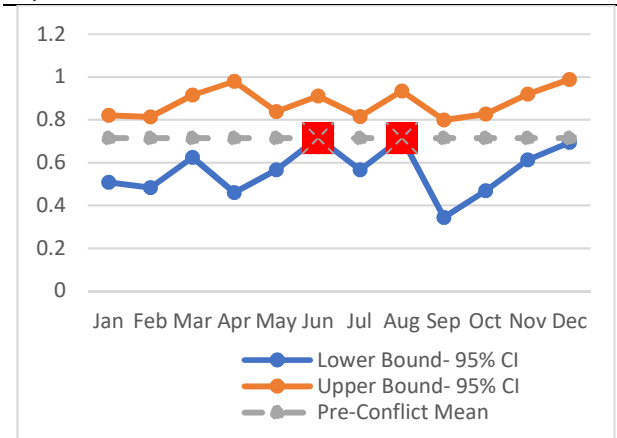
1) Household Size



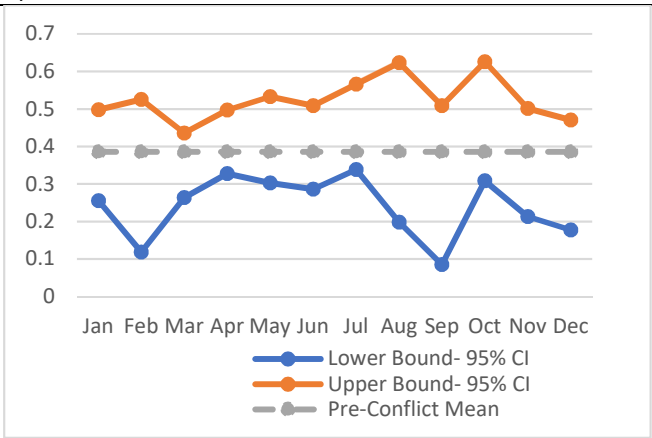
2) Household Head Married



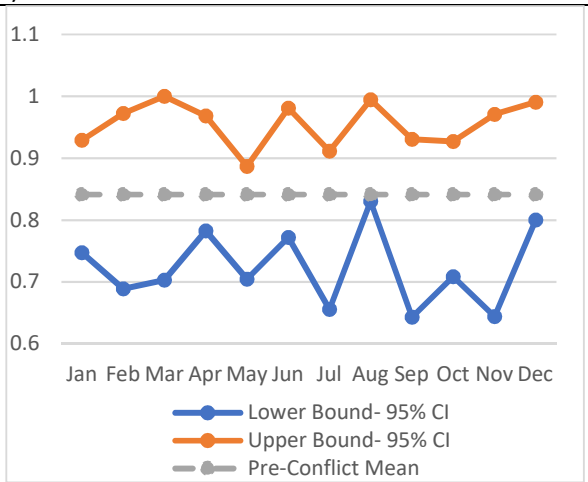
3) Household Head Never Attended School



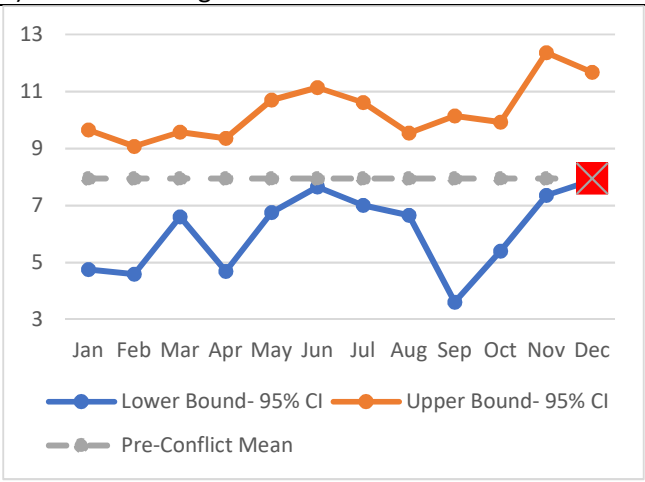
4) Household Head a Smoker



5) Household Head Chews Qat



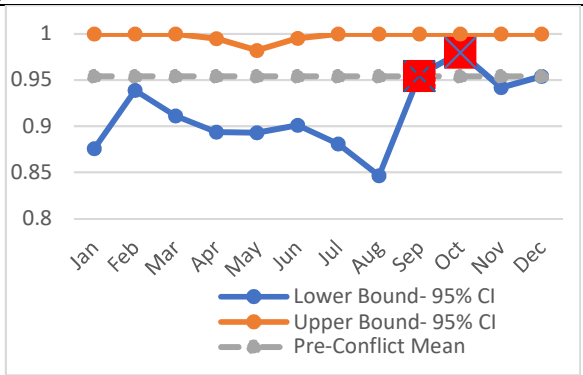
6) Years Schooling



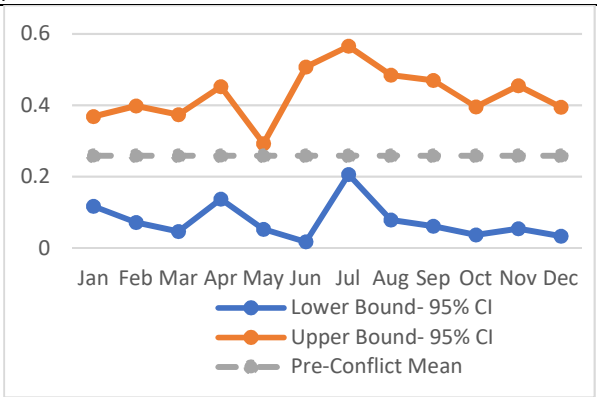
Source: 2014 Household Budget Survey, Author's Calculation

Figure 3b- Summary Statistics by Month

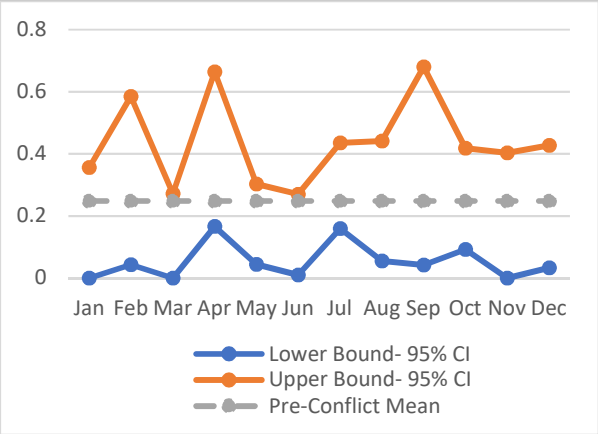
7) Household has a Child



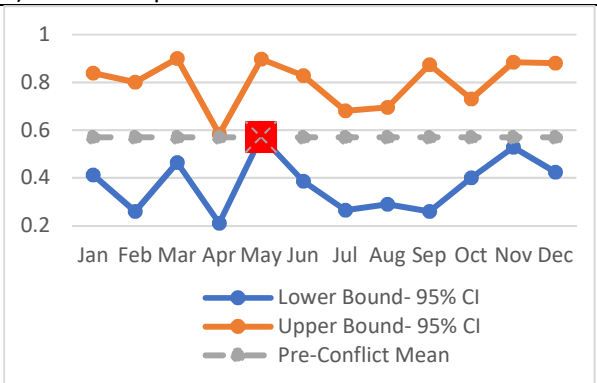
8) Household has a Flush Toilet



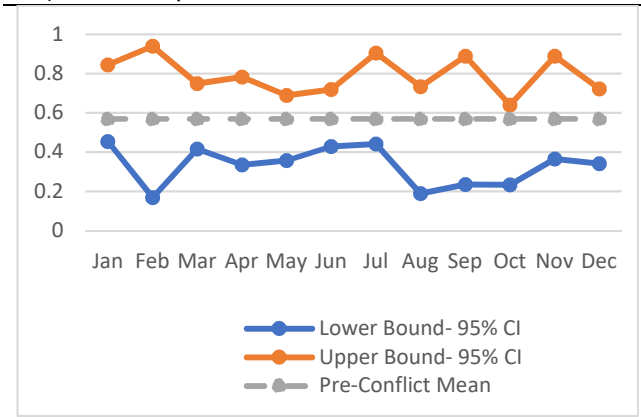
9) Walls Composed of "Cut Stone"



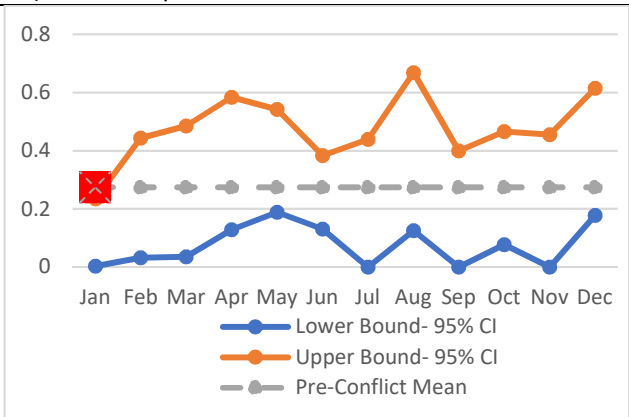
10) Walls Composed of Other Material



11) Roof Composed of Reinforced Concrete



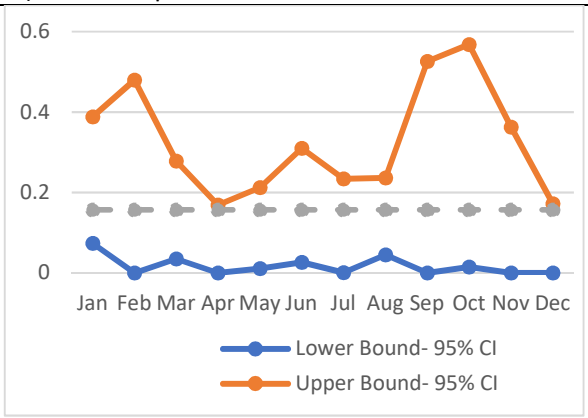
12) Roof Composed of Wood and Concrete



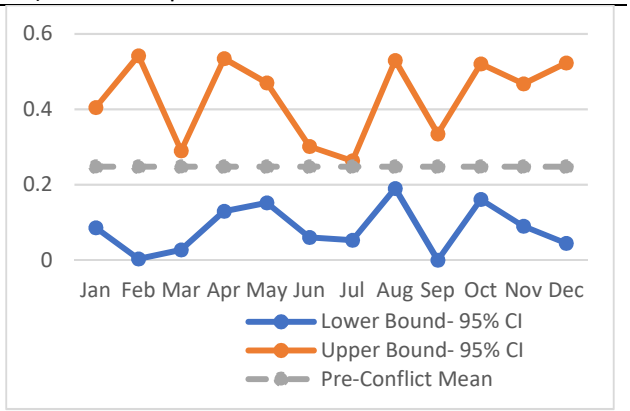
Source: 2014 Household Budget Survey, Author's Calculation

Figure 3c- Summary Statistics by Month

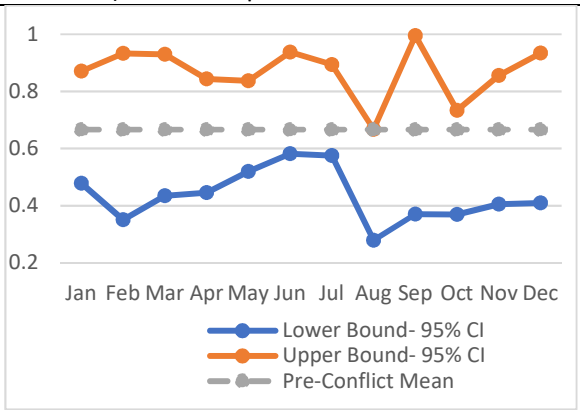
13) Roof Composed of Mud



14) Floor Composed of Concrete

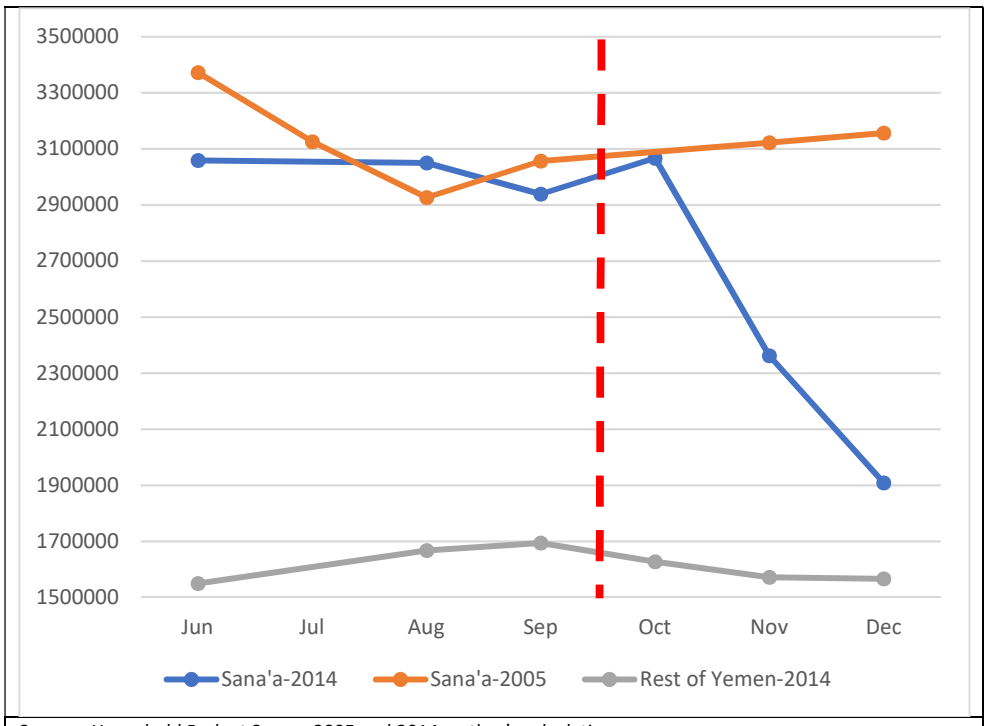


15) Floor Composed of Natural Tiles



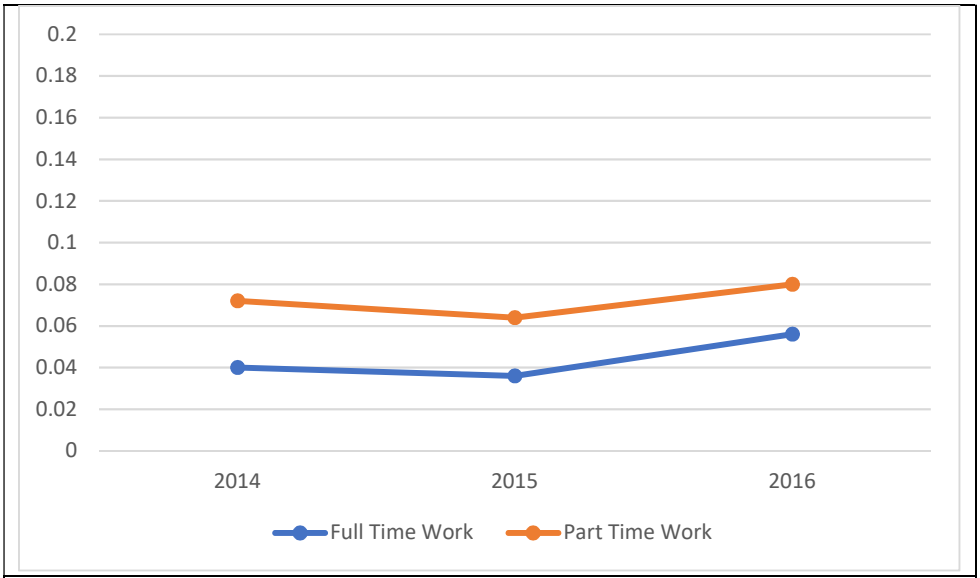
Source: 2014 Household Budget Survey, Author's Calculation

Figure 4. Change in Annual Expenditure Following the Capture



Source: Household Budget Survey 2005 and 2014, author's calculation.

Figure 5. Share of Women Employed Escalated



Source: Gallup World Poll, 2014-2016, author's calculation. Figure summarizes the average employment status of female respondents.

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