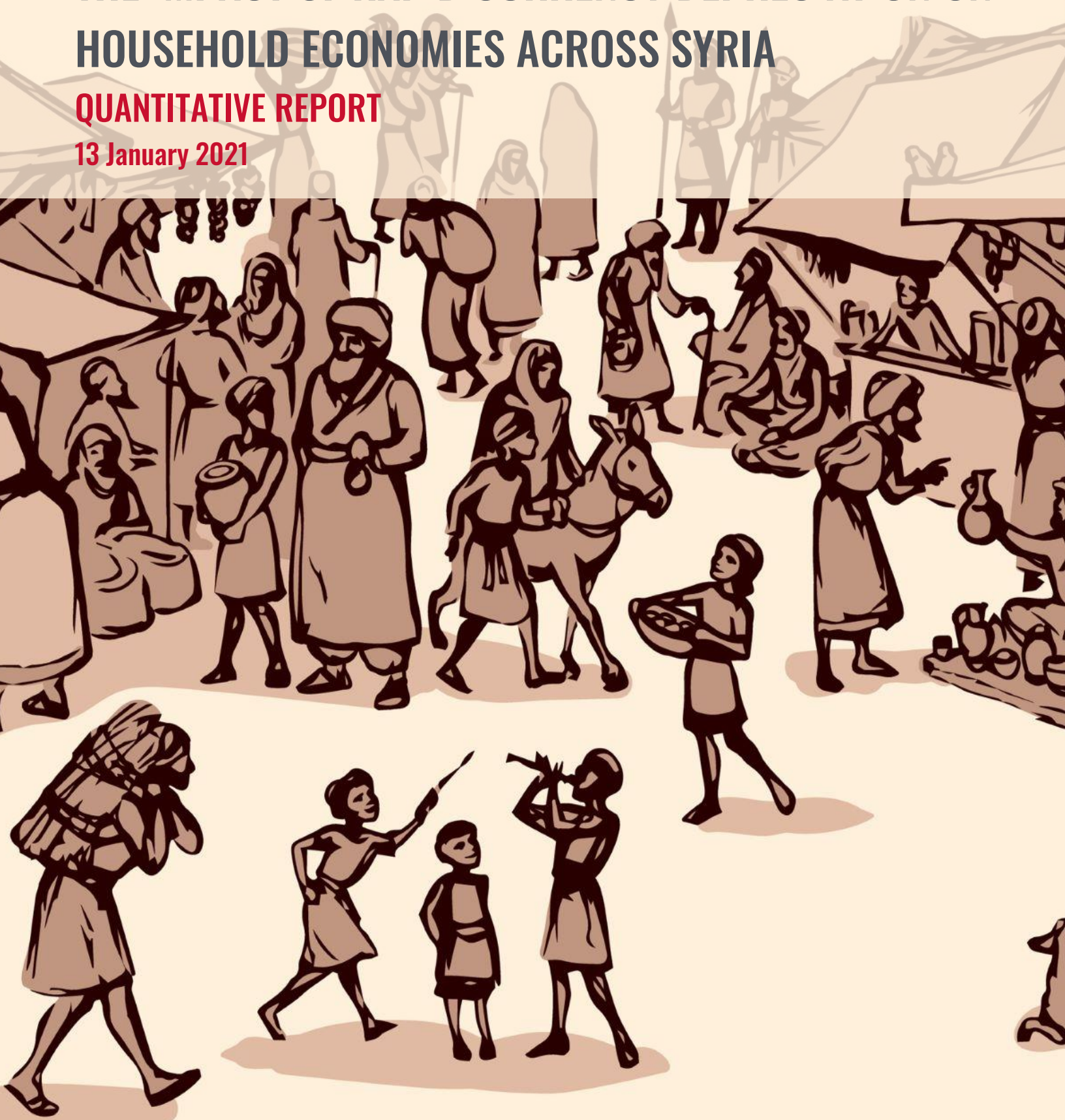


# FROM BAD TO WORSE

## THE IMPACT OF RAPID CURRENCY DEPRECIATION ON HOUSEHOLD ECONOMIES ACROSS SYRIA

### QUANTITATIVE REPORT

13 January 2021



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# EXECUTIVE SUMMARY

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The rapid depreciation of the Syrian pound since mid-October 2019 has strained the beleaguered economy of Syria and greatly diminished the already tenuous purchasing power of many Syrians. This report analyzes how business owners and workers respond to rapid currency depreciation, and quantifies the relationship between the daily wage rate of unskilled workers and the price of essential items across the zones of control in Syria during a period of rapid and uncontrolled depreciation of the pound from October 2019 to October 2020. Using the same data, predictions have been made on wage rates and food affordability across all Syrian zones of control for Q1 2021.

The gap between market prices and wage rate increases is the underlying issue decreasing individuals' purchasing power, with multiple factors contributing to a growing disparity between the two. The combination of high price inflation and insufficient wage increases has led to a decrease in affordability of essential items in all the zones of control, except Self-Administration areas. Affordability decreased the most in Syrian government-held areas, and diminishing daily wage rates in Turkish-controlled areas has rendered essential items significantly less affordable. Counter to this, the increase in affordability of essential items in Self-Administration areas are mainly attributed to continuing fuel subsidies and higher wage rates, likely the result of positive spillovers from a public-sector wage increase. According to HAT's statistical price prediction models outlined in this paper, the affordability of essential items will decrease in Self-Administration, opposition-controlled, and Turkish-controlled areas throughout Q1, while remaining constant in Syrian government-held areas.

In response, Syrians have employed food and income coping strategies, which are similar across zones of control. This has included buying smaller quantities of goods, buying cheaper or lower-quality foods, buying food with money normally used to purchase other items or luxury goods, skipping meals, cutting meat from their diet, borrowing money, and selling non-productive assets. The rank-order prevalence of adopted coping strategies were markedly similar among the zones of control in northern Syria.

It is estimated that essential items will continue to become less affordable across different zones of control as the Syrian pound continues to depreciate; therefore, humanitarian interventions should be considered to address increasing household food insecurity, as well as protection issues arising from certain food and income coping mechanisms.

# KEY POINTS

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- › Currency depreciation has exacerbated an already challenging economic situation in Syria, and has impacted all zones of control to varying degrees.
- › Imported products and domestic products reliant on foreign inputs have become much less affordable, while domestic produce affordability has remained stable.
- › A partial monthly survival minimum expenditure basket (SMEB) costs more than a month of wages for the typical Syrian unskilled worker; in fact, they had to work 11.5 weeks to purchase a partial SMEB during the rapid depreciation period, compared to 8.5 weeks prior to this. Therefore, many households have adopted strategies to cut costs and earn additional income; particularly, skipping meals, buying on credit, borrowing money, and sending children to work or beg.
- › Essential items have become less affordable in Syrian government, Turkish-controlled, and opposition-controlled areas; in fact, the average unskilled worker in these zones of control must work an additional 69 to 141 additional hours to purchase the same monthly basket of essential items at the same price relative to their daily wage during the depreciation period, compared to the previous year.
- › Self-Administration areas were the only zone of control where affordability of essential goods increased, likely due to positive pressure on the private sector from administrative wage increases for government employees.
- › According to HAT's predictive price modeling, affordability of essential food items is projected to markedly decrease across all zones of control, except Syrian government-held areas, in Q1 2021, while wages are predicted to severely lag behind the price of essential items in Turkish-controlled areas.
- › Trading using different currencies mitigates losses caused by fluctuations in the value of the Syrian pound; however, the illegality of dealing in foreign currencies in Syrian government-held areas and the recent depreciation of the Turkish lira have complicated this approach.

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# INTRODUCTION

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The Syrian economy has suffered significantly since the onset of conflict in 2011. Gross domestic product in 2020 sits at just one third of its pre-conflict level in 2010, while both internal and external economic shocks have further undermined domestic trade, financial markets and export markets. Internally, the country's two main sectors, agriculture and oil, have been hugely affected by the protracted conflict and its impact on extraction, production and national and international trade. The agricultural sector is largely unproductive, with damaged irrigation systems, trade routes and a lack of access to primary production inputs, while Syria's major oil producing regions in the northeast are now under the control of the Self-Administration.<sup>1,2,3</sup>

Externally, economic sanctions imposed on the country by the EU and USA have decimated the export market and foreign investment opportunities, while the neighboring financial crisis in Lebanon has strangled financial systems dependent on the Lebanese banking and financial sectors. More recently, the global outbreak of COVID-19 has significantly decreased prospects for economic growth as the secondary impact of preventative measures of lockdown, curfews and movement restrictions have further limited internal economic activity and trade.<sup>4,5</sup>

One of the major effects of Syria's failing economy has been the depreciation of the Syrian pound (SYP). From the beginning of the conflict in 2011 to the end of March 2020, the exchange rate fell from 47 SYP per USD to 1,360 SYP per USD, representing a 96.5% decline in value. On 8 June 2020, the pound reached a record low of 3,175 SYP per USD, coinciding with the implementation of the Caesar Act sanctions in Syrian government-held areas. Additionally, in a single week in December 2020, the pound further devalued to 2,778 SYP per USD on the black market, demonstrating again its instability. The most significant period of depreciation occurred, when the

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<sup>1</sup> Chatham House, '[The Syrian Pound Signals Economic Deterioration](#)', September 2019

<sup>2</sup> According to the Government of Syria statistics, oil production contribution to aesthetic GDP in Syria was 9.5 percent in 2010.

<sup>3</sup> Humanitarian Access Team, '[Fuel in Government of Syria-held areas](#)', March 2020.

<sup>4</sup> GDP per capita growth (annual %) [World Bank Data](#), April 2020

<sup>5</sup> Middle East Monitor, '[With the Syrian economy on the verge of collapse, recovery seems like mission impossible](#)', February 2020

pound fell 277% from 632 to 2,380 SYP per USD from October 2019 to October 2020 (as shown in Figure 1), categorized within this report as the ‘rapid depreciation period’.

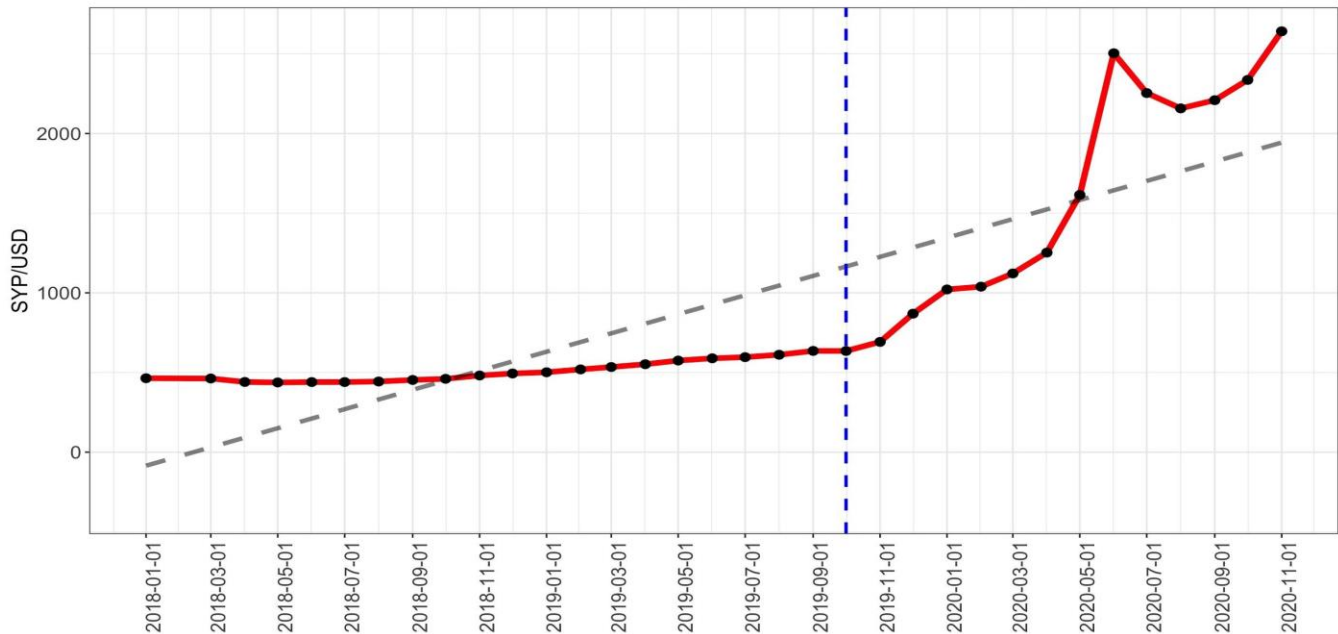


Figure 1: SYP/USD exchange rate, January 2018 to October 2020.

For communities within Syria, the declining value of the pound has been compounded by increasing levels of inflation of basic food, sanitation and medical items, as well as increased resource scarcity. Internal agricultural production has also been negatively affected, through difficulties in importing basic production inputs, machinery and supplies. This places further concerns of resource scarcity and food insecurity on an economy already struggling with high levels of inflation.<sup>6,7</sup>

While not the sole cause, this was largely triggered by the financial crisis in neighboring Lebanon, which essentially froze an estimated \$30 billion worth of Syrian owned financial assets in Lebanese financial institutions.<sup>8,9</sup> Additionally, while the currency depreciation began to

<sup>6</sup> Forexeasy, [How to Calculate Currency Depreciation](#), May 2013

<sup>7</sup> Enab Baladi, [‘Daraa farmers face a “disastrous season” after fertilizers’ prices hike’](#), March 2020

<sup>8</sup> Syrian Observer, [Syrian Assets in Lebanon in Danger](#), Accessed November 27, 2020.

<sup>9</sup> The Syria Report, [Central Bank Devalues Exchange Rate for Remittances](#) [Account needed], Accessed November 27, 2020.

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accelerate in October 2019, preventative measures against the COVID-19 pandemic, implemented in March 2020, then also further crippled local businesses via shutdowns and limitations to working hours. These restrictions began while the pound was rapidly depreciating, which lowered household income while its value declined.<sup>10</sup> According to the World Food Program (WFP), the economic limitations imposed by COVID-19 restrictions led to a 9.5% increase in the price of a basic food basket in March, 16% in April, and 11% in May.<sup>11</sup> Further hardship was endured as a result of restricted access to markets, delayed store restocking, and an inability to access remittances; in addition, traders have reduced the number of people they extended credit to avoid payment defaults.<sup>12</sup> A range of additional factors including poor monetary policy decisions, the global economic effects of COVID-19, the economic effects of international sanctions, as well as a general deterioration of internal production have all assisted in depressing the Syrian pound.<sup>13</sup>

This quantitatively-focused report measures the affordability of food items as the price of a food item relative to the local wage rate, and calculates differences in affordability before and during the current economic crisis across Syria. The predicted affordability of essential items was estimated by applying historical price and wage data to a machine learning model, which statistically identified patterns and used those trends to extrapolate prices and wages over the next four months, into Q1 2021 (with a 90% confidence interval). The quantitative findings are supported by 31 key informant interviews (KIIs) conducted across all zones of control for additional insight into how business owners, teachers, doctors, and general workers have coped with the financial challenges caused by the recent economic crisis.

The results indicate that, on average, the typical unskilled worker in Syria must work an additional two and a half weeks to purchase a basket of essential goods at the same relative cost as they did before the rapid depreciation period; however, affordability dynamics vary by zone of control. In response, many households have adopted food and income coping mechanisms to compensate for their diminished purchasing power.

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<sup>10</sup> Center for Operational Analysis and Research. [Syria after COVID-19: No relief for an ailing economy](#). April 2020.

<sup>11</sup> WFP [via ReliefWeb]. "[Syria - Socio-Economic Impacts of the COVID-19 Pandemic, October 2020 - Syrian Arab Republic](#)." Accessed November 27, 2020.

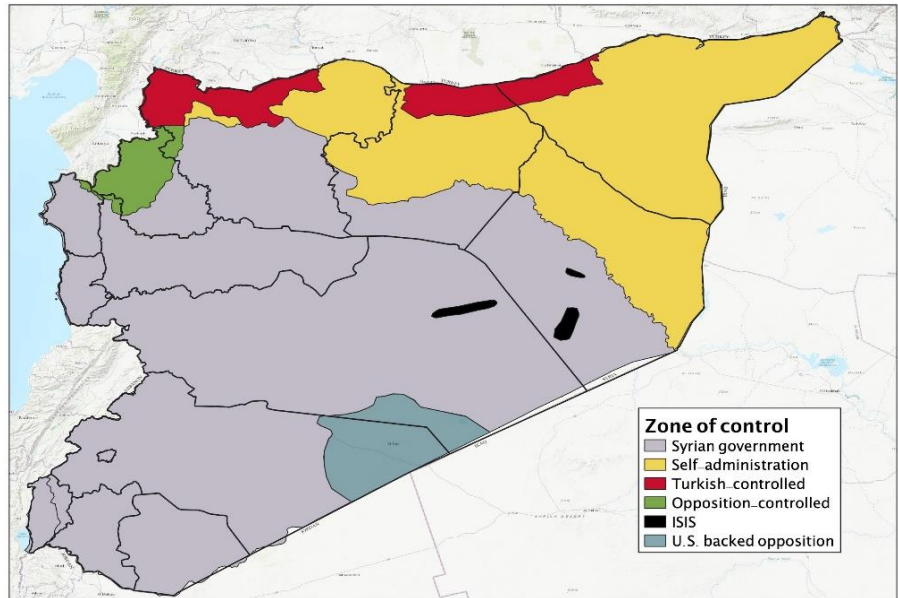
<sup>12</sup> *ibid*

<sup>13</sup> Mercy Corps Humanitarian Access Team, Syria. '[Government of Syria responses to the financial crisis](#).' May 2020



## Zones of control

This report focuses on the four main zones of control, dynamically defined according to the boundaries as they change over time. Specifically, the zones of control are defined according to mid-month boundaries, obtained from liveuamap.com. Monthly data is matched with the mid-month zone of control to ensure the accurate zone of control boundaries over time.



*Figure 2: Administrative zones of control in Syria, as of November 2020.*

The main zones of control, mapped in Figure 2, are as follows:

- > **Syrian government** (grey): Areas controlled by the Syrian government in Damascus, headed by Bashar al-Assad, the Syrian president.
- > **Self-Administration** (yellow): Areas in the northeast of the country under the governance of the Self-Administration, initially gained with support from the US-backed International Coalition during operation Inherent Resolve in the fight against ISIS.
- > **Opposition-controlled** (green): Areas in the northwest of the country under armed opposition control, largely Idlib and small areas in neighboring governorates. The primary armed opposition group in power has been Hay'at Tahrir al-Sham (HTS) and its political branch, the Syrian Salvation Government (SSG). Smaller armed opposition groups also exist in the area.
- > **Turkish-controlled** (red): Areas bordering Turkey in northern Aleppo, Ar-Raqqa, and, Al-Hasakeh governorates under the control of the Turkish-backed Syrian Interim Government (SIG), including territory gained during operations Euphrates Shield (Aug 2016 - Mar 2017) and Peace Spring (Oct - Nov 2019), as well as areas under the control of Turkish-backed forces, namely the Syrian National Army.

# PART I. QUALITATIVE IMPACT OF CURRENCY DEPRECIATION

## Business owner and worker responses to inflation

Dollar-adjusted wages sharply dropped at the beginning of the crisis and have been steadily decreasing over time across all zones of control, as shown in Figure 3. This signals it will take a considerable amount of time for solely wage increases to regain the purchasing power lost during the rapid depreciation period. Interviews conducted by HAT provide insight into responses by employers and employees to the reduction in real value of wages.

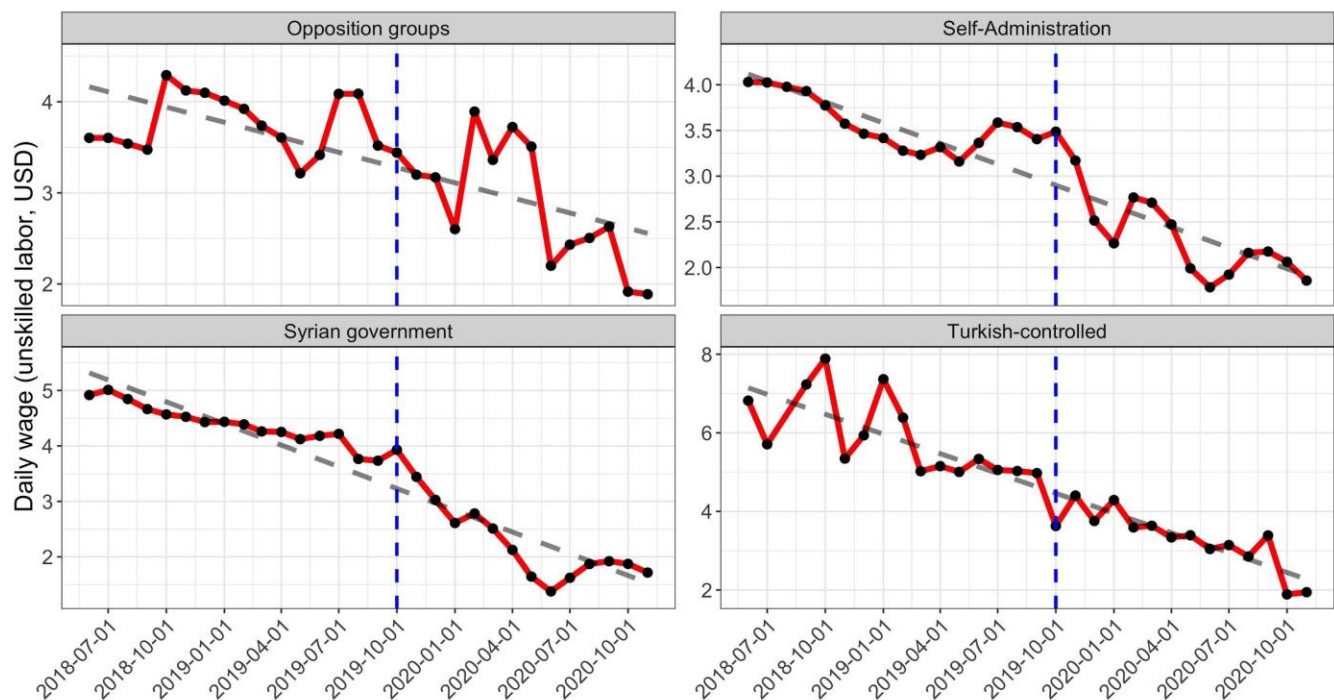


Figure 3: USD-adjusted daily wages for unskilled workers across Syrian zones of control.

Trends observed from those interviewed match the economic effects expected during a currency depreciation. When the local currency depreciates, imported goods become more expensive as do

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domestic products dependent on imported inputs (eg, fertilizer; animal feed; diesel<sup>14</sup>). Subsequently, the incurred costs of traders and producers are passed onto consumers after merchants adjust their prices to maintain profitability. Consequently, domestic demand for locally-produced goods increases in comparison to foreign imports, as does the incentive to export domestic goods due to competitive selling prices in foreign markets. Unfortunately, benefits from increased exports are unfeasible in many parts of the country, as export markets are severely limited due to negative effects of conflict (a lack of trade routes or viable trade partners), trade sanctions and irregular profit margins (as a result of fuel and other shortages in Syrian government-held areas).<sup>15</sup>

Rapid currency depreciation has therefore placed pressure on businesses to maintain profitability, and on workers to ensure they can purchase basic items to sustain their household's needs. While there have been changes in price inflation as well as wage increases following periods of currency depreciation, these have not been linear, often leading to greater price increases with lagged or limited wage growth. The HAT interviewed ten small and medium sized business owners concerning their operational response to the rapid currency depreciation. The sample of business owners were located across the main zones of control in Syria, and operated establishments in diverse industries, ranging from a large-scale chicken farm to a beauty shop. They also varied in size, ranging from 4 to 28 employees.

All ten business owners interviewed by the HAT waited for the currency to stabilize before raising the wages of their employees and gradually raised the price of domestic goods. Further, all business owners that purchased products in a foreign currency raised the price of those items in accordance with the exchange rate. An example of this are the prices of pharmaceuticals and poultry, which are set by the Syrian government and increase in accordance with the exchange rate, according to business owners interviewed in Syrian government-held areas.

Further, while price increases were in line with the depreciation of the Syrian pound, the majority of business owners noted only offering one wage increase for their employees throughout the period. According to all the workers interviewed, the wage increase did not compensate for the lost income from currency depreciation. As a result of the lost income, many workers adopted various coping strategies, most commonly buying smaller quantities of goods, buying cheaper foods, cutting meat from their diet, borrowing money, and selling non-productive assets. This

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<sup>14</sup> WFP, SYRIA - [Review on the impact of rising food prices](#), March 2020

<sup>15</sup> Middle East Institute, [The Syrian Oil Crisis: Causes, Possible Responses, and Implications](#), August 2019

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disparity between prices and wages before and during the ongoing economic crisis is the central focus of this paper.

Most of the interviewed business owners immediately increased prices when the currency depreciated to preserve their profit margins, particularly on imported goods, though several waited for the currency to stabilize before increasing prices. Business owners reported that the price of imported goods (eg, electronics, rice, and sugar) and products relying on imported inputs (eg, chicken) increased the most during the rapid depreciation period (Oct 2019–Oct 2020). They reported that the price of vegetables, local products (eg, cleaning supplies), and service labor changed the least. A pharmacy owner added that pharmaceutical prices are set by the Syrian government; therefore, there is no way for pharmacies to independently change prices. Business owners reported that during this period, demand fell by about 40%. In response to lower demand, businesses also noted accepting payment in installments, goods for barter (e.g produce; tea), or payment in foreign currencies (Turkish lira and/or US dollars).

All the interviewed business owners raised their employee's wages during the rapid depreciation period. The timing of which depended on their perception of when the currency stabilized, which ranged from two weeks to nine months after the beginning of the rapid depreciation period. The majority of business owners reported that their employees asked for a wage increase before they decided to raise wages. One vegetable shop owner in Tell Abiad in Ar-Raqqa governorate reported that several employees quit because the owner did not increase wages fast enough and consequently, their current wage rate was unsustainable given the rapid levels of price inflation. The business owners may have been hesitant to increase wages due to concerns that their employees would not accept lower wages if the currency began to appreciate, consequently affecting their profitability and ability to operate.

The unskilled (eg, laborers and clerks) and skilled (eg, teachers and doctors) workers interviewed by the HAT confirmed that their employers generally increased their wages; however, only one reported receiving more than one pay raise during the period. Moreover, there was a consensus amongst all interviewed workers that the raises were insufficient. Two laborers reported that their wages did not increase because their employer could not afford to, in one case because the client of his employer did not pay for the completed work. The majority of unskilled workers asked their employer for a raise before receiving one; in fact, only two unskilled workers received a raise from their employer before asking for one. Additionally, a clerk in Idleb reported that he received a pay raise when he began to be paid in Turkish lira in June, the only unskilled worker to report being paid in a foreign currency.

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Three of the seven teachers interviewed did not receive pay raises. One teacher in Azaz, Aleppo requested a raise but their employer did not respond, another teacher in Idleb did not receive a pay raise because they agreed to a fixed employment contract, and another teacher in Tell Abiad, Ar-Raqqa, who did not receive a pay raise started giving private lessons to compensate for their falling income; in fact, three of the seven interviewed teachers started giving private lessons to compensate for income lost to rising prices.

Two doctors HAT interviewed increased the price of examinations and procedures to cover the losses incurred by currency depreciation; however, the price increases did not adequately cover the higher cost of essential medical and cleaning supplies, which they reported were already more expensive due to COVID-19. Further, one doctor working in a private clinic in As-Sweida reported that the price of medical services could not remain aligned with the rate of depreciation because high prices would severely limit patient care, stating “doctors cannot raise prices like traders do every time the Syrian pound depreciates.” The other doctor, who works in a government-run hospital in Damascus, received a 36% salary increase from the state, though the trade union unsuccessfully demanded a further pay raise.

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# PART II. QUANTITATIVE ANALYTICAL APPROACH

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Affordability is the central metric of our analysis. Affordability is calculated by dividing the price of an item by the daily wage of an unskilled laborer, the only wage recorded by WFP. This statistic represents the number of working days needed to purchase the specified quantity of that item. Further, multiplying this fraction by the length of the average workday produces the number of working hours needed to purchase an item. For this report, we apply the standard 9-hour work day and six day work week for the typical Syrian unskilled laborer.<sup>16</sup>

Essential items were identified using the WFP definition of the (non-seasonal) survival minimum expenditure basket (SMEB) in Syria.<sup>17</sup> This basket contains the cooking fuel, non-food items, and food items in quantities needed to sustain a six-person household for one month. Not all of the items in the SMEB had sufficient data to be included in the analysis; therefore, a partial SMEB consisting of items with sufficient data at the given level of aggregation (market; zone of control; national) was defined. As a result, the items included in a partial SMEB are slightly different according to the level of aggregation, the contents of which are defined in footnotes. The affordability of SMEBs were

## PREDICTION MODELING

Future food prices and wage rates were predicted using a machine learning algorithm. Machine learning algorithms “learn” or are “trained” by identifying statistical patterns in existing data, and extrapolate upon those patterns to estimate predicted values. The WFP price dataset, disaggregated by zone of control, was divided into a training dataset between January 2019 and July 2020, and a validation dataset between August 2020 and December 2020. We used these datasets to train and validate several different algorithms using AWS Forecast’s AutoMachineLearning application, and selected the Convolutional Neural Network Quantile Regression algorithm for prediction because it was found to be the most accurate. Further information on model parameters and model evaluation metrics are found in the [Annex](#). The item-specific models predicted four months ahead (December 2020 to March 2021); additionally, the average predicted value is reported, within a 90% confidence interval.

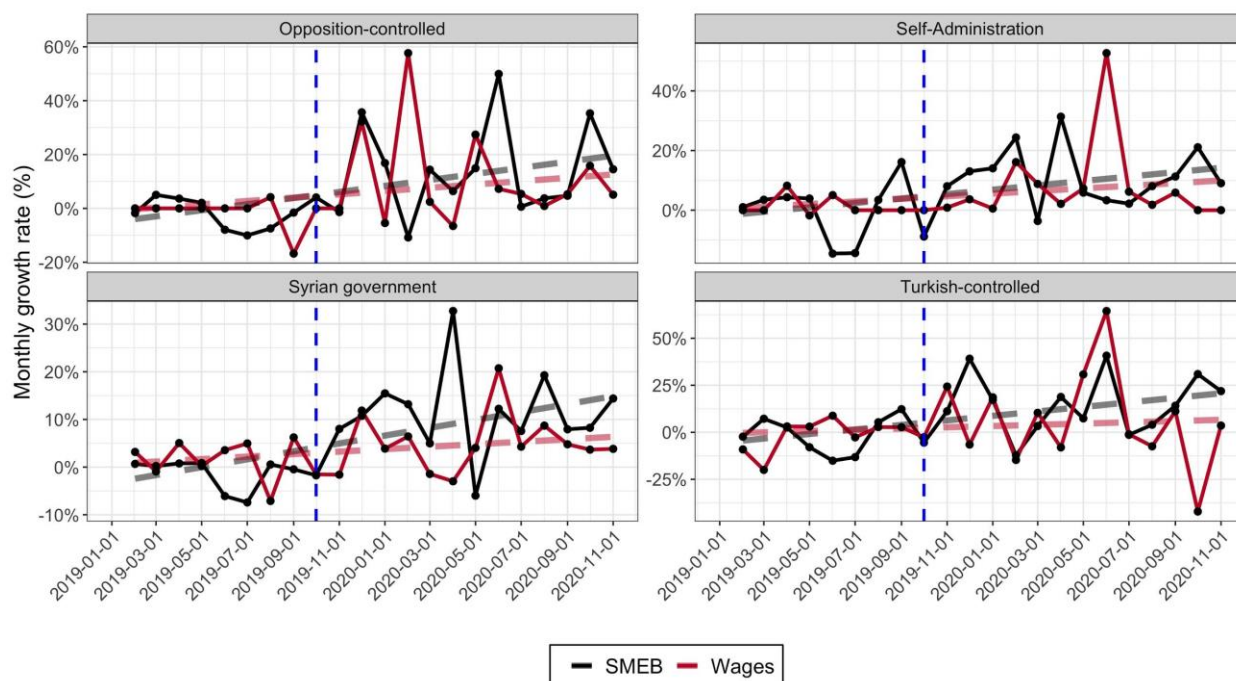
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<sup>16</sup> International Labour Organisation, [Syria labour inspection audit Joint outcome on labour inspection](#), October 2010

<sup>17</sup> For information regarding the development of the SMEB, please see Cash-Based Responses - Technical Working Group, [‘Northern Syria Survival Minimum Expenditure Basket: Guidance Document’](#), developed in 2014

analyzed by comparing the hours needed to purchase the basket before and after the rapid depreciation period; specifically, from October 2019 to the latest datapoint (November 2020), and the year prior.

## Survival minimum expenditure basket affordability



p) - Retail, Eggplants - Retail, Eggs - Retail, Fuel (diesel) - Retail, Lentils - Retail, Meat (chicken, plucked) - Retail, Oil - Retail, Sugar - Retail, Tomatoes - Retail

**Figure 4: Growth rates of daily wage labor and the price of a partial SMEB**

The general trend in SMEB affordability is demonstrated by comparing the growth rates of wages and the price of a partial SMEB, as shown in Figure 4. According to this graph, wage growth outpaced inflation in all zones of control for a majority of months before the beginning of the depreciation period, most notably in Syrian government-held areas; however, the trend reversed when the currency began to rapidly devalue in mid-October 2019 and the price of the partial SMEB began to rise faster than wage rates in all zones of control. This indicates that essential items have become less affordable, though to varying degrees, which are represented by the gap between the (dotted) trendlines for price and wage growth. The gap between price and wage growth was much less pronounced in Self-Administration territories than the other zones of control, which is consistent with our more detailed analysis.

Changes in SMEB affordability are shown in Table 1 (please see [Annex](#) for detailed information on SMEB items). Nationally, the partial SMEB became significantly less affordable, but the

affordability of the partial SMEB varied when disaggregated across the zones of control. According to the calculation of a partial SMEB, which includes all WFP markets with sufficient data, the average unskilled daily wage laborer must work around 18 additional working days to purchase the basket at the same relative affordability as they did the year before the rapid depreciation period. To understand how drastic this increase is, that translates to *18 additional days of work for a basket of goods that is only designed to sustain a family for one month*. In other words, the typical laborer must work three additional weeks to purchase the same partial SMEB at pre-crisis levels of affordability. In terms of price, the cost of the partial SMEB more than doubled from 102,627 SYP to 231,725 SYP before and after the rapid depreciation period.

Changes in the affordability of a partial SMEB varied greatly by zone of control. The partial SMEB became more affordable in Self-Administration areas, largely due to the administration’s wage increase for government workers in June 2020.<sup>18</sup> These increases could have theoretically produced short-term positive externalities for the private sector in the form of higher wages.<sup>19,20</sup>

*Table 1: Percent change in the affordability of a partial SMEB, and the number of additional hours needed to purchase the basket at the same relative cost, pre-Oct 2019 and post-Oct 2020*

Zone of control	Change in wage rate	Change in partial SMEB price	% change in affordability	Change in working hours
National	+58%	+128%	-35%	+161 hours
Self-Administration	+90%	+110%	+5%	-24 hours
Syrian government	+40%	+111%	-37%	+141 hours
Opposition-controlled	+103%	+129%	-19%	+69 hours
Turkish-controlled	+66%	+144%	-36%	+93 hours

<sup>18</sup> AP News, [‘Syrian Kurdish region increases salaries amid currency crash.’](#) June 2020

<sup>19</sup> National Institute for Social and Economic Research. [The dynamics of public and private sector wages, pay settlements and employment](#), March 2020.

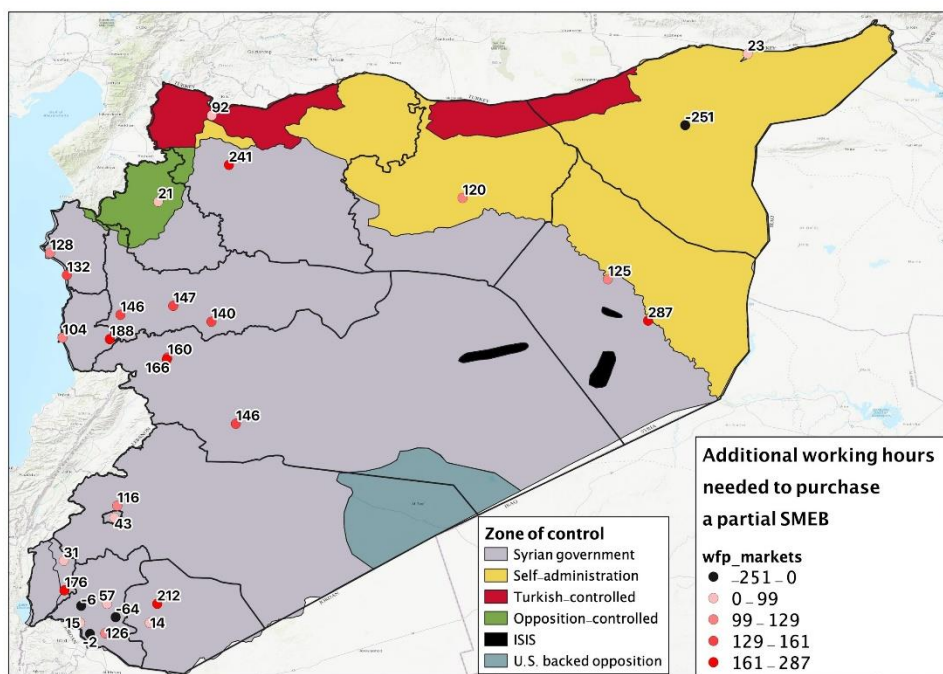
<sup>20</sup> European Central Bank. [Public and private sector wages interactions in a general equilibrium model](#), June 2009.



The partial SMEB became less affordable in opposition-controlled, Turkish-controlled, and Syrian government-held areas. Though the difference between the wage growth and the SMEB price growth in Self-Administration and opposition-controlled areas were similar, higher diesel prices in opposition-controlled areas overpowered the financial gains seen by lower prices of less expensive goods in the basket (eg, vegetables); however, SMEB affordability improved in Self-Administration areas because the price of diesel remained constant as wages increased. The affordability of the partial SMEB decreased the most in Syrian government-held areas because wage growth severely lagged behind partial SMEB price increases.

The affordability of a partial SMEB<sup>21</sup> was calculated at the market level for locations with sufficient data and mapped to assess how changes in the affordability of essential items are geographically distributed. The map, shown in Figure 5, indicates that SMEBs have become much less affordable in the majority of markets during the rapid depreciation period, with few exceptions in southern Al-Hasakeh, As-Sweida, and Dar'a governorates.

These findings highlight several idiosyncratic local economic contexts across the country, with specific governorates demonstrating diverging trends. This data is supported by WFP's Vulnerability Analysis and Mapping reports,<sup>22,23</sup> in which, despite their geography, As-Sweida and Dar'a governorates have consistently reported the lowest proportion of households with inadequate food



*Figure 5: Map of the change in the number of working hours needed to purchase a partial SMEB, before and after the rapid depreciation period.*

<sup>21</sup> "Bread (shop) - Retail", "Bulgur - Retail", "Eggplants - Retail", "Eggs - Retail", "Fuel (diesel) - Retail", "Lentils - Retail", "Meat (chicken, plucked) - Retail", "Oil - Retail", "Rice - Retail", "Sugar - Retail", "Tomatoes - Retail"

<sup>22</sup> WFP [Syria mVAM Bulletin #47](#): May-June-July 2020.

<sup>23</sup> WFP [Syria mVAM Bulletin #49](#): October 2020: October 2020.

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consumption since the beginning of the crisis. Further, Al-Hasakeh governorate has been ranked among the lowest in terms of the proportion of households with inadequate food needs in recent months, showing unexpected resilience to economic shocks.<sup>24,25</sup>

Essential items became much less affordable in markets located in areas that recently experienced conflict, specifically western Hama, southern Idleb and Ar-Raqqa city. HAT's local sources reported that the lower levels of affordability in Al Mayadin may be due to additional costs for traders from Syrian government and Iranian checkpoints *en route* to the city, all of which require a fee or tribute; additionally, the proximate resurgence of ISIS<sup>26</sup> poses an alarming security risk and burdens traders with additional tolls to pass through roads controlled by the armed group.

Al-Hasakeh city has become substantially more affordable since the beginning of the rapid depreciation period due to government worker wage increases coupled with modest price inflation; however, this was not the case for the other markets in Self-Administration-held areas. Ar-Raqqa and Qamishli for example, witnessed much higher price inflation. The reason for these differences are attributed to Al-Hasakeh city having extensive conventional trade with Syrian government-held areas and a thriving black market of smuggled goods from Iraq.

The SMEB also became more affordable in several markets in southern Syria; particularly, Hrak in Dar'a governorate. The increased affordability of the SMEB in Hrak is explained by a combination of relatively even wage and price growth, lower diesel prices, and less inflation on higher-value items demanded in large quantities, particularly chicken, eggs, and sugar. Further, this finding is supported by local sources, who report that Hrak is known to host a competitive market where prices are lower than the surrounding markets. The same trend occurred in Sheik Sa'ad (Dar'a) and Dar'a city, where relatively even price and wage growth and lower diesel prices rendered partial SMEBs more affordable.

Conversely, price growth far outpaced wage growth in Shahba (Dar'a) and Sayda (As-Sweida), resulting in much less affordable SMEBs. Mzeireb (Dar'a), As-Sweida city, and Izra (Dar'a) all experienced similar wage growth rates, but a partial SMEB became less affordable in Izra due to relatively higher prices for high value, high-quality SMEB items, particularly large increases in cooking oil and sugar, and diesel prices that decreased at lower rate than in the surrounding markets.

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<sup>24</sup> WFP [Syria mVAM Bulletin #47](#): May-June-July 2020.

<sup>25</sup> WFP [Syria mVAM Bulletin #49](#): October 2020: October 2020.

<sup>26</sup> Middle East Institute, '[Between the Coalition, ISIS and Assad, Courting the Tribes of Deir-ez-Zor.](#)' November 2020

## PART III. PREDICTIONS

The predicted affordability of the partial SMEB is presented in Table 2, and indicates the affordability of a partial SMEB will decline over the four months Dec 2020 – Mar 2021, in comparison to the previous four months, in aggregate and across all zones of control, except Syrian government-held areas.

Wages are predicted to severely lag behind the price of essential items in Turkish-controlled areas, the former presumably statistically influenced by the large wage decrease in the region starting in October 2020, likely caused by the rapid depreciation of the Turkish lira, which has been adopted as the de-facto currency in the region. The affordability of a partial SMEB is projected to decline in Self-Administration areas, particularly alarming because the region managed to maintain the affordability of basic goods throughout the rapid depreciation period. Essential items will also become less affordable in opposition-controlled areas over the predicted period, though at a lower rate than the previous year-over-year change. The affordability of essential items in Syrian government-held areas is predicted to remain essentially constant, as wage growth is projected to sufficiently compensate for the predicted increase in the price of essential goods.

*Table 2: Predicted percent change in the affordability of a partial SMEB, and the number of additional hours needed to purchase the basket. Calculations compare the average predicted four month wage and SMEB price and affordability values (Dec 2020-Mar 2021)*

Zone of control	Predicted change in wage rate	Predicted change in partial SMEB price	Predicted % change in affordability	Predicted change in working hours
National	+26%	+43%	-7%	+51 hours
Self-Administration	+32%	+47%	-11%	+56 hours
Syrian government	+36%	+41%	+2%	-14 hours
Opposition-controlled	+10%	+28%	-8%	+48 hours
Turkish-controlled	-15%	+33%	-44%	+210 hours

The significant depreciation of the Turkish lira (Figure 6), also during the rapid depreciation period has likely contributed to continuing decreasing affordability and predicted affordability of the SMEB in zones which have adopted it as their main currency, mainly Turkish and opposition-controlled areas under the Syrian Interim and Syrian Salvation Governments. Across all indicators for affordability (fuel, fruit and vegetables, bread and meat), adoption of the lira has not had a positive impact, and suggesting its adoption to mitigate negative effects of an unstable Syrian pound has not been effective.

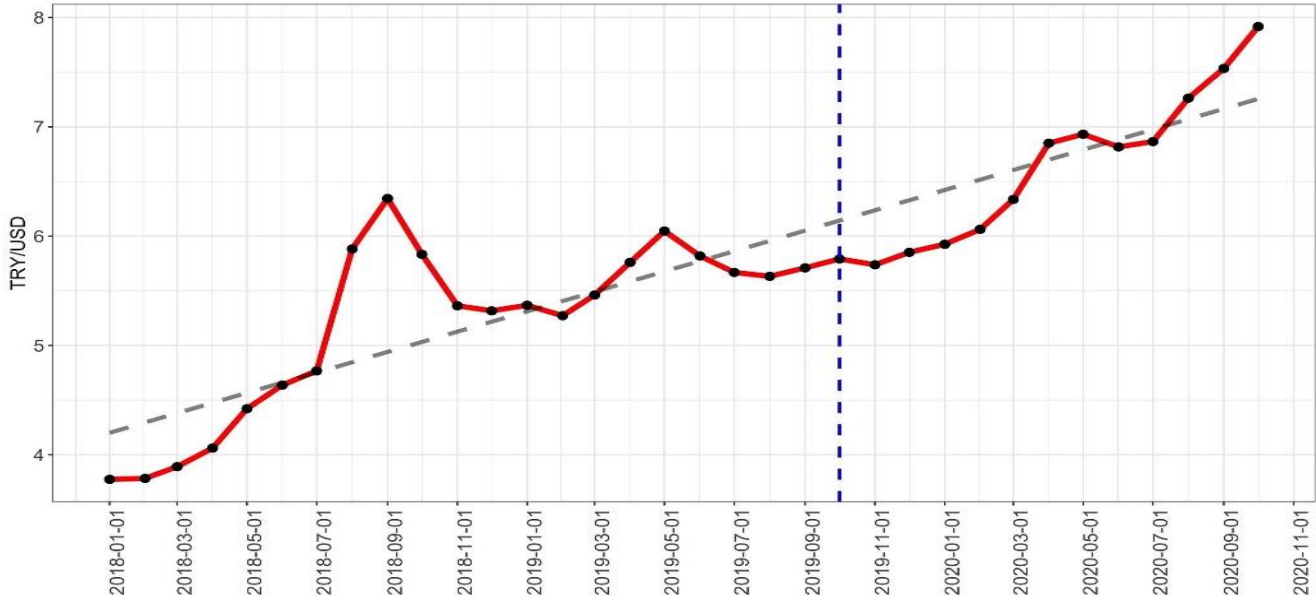


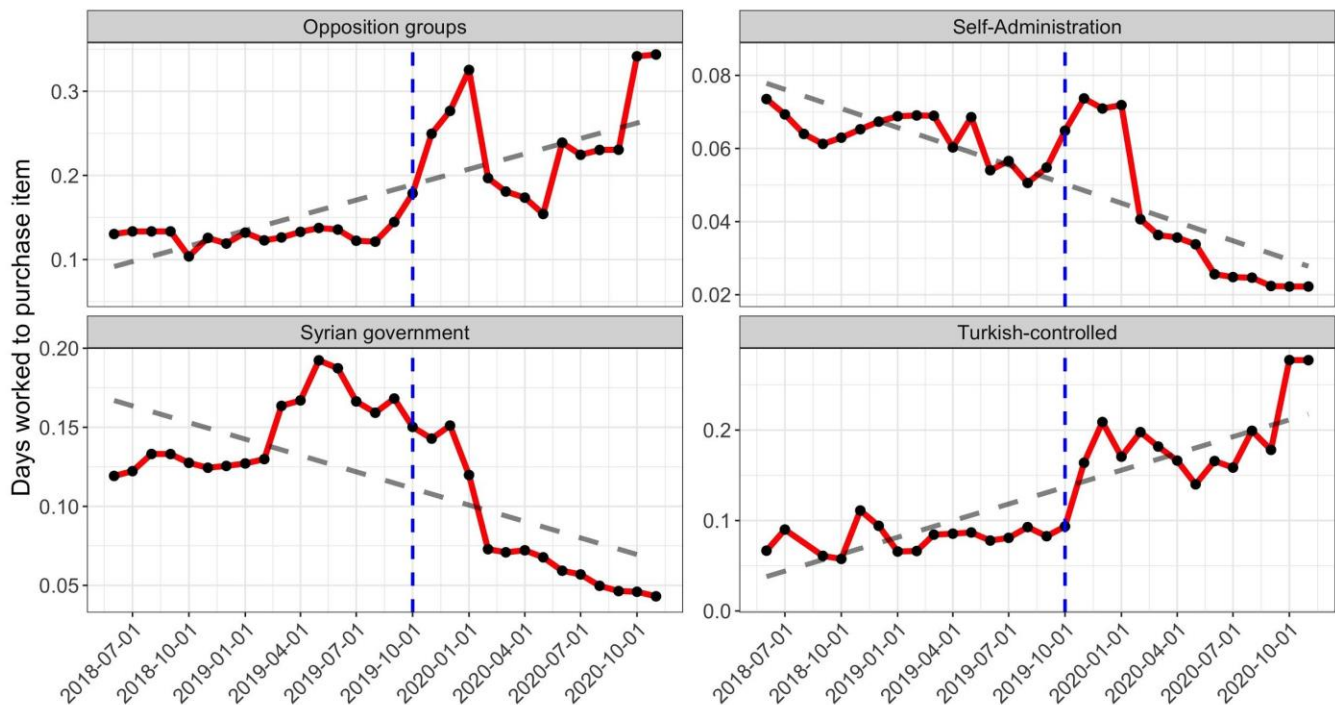
Figure 6: Turkish lira per-US dollar exchange rates.

## Fuel affordability

Fuel affordability within the Syrian economy (as with most economies) provides a good barometer for measuring decreases in affordability; if fuel prices are high, the knock-on effects on manufacturing, transportation and to the domestic fuel market (heating, cooking, small-scale agriculture) mean prices of consumer products are also likely to rise.

Figure 7 shows fuel affordability across all zones of control. Throughout the rapid depreciation period, Syrian government-held areas have experienced fuel shortages; in part because the region’s largest oil refinery, the Baniyas refinery, has experienced technical difficulties, but also as many international sanctions (implemented by the US) prohibit the sale of oil to Syrian

government-held areas (although Iran has continued its oil trade with the government).<sup>27,28</sup> As a result of the contraction in supply, Syrian government authorities have imposed consumption limits on subsidized and unsubsidized diesel and gasoline.



*Figure 7: Fuel (diesel) affordability in Syrian zones of control.*

Diesel is markedly less affordable in opposition-controlled and Turkish-controlled areas where oil is not subsidized. The depreciation of Syrian pound during the rapid depreciation period decreased diesel affordability, but was stabilized by the influx and wide adoption of the Turkish lira in both zones of control starting in June 2020.<sup>29,30</sup> The affordability of diesel then decreased again in October 2020 because wages adjusted to the rapidly depreciating value of the Turkish lira, but diesel prices did not. This trend was apparent in opposition-controlled markets near the Turkish border (Atareb and Harem), but was much less noticeable in markets more distant from the border (Idleb and Bennsh), suggesting that proximity to Turkey likely determines the extent that the Turkish lira is traded on the market. Diesel is least affordable in opposition-controlled

<sup>27</sup> Reuters, Syria fuel crisis eases as Iran delivers new oil supplies, October 2020

<sup>28</sup> WFP, Syria mVAM (September 2020) Issue no. 48, September 2020

<sup>29</sup> France 24, [Syria's Idlib adopts Turkish lira in place of plummeting pound](#), June 2020

<sup>30</sup> Al-Arabiya, [Turkish lira becomes unofficial currency in Syria as economy sinks](#), June 2016

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areas because, until late November 2020, Watad Petroleum held a monopoly over the fuel market in the territory and was able to set prices accordingly. The introduction of two new petroleum companies has as yet had no impact on price levels and affordability.<sup>31,32</sup>

Trends for increasing fuel costs are predicted to continue into Q1 of 2021, with reductions in affordability seen in Turkish and opposition-controlled areas.

## Food item affordability

Despite the decline in SMEB affordability in most zones of control, affordability trends varied by item. In general, vegetables became more affordable, and imported products and domestic products that depend on imported inputs (eg, meat; olive oil) became less affordable. Further, wheat and fuel subsidies provided in Syrian government and Self-Administration-held areas have offset otherwise inevitably higher bread and fuel prices and maintained the affordability of those products on the official market. However, even if both items are affordable on the official market, supply is sometimes low, forcing citizens to resort to purchasing these items from the black market at a much higher price.

### Bread affordability

Bread affordability is markedly different across the zones of control due to subsidies provided by the administrations of the Syrian government and Self-Administration, and the lack thereof in opposition-controlled and Turkish-controlled areas. Figure 8 highlights these differences, as bread has remained affordable (despite issues with supply) in Syrian government and Self-Administration-held areas, and has become much less affordable in Turkish and opposition-controlled regions.

The Syrian government subsidizes domestic and imported wheat;<sup>33</sup> however, it is facing a bread crisis due to lower local yields and difficulties securing tenders for additional wheat imports from Russian companies,<sup>34</sup> which has pushed the government to search for other national and international sources and solutions. This is further complicated by the fact that the Self-Administration has prohibited farmers in its area to sell wheat to the Syrian government<sup>35</sup>.

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<sup>31</sup> Syria Direct, [As winter sets in, HTS faces popular discontent around fuel prices](#), December 2020.

<sup>32</sup> The Syria Report, [Rise of Two New Fuel Companies Highlights HTS Control in Northwest Syria](#), December 2020

<sup>33</sup> FAO/WFP, [Special Report: Crop and food security assessment mission to the Syrian Arab Republic](#), September 2019

<sup>34</sup> Mercy Corps Humanitarian Access Team, Syria. [Bread crisis in Syrian government-held areas](#), October 2020

<sup>35</sup> Reuters, [Syrian Kurdish authorities to stop wheat going to govt territories](#), June 2019

Nevertheless, subsidies have continued to allow bread to remain affordable in Syrian government-held areas, though the quantity and quality of bread production has been significantly reduced, forcing citizens to wait hours in line to purchase subsidized bread.<sup>36</sup>

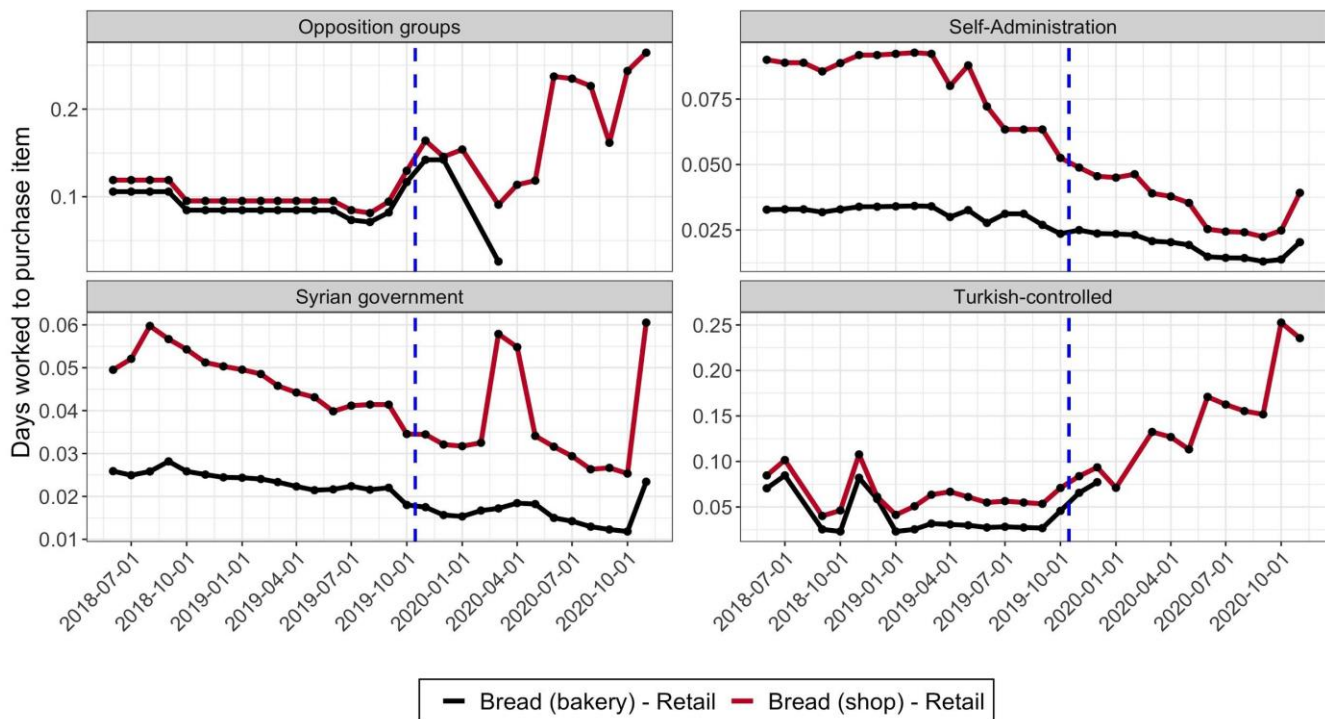


Figure 8: Bread affordability across Syrian zones of control.

Bread has remained affordable in Self-Administration territories also due to subsidies, particularly pegging wheat to \$0.17 per kilogram, which is facilitated by the fact that much of Syria’s sizable wheat crop is grown in the region<sup>37</sup>. The lack of wheat subsidies and higher fuel prices in Turkish-controlled and opposition-controlled areas caused bread to become much less affordable during the rapid depreciation period. Further, the price of bread in opposition-controlled territories may have been influenced by recent cereal burning attacks.<sup>38,39</sup> Predictions show decreasing affordability in opposition and Turkish-controlled areas, as expected due to a lack of subsidies and decreasing supply, and fluctuations in Syrian government-held areas due to instability and wider economic pressures.

<sup>36</sup> Al-Jazeera, ‘[Syria faces severe bread shortages as US sanctions worsen economy](#),’ July 2020

<sup>37</sup> The Arab Weekly, ‘[Severe bread shortages loom for Syria with supply shortfall](#),’ July 2020

<sup>38</sup> The National News, ‘[Syrian forces use scorched earth policy in newly recaptured Idlib](#),’ July 2020

<sup>39</sup> FAO/WFP, ‘[Special Report: Crop and food security assessment mission to the Syrian Arab Republic](#),’ September 2019

## Fruit and vegetable affordability

The affordability of vegetables have largely remained in accordance with seasonal trends during the rapid depreciation period, as shown in Figure 9. On further investigation of wider data, it can be extrapolated that fruit and vegetables are cheaper to produce in Syrian government and Self-Administration-held areas, likely because fuel is cheaper. However, fuel shortages in Syrian government-held areas are expected to be a contributing factor to decreased affordability for some items of which significant amounts of crops are grown in the area, for example, apples or olive oil.<sup>40</sup> Lower fuel supplies decreased the amount of time diesel-powered irrigators were operated and increased the cost of transportation to markets.<sup>41</sup> Predictions show that fruit and vegetable affordability is likely to continue to follow seasonal trends, with decreased supply expected in January and February 2021, and increasing closer to Q2 2021.

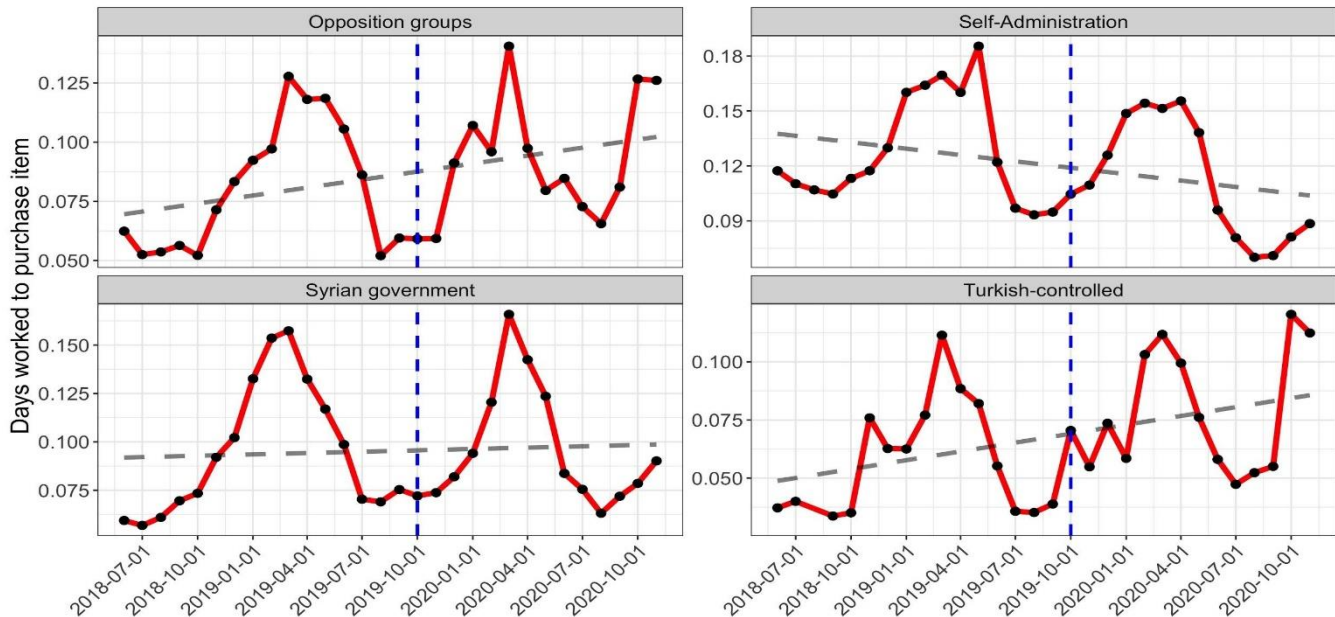


Figure 9: Vegetable affordability in Syrian zones of control. The following vegetables are included: "Potatoes - Retail", "Eggplants - Retail", and "Parsley - Retail"

## Meat affordability

Chicken and sheep (meat) have become less affordable in all zones of control, as shown in Figure 10. The majority of key informants (KIs) stated they removed chicken and eggs from their diet due to higher prices. Instead, our KIs centered meals around vegetables and rice, which most continue

<sup>40</sup>Japan International Cooperation Agency, [the study on quality improvement of agricultural products Syrian Arab Republic](#), August 2002

<sup>41</sup>JICA/Syrian Ministry of Agricultural Report, '[The study on quality improvement of agricultural products.](#)' August 2002



to use as a staple grain, albeit of a lower quality variety than before the crisis. This raises concern about protein-energy under-nutrition, which renders people (especially children) susceptible to diseases like marasmus and kwashiorkor as well as other health conditions. Trends are predicted to continue leading to households using increasing and continued coping strategies to make up for a lack of affordability of many basic items.

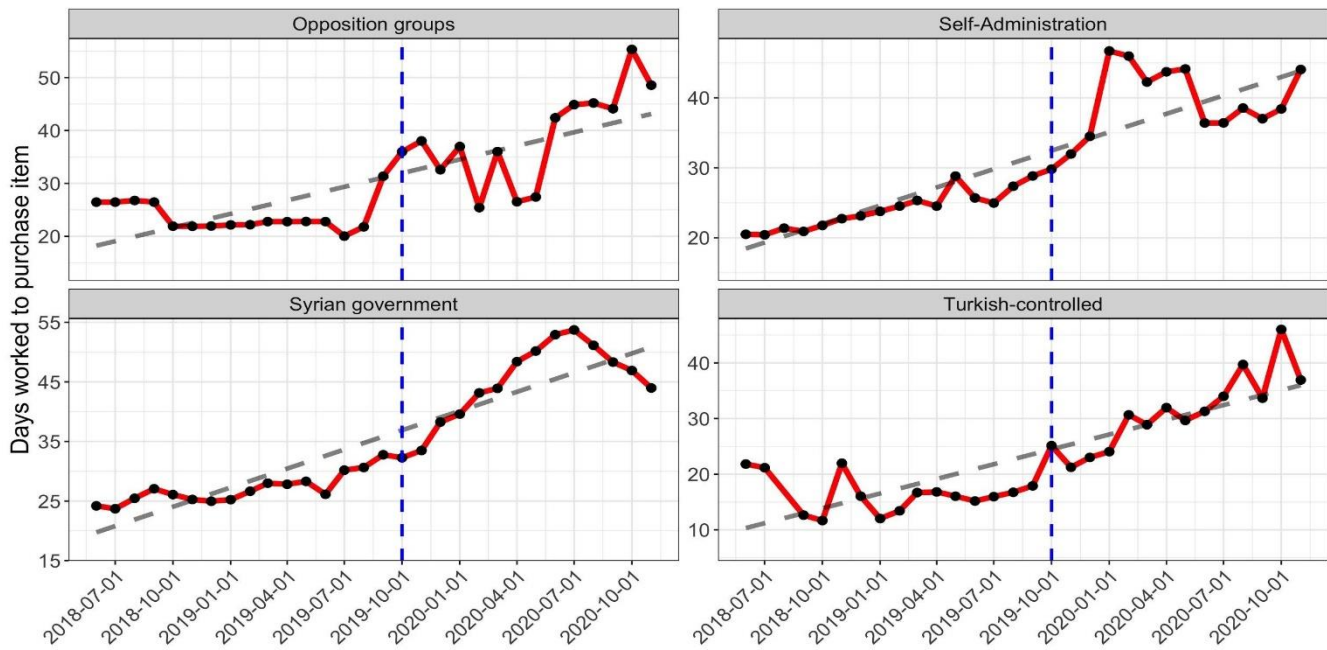


Figure 10: Meat affordability in Syrian zones of control. The following meat products are included "Livestock (sheep, two-year-old male) - Retail" and "Meat (chicken, plucked) - Retail"

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# PART IV. FOOD INSECURITY AND INCOME COPING STRATEGIES

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The partial monthly SMEB costs more than a month of wages for the typical Syrian unskilled worker; in fact, they had to work 11.5 weeks to purchase a partial SMEB during the rapid depreciation period, compared to 8.5 weeks prior. Therefore, many households have adopted strategies to cut costs and earn additional income.

Economic pressure alters household consumption patterns. According to a WFP report,<sup>42</sup> a large proportion of the interviewed households are consuming a basic diet consisting of bread, rice, oil, pulses/vegetables and sugar, and avoid cooking when possible, consuming raw vegetables, to avoid using increasingly expensive butane gas. Lamb and beef consumption has been heavily reduced and chicken is eaten only once or twice a month since the rapid depreciation period. However, food and livelihood coping strategies extend beyond altering consumption patterns, and in the context of currency depreciation, many households have adopted more drastic mechanisms to compensate for their diminished purchasing power.

HAT analyzed food and income coping strategies using an indicator recorder by the Humanitarian Overview of Syria (HSOS) assessment, produced by REACH, from October 2019 to October 2020. The assessment geographically covers communities in northeast and northwest Syria, and we aggregated the data according to Self-Administration, Turkish, and opposition-controlled zones. Note that the HSOS dataset does not cover all possible zones of control every month, and so alternative data analysis has been completed by the HAT in Syrian government-held areas; further, the assessment was not conducted in March 2020.

## Food insecurity coping strategies

Figures 11 to 13 show the top five food insecurity coping strategies used among communities, according to control. All the regions reported a high proportion of communities using coping strategies; however, Self-Administration territories reported the highest proportion. Overall, purchasing food items on credit or with borrowed money was the most common strategy across all zones of control.

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<sup>42</sup> WFP, '[Syria mVAM, Issue no.48.](#)' September 2020

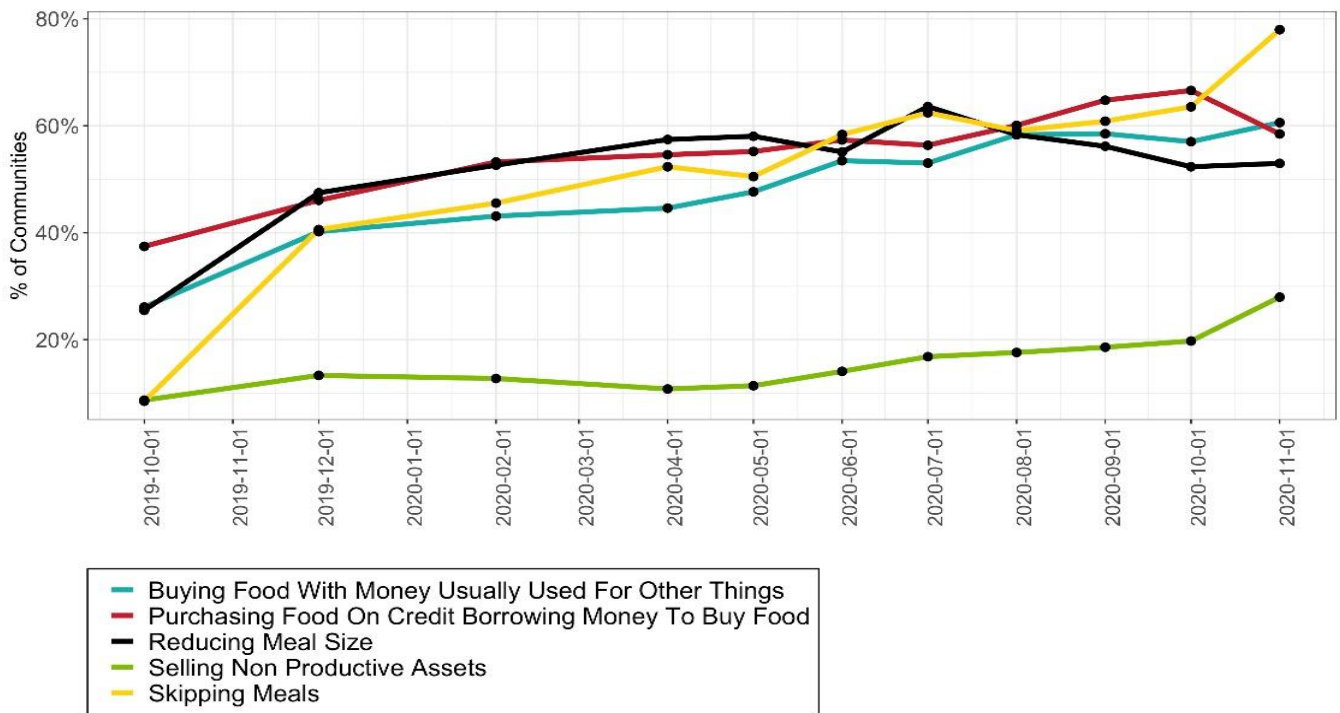


Figure 11: Reported household food coping strategies, Turkish-controlled areas.

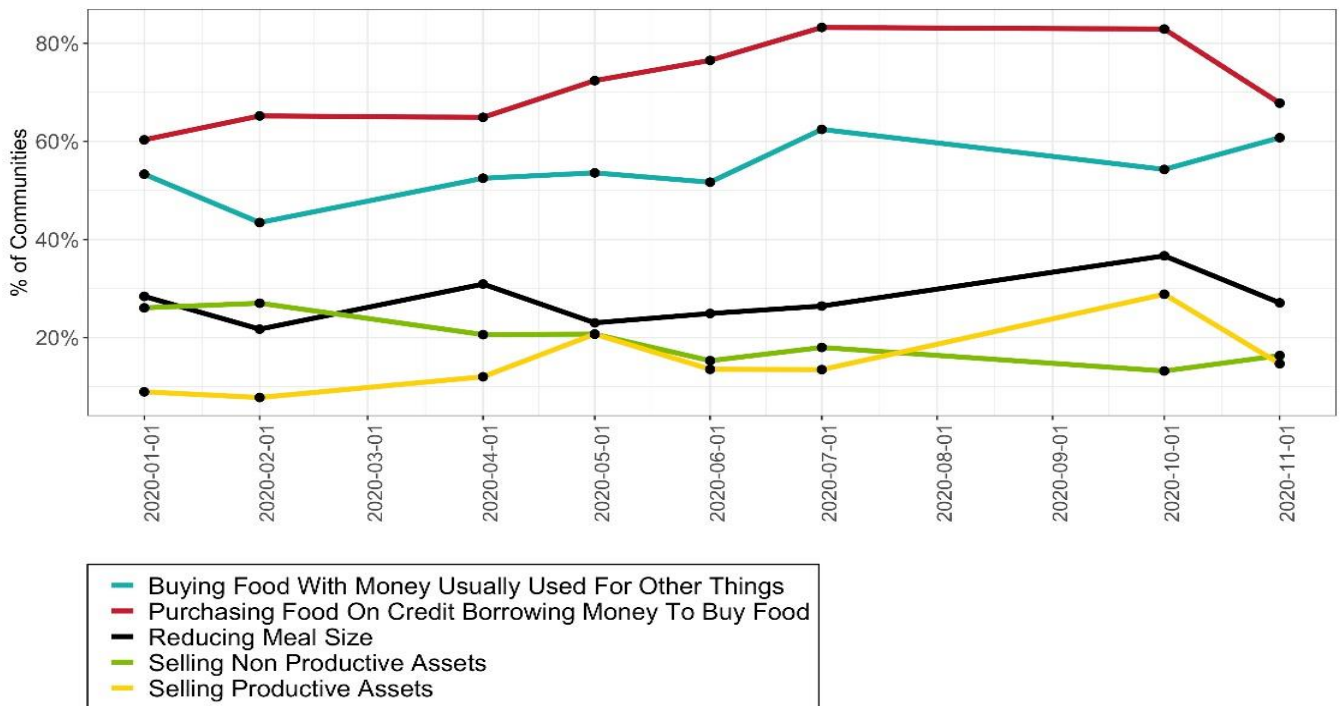


Figure 12: Reported household food coping strategies, Self-Administration areas

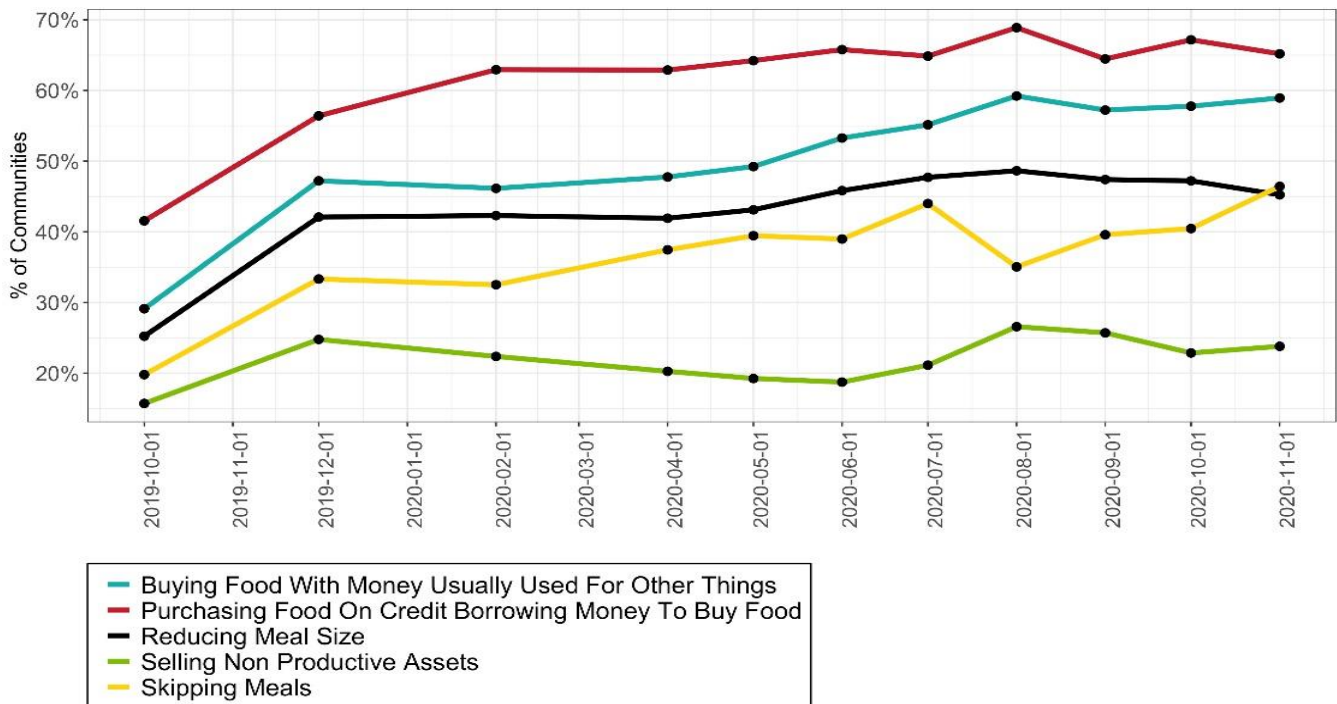


Figure 13: Reported household food coping strategies, opposition-controlled areas.

The ranking and trend of food insecurity coping strategies in the Self-Administration and opposition-controlled regions were markedly similar; they included, in rank order; buying food with credit or borrowed money – an average of 70% of communities reporting the strategy (though traders still reported decreased sales volumes);<sup>43</sup> allocating money set aside for other things to buy food – an average of about 50% of communities reporting the strategy during the time period; reducing meal size – an average of about 35% of communities reporting the strategy; skipping meals was the fourth most common strategy in opposition-held territories, while it was not a top-five food coping strategy in Self-Administration areas; instead, selling non-productive assets was the fourth; selling productive assets was the fifth most common strategy in Self-Administration areas, whereas selling non-productive assets was the fifth most common strategy in opposition-held territories. Turkish-controlled regions had the same top-five food coping strategies as the opposition-held territories, though they are differently ranked, and have their prevalence has been rapidly increasing since the beginning of the rapid depreciation period, compared to Self-administration and opposition-controlled areas. Notably, skipping meals increased at the highest rate, occurring in less than 10% of cases in October 2019, to 40% in December 2019, and has continued to rise in line with the aforementioned strategies. A significant

<sup>43</sup> WFP, 'Syria mVAM, Issue no.48,' September 2020

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proportion (33%) of communities in these territories reported not applying any food coping mechanism in October 2019, but then the rapid increase in the application of food coping mechanisms suggests that food security considerably worsened since the beginning of the rapid depreciation period, aligning with our finding that essential items have become less affordable.

Data on the application of coping mechanisms in Syrian government-held areas is scarce. However, the coping strategies reported by the nine KIs living in these areas, interviewed by the HAT, were similar to those reported by in the HSOS assessment in northern Syria. Many respondents reported they economized their spending habits by limiting their purchases to cheap and essential items, eliminating luxuries from their budget; in terms of the HSOS assessment, they “bought food with money usually used for other things.” Most KIs reported purchasing lower-quality and cheaper food items, such as lesser brands of rice and vegetables; further, practically all respondents stopped purchasing meat, chicken, and fruit. Additionally, the majority of respondents reported buying food in quantities sufficient only for the meals they could afford for that day, and several reported skipping meals to save money.

## Income coping strategies

Income coping mechanisms were analyzed using REACH’s HSOS assessment<sup>44</sup> to understand how communities responded to rapidly and drastically reduced purchasing power. A time series of the top five income coping strategies in each zone of control are shown in Figures 14 to 16. The rank-order of the most prevalent livelihood coping mechanisms were uniform across zones of control and mirrored related research on income coping mechanisms in Syria.<sup>45</sup>

Borrowing money from family or friends was by far the most often and consistently reported income coping mechanism, while sending children to beg or work was consistently the second-most reported, and has been rising in Turkish-controlled areas; however, there was temporarily a much lower prevalence from August to October, likely in response to the identification of the first cases of COVID-19 in July and its subsequent spread throughout the region. Purchasing items on credit was the third most common income coping strategy during most months across all zones of control. Alarming, early or forced marriage was consistently the fourth most common strategy, followed by selling household assets.

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<sup>44</sup> ‘Reported coping strategies that resident population households have used to cope with the lack of income/resources to meet basic needs’

<sup>45</sup> WFP, ‘[VAM: Syria - Review on the impact of rising food prices.](#)’ Food Security update, March 2020

All the coping mechanisms, with the possible exception of sending children to work or to beg in opposition-controlled and Self-Administration areas, increased at a steady rate since October 2019, indicating a greater prevalence of income coping mechanisms in response to the rapid depreciation period. The rank-order of the coping mechanisms remained constant among all zones of control, which suggests that preferences for methods to cope with a lack of income have become relatively embedded after an extended learning period during the country's protracted conflict.

Our KIs in Syrian government-held areas reported applying similar coping mechanisms. Most respondents reported borrowing or asking money from relatives or friends, and selling valuable non-essential items, such as furniture, televisions, gold jewelry, and even an inherited house. One respondent sent their children to work because school became unaffordable; another began to share clothes with relatives to save money on apparel. Notably, all of the interviewed teachers and doctors living in Syrian government-held areas reported food and income coping mechanisms, including spending money on food usually spent on other items, reducing meals, and selling non-productive assets.

## EARLY AND FORCED MARRIAGES

The trend and rankings of income coping mechanisms highlight the relative frequency of early and forced marriages as a coping strategy; in fact, approximately 30% of communities across zones of control report its occurrence as a response to a lack of income.

Families subject their daughters to early or forced marriages in conflict situations as a means to relieve financial burden, and because a husband serves as additional protection from pervasive sexual violence.<sup>1</sup> However, girls married at younger ages are at high risk of complicated pregnancies and deliveries, the children have worse health outcomes, are at higher risk of intimate partner violence, and on average receive less formal education than girls married as a consenting adult. Another formulation of early and child marriage counted in this data are the temporary "summer marriage" (Mut'ah), in which the daughter is married for a short period of time for fee (in place of a dowry), which economically benefits the family but does not necessarily improve the economic situation of the girl.<sup>2,3</sup>

<sup>1</sup> Bartels, S. A., Michael, S., Roupetz, S., Garbern, S., Kilzar, L., Bergquist, H., Bakhache, N., Davison, C., & Bunting, A. (2018). [Making sense of child, early and forced marriage among Syrian refugee girls: a mixed methods study in Lebanon](#). *BMJ global health*, 3(1), e000509.

<sup>2</sup> Human Trafficking Centre. '[Modern servitude beneath the guise of the Islamic marriage contract](#).' March 2015

<sup>3</sup> CARE, '["To Protect her Honour", Child marriages in emergencies - the fatal confusion between protecting girls and sexual violence](#).' *Gender and Protection in Humanitarian Contexts: Critical Issues Series #1*. May 2015

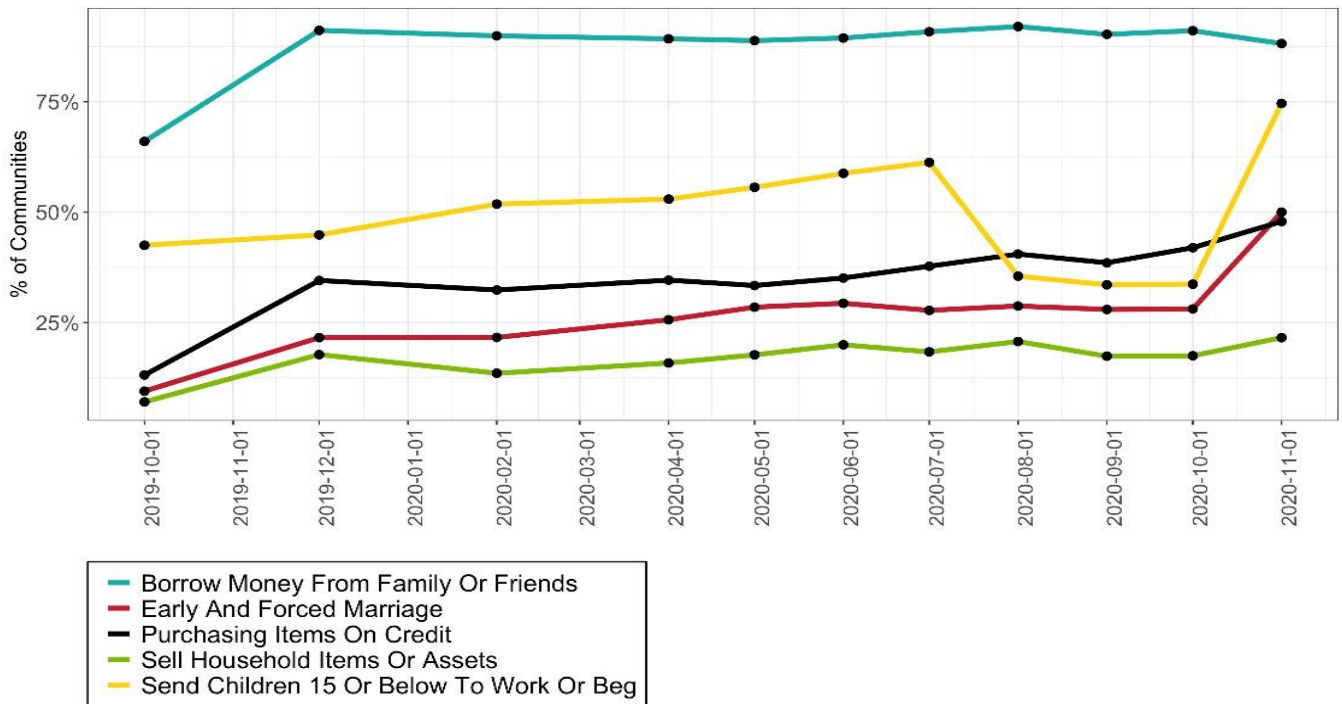


Figure 14: Reported household food coping strategies, Turkish-controlled areas.

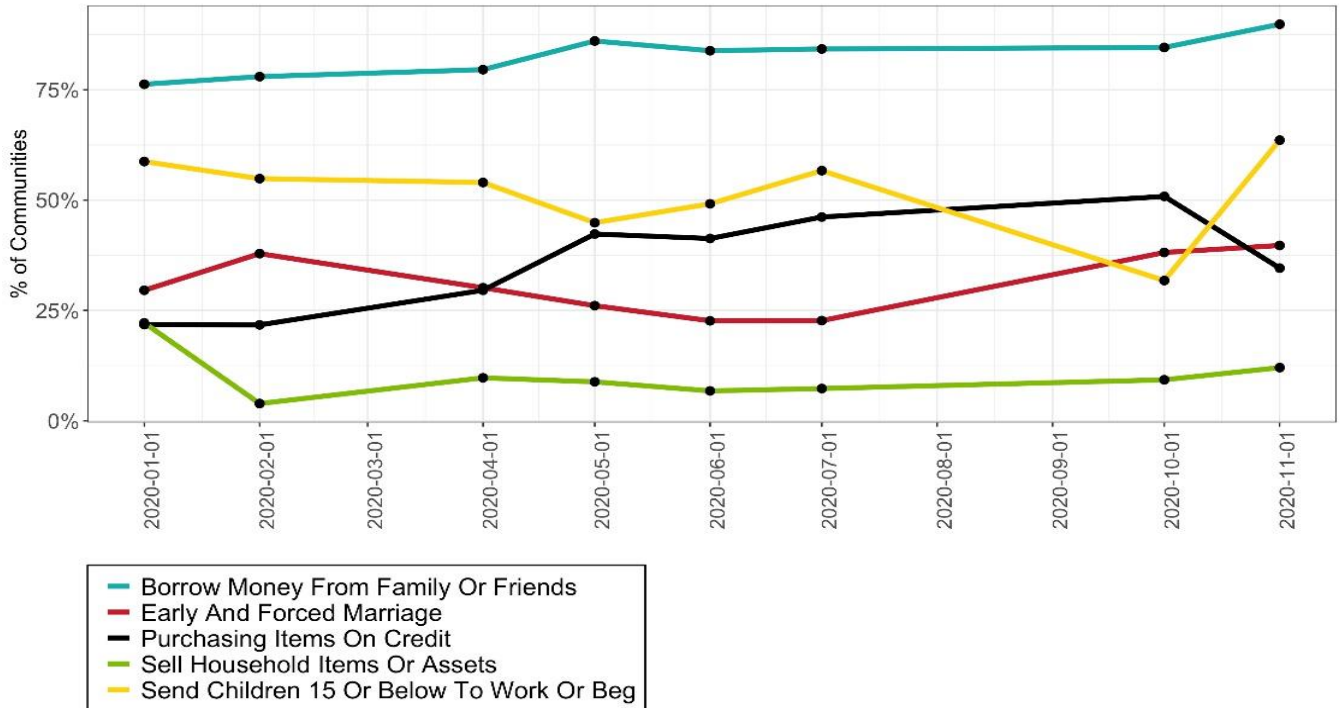


Figure 15: Reported household income coping strategies, Self-Administration areas.

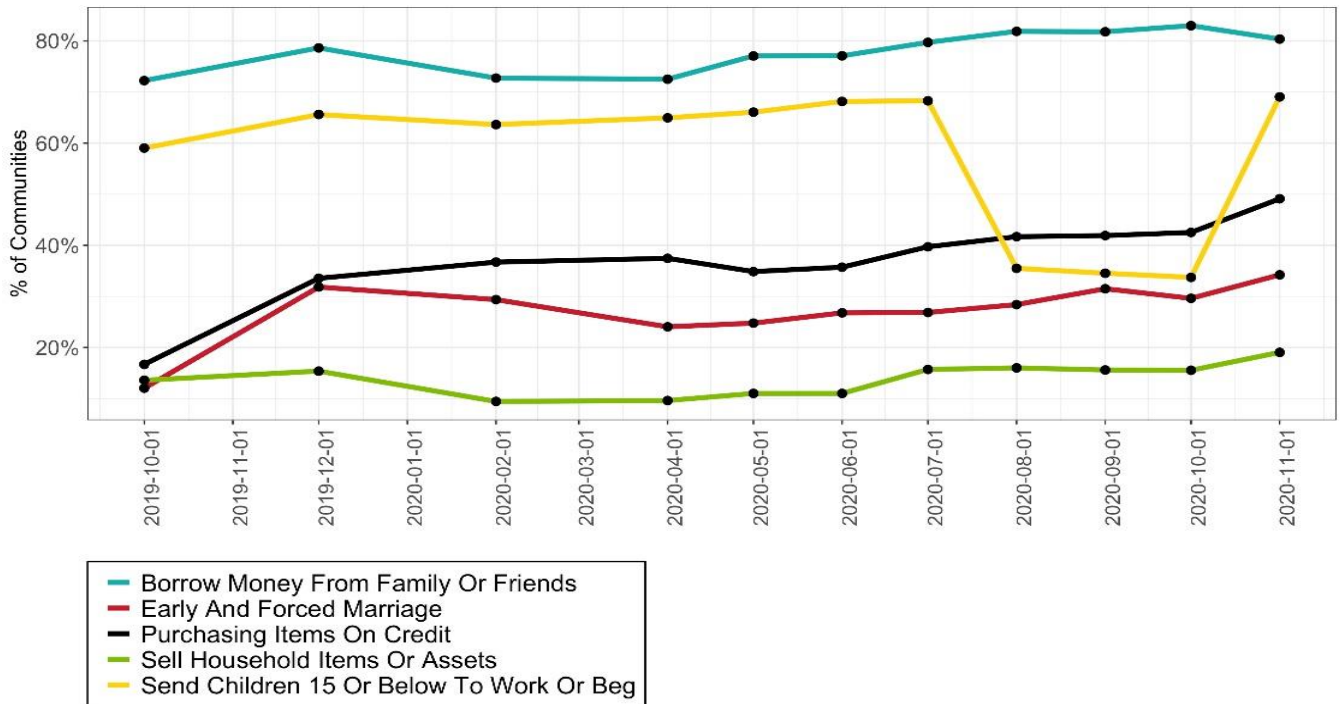


Figure 16: Reported household food coping strategies, opposition-controlled areas.



## PART V. FOREIGN CURRENCY USAGE

Self-Administration and opposition-held areas increased the use of foreign currencies to mitigate the effects of the Syrian pound's depreciation. In Self-Administration areas, local sources reported that property is being priced in US dollars and that all large financial transactions are conducted in US dollars or in Syrian pounds at the current black market exchange rate to compensate for the pound's volatility. The Self-Administration is pegging state prices to the dollar; for example, the administration purchases wheat for \$0.17 per kilogram, regardless of the current pound exchange rate; further, the salaries of Self-Administration military and civilian personnel have been based on the relative value of the dollar since June. Local sources reported that exchange companies, primarily located in Quamishli city, provide steady supply of US dollars for Self-Administration areas. The locally-preferred currency in northern Syria was mapped (Figure 17) using REACH's Rapid Currency Assessment, conducted in June 2020. The Turkish lira is not accepted in Self-Administration territories; while the economy of Al-Hasakeh governorate has become ostensibly dollarized.

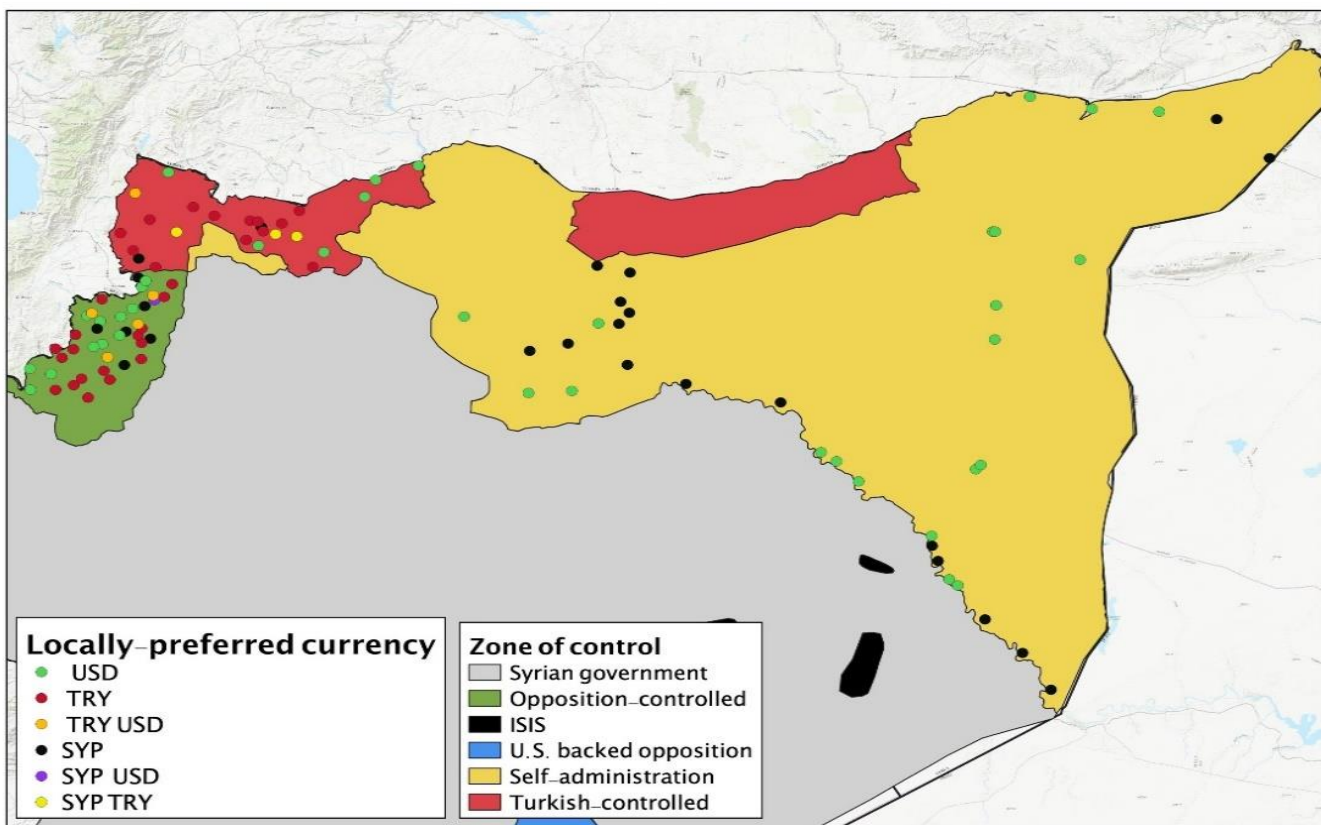


Figure 17: Preferred currency by merchants in northern Syrian communities, June 2020.

As expected, the Turkish lira is extensively used in opposition and Turkish-controlled territories. Turkey delivered Turkish lira to opposition-held areas in northern Aleppo via their postal service (Posta ve Telgraf Teskilatı) in early June 2020. The Syrian Salvation Government (SSG) followed suit a week later, introducing the Turkish lira into Idleb and western Aleppo through the Public Monetary Authority (PMA).<sup>46</sup> The SSG later banned the use and trade of the Syrian pound on 27 July via Decree No.24. As a result, communities in opposition and Turkish-controlled areas are more likely to use the Turkish lira as the exclusive preferred currency since June.

Citizens in Syrian government-held areas do not have the option of openly dealing in foreign currencies and have been forced to conduct financial transactions using the Syrian pound. In January 2020, President Assad, as a strategy to deal with the growing financial crisis,<sup>47</sup> issued decree 3/2020, which amended the prior legislative decree 54/2013 by increasing the punishment of dealing with foreign currencies to at least seven years of hard labor and a fine double the amount of money paid or received in the foreign currency. Indeed, many of the KIs interviewed from government-held areas emphasized the impossibility and illegality of dealing in foreign currency.

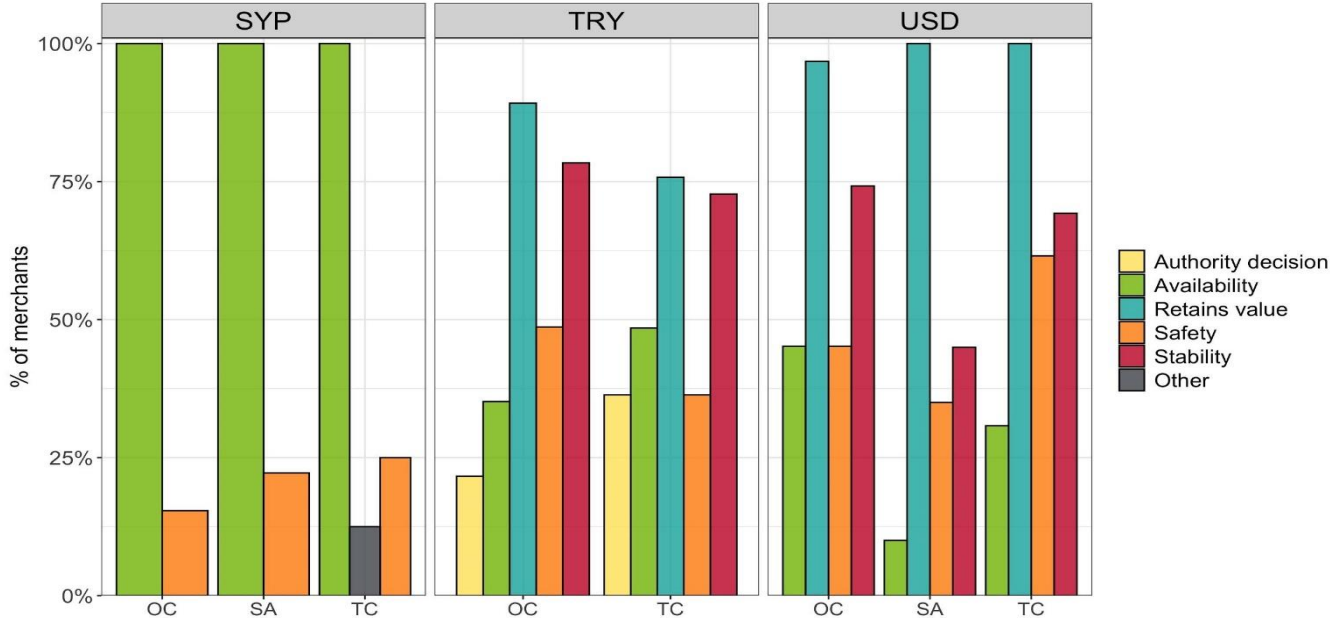


Figure 18: Reason traders prefer a currency, REACH Rapid Currency Assessment (June 2020). OC = Opposition controlled; SA = Self-Administration; TC = Turkish-controlled.

<sup>46</sup> Mercy Corps Syria HAT, 'The Public Monetary Authority in Northwest Syria,' July 2020  
<sup>47</sup> Mercy Corps Syria HAT, 'Government of Syria responses to the financial crisis,' May 2020

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This dollarization or adopted use of foreign currencies outside of Syrian government-held areas looks to be a permanent change. It is highly unlikely that areas that have adopted foreign currencies as the main medium of exchange will fall back on using the Syrian pound in the future. Consequently, the abandonment of the pound in these areas will only place further depreciating pressure on its value, further harming its ability to recover.

Using the same REACH assessment, responses to a question asking traders why they prefer one currency over another were examined (Figure 18). As expected, availability appears to be the primary attractive attribute of the Syrian pound, whereas value, retention and stability were the main reasons to prefer the US dollar and Turkish lira. However, a sizable proportion of traders reported that use of Turkish lira was required by the authorities in opposition and Turkish-controlled territories, further evidence of the ‘lirafication’ in northwest Syria and the regions’ deepening economic integration with Turkey.

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## PART VI. CONCLUSION

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The ongoing depreciation of the Syrian pound has led to growing economic hardships faced by Syrians. A lack of purchasing power caused by an enlarging gap between wage growth and inflation has led to many rely on negative coping strategies, and in areas outside of Syrian government control, completely adopt foreign currencies as a mode of exchange. Wage rates have persistently lagged behind inflation in Syria which is in part due to business owners being cautious to incur additional costs given the volatile market.

In this paper, we quantified the affordability of essential items across the Syrian zones of control before and during the rapid depreciation period, with the essential finding that the rapid depreciation has affected each zone of control differently.

The quantitative affordability measurements indicate that essential items have and will become markedly less affordable in most areas. A basket of essential items became much less affordable in Syrian government and Turkish-controlled areas, where the typical unskilled laborer must work 37% (+141 hours) and 36% (+93 hours) more hours to buy a basket of essential items at the same price relative to their wage rate. Essential goods also became less affordable in opposition-controlled areas, though to a lesser degree (19% more hours). Essential items became more affordable (5% less hours) in Self-Administration areas, which managed to mitigate higher prices with price controls in Al-Hasakeh, and raising the wage rate for public servants across the zone of control, which appeared to spill over into the private sector. Our statistical price prediction model indicates that essential items will become less affordable in Self-Administration, Turkish-controlled, and opposition-controlled areas over the next four months, while remaining constant in Syrian government-held areas.

It is important to note that the affordability of product categories varied by zone of control. The affordability of bread and fuel depends on subsidies provided by the local administration, which explain the much lower relative price for those items in Self-Administration and Syrian government-held areas. Imported products and products that rely on imported inputs, such as meat, fruit, sugar and rice became less affordable, while most vegetables, specifically potatoes, tomatoes, and eggplants remained affordable due to sufficient domestic supply.

In response to the crisis, many Syrians employed food and income coping strategies. The most common food coping strategies reported by our KIs were buying less and lower quality foods, and spending money usually used for other items on food. Borrowing or asking for money from

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relatives or friends and selling non-essential items were the most reported income coping mechanisms. According to REACH data, 90% of the communities assessed across the zones of control in northern Syria reported the presence of a food or income coping mechanism. Further, the rank-order prevalence of food and income coping strategies were remarkably similar among the zones of control.

The continuous reduction in affordability of essential items within Syrian households is likely to continue to degrade standards of living. Already, families are reducing food intake and cutting out basic necessities in order to deal with their diminished purchasing power, pushing large portions of the population further into poverty. With predictions showing these trends likely to continue, at least in the short term, humanitarian intervention in developing improved supply-side production methods could encourage domestic production and increase aggregate supply while reducing expenditure and decreasing prices. Humanitarian interventions could also consider addressing increasing household food insecurity, as well as protection issues arising from certain food and income coping mechanisms.

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# ANNEX

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## SMEB items

**National:** "Bread (shop) - Retail, Bulgur - Retail, Eggplants - Retail, Eggs - Retail, Fuel (diesel) - Retail, Lentils - Retail, Meat (chicken, plucked) - Retail, Oil - Retail, Rice - Retail, Sugar - Retail, Tomatoes - Retail

**Syrian government:** Bread (shop) - Retail, Eggplants - Retail, Eggs - Retail, Fuel (diesel) - Retail, Lentils - Retail, Meat (chicken, plucked) - Retail, Oil - Retail, Sugar - Retail, Tomatoes - Retail

**Self-Administration:** Bread (shop) - Retail, Eggplants - Retail, Eggs - Retail, Fuel (diesel) - Retail, Lentils - Retail, Meat (chicken, plucked) - Retail, Oil - Retail, Sugar - Retail, Tomatoes - Retail

**Opposition-controlled:** Eggplants - Retail, Eggs - Retail, Fuel (diesel) - Retail, Lentils - Retail, Meat (chicken, plucked) - Retail, Oil - Retail, Sugar - Retail, Tomatoes - Retail

**Turkish-controlled:** Eggplants - Retail, Eggs - Retail, Fuel (diesel) - Retail, Lentils - Retail, Meat (chicken, plucked) - Retail, Oil - Retail, Sugar - Retail, Tomatoes - Retail

## Price prediction methodology

### Data

The World Food Program (WFP) Syria Food Prices dataset consists of food items and non-food items organized by market and providing monthly observations beginning in 2011.

In order to capture the pattern of price inflation beginning in 2019, the dataset was reduced to observations beginning with 2019-01-01 through 2020-12-01 (the final observation available when modeling began). The WFP dataset includes both retail and wholesale items. For this analysis, wholesale items were removed from the training data. In addition, retail items with an average price of less than 200 SYP were removed from the training data leaving 47 food and non-food items and 2412 observations. Each market in the dataset was assigned to a zone of control (ZOC) by a Syria Humanitarian Analysis Team (HAT) analyst as of 2020-12-01. The dataset was divided into a training and validation dataset. The training dataset consisted of all observations between 2019-01-01 and 2020-06-01. The validation dataset consisted of all observations between 2020-07-01 and 2020-10-01.

## Methods

Amazon Forecast using AutoMachineLearning (AutoML) was used to determine the best algorithm for modeling the future value of individual commodities, aggregated by zone of control. CNN-QR was selected as the best performing algorithm. After experimentation, the modeling parameters were used for a four month prediction (December 2020 - March 2021). This model version had an overall root mean squared error (RMSE) of 857.9006 and a weighted average percent error (WAPE) of 0.2718 in one backtest window.

Food basket items of interest were selected by the HAT analyst based on the current survival minimum expenditure basket published by WFP. The model’s accuracy at predicting the food items of interest was evaluated using the MAPE and RMSE of individual SMEB items.

The final model was fitted to all available data (2020-01-01 through 2020-11-01). A four month forecast was produced for predictions 2020-12-01 through 2021-03-01. The Amazon Forecast tool automatically calculated a 90% prediction interval for the analysis. This model had an overall RMSE of 648.4254 and a WAPE of 0.1710 in one backtest window.

For more information on modeling, please contact HAT Syria.

Model	RMSE	WAPE
Validation	857.9006	0.2718
Final	648.4254	0.1710

**Table 1.** Model Metrics

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## CONTACT

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The Humanitarian Access Team (HAT) was established in Beirut in March 2015 in response to the collective challenges facing the remote humanitarian response in Syria. Successful humanitarian and development interventions require a nuanced and objective understanding of the human ecosystems in which these interventions occur. To this end, the HAT's most important function is to collect, triangulate, synthesize, analyze and operationalize disparate data and information. Since 2015, HAT analysis has provided a forward-looking template for international interventions in Syria, and facilitated an increasingly nimble, adaptive, integrated, and ultimately impactful international response to the Syrian conflict.

