Cost of Nutritious Diet for Children in Pakistan and Effects of Imminent Afghan Refugees on Existing Consumption Pattern

Rahema Obaid[1], Tehseen Ahmed Qureshi[2], Stephen Davies[3] & Abdul Wajid Rana[4]

[1] Rahema Obaid is a Research Analyst at International Food Policy Research Institute, Pakistan
[2] Tehseen Ahmed Qureshi is a Research Analyst at International Food Policy Research Institute, Pakistan
[3] Stephen Davies is a Senior Research Fellow International Food Policy Research Institute, Pakistan
[4] Abdul Wajid Rana is the Program Leader of Pakistan Agriculture Capacity Enhancement project (PACE) in International Food Policy Research Institute (IFPRI), Islamabad, Pakistan.

ABSTRACT

The fall of Kabul after the US withdrawal from Afghanistan may have serious repercussions for Pakistan if the influx of refugees accelerates, as additional demand for food items and resulting inflationary pressures can jeopardize the diets of children. To examine this issue, we estimate the gap between actual and desired per capita expenditures on a least cost nutritious diet consumed by Pakistani children aged 3-10 years. The study finds the gap across income groups and regions for two provinces of Pakistan i.e., KP and Balochistan. We find that under-consumption is highest in children of Balochistan Urban and KP Urban, as households in both locations spend only 21 percent of the recommended dietary expenditures. We estimate the decrease in dietary expenditures coming from an increase in food prices after the refugees' influx. We found the dietary gap is high if the influx of refugees exceeds one million by the first quarter of 2022. However, the dietary gap does not increase much if the number of refugee arrival remains under 700,000, albeit the large nutrition gap does not improve.

1. Introduction

Access to a healthy diet remains a major global concern, even in the 21st century. The

nexus between nutrition and food security remains largely dependent upon diet quality and food consumption, but a healthy diet remains unaffordable for many[1]. The State of Food and Nutrition Security report (2020) defines three types of diets: An "Energy sufficient diet," which provides adequate calories for the energy needed for work each day. using mainly the basic starchy staple (e.g., maize, wheat or rice only)[2] . A "Nutrient adequate diet" not only provides adequate calories (per the energy sufficient diet above), but also relevant nutrient intake values of 23 macro- and micronutrients to prevent deficiencies and avoid toxicity. A "Healthy diet" provides adequate calories and nutrients (per the energy sufficient and nutrient adequate diets above), but also includes a more diverse intake of foods from different food groups to help prevent malnutrition in all its forms, including diet-related non-communicable diseases. The nutritious diet discussed in this paper falls under the "healthy diet" category because it is based on country-specific food-based dietary guidelines (FBDGs).

The Food and Nutrition Security report (2020) argues that a 'healthy diet' costs about 60 percent more than a 'nutrient adequate diet'.[3] However, a healthy diet costs on average 500 percent more than an 'energy sufficient diet'. It is estimated that three billion people worldwide cannot afford the healthy diet, including 57 percent of the population in South Asia and Africa[4].

The less-than-optimal consumption of nutritious and healthy foods results in greater stunting and wasting in children. An estimated 149 million children under the age of five suffer from stunting around the world, while 45.4 million children under five years old suffer from wasting[5]. Therefore, availability and affordability of a healthy diet for children is significant in determining their future productivity and living standards. This paper estimates the gap between the actual and recommended nutritious diets for children between the ages of 3-10 at the subnational level and across different income groups for Pakistan. It is a stark fact that 68 percent of the Pakistani population cannot afford a

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[1] Dizon, F., Wang, Z., & Mulmi, P. (2021). *The cost of a nutritious diet in Bangladesh, Bhutan, India, and Nepal*. World Bank Policy Research Working Paper 9578, Washington, DC: World Bank

[2] FAO, IFAD, UNICEF, WFP and WHO. (2020). *The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome, FAO.
https://doi.org/10.4060/ca9692en

[3] Ibid.

[4] Ibid.

[5] FAO, IFAD, UNICEF, WFP and WHO. 2021. *The State of Food Security and Nutrition in the World 2021.*
Transforming food systems for food security, improved nutrition and affordable healthy diets for all. Rome, FAO.https://doi.org/10.4060/cb4474en

'nutritionally adequate diet' and 'healthy diet,' whereas about five percent of the population still cannot afford an 'energy sufficient' diet[6].

The target of this paper is Pakistani children as they are likely to be more affected by the impact of positive and negative shocks to consumption, such as an influx of refugees. Pakistan has remained a top host for displaced Afghans since the 1980s when, with the advent of Afghan-Soviet war in 1979, over 3 million Afghan refugees crossed to Pakistan. After the Russian invasion of Afghanistan in 1979, Afghan refugees were initially held in camps in the border areas of KP and Balochistan. However, later refugees began to settle in urban areas and started small-scale businesses or took jobs in the informal sector. Today, about 1.6 million Afghan refugees are dispersed across Pakistan, and they have acquired legal refugee status, so no major refugee camps are left in Pakistan[7]. Thus, they are integrated with the Pakistani population and share families and businesses—and thus face the same prices for goods and services as the local population does.

The Taliban takeover of Afghanistan on August 15, 2021 may now trigger a new wave of out-migration to different countries including Pakistan. It is estimated that around 700,000 Afghans might migrate to Pakistan in the coming months if the internal security situation in Afghanistan deteriorates. The hosting of 'externally displaced Afghans (EDA)' for three years may cost around USD 2.2 billion[8]. However, while the above direct cost may be correct, the indirect costs could be much higher through inflationary pressures on food products due to increased demand by refugees. Furthermore, effects on population and consequent demands for education and health, employment, property, as well as negative impacts on forests, other environmental and land degradation may arise with the higher demand for the country's limited resources.

This paper will restrict its analysis to the expected rise in food inflation due to the arrival of these migrants, which can result in even lower than desired expenditure on a nutritious diet by the households—thereby compromising the future of affected children. The economic cost of stunting and wasting is estimated to be seven percent of annual per capita income (Galasso and Wagstaff, 2018). As a large part of this cost is related to deficiencies in diets, this paper estimates the possible linkage between prices of a

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[6] Global Alliance for Improved Nutrition. (n.d.) Pakistan. Retrieved from
https://www.gainhealth.org/impact/countries/pakistan

[7] United Nations High Commissioner for Refugees. (2016). After decades in Pakistan, more Afghan refugees set to return. Retrieved fromhttps://www.unhcr.org/news/latest/%202016/6/576bd0a84/decades-pakistan-afghan-refugees-set-return.htm

[8] Rana, S. (2021, July 18). Hosting 700k Afghans will cost $2.2 b for 3 years. *The Express Tribune*. Retrieved from https://tribune.com.pk/story/2311234/hosting-700k-afghans-will-cost-22-b-for-3-years

nutritious diet and actual versus needed per capita expenditures on nutritious diets in a business-as-usual case and then with the arrival of refugees.

1.1 Purpose of the Study

The main purpose of this study is to estimate the gap between food intake based on required food-based dietary guidelines (FBDGs) and actual consumption. We study the gap for Pakistan for two of its provinces – Khyber Pakhtunkhwa (KP) and Balochistan – and within these, for all income quintiles. The focus of the study is children between 3-10 years old. The study is novel because a) it measures the gap for children who are just old enough to require a varied diet rather than adolescents; b) it also estimates the gap at the sub-national level across income quintiles; and c) it is based on the most recent available household survey. The household survey does not explicitly report consumption according to age groups. This is one of the limitations that is addressed in detail under the section 3.1.

The major objective of this study is to understand the impact of food prices on the potential to consume a nutritious diet for all five income quintiles. Further, we introduce shocks to compute the impact of a possible refugee influx from Afghanistan in the provinces of Balochistan and KP. A negative shock would be an inflow of refugees leading to higher demand for food—causing an upward spiral in food prices. On the flip side, a positive but less likely shock in the near term would be the repatriation of existing refugees back to Afghanistan should the security and political situation stabilize, thereby generating economic opportunities and reduced food demand—causing a downward shock in food prices. As majority of refugees are expected to settle in KP and Balochistan, only these two provinces are the focus of this paper.

FBDGs encompass nutritious food items with the objective of promoting healthy diets for children, adolescents, and adults. This study can be helpful for policymaking as it estimates the diversion from recommended intake and computes the effect of a future refugee influx on the diet of the local population. The results of the study can support strategies to eliminate the existing gap in expenditure on nutritious diets using various policy interventions. Furthermore, the research is also supportive of policy directions on refugee intake as it affects food security due to higher demand and increased food prices.

2. Literature Review

The literature on the cost of a nutritious diet is still at a nascent stage but is not entirely new. There is an extensive use of linear programming (LP) models to estimate the cost of a diet that provides the most nutrition at least cost, which goes as far back as

1945 when it was proposed by George Stigler (Stigler, 1945). It has been further presented as a better measure of poverty compared to the conventional World Bank poverty line (Allen, 2017). Moreover, LP analyses have been used to investigate the effect of food inflation on a least-cost diet in various countries alone, as well as relative to actual expenditures (O'Brien-Place and Tomek, 1983; Håkansson, 2015; Omiat and Shively, 2017; Jensen and Miller, 2010; Maillot et al., 2017). In a similar vein, comparisons between countries have also been studied (Chastre et al., 2007).

The emerging literature often makes use of linear programming software to calculate the least-cost diet. The "Cost of the Diet" (or CoD) created by Save the Children computes the least costly dietary combination of locally available food meeting average energy requirements and recommended ingestion of micronutrients, protein, and fat for one or more persons (Deptford et al., 2017). The software also can model the impact of food and nutrition-based interventions. Another similar linear programming software is Optifood, which goes one step ahead in that its computation of nutritious diet is directed at a given population segment (Food and Nutrition Technical Assistance, n.d.).

According to Dizon et al. (2019), one obvious drawback of these approaches is the need for specific data that may not be easily available. The calculation of the cost of the recommended diet (CoRD) on the other hand is straightforward and can be computed based on available food price data. Moreover, while CoD estimates are based on securing important minerals and vitamins, CoRD incorporates food-based dietary guidelines (FBDGs) that aim to strengthen general health rather than meeting selected nutrients. In this regard, Masters et al. (2018) developed a least-cost dietary diversity index based on the food groupings used in the minimum dietary diversity for women (MDD-W) indicator[9]. Mulik and Haynes-Maslow (2017) utilize the US Department of Agriculture's (USDA's) MyPlate dietary standards to estimate the cost of diet for various population groups in the US.

Recent work by Dizon et al. (2019) uses FBDGs to calculate the CoRD in four South Asian countries, where CoRD is matched against actual expenditures using a simple methodology rather than more complex linear programming. Extending their analysis, this paper focuses on Pakistan and the implications on the estimated CoRD in the light of the potential refugee influx following the takeover of Afghanistan by the Taliban on the diet of 3-10 years old

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[9] Masters, W., Bai, Y., Herforth, A., Sarpong, D. B., Mishili, F., Kinabo, J., & Coates, J. C. (2018). Measuring the Affordability of Nutritious Diets in Africa: Price Indexes for Diet Diversity and the Cost of Nutrient Adequacy. *American Journal of Agricultural Economics*, *100*(5), 1285-1301

As of 2018, nearly 37 percent of the population in Pakistan was food insecure (Government of Pakistan and UNICEF, 2018). The rate of stunting and wasting of children under the age of five years stood at 40.2 percent and 17.7 percent respectively. Also, 28.9 percent of children under five are underweight and 9.5 percent are overweight. Pakistan ranks 88th out of 107 countries in the 2020 Global Hunger Index and its score of 24.6 is categorized as "serious"[10], with the score just short of being in the "alarming" category (Global Hunger Index, 2020). Being a net food importer with a population of 221 million to feed, the influx of refugees would put a further strain on food security in Pakistan (BR Research, 2021).

The Soviet invasion of Afghanistan in December 1979 spurred the movement of Afghans to other countries as refugees (Lapping et al., 2002). Since then, there has been a constant flow of refugees to Pakistan due to the persistent political instability in Afghanistan, with the cumulative number of Afghan migrants to Pakistan reaching nearly 3.3 million in 1989 (Grare and Maley, 2011). This number corresponded to more than 3 percent of Pakistan's population at that point, and, during 1980-2002, the Afghan asylum seekers in Pakistan formed the largest refugee group in the world.

Pakistan currently hosts 1.6 million registered Afghan refugees of which 58 percent are located in KP, while Balochistan holds 23 percent– the two provinces where they have traditionally been concentrated (UNHCR, 2021). As such, this paper looks at the impact of the inflow of Afghan refugees on the CoRD in these provinces. As mentioned before, the influx of refugees following the Taliban takeover of Afghanistan is likely to further squeeze food availability and accessibility for the local population, driving up the CoRD. This could operate through the channel where increased demand drives up local food prices (Baloch et al., 2018; Chambers, 1986).There exists some evidence on the impact of refugees' influx on food inflation. Akgündüz et al. (2015) examine the effect of Syrian refugees in Turkey following the Syrian crisis in 2013. The study estimates that an incursion of Syrian refugees equal to one percent of the Turkish population would result in a food price hike of 2.2 percent.

Enghoff et al. (2010) also reported a decline in food prices with added refugee camps in Kenya. These anomalous results however were driven by the re-selling of the World Food Program (WFP) food rations; registration of some locals as refugees to claim

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[10] Countries with a score lesser or equal than 9.9 are categorized as having "low" level of hunger whereas countries with a score of greater than or equal to 50 are categorized to have "extremely alarming" hunger level.

rations; and smuggling low-cost food items from Somalia which translated into USD 10 million per annum savings for Kenyan consumers.

In summary, refugees' influx in various countries is found to be associated with changes in food prices. These effects depend upon the similarity between diets of locals and refugees, integration of markets, whether the refugees source their food from markets or direct food transfers and the extent to which aid is available. Empirically, the upward pressure on prices is due to the increased demand for food, mainly the staple items consumed equally by both the local population and refugees. A possible future exodus of Afghans to Pakistan without significant food aid may result in a similar price hike for food items in the markets of KP and Balochistan (where Afghan refugees mainly settled after the Soviet invasion). This is more likely to be true for items such as wheat and dairy products as these are staples for both Afghans and Pakistanis residing in KP and Balochistan

2.1 Present Refugee Situation in Pakistan

Following recent political developments in Afghanistan, there has been concern for a possible refugee influx, but which has so far remained under control because of fencing of the Pakistan-Afghanistan border and effective Border Management arrangements in Pakistan, which implemented the Government's strategy that keeps refugees in border camps (Amparado et al., 2021). The government's stance on the Afghan situation is categorical: Pakistan is not in a state to welcome further refugees (Furqan, 2021). Nevertheless, as the inexperienced Taliban government runs into economic difficulty, the exodus of refugees could accelerate. According to UNHCR, 500,000 more Afghan refugees were likely to flee to bordering countries by the end of 2021 (Dawn, 2021). While the movement of Afghan refugees in Pakistan seems controlled at present, it may only be a matter of time before an additional population has to be hosted.

3. Methodology

This study applies a two-step methodology. The first part of the paper develops estimates of the gap between actual and required expenditures, where the latter is the cost of a nutritious diet (CoRD). These gaps are calculated for different household quintiles in KP and Balochistan. The second approach makes use of price and income elasticities drawn from recent work using the Quadratic Almost Ideal Demand system (QUAIDs). Details are given below.

3.1 Calculating the Gap between Actual and Required Household Expenditures for a Nutritious Diet

First, we calculate the minimum cost of meeting food-based dietary guidelines (FBDGs) using the Household Integrated Economic Survey (HIES) 2018-19 for Pakistan, from which we developed a basket of items that reflect the FBDGs published by the Pakistan Ministry of Planning, Development & Reforms and the Food and Agriculture Organization (2018).

To estimate the prices of food items, two approaches are commonly used. First, the monthly CPI index can be used to extract prices at the city or national level, while a second method estimates prices using a ratio of per capita monthly expenditure and quantities consumed of each food item found in HIES. We used the second method as it is largely followed in the literature of CoRD and incorporates actual market prices paid by different consumers (Dizon et al., 2019). A further advantage of using HIES data is that it reports consumption and expenditure across all income quintiles instead of using aggregated data. Deaton (1988) states that an advantage of using survey data for prices is that it incorporates household variation influenced by the demographic characteristics such as age, male/female ratio in a household, income quintiles, seasonal effects, quality of products, and others.

This study classified the nutrition basket into the following groups:

a) Milk and milk products, b) cereals, c) vegetables, d) fruits and e) meat and pulses.

These account for between 40 and 50 percent of household expenditures in the different provincial and income groups, but they represent those commodities that most likely to face greater competition and increased prices with an Afghan influx. Each food group initially contains all commodities specified by the FBDGs except those which are not reported in the HIES. Then, we calculate the least cost of a healthy and nutritious diet for children based on the FBDG for children aged 3-10 years, using the lowest cost item in the group.

The purpose of selecting age group 3-10 is that it is the most important age group for nourishment that determines the stunting and wasting of children in the future. Although the first 3 years of a child life are also important for nutrition, however, their diet plan does not include any other item other than milk. In this way, the most important group is 3-10 years that also has to consume market items in their daily intake and are thus affected by the prices.

We implicitly assume that households pick the least expensive item within each food group and so pursue a type of cost minimization. The food items selected for each group are those for which we were able to compute prices based on data availability in HIES. For instance, bananas are the lowest cost item in our fruit basket—however, it is possible that another fruit is cheaper, but we could not use it, as the HIES does not report per capita consumption and expenditure for all commodities. The final commodities, with the lowest costs per serving, selected to represent each group are a) fresh milk, b) wheat, c) onions, d) bananas and e) chicken.

Thus, a major difference between our research and prior work is that we do not take an average cost but rather estimate the diet based on the lowest cost items (Mulik and Haynes-Maslow, 2017). Dizon et al (2019) used the average of two lowest cost items in each category for households at the provincial level, and then estimated a median value across households to calculate CoRD for Pakistan as a whole. They chose more than one low-cost item as FBDG recommends diversity within food groups.

Instead, we use the lowest-cost option and estimate the provincial gaps separately rather than using a median value of provinces to arrive at a national estimate. We have only taken one least-cost commodity as our focus is the affordability of the nutritious diet. Further, to the best of our knowledge, this is the only study in Pakistan that estimates the least-cost at the quintile level using a diet appropriate for 3- to 10-year-old children.

The next step is to estimate the difference between actual per capita expenditure on the food items found in the nutritious diet and the CoRD, in other words 'the gap'. This gap is compared at the sub-national level, specifically for rural and urban KP and Balochistan compared to Urban Punjab. Urban Punjab is the most prosperous region of the country and can be taken as a baseline.[11]

3.2 Simulations of the Nutrition Effects from Changing Prices

With selected price elasticities computed by Haider and Zaidi (2017), who used the Quadratic Almost Ideal Demand System (QUAIDS), we estimate the change in quantity demanded when consumers face changing prices. The estimates contain both own and cross-price elasticities of various food products at the provincial level for Pakistan, including those that are in the FBDGs. The basic QUAIDS model provides estimates of a system of demand equations, where the dependent variables are quantities expressed as budget shares. These equations determine the effects of a full set of prices for the

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[11] As per the Punjab Growth Strategy 2023 report, the per capita income of Punjab in 2017-18 was two percent higher than the national average, i.e., USD 1673

food items within the system, along with total expenditures, on the allocation of budget shares to those items. A set of standard theoretical restrictions of homogeneity, adding up, and symmetry are imposed on the estimation.

We use these calculated unconditional elasticities, along with varying levels of price changes of commodities affected by an influx of Afghan refugees to find the effects on nutrition in 3- to 10-year-old Pakistani children. The process can be seen in the following equation, which shows how we translate price shocks into changes in quantities consumed and thus to the impact on nutrition. The effect on a quantity consumed of food item i, is expressed as

$$\partial Q_i = \varepsilon_{ii}\partial P_i + \sum_{j \neq i} \varepsilon_{ij}\,\partial P_j + \varepsilon_{iy}\partial Y_h \ \ldots\ldots(i)$$

Eq (i) refers to the QUAIDs model used to estimate the elasticities of food items. Where ∂Q_i is the percentage change in quantity consumed for the ith commodity, ε_{ii} is the own price elasticity and ∂P_i is the percentage change assumed for the ith price. Additionally, the Q_i is affected by changes in prices of the other commodities in the system via cross price elasticities (ε_{ij}) and changes in the other prices (P_j). The last term in the equation describes effects of changes in income of the relevant households, translated through the expenditure elasticity (ε_{iy}). Most of our analysis focuses on the price effects but we make occasional reference to possible income changes from a greater influx of Afghan refugees, and so we include this term in the above equation.

There are several important assumptions in this approach. The elasticities used are for the overall household and there may be differences in responses for 3- to 10-year-olds. There may be either less sensitivity to prices for younger children, as mothers worry about their health, or they could be a "residual claimant" on food, with more variable consumption and perhaps more sensitivity to prices. Also, the elasticities are the same for both Baluchistan and KP. Finally, the changes in prices are assumed to be real changes and do not include the normal inflation rate in the country.

It is also pertinent to note that influx of refugees is expected to be greater in Balochistan compared to KP. This is because the Pak-Afghan border in the KP province is now almost completely fenced and any illegal arrival is not possible,[12] whereas the Pak-Afghan border fence in Balochistan is still not completely finished and about

[12] Yousaf, M. (2021, August 04). Pakistan army completes 90% of fence along Afghan border. *AP News*. Retrieved from https://apnews.com/article/pakistan-bd8165697772792b69d65c8509633cd9

20,000 Afghans are entering Pakistan from the Chaman border daily.13 Currently, Government of Pakistan is only allowing Afghans who are coming for medical treatment or who possess a valid refugee identity—still this number is three times the daily average of pre-Taliban takeover era.14

The predicted number of total refugees' influx in Pakistan is based on government estimates, whereas the number of refugees expected to settle in KP is based on the current distribution of Afghan refugees across provinces (see Annex A).

3.3 Assessing Outcomes for 3–10-year-old Children

There are two explicit limitations in this study. First, the HIES survey only reports per capita expenditure on food items by household, but they not disaggregated into gender and age groups. The actual expenditure on children aged 3-10 years old in the study is thus likely to be overstated and the gap vis-à-vis CoRD understated because children are likely to be consuming less than adults on average.

Table 1: Differences in Dietary Guidelines for Children and Adults as per FBDGs

Items	Number of servings per day for 3-10 years old	Number of servings per day for 19-60 years old
Milk and Dairy	2-3	2-3
Cereal grains & Grains products	3-5	4-5
Vegetables	1-2	2-3
Fruits	1-2	2-3
Meat, pulses& eggs	3-4	2-3

Source: Based Dietary Guidelines (2019), Planning Commission of Pakistan

In KP and Balochistan, approximately 25 and 28 percent of the population is between the ages of 3-10 years respectively. Out of this, 58 percent of the children in Balochistan and 52 percent in KP are male. It is also important to mention that the dietary guidelines of children aged 3-10 are not much different than that of adolescents and adults (Table 1). If we compare the minimum dietary requirements of adults and children as per Pakistan's FBDGs, the daily servings of milk and dairy and cereals remains the same. However, there is increase of one serving per day in fruits and vegetables for adults along with a decrease of one serving per day in meat and pulses. This shows that dietary requirements of adults and children in a typical Pakistani

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[13] Baloch, S.M. & Ellis-Petersen, H. (2021, August 27). 'Unprecedented' numbers crossing from Afghanistan to Pakistan. *The Guardian*. Retrieved from
https://www.theguardian.com/world/2021/aug/27/unprecedented-numbers-crossing-afghanistan-pakistan
[14] Ibid

household are quite the same. Hence, the assumption that per capita expenditure on each commodity would approximately be same on children as well as on adults may be quite true.

The estimation also does not consider gender dynamics. For instance, Argaw (2020) found a high gender inequality in dietary diversity in Ethiopia, which in turn depends upon where the food is sourced from – the market or home produced.15 The gender inequality was found to be higher in case of market sourced food. We assume that the per capita expenditure on food items reported by household is same across all age groups and gender, including 3 to 10-year-olds. However, as proportion of boys is relatively higher in Balochistan, some gender inequality might exist in the household diet.

Second, we do not know what the magnitude of the increased population on individual food items could be. At the moment, we assume that there would be a 1:2 impact of refugees' influx on food prices, based on Akgündüz et al. (2015) estimates for Turkey. Thus, a 10 percent increase in population would result in food prices increasing by 20 percent. These effects will also not be uniform but will vary according to the extent of market integration with the wider economy. Thus, the prices of wheat, which tend to be nationally tied together, will increase less than for milk, which may be more likely to see locally separated markets.

4. Results

The study results are presented in three subsections, with the first providing a context on current expenditures for important food items. Secondly, comparisons between the CoRD and current expenditures are presented, with the gap between those two measures as the main investigation. Next, we present simulations of price shocks on nutritional outcomes using price elasticities from the QUAIDs model. Lastly, we discuss the market integration and price variability across provinces.

4.1 Current Expenditure Proportions, Prices, and Per Capita Income Differentials

Figure 1 presents the daily expenditures made on relevant food groups in the lowest and highest quintiles in each region. We see that overall, wheat and milk account for most expenditures among Quintile 1 households, usually accounting for 33 to 37 percent of the total food expenditures. Vegetables, meat, and fruits together are no more than

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[15] The same may hold true for Pakistan which ranks 153 out 156 in Gender Parity Index published by the World Economic Forum (2021).

five percent of the total expenditure for these households. Balochistan quintile 1 households consume less milk proportionally and more chicken than do the other poor households included in the figure. While in quintile 5, families also spent considerable amount on meat consumption (chicken in this case).

The comparisons between Quintile 1 and 5 in these regions provide a perspective on how increased family income affects the consumption of CoRD food products. First, wheat on average accounts for an expenditure of PKR 9.03 in Quintile 1 (about 16 percent of the total food expenditure in that Quintile), and PKR 10.18 for households in Quintile 5 but that is 9.9 percent of their total food expenditures. Similarly, we can see that when moving from Quintile 1 to Quintile 5, there is a clear diminishing proportion of wheat with a rising one for milk—implying better dietary diversity as income increases.

This analysis shows that the households in KP and Balochistan are spending much of their food expenditure on wheat and milk and less on fruits, vegetables, and meat. This is not surprising given that wheat meets more than fifty percent of the caloric requirement for the poor in Pakistan[16]. This is also related to the food culture and preferences in these provinces, where meat along with bread (chapatis) are preferred meals. Also, in terms of daily serving requirements, wheat is the cheapest amongst all lowest cost items included in CoRD to meet caloric requirements—thus the price effect cannot be ignored.

As seen in Figure 1, households in quintile 1 are deriving much of their caloric requirement from wheat. As per Pakistan's FBDGs, children aged 3-10 years old are required to consume 1365 calories per day. This can be called a mid-point as 3 years old require 1000 calories per day while 10 years should consume 1800 calories a day. Thus, FBDGs prepared the CoRD based on mid-point calorie requirement. Out of the 1350 required calories, wheat has a share of 400 calories. Further, the average cost per calorie of wheat for quintile 1 households is PKR 0.017 and 0.018 for quintile 5 households, cheapest across all food groups, while milk is the most expensive with PKR 0.12 and PKR 0.14 cost per calorie for quintile 1 and 5 respectively. This is followed by chicken at 0.060 and 0.062 for quintiles 1 and 5. Thus, cost can be a major reason for the poorest households having a large intake of wheat in their daily diet. However, households in quintile 5 have a more balanced diet, with higher proportions of milk and

[16] Malik, S. J., Nazli, H. L., & Whitney, E. (2014, December). Food consumption patterns and implications for poverty reduction in Pakistan. *30th AGM & Conference of Pakistan Society of Development Economists*. Paper submitted to the 30th AGM & Conference of Pakistan Society of Development Economists, Islamabad, Pakistan.

chicken—yet much lower than the recommended intake and are still higher than FBDG requirements for wheat. For the ease of understanding, we have not included households from quintile 2 to 4 in this graph as there is a linear increase with every quintile.

Figure 1: CoRD vs Actual Daily Expenditure on Least Cost Items
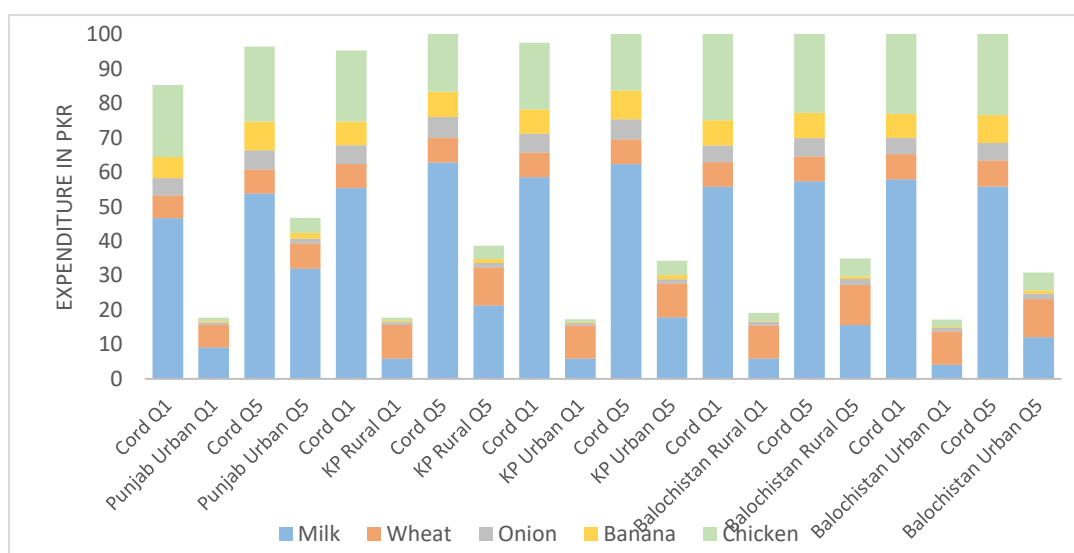
Source: Authors' own estimations

However, we do dig deeper into them in the later analysis. The importance of cereals also holds true the diet of Afghan children. More than 70 percent of Afghan children under the age of 5 were reported to consume cereals (72.9 percent) and fats (70.6 percent) as per the 2013 National Nutrition Survey of Afghanistan (Government of Afghanistan, 2013). Dairy and sugar also feature prominently in their diet, consumed by 67.1 and 61.7 percent of children under the age of 5 respectively. The proportion of children who consume tubers, fruits, and pulses and nuts was estimated to be 48.9, 41.5, and 27.3 percent respectively. Around 30 percent children under the age of 5 consumed meat, fish, and eggs. This shows that similar to Pakistan, Afghan children diet also comprises mainly of cereals and milk, however, we are unable to find any data on the per capita consumption of these items by Afghan children.

The diet of Afghans generally is comprised of halal meat, bread, rice, dairy produce, eggs, onions, peas, beans, tomatoes, dried fruit, and nuts (Khakpor et al., 2019). As per the Afghanistan Living Conditions Survey 2016-17, poor Afghans very rarely consume meat, eggs, dairy and dairy products, so their diet consists mainly of cereals, oil and sugar. Rich Afghans consume meat, eggs, and pulses two days per week, and dairy

products for about 5 days a week, but they eat vegetables only 3 times a week. Moreover, according to Dizon et al. (2019), about 35 percent of Afghan households' total food expenditure is for wheat, 23 percent is protein and 11.7 percent is for dairy and oils. Although it varies by income quintile, this is similar to the KP and Balochistan diet in terms of preferences, where wheat takes about 17 percent and dairy has a 15 percent share in the total food expenditures on average across both provinces.

4.2 Disaggregated CoRD Estimates for Balochistan and KP

The results of the estimated CoRD and the actual daily per capita expenditure on the nutritious diet food groups are shown in Table 2. We see that, overall, the CoRD increases with income quintile, which shows that prices vary by households belonging to the different income quintiles, as the associated quantities are fixed for all households. This could be because low-income households generally purchase groceries from Kiryana stores (small grocery kiosks) or street vendors, whereas richer households tend to purchase from supermarkets. Thus, the cost of the CoRD differs across income groups and is captured in our estimation. In the presence of such variation, the use of survey data is a better measure than CPI.

It might be expected that the overall proportions spent on key food items in the CoRD would differ significantly across rural and urban areas, but Figure 3 suggests they do not. Part of the reason is that the per capita incomes in the different regions of a province do not differ much in most quintiles. As per the HIES 2018-19, the following monthly per capita incomes of all quintiles in urban and rural regions show no major differences in levels between rural and urban households in Quintiles 1 to 4 (Table 2). However, a significant jump occurs in Quintile 5, where average per capita income in urban households exceeded that in rural ones by nearly one quarter, which probably shows up in the much larger proportion of expenditures on readymade food in urban areas. However, this is partly because these foods are less available in rural areas.

Table 2: Quintile-Wise Per Capita Monthly Incomes

|	Urban	Rural
Quintile 1	2,865	2,838
Quintile 2	3,903	4,167
Quintile 3	5,051	5,106
Quintile 4	6,717	6,904
Quintile 5	15,537	12,478

Source: HIES 2018-19

The CoRD as percentage of monthly income is inversely proportional to the quintile, as expected. As seen in Figure 2, the CoRD for Quintile 1 is highest for children aged

3-10 years in the Balochistan Urban region, where on average, a household would have to spend 107 percent of per capita monthly income to provide the CoRD food items for their child. The CoRD for Quintile 5 is found to be highest in KPK Rural, i.e., at PKR 105.6 per capita per day. This translates into only 25 percent of total per capita monthly income for that quintile (see Figure 3). In other words, an individual falling in Quintile 1 from Balochistan and KP (both Urban and Rural) will have to spend around 100 percent of their monthly income only to cover the expense of a recommended diet for a child alone (Figure 2).

Almost all regions have a similar situation when moving from quintile 1 to quintile 5—the proportion of income required for maintaining CoRD decreases with the increase in income. These declines are largest as households move from quintile 1 to 2, or from quintile 4 to 5. So, households in quintile 1 are in significantly worse shape than quintile 2. Punjab urban households in quintile 5 spend 19 percent less of their per capita income than those in quintile 4, an increment that is similar in urban areas of Balochistan and KP.

Figure 2: CoRD as a Percentage of Per Capita Income
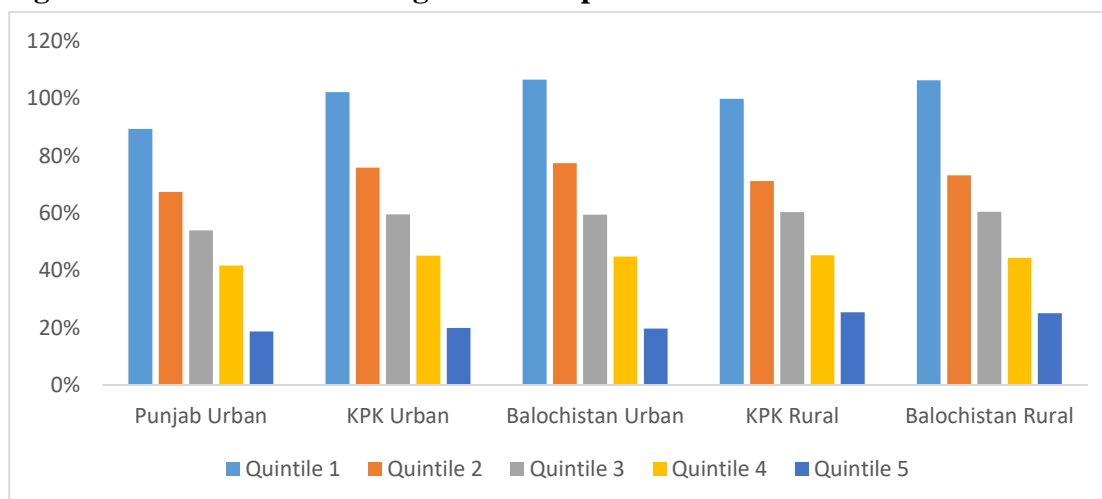
Source: Authors' own estimations

These results can also be interpreted as measuring the state of competition in various provinces, and in urban versus rural areas. The CoRD is lower for Punjab Urban for all quintiles, implying lower food prices there —likely because that province is the country's supply center for many staple foods, as well as due to higher connectivity between farms and urban areas It is logical that in Balochistan, with many rural areas being very remote, prices are higher, while in Punjab, extensive farm to market linkages

have developed and there are likely competitive food markets throughout the province. Similarly, prices are higher in rural areas in Balochistan and KP as food commodities from Punjab and Sindh are transported to those areas, incurring added costs that are reflected in the market prices. For instance, poultry farms are generally located across urban peripheries and thus, rural areas face higher poultry prices due to transportation costs.

Similarly, households in Quintile 5 face higher prices because the quality of their consumed products might be superior. Although, it cannot be validated from the given data, it is likely that individuals with higher incomes purchase better quality products, which in turn increases the cost of their recommended diet.

Given the low purchasing power and higher prices, Quintile 1 households in Balochistan Rural are only spending 21 percent of the expenditure needed to reach a nutritious diet. If they consume the recommended diet, they will have very little left to cover other expenses such as the child's education, health, clothing, and others.

Further, we calculate the actual expenditure as a percentage of CoRD across regions, where differences among groups is driven by price and/or income differentials. As seen in Figure 3, the expenditure as a percentage of CoRD is highest in Quintile 5, Punjab Urban, at 48 percent. However, the expenditure is still 52 percent lower than the required amount needed to reach the CoRD (Figure 3). Similarly, we found that under-consumption is highest in Balochistan Urban and KP Urban, i.e., both spend only 17 and 18 percent respectively of the recommended CoRD, equivalent to a 30-percentage point gap between these regions and the baseline (Punjab Urban quintile 5). This shows that Balochistan and KP are lagging significantly behind the baseline—even as baseline is not an ideal scenario. Moreover, quintile 1 households in Balochistan Rural and KP Rural are spending 19 of the required expenditure. The slightly better consumption in rural areas could be attributed to home-grown staples, and hence lesser vulnerability to market price. However, even quintile 5 households in KPK and Balochistan are spending between 30 to 37 percent of the recommended diet—much lower than required for healthy growth of children.   These findings show that there is little divergence between regions in each quintile, and a dire situation exists for all in Quintile 1 households.

Figure 3: Actual Expenditure Per Capita as Percentage of CoRD
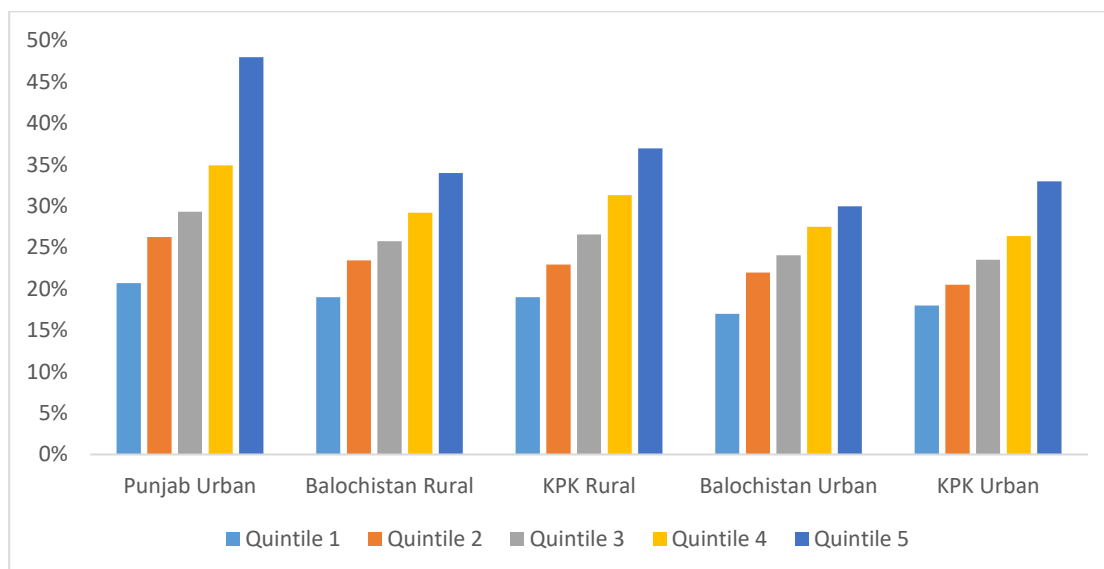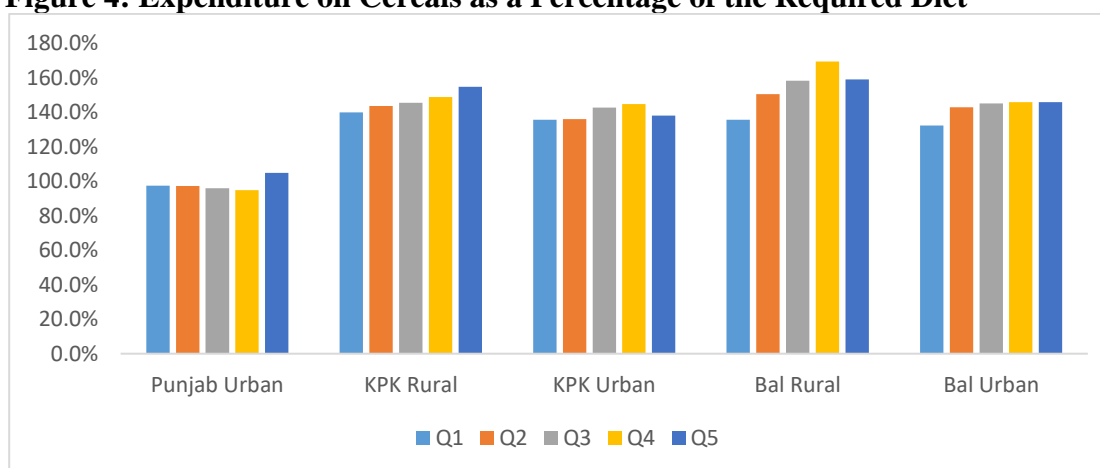
Source: Authors' own estimations

The findings suggest that households belonging to Quintiles 1-3 are all in poor shape, as their expenditure per capita on children aged 3 to 10 years accounts for between 21 and 36 percent of CoRD respectively, regardless of geography. In Quintiles 4 and 5, however, region appears affect the divergence in nutritious consumption. For instance, in Quintile 4, both Balochistan and KP lag Punjab Urban, which is even more obvious for Quintile 5. The high disparity between the expenditure of households in Quintile 5 relative to other quintiles in Punjab urban could be a reflection of wealth concentration in Lahore. Overall, none of the households are spending the desired amount on the nutritious diet recommended by the FBDGs, and thus most children between the ages of 3-10 years are consuming less than a nutritious diet, likely leading to development challenges. Because of the extremely high proportion of per capita income covered in the CORD, behavioral decisions that lower consumption for 3–10-year-olds will likely have even higher proportional impacts on such children with rising prices due to the influx of refugees

Expenditures on Specific Commodities: Figures 4 and 5 show the expenditures on specific food groups as a percentage of the recommended diet for children aged 3-10 years. The figures show obvious heterogeneity across food groups, reflecting consumption preferences and costs per calorie for the Pakistani population (children aged 3-10 years) as a whole, as well as across regions and income groups. First, we analyze the expenditure on cereals, which has the highest share in consumption

expenditure for Quintile 1 across regions in our data (Figure 4). (Only milk has a greater expenditure proportion for Quintile 5 households. See Figure 5). Wheat, which is the national staple, was found to be the lowest cost item among cereals and hence features prominently in the consumption pattern described below.

The highest consumption of cereals in Quintile 1 is in KP rural, i.e., at about 140 percent of the recommended daily intake, followed by KP Urban and Balochistan Rural, each consuming 135 percent of the recommended cereal intake. Punjab Urban is spending relatively lesser on cereals (wheat) as a percentage of the required diet, but still consuming three percent less than the required diet. This shows that there is overconsumption of cereals by almost 30 to 40 percent in the poorest households. Cereals are the only category in the nutrition basket in which Balochistan and KP are consuming at or over the required intake. If households in KP and Balochistan follow the pattern set by Punjab Urban ones, they will reduce their expenditures on cereals by forty percent or more as income grows to Punjab levels

**Figure 4: Expenditure on Cereals as a Percentage of the Required Diet**

Source: Authors' own estimations

However, moving back to CoRD, the lower consumption of cereals by children aged 3-10 years in Quintile 5 households, relative to Quintile 1, can be explained by significant substitution towards meat (i.e., chicken) or milk and dairy (see Figure 5). For instance, chicken consumption of Punjab in Quintile 1 is 05 percent of the required expenditure, compared with 20 percent in Quintile 5. The corresponding figures for milk consumption are 20 percent for Quintile 1, compared to 60 percent for Quintile 5 in Punjab. This pattern also is evident in the earlier Figure 1, where the proportions of expenditures on wheat and milk vary clearly across the two locations.

Overall, the gradual increase in the consumption of these food groups can be seen across regions as we move from Quintile 1 to Quintile 5, with the highest jump from Quintile 4 to Quintile 5, particularly in the case of meat and fruits. All of the graphs show positive relationships between dietary diversity and income across all regions.

Figure 5: Expenditure as a Percentage of Required Diet- Other than Cereals
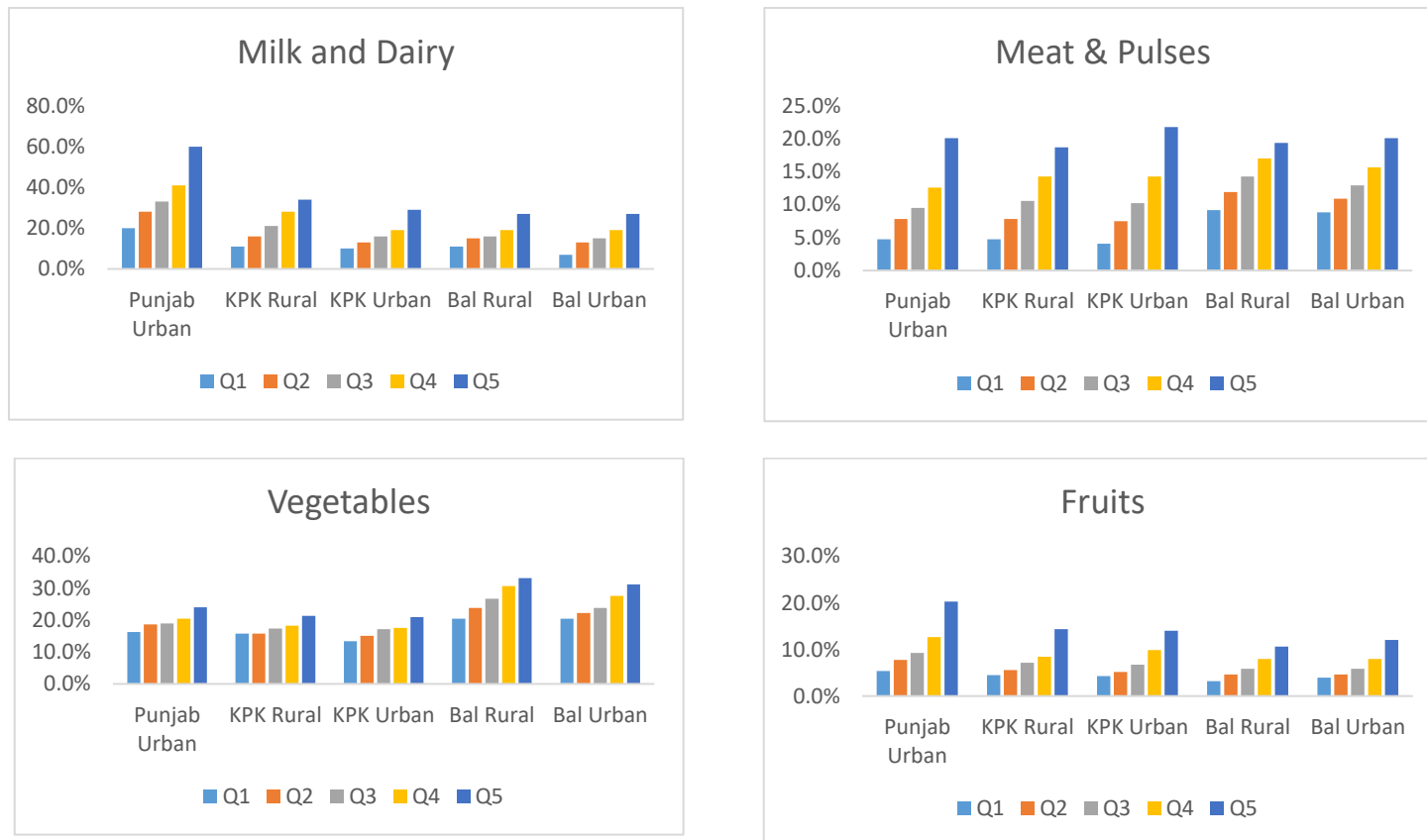
One common pattern across regions in Quintile 1 is that no region spends more than 21 percent of the amounts needed for a nutritious diet in any food group. This highlights the overconsumption of cereals and relatively significant underconsumption of other important food groups – which can be explained by their low-income and dependence on cereals for calorie adequacy. The analysis shows great variation in consumption among food groups – for instance vegetables (i.e., for which onions had the least cost) are consumed the most across regions on average, whereas fruits (i.e., bananas) are consumed the least.

Moreover, within regions, Punjab Urban leads in the consumption of milk and dairy, and fruits, while Balochistan urban is consuming more vegetables, and meat and pulses than Punjab and KP. KP lags Punjab Urban across all food groups except meat and pulses, with the deficiency highest in milk and dairy, i.e., by about nine percentage points.

The highest dispersion among regions across food groups is found in milk and dairy, where on average other regions are consuming 30 percentage points less than Punjab urban.

4.3 Scenario Analysis: Post-Refugees Influx

In this section, we provide estimates for three different scenarios of Afghan refugee influx into Pakistan. The scenario analysis is based on the refugees' influx anticipated by the government, with a fifty percent deviation. The Government of Pakistan is anticipating 700,000 new Afghan refugees by the first quarter of 2022.[17] Nevertheless, given border controls and lack of a clear policy at present regarding accepting further refugees, the actual number may be less than the anticipated number. On the other hand, however, the difficult political and economic situation in Afghanistan in the future may result in lax policy and greater humanitarian effort, leading to a higher than anticipated influx of refugees. Thus, we have also estimated a conservative (350,000) and liberal (1,050,000) figure of refugees' influx (scenarios 2 and 3).

Table 2 breaks down dietary expenditure estimates for KP based on region and income groups for all three scenarios. The table shows estimates for pre and post refugees' influx, where the post-influx results are the expenditures on a nutritious diet by the local population following an increase in food prices from increased demand.

[17] Rana, S. (2021, July 18). Hosting 700k Afghans will cost \$2.2 b for 3 years. *The Express Tribune*. Retrieved from https://tribune.com.pk/story/2311234/hosting-700k-afghans-will-cost-22-b-for-3-years

The results show the law of demand at work, in that an increase in general price level results in a decrease in quantity demanded, and hence expenditure across food items. As expected, a higher number of refugees creates a lower expenditure on a nutritious diet. In scenario 1, we introduced a shock of 700,000 refugees which results in a 2.07 percent increase in prices across food items (see Annex A). The corresponding percentage increase in prices for scenario 2 and 3 is 1.04 and 3.11 percent respectively.

As shown in Table 3, we found that the impact of the arrival of refugees on dietary expenditure of local children aged 3-10 increases with the income of the household. However, the gap increase remains under one percentage point – which translates to just PKR 9 per capita per month on average – under scenario 1. In all scenarios, a common finding is that rural households face a higher impact of increased food prices and the biggest increase in gap is seen in Q5 rural households i.e., 3.28 percent. However, shortages are likely to be perceived as more pressing among the lower quintiles, leading to higher more deficiencies in the 3–10-year-old' diets.

Overall, if the number of refugees remains under 700,000, the adverse impact on existing dietary expenditure, even for children aged 3-10, would not be high. However, if the number of refugees exceeds one million, then the adverse impact on children's nutritious diet could be relatively higher.

As a fiscal response to the increase in food prices, government can opt for various interventions. These could include providing subsidies on staple items, decreasing income or indirect taxes, and/or increasing purchasing power through transfer payments. Pakistan has already run a successful Ehsaas Cash Disbursement program during the first wave of COVID-19 in the second quarter of 2020. However, depending upon the own and cross price elasticities and income elasticities, each intervention for a particular commodity will give different results.

Table 3: Impact of Refugee Influx on Existing Dietary Expenditures of Children aged 3-10 years in KP

Scenarios	Income Group	Change in Existing Dietary Gap Rural (pp)	Change in Existing Dietary Gap Urban (pp)
Scenario 1- 700,000 Refugees	Q1	0.74	0.70
	Q2	0.96	0.83
	Q3	1.17	0.99
	Q4	1.47	1.15
	Q5	1.99	1.6
Scenario 2- 350,000 Refugees	Q1	0.30	0.29
	Q2	0.39	0.34

	Q3	0.48	0.41
	Q4	0.61	0.47
	Q5	0.77	0.66
Scenario 3- 1,050,000 Refugees	Q1	1.30	1.22
	Q2	-1.68	1.46
	Q3	2.05	1.74
	Q4	2.59	2.03
	Q5	3.28	2.81

Source: Authors' own estimations

Note: Gap refers to the difference between CoRD and actual expenditure by the households and is estimated in terms of change in percentage points (pp)

With the help of available price and income elasticities, our simulations found that a subsidy of more than seven percent in wheat could in fact increase the gap in dietary expenditures.[18] This could be explained by the fact that the existing consumption of wheat is already one and a half times higher than the recommended diet across all income groups and regions. Therefore, lowering the price of wheat can be counter-productive and could eventually increase the gap. On the flip side, providing a similar subsidy to other commodities may result in a decrease in the expenditure gap, something that is desirable. For example, we found that the highest decrease in the gap would be when a subsidy is provided to fresh milk. A seven percent subsidy could nearly eliminate the increase in gap caused by the increased food prices post-influx.

Lastly, the price changes that are developed for our analyses are generally similar across all commodities, as we use estimates reflecting overall price effects from rising immigration. However, it could be that if markets are not well integrated, prices could vary more than the average in our simulations for selected commodities. To assess this possibility, in Figure 7 we show that prices of chicken and milk vary considerably across households in the different regions, both for the Quintile 1 and 5 households. In contrast, markets for wheat, onion, and banana, are relatively well integrated and the prices only vary by small amounts regardless of where households are located. This implies that the shocks and the difference in consumption expenditures across regions are not mainly due to prices but rather to income and preferences. Even in the case of chicken, where price variation is high, the quantities consumed are so low with respect to the recommended diet that these differences are not likely due to price differences. The

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[18] The seven percent subsidy number is derived from the Government of Pakistan's plan to provide a subsidy equal to PKR 2.5 per kg, or about seven percent of the market price of wheat per kg. See: Rana, S. (2021, September 14). PM okays lifting of 32% flour subsidy. *The Express Tribune*. Retrieved from https://tribune.com.pk/story/2320136/pm-okays-lifting-of-32-flour-subsidy

main commodity where local markets might have distinctly different price behavior is milk where the percentage variation around the households means in HIES is high.

Figure 7: Price Differentials across Commodities for Quintile 1 and 5 Households
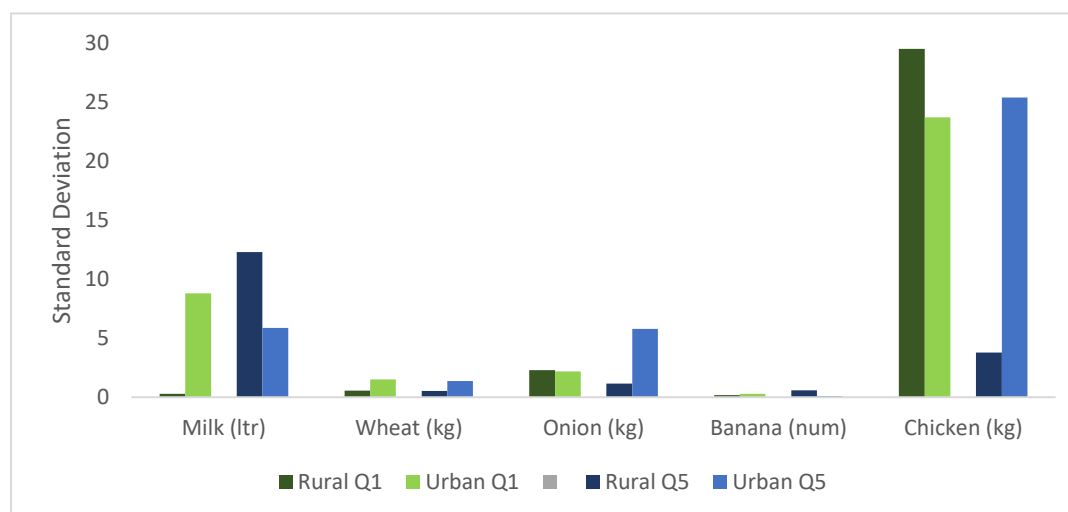
Source: Authors' own estimations

5. Conclusion and Policy Implications

This paper highlighted the existing malnutrition of children between the ages of 3-10 years at the subnational level for Pakistan. We estimated the least cost for a recommended nutritious diet using the HIES 2018-19 data. The results suggest a significantly larger gap in the actual expenditures on a nutritious diet in the provinces of KP and Balochistan when compared to the relatively prosperous region of Urban Punjab. We also found that the expenditures are significantly higher in cereals but drastically lower in fruits and vegetables. Overall, the results suggest that CoRD is very high relative to the per capita income of Quintile 1; however, even children in households from higher quintiles are consuming on average under 40 percent of the recommended diet in the provinces of KP and Balochistan. Moreover, the percentage impact of refugee influx on dietary expenditures of children in KP is expected to be higher for Quintile 5 households in the rural regions while almost insignificant for households in lower quintiles in both rural and urban areas. However, as indicated earlier, if children 3-10 years of age have less priority in household food allocation, they are likely to be more at risk in the lower quintiles, where the challenges of meeting a nutritious diet are even higher.

In expectation of the arrival of Afghan refugees in Pakistan, WFP has prepared a six-month contingency plan to provide support to the refugees and their host

population[19]. To finance the plan, the WFP has sought funding of USD 23.2 million, but only USD 2.1 million had been secured as of September 2021. However, even if wheat is donated to all of the refugees, other dietary products such as meat, milk, fruits and vegetables are to be purchased by the market at the market prices. This would put pressure on the prices due to increased demand even in the presence of international food transfers.

In terms of policy implications, the first and foremost policy should be to improve the existing dietary diversity of children, especially for the marginalized households falling in Quintile 1. There is a significant overconsumption of wheat by more than 1.5 times, resulting in significant underconsumption of other necessary items such as milk, fruits, and vegetables.

There could be three possible policy interventions to balance out this asymmetry in consumption: (a) cash transfers to Quintile 1 households; (b) providing direct food transfers with the help of international donors; or (c) subsidizing dietary items for all households.

If (a) is adopted, the income elasticity of various food items for KP indicates that households are likely to spend more on poultry, beef, eggs, and milk than on wheat. For example, given the existing income elasticities of KP Rural, a 10 percent increase in income may result in 10 percent increase in poultry, 9.3 percent in milk and 14 percent in fruits compared with just 3.6 percent in wheat. The same is true for KP Urban households. This implies that any further increase in income through cash transfers, such as the Ehsaas Program, may lead towards balancing of the diet. Refugees are not eligible for the Ehsaas program but receive aid from international donors from time to time.

In case of (b), there exists evidence of similar interventions in the past. The local population has historically benefitted from food related aid, such as direct food transfers, cash transfers to purchase food, and through food-for-work programs from international donors. For instance, following drought conditions in the last few years, the WFP made a provision of 4,200 metric tons of food and cash transfers worth USD 88,000 to nearly 315,000 people in Pakistan in August 2019 alone, which went to vulnerable groups in Sindh and Balochistan and supported internally displaced people in KP.[20]

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[19] WFP. (2021). WFP Pakistan country brief. Retrieved from
https://reliefweb.int/sites/reliefweb.int/files/resources/WFP-0000132944.pdf

[20] USAID. (2019). Pakistan – Complex emergency and drought. Retrieved from

Additionally, almost 401,000 vulnerable individuals impacted by the harsh winter in Azad Jammu and Kashmir (AJK) and Balochistan were provided direct food transfers by WFP from February to June 2020.[21] More recently, food transfers were provided to 6,870 households including flood affectees in the Lower Kohistan district of KP and to the poor families suffering from malnourishment in Upper Dir and Khyber districts.[22]

On the other hand, an across-the-board commodity-specific subsidy will benefit both poor and rich households as it is difficult to exclude the rich from availing food subsidies until and unless the government initiates a food stamp program—something that would require a greater administrative cost. Governments in Pakistan have been providing a wheat subsidy to rural and urban households for many years and even in 2021, the government provided PKR 14.3 per kg subsidy on wheat to urban households.[23] As wheat remains one of the most highly regulated crops in Pakistan, administering the subsidy on it is relatively easy. However, any further provision of a subsidy on wheat may lead to a more imbalanced diet, whereas, a same subsidy on milk and poultry could partially offset the existing imbalance in dietary intake of children.

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[21] USAID. (2020). Food assistance factsheet: Pakistan. Retrieved from https://www.usaid.gov/sites/default/files/documents/1866/FFP_Pakistan_Fact_Sheet.pdf

[22] WFP. (2021). WFP Pakistan country brief. Retrieved from https://reliefweb.int/sites/reliefweb.int/files/resources/WFP-0000132944.pdf

[23] Rana, S. (2021, September 14). PM okays lifting of 32% flour subsidy. *The Express Tribune*. Retrieved from https://tribune.com.pk/story/2320136/pm-okays-lifting-of-32-flour-subsidy

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Annex A: Estimation of Refugees' Scenario

Scenario 1		
Total Expected Refugee Influx	**700,000**	
	Bal	KP
Refugees	159,600	406,700
Existing population	14,083,862	39,272,000
Population after Refugees	14,243,462	39,678,700
% increase in Population	1.13%	1.04%
Impact on inflation	2.3%	2.07%
Scenario 2		
Total Expected Refugee Influx	**350,000**	
	Bal	KP
Refugees	79,800	203,350
Existing population	14,083,862	39,272,000
Population after Refugees	14,163,662	39,475,350
% increase in Population	0.57%	0.52%
Impact on inflation	1.1%	1.04%
Scenario 3		
Total Expected Refugee Influx	**1,050,000**	
	Bal	KP
Refugees	239,400	610,050
Existing population	14,083,862	39,272,000
Population after Refugees	14,323,262	39,882,050
% increase in Population	1.70%	1.55%
Impact on inflation	3.4%	3.11%